GRANT STREET APARTMENTS

287 E. 17th Avenue
Denver, CO 80203

Owner: AMFP VI Grant LLC
Architect: Meeks + Partners (M+P)

Issue Name: Issued For Permit
Issue Date: October 18, 2024
M+P Project No. 22035

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These specifications contain the Architectural Design criteria.

Landscape Architecture specifications are included on the Landscape Architect’s plans.

Structural specifications are included on the Structural Engineer’s plans.

Civil specifications are included on the Civil Engineer’s plans.

MEP specifications are included on the MEP Engineer’s plans.

Interior Design specifications are included on the Interior Designer’s plans.

SECTION 00 01 07.13

SEALS PAGE - ARCHITECT

A. Architect:

1. **Meeks + Partners**

2. State of Colorado License Number: 306106

3. Responsible for Divisions 01-14 and Division 31 Sections except where indicated as prepared by other design professionals of record.

ARCHITECTURAL SEAL:

10/18/2024

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SECTION 00 10 00

SPECIFICATION REVISION INDEX

1.1 REVISION INDEX

A. Issue for Permit:

1. Date of Submittal: 10/18/2024

END OF SECTION

SECTION 00 10 00

SPECIFICATION REVISION INDEX

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SECTION 02 32 00

GEOTECHNICAL INVESTIGATION

1.1 GEOTECHNICAL DATA

A. Because subsurface conditions indicated by the soil borings are a sampling in relation to the entire construction area, and for other reasons, the Owner, the Architect, the Architect's consultants, and the firm reporting the subsurface conditions do not warranty the conditions below the depths of the borings or that the strata logged from the borings are necessarily typical of the entire site. Any party using the information described in the soil borings and geotechnical report shall accept full responsibility for its use.

B. A geotechnical investigation report for the Project, prepared by Ninyo & Moore, dated June 29, 2022, is attached.

1. The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Architect is not responsible for interpretations or conclusions drawn from the data.

END OF SECTION

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Geotechnical Evaluation
1717 Grant Development
1717 Grant Street
Denver, Colorado

Abacus Capital Group
999 18th Street, Suite 925N | Denver, Colorado 80202

June 29, 2022 | Project No. 502427001

Geotechnical | Environmental | Construction Inspection & Testing | Forensic Engineering & Expert Witness

Geophysics | Engineering Geology | Laboratory Testing | Industrial Hygiene | Occupational Safety | Air Quality | GIS

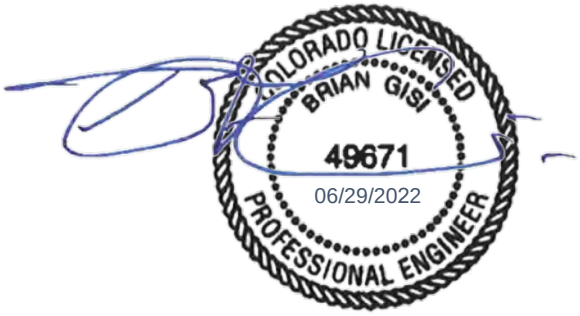
Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

Geotechnical Evaluation
Proposed Multi-Family Development
1717 Grant Street
Denver, Colorado

Mr. Evan Austin
Abacus Capital Group
999 18th Street, Suite 925N | Denver, Colorado 80202

June 29, 2022 | Project No. 502427001



Andrew Lee, EI
Staff Engineer

Brian F. Gisi, PE
Principal Engineer

ACL/BFG/lm

Distribution: (1) Addressee (via e-mail)

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1 INTRODUCTION

In accordance with your request and authorization, we have performed a geotechnical evaluation for the proposed 1717 Grant development located from 1717 to 1775 North Grant Street in Denver, Colorado. The approximate location of the site is depicted on Figure 1.

The purpose of our study was to evaluate the subsurface conditions and to provide design and construction recommendations regarding geotechnical aspects of the proposed project. This report presents the findings of our subsurface exploration, results of our laboratory testing, conclusions regarding the subsurface conditions at the site, and geotechnical recommendations for design and construction of this project.

2 SCOPE OF SERVICES

The scope of our services for the project generally included:

- Review of referenced background information, including aerial photographs, published geologic and soil maps, previous geotechnical evaluations, in-house geotechnical data, and available topographical information pertaining to the project site and vicinity.
- Site reconnaissance to mark out the boring location.
- Drilling, logging, and sampling of seven small-diameter exploratory boring within the project site to depths of approximately 30 to 92.2 feet below the ground surface (bgs). The boring logs are presented in Appendix A. The approximate boring location is presented on Figure 2.
- Performance of laboratory tests on selected samples obtained from the borings to evaluate engineering properties including in-situ moisture content and dry density, Atterberg limits, percent materials passing the No. 200 sieve and grain size analysis, swell/consolidation potential, direct sheer, and soil corrosivity characteristics (including pH, resistivity, water soluble sulfates and chlorides). The results of the laboratory testing are presented on the boring logs and in Appendix B.
- Compilation and analysis of the data obtained.
- Preparation of this report presenting our findings, conclusions, and geotechnical recommendations regarding design and construction of the project.

3 SITE DESCRIPTION AND BACKGROUND REVIEW

The project site consists of an approximately 1.65-acre parcel of land located from 1717 to 1775 Grant Street in Denver, Colorado. The project site is currently occupied with a park at 1775 Grant street, and a one-story commercial building (Wells Fargo Bank), multiple drive-thru bank tellers, and the associated infrastructure and pavement at 1717 Grant Street. These existing structures

will be demolished prior to construction. The approximate location of the site is depicted on Figure 1.

4 PROPOSED CONSTRUCTION

Based on the information provided by you, we understand the project may involve the construction of a seven-story residential building. The building will be five-stories of wood frame residential units over two levels of above-grade parking. All levels will be above-ground, however, proposed improvements such as elevator pits and water-quality vaults will extend several feet below the ground surface. The actual depth of these improvements is not known at this time

5 FIELD EXPLORATION AND LABORATORY TESTING

On May 17 through 19, 2022, Ninyo & Moore conducted a subsurface exploration at the site to evaluate the existing subsurface conditions and to collect soil samples for laboratory testing. The evaluation consisted of the drilling, logging, and sampling of seven small-diameter borings. Seven borings were completed using a truck-mounted drill rig equipped with 4-inch solid-stem augers to depths of approximately 29.9 to 31.4 feet bgs. Boring B-3 was completed using a truck-mounted drill rig equipped with 4.25-inch hollow-stem augers to a depth of approximately 92.2 feet bgs. The sampling methods used during the subsurface evaluation are presented in Appendix A.

Soil samples collected during the subsurface exploration were transported to the Ninyo & Moore laboratory for geotechnical laboratory analyses. Selected samples were analyzed to evaluate engineering properties including in-situ moisture content and dry density, Atterberg limits, percent materials passing the No. 200 sieve and grain size analysis, swell/consolidation potential, direct shear and soil corrosivity characteristics (including pH, resistivity, water soluble sulfates and chlorides). The results of the in-situ moisture content and dry density tests are presented on the boring logs in Appendix A. Descriptions of the laboratory test methods and the remainder of the test results are presented in Appendix B.

6 GEOLOGY AND SUBSURFACE CONDITIONS

6.1 Geologic Setting

The site is located in Denver, Colorado, approximately 14 miles east of the Rocky Mountains, within the Colorado Piedmont section of the Great Plains Physiographic Province. The Laramide Orogeny uplifted the Rocky Mountains during the late Cretaceous and early Tertiary Periods. Subsequent erosion deposited sediments east of the Rocky Mountains, including the Denver

Formation in the area. As a result of regional uplift approximately 5 to 10 million years ago, streams down-cut and excavated into the Great Plains forming the Colorado Piedmont section (Trimble, 1980). Surficial geology of the site is mapped by Shroba (1980) as upper Holocene-age Eolian sands consisting of silty, very fine to very coarse sand. Undifferentiated alluvium consisting of post-Piney Creek alluvium and Piney Creek alluvium is mapped underlying the alluvium. Denver Formation is mapped underlying the project site at depth.

6.2 Subsurface Conditions

Our understanding of the subsurface conditions at the project site is based on our field exploration and laboratory testing, review of published geologic maps, historic aerial photographs, and our experience with the general geology of the area. The following sections provide a generalized description of the subsurface materials encountered during our subsurface exploration. More detailed descriptions are presented on the boring log in Appendix A.

6.2.1 Fill Materials

Fill materials were encountered in the borings and extended to depths of approximately 1.5 to 9.5 feet bgs. The fill encountered in the northern park area generally consisted of various shades of brown and gray, moist, sandy lean clay with gravel. The undocumented fill material encountered in the bank area generally consisted of brown, gray, yellow and orange, moist sand with varying amounts of clay.

Based on the results of the laboratory testing, selected samples of the fill material had in-place moisture contents between approximately 7.9 and 10.4 percent and in-place dry densities between approximately 104.4 and 124.7 pounds per cubic foot (pcf).

6.2.2 Overbufden Deposits

Eolian and alluvial overburden deposits were encountered beneath the fill materials in the borings and extended to a depth of approximately 92 feet bgs in Boring B-3 and termination depths in the remaining boring. The overburden generally consisted of different shades of brown, yellow, and gray, moist, loose to dense, sand with varying amounts of silt, clay, gravel, and cobbles and occasional lenses of sandy lean clay.

Based on the results of the laboratory testing, selected samples of the alluvium had in-place moisture contents between approximately 1.8 and 10.4 percent and a dry density between approximately 108.2 and 120.7 pounds per cubic foot (pcf).

6.2.3 Denver Formation

Bedrock mapped as the Denver Formation was encountered in Boring B-3 beneath the alluvium at a depth of approximately 92 feet bgs and extended to the boring's termination depth of approximately 92.2 feet bgs. The Denver Formation generally consisted of blueish gray, moist, very hard, claystone.

Based on the results of the laboratory testing, a selected sample of the Denver Formation bedrock had an in-place moisture content of approximately 16.2 percent and an in-place dry density of approximately 118.7 pcf.

6.3 Groundwater

An attempt to measure groundwater was performed during drilling operations. At that time, groundwater was encountered in Boring B-3 at a depth of approximately 74.5 feet bgs. Groundwater was not encountered in the remaining borings during drilling operations.

Groundwater levels will fluctuate due to seasonal variations in the amount of rainfall, runoff, water level of the nearby rivers and tributaries, groundwater withdrawal from adjacent sites, and other factors. In addition, perched water can develop within the fill materials and/or within the higher permeability overburden deposits following periods of heavy or prolonged precipitation. Based on our groundwater observations, groundwater is not anticipated to be a constraint during the life of the structure.

7 GEOLOGIC HAZARDS

The following sections describe potential geologic hazards at the site including faulting and seismicity, expansive soils, compressible/collapsible soils, and liquefaction potential.

7.1 Faulting and Seismicity

Historically, several minor earthquakes have been recorded around the Denver area. Based on our field observations and our review of readily available published geological maps and literature, there are no known active faults underlying or adjacent to the subject site. The faults closest to the project site include the Rocky Mountain Arsenal Fault and the Golden Fault.

The Rocky Mountain Arsenal Fault lies approximately 10 miles northeast of the site (Kirkham and Rogers, 1981). This fault is approximately 15 miles in length, trends generally northwest to southeast, and is considered to be a right lateral strike-slip fault. The most recent significant seismic movements associated with the Rocky Mountain Arsenal Fault occurred in the 1960's,

with recorded earthquake magnitudes up to 5.5. United States Geological Survey (USGS) investigators concluded that a strong correlation existed between the seismic activity of this fault and pressure injection of liquid waste into a disposal well located at the nearby Rocky Mountain Arsenal. Pressure injection in the disposal well was discontinued in 1966 and minor seismic movements along the fault have been recorded since. The risk of this fault giving rise to damaging, earthquake-induced ground motions at the site during the design life of the proposed structure is considered to be relatively low, based on the previously recorded low seismic magnitude.

The Golden Fault lies approximately 12.5 miles west of the site (USGS, 2018). The fault is considered to be late Quaternary in age and has not shown displacement in Holocene time, as Pleistocene deposits overlie the fault (approximately 75 to 125 thousand years before the present [Kirkham, 1977]). Therefore, the probability of damage at the site from seismically induced ground surface rupture from this fault is considered to be low.

Design of the proposed improvements should be performed in accordance with the requirements of the governing jurisdictions and applicable building codes. Table 1 presents the seismic design parameters for the site in accordance with the 2018 IBC guidelines and adjusted maximum considered earthquake spectral response acceleration parameters evaluated using the OSHPD (OSHPD, 2022) ground motion calculator (web-based).

Table 1 – 2018 International Building Code Seismic Design Criteria

Seismic Design Factors	Value
Site Class	D
Site Coefficient, F_a	1.6
Site Coefficient, F_v	2.4
Mapped Spectral Acceleration at 0.2-second Period, S_S	0.211 g
Mapped Spectral Acceleration at 1.0-second Period, S_1	0.058 g
Spectral Acceleration at 0.2-second Period Adjusted for Site Class, S_{MS}	0.338 g
Spectral Acceleration at 1.0-second Period Adjusted for Site Class, S_{M1}	0.139 g
Design Spectral Response Acceleration at 0.2-second Period, S_{DS}	0.225 g
Design Spectral Response Acceleration at 1.0-second Period, S_{D1}	0.093 g

7.2 Expansive Soils

One of the more significant geologic hazards in the Front Range area is the presence of swelling clays in bedrock or surficial deposits. Wetting and drying of bedrock or surficial deposits containing

swelling clays can result in expansion and collapse of those units, which can cause major damage to structures. A review of a Colorado Geological Survey map delineating areas based on their relative potential for swelling in the Denver area by Hart (1973-1974) indicates that the soil and bedrock materials in the site vicinity typically exhibit low to moderate swell potential.

Based on our review of the reported subsurface conditions, the eolian deposits underlying the fill material that are expected to be encountered across the site are not anticipated to create a design hazard in terms of potentially swelling soils.

7.3 Compressible/Collapsible Soils

Compressible soils are generally comprised of soils that undergo consolidation when exposed to new loadings, such as fill or foundation loads. Soil collapse (or hydrocollapse) is a phenomenon where soils undergo a significant decrease in volume upon an increase in moisture content, with or without an increase in external loads. Buildings, structures, and other improvements may be subject to excessive settlement-related distress when compressible soils or collapsible soils are present.

Based on our subsurface exploration, the on-site soils generally exhibit low collapse potential. However, compression (settlement) of the undocumented fill materials could occur as a result of new floor slab loading. Removal and recompaction of the undocumented fill or support of floor slabs on intermediate foundation systems is recommended.

8 CONCLUSIONS

Based on the results of the subsurface evaluation, laboratory testing, and data analyses, it is our opinion that the proposed project is feasible from a geotechnical standpoint, provided the recommendations presented herein are implemented and appropriate construction practices are followed. Geotechnical design and construction considerations for the proposed project include the following:

- Fill materials were encountered at the surface and extended to depths of 1.5 to 9.5 feet bgs. The fill encountered in the northern park area generally consisted of sandy lean clay. The fill material encountered in the bank area generally consisted of sand with varying amounts of clay. The fill is considered undocumented and should be removed, moisture-conditioned, and recompacted as engineered fill for floor slab support.

- It should be noted that undocumented fill materials that contain organic material and/or inert construction debris (regardless of particle size) may not be approved by City and County of Denver (CCOD) Public Works Department for trench backfill associated with publicly-owned utilities.

- Eolian (wind-blown material) deposits were encountered underlying the undocumented fill and extended to depths of approximately 24 to 31.5 feet bgs. The alluvium generally consisted of brown, orange, and yellow, moist, loose, sand with varying amounts of clay.

- Overburden eolian and alluvial deposits were beneath the undocumented fill and extended to a depth of approximately 92 feet bgs in Boring B-3 and termination depths in remaining boring. The overburden generally consisted of sand with varying amounts of silt, clay, gravel, and cobbles and occasional lenses of sandy lean clay.

- Bedrock mapped as the Denver Formation was encountered in B-3 beneath the alluvium at a depth of approximately 92 feet bgs and extended to the boring's termination depth of approximately 92.2 feet bgs. The Denver Formation generally consisted of blueish gray, moist, very hard, claystone.

- Groundwater was encountered in B-3 while drilling at a depth of 74.5 feet bgs. Groundwater was not encountered in the remaining borings. Groundwater should not be a constraint to this development. Perched groundwater may still be encountered within the fill material and along the interface of the fill and eolian deposits.

- Based on the subsurface and groundwater conditions encountered, it is our opinion the proposed building may be supported on conventional spread footing foundations. The installation of intermediate foundation systems (e.g. stone columns or Geopier Impact system) below spread footings will be needed to increase the bearing capacity of the site soils and reduce total and differential settlements.

- The on-site soils should generally be excavatable to the anticipated removal depths with medium- to heavy-duty earthmoving or excavating equipment in good operating condition.

- Site soils generated from on-site excavation activities consisting of undocumented fill and alluvium that are free of deleterious materials, and do not contain particles larger than 3 inches in diameter, can generally be used as engineered fill during site grading provided, they are moisture-conditioned and compacted as recommended in this report. Environmental factors that may restrict the re-use of the undocumented fill material were not studied in this report.

- Based on our laboratory data and our experience with similar materials at adjacent sites, the sulfate content of the tested soils presents a negligible risk of sulfate attack to concrete. We recommend the use of Type I/II cement for construction of concrete structures at this site.

- Based on our laboratory data and our experience with similar materials at adjacent sites, the subgrade soils at the site have a moderately high potential for corrosivity to ferrous metals. Special consideration should be given to the use of heavy gauge, corrosion-protected, underground steel pipe or culverts, if any are planned. As an alternative, plastic pipe or reinforced concrete pipe could be considered. A corrosion specialist should be consulted for further recommendations.

9 GEOTECHNICAL CONSIDERATIONS AND DISCUSSION

The Eolian overburden deposits encountered during the subsurface exploration exhibited low to moderate blow counts and extended to depths of approximately 24 to 31.5 feet bgs. To reduce building settlements and increase the bearing capacity, the building can be supported on conventional spread footings bearing on an intermediate ground improvement system (i.e. stone columns or the Geopier Impact system). If it is desired to leave the undocumented fill in-place, additional ground improvement elements can be installed for floor slab support.

A Geopier® reinforced subgrade may be a viable option and may potentially provide an economic benefit to this project. The Geopier Impact system is designed to reinforce soils, including the loose to medium dense sands encountered at this site. The Impact system is installed using a displacement mandrel. This process allows for installation of the Geopier elements with no spoils and eliminates the need for casing. Installation depths of approximately 30 to 40 feet are possible with this system.

Based on our understanding of this specialized ground improvement system, we anticipate that the site soils could be strengthened to provide a substantially increased allowable bearing pressure (estimated at approximately 6,000 to 8,000 psf) while reducing total and differential settlement by providing uniform support conditions directly beneath the footings.

Geopier soil reinforcement solutions are delivered by the design build organization, Geopier Foundation Company, or their local design partner, Ground Improvement Engineering. Detailed design and feasibility information for this project should be provided by them. We will work with them to provide the soil information needed for the design of this system. The specific foundation design recommendations and ultimate design responsibility for this solution will be on Geopier Foundation Company and Ground Improvement Engineering.

We recommend contacting a specialty foundation design/construction company such as Geopier Foundation Company to obtain detailed design, feasibility, and cost information for the items outlined above.

10 RECOMMENDATIONS

Based on our understanding of the project, the following sections present our geotechnical recommendations for design and construction of the proposed building and other site improvements.

Ninyo & Moore should be allowed to evaluate the anticipated site grading and construction plans to provide further recommendations prior to bidding the project for construction. In addition, settlement of shallow spread footings should be confirmed once structural loads are known. Depending on structural loads, modifications to the recommendations provided herein may be needed.

10.1 Demolition

The subject project will include demolition of existing building foundations, pavements, and other site improvements. Although not encountered during our subsurface exploration, considering the historic past-uses of the site, there may be buried concrete remnants, areas of deeper fills, tanks, or other features present below the ground surface. Remnants from the demolition activities should be removed from the site. Demolition of the existing improvements should include rerouting, removal, or in-place abandonment of underground utilities. Utilities should be adequately capped or rerouted at the project perimeter at the time of demolition in accordance with the requirements of the governing authorities and the recommendations of the geotechnical consultant. Abandoned underground utility pipes under proposed building limits should be removed from the site, or, if the pipes are left in place, they should be filled with flowable fill, such as grout or controlled low strength material (CLSM). The contractor should take adequate precautions when grading the site to reduce the potential for damage to existing utilities that are to remain in service.

10.2 Earthwork

The following sections provide our earthwork recommendations for this project. In general, the CCOD and/or project specific earthwork specifications are expected to apply, unless noted.

10.2.1 Remedial Grading

Considering the in-fill nature of the site and its historic past-uses, there may be buried concrete remnants, areas of deeper fills, tanks, or other features present below the ground surface. As previously mentioned, the undocumented fill materials that contain debris and organic material will not be suitable for re-use as engineered fill without sorting of the unsuitable materials.

The undocumented fill materials would provide a risk to the owner of floor slab settlement and resultant distress. As a result, removal, moisture-conditioning, and recompaction of these materials below the building is recommended. As an alternative, additional intermediate

ground improvement elements could be installed below the floor slab and the floor slab could bear on these elements while leaving the undocumented fill in-place as-is.

Exterior flatwork and exterior pavements should be placed on 12 or more inches of compacted engineered fill.

The exposed subgrade materials should be dense or firm and unyielding prior to fill placement. The extent of and depths of removal should be evaluated by our representative during the excavation work based on observation of the soils exposed.

Additional recommendations specific to the site conditions encountered may be provided at the time of construction. The project budget should include additional cost associated with the removal and replacement of additional fill material and stabilization of additional subgrade materials.

10.2.2 Excavations

Our evaluation of the excavation characteristics of the on-site materials is based on the results of our subsurface exploration, our site observations, and our experience with similar materials. The on-site surface and near surface soils may generally be excavated with medium- to heavy-duty earthmoving or excavation equipment in good operating condition.

Equipment and procedures that do not cause significant disturbance to the excavation bottoms should be used. Excavators and backhoes with buckets having large claws to loosen the soil should be avoided when excavating the bottom 6 to 12 inches of excavations as such equipment may disturb the excavation bases.

The eolian deposits are generally sands with varying amounts of clay. These soils may loosen under the action of light equipment and foot traffic. Where encountered, stabilization may be needed to support construction equipment. If the subgrade becomes disturbed, it should be compacted or removed and replaced before placing additional backfill material.

Groundwater should not be a constraint to this development. Perched groundwater may still be encountered within the fill material and along the interface of the fill and eolian deposits.

In areas where the excavation bottom is disturbed under the action of excavation equipment traffic, construction of a 12 or more inches thick “mud-mat” using coarse angular material (i.e. 4-inch minus crushed rock) may be needed to establish a stable platform for operating the excavation equipment during construction.

10.2.3 Temporary Excavations and Shoring

The near-surface earth materials encountered in the exploratory borings are comprised predominantly of sands with varying amounts of clay, silt, gravel, and debris. In our opinion, temporary slopes in the near-surface fill and eolian soils should be stable at a slope ratio of approximately 1.5:1 (horizontal[H]:vertical[V]). Some surficial sloughing may occur and temporary slopes should be evaluated in the field by a competent person in accordance with Occupational Safety & Health Administration (OSHA) guidelines. The near-surface site soils should be considered to be Type C soils as evaluated by OSHA. Temporary excavations should conform with OSHA regulations.

The contractor should provide safely sloped excavations or an adequately constructed and braced shoring system, in compliance with OSHA regulations, for employees working in excavations that may expose them to the danger of moving ground. Reducing the inclination of the sidewalls of the excavations, where feasible, may increase the stability of the excavations. If construction or earth material is stored, or equipment is operated near an excavation, flatter slope geometry or shoring should be used during construction.

10.2.4 Re-Use of Site Soils

Site soils generated from on-site excavation activities of fill and eolian deposits that are free of deleterious materials and organic matter, and do not contain particles larger than 3 inches in diameter, can generally be used as engineered fill.

Fragments of rock, cobbles, and inert construction debris (e.g., concrete or asphalt) larger than 3 inches in diameter may be incorporated into the project fills in non-structural areas and below the anticipated utility installation depths. A Geotechnical Engineer should be consulted regarding appropriate recommendations for usage of such materials on a case-by-case basis when such materials have been observed during earthwork. Care should be taken to avoid nesting of oversized materials during placement. Recommendations provided in Section 203 of the current the Colorado Department of Transportation (CDOT) Standard Specifications for Road and Bridge Construction should be followed during the placement of oversized material.

Undocumented fill materials that contain organic material and/or inert construction debris (regardless of particle size) may not be approved by CCOD Public Works Department for trench backfill associated with publicly-owned utilities.

Additional evaluation and laboratory testing should be performed during earthwork activities to better evaluate the suitability of the on-site soils for re-use as engineered fill at this site. An evaluation of the potential for contamination by hazardous materials was beyond the scope of this study and the possibility of restrictions on re-use due to environmental factors was not studied.

10.2.5 Fill Placement and Compaction

Granular soils (on-site soils that classify as SC-SM, SC, SP, SP-SC, or import soils) used as engineered fill should be moisture-conditioned to moisture contents within 2 percent of optimum moisture content. Fine-grained soils (on-site soils that classify as CL) used as engineered fill should be moisture-conditioned to moisture contents between optimum moisture content and 3 percent over optimum moisture content. Engineered fill should be placed in uniform horizontal lifts. Engineered fill should be compacted to a relative compaction of 95 percent, or more, as evaluated by ASTM D698.

The engineered fill should be compacted by appropriate mechanical methods. Lift thickness for fill will be dependent upon the type of compaction equipment utilized. Backfill should be placed in lifts not exceeding 8 inches in loose thickness in areas compacted by other-than hand operated machines. Backfill should be placed in lifts not exceeding 6 inches in loose thickness in areas compacted by hand operated machines.

Fill materials should not be placed, worked, rolled while they are frozen, thawing, or during poor/inclement weather conditions.

Compaction areas should be kept separate, and no lift should be covered by another until relative compaction and moisture content within the recommended ranges are obtained.

Use of CLSM should be considered in lieu of compacted fill for areas with low tolerances for surface settlements, for excavations that extend below the groundwater table and in areas with difficult access for compaction equipment. CLSM should be placed in lifts of 5 feet or less with a 24-hour or more curing period between each lift.

10.2.6 Imported Soil

Imported soil for use as engineered fill should have less than 35 percent passing the No. 200 sieve, a very low swell potential (approximately 1 percent or less when wetted against a surcharge pressure of 200 psf), and a low plasticity index (less than 20). Imported soil should not contain organic matter, clay lumps, bedrock (claystone, sandstone, etc.) fragments,

debris, other deleterious matter, or rocks or hard chunks larger than approximately 3 inches' nominal diameter.

Imported soil for use as engineered fill should exhibit low corrosion potential. Imported soil placed in contact with ferrous materials should have a saturated soil resistivity of 2,000 ohm-cm or more and a chloride content of 25 parts per million or less. Soils in contact with concrete should exhibit a soluble sulfate content less than 0.1 percent.

We further recommend that proposed import material be evaluated by the project's geotechnical consultant at the borrow source for its suitability prior to importation to the project site.

10.2.7 Controlled Low Strength Material

Use of CLSM should be considered in lieu of compacted fill for areas with low tolerances for surface settlements and in areas with difficult access for compaction equipment. CLSM consists of a fluid, workable mixture of aggregate, Portland cement, and water. CLSM should be placed in lifts of 5 feet or less with a 24-hour or more curing period between each lift.

The use of CLSM has several advantages:

- A narrower excavation can be used where shoring is present, thereby minimizing the quantity of soil to be excavated and possibly reducing disturbance to the near-by traffic;
- Compaction requirements do not apply;
- There is less risk of damage to improvements, since little compaction is needed to place CLSM;
- CLSM can be batched to flow into irregularities in excavation bottoms and walls; and
- The number of workers needed inside the trench excavation is reduced.

The CLSM mix design should be submitted for review prior to placement. The 28-day strength of the material should be no less than 50 pounds per square inch (psi) and no more than 150 psi. CLSM should be observed and tested by the geotechnical consultant.

10.2.8 Utility Installation

The contractor should take care to achieve and maintain adequate compaction of the backfill soils around manholes, valve risers and other vertical pipeline elements where settlements commonly are observed. Use of CLSM should be considered in lieu of compacted soil backfill for areas with low tolerances for surface settlements. This would also reduce the permeability of the utility trenches.

Pipe bedding materials, placement and compaction should meet the specifications of the pipe manufacturer and applicable municipal standards. Materials proposed for use as pipe bedding should be tested for suitability prior to use.

Special care should be exercised to avoid damaging the pipe or other structures during the compaction of the backfill. In addition, the underside (or haunches) of the buried pipe should be supported on bedding material that is compacted as described above. This may need to be performed with placement by hand or small-scale compaction equipment.

Surface drainage should direct water away from utility trench alignments. Where topography, site constraints or other factors limit or preclude adequate surface drainage, the granular bedding materials should be surrounded by non-woven filter fabric (e.g., TenCate Mirafi® 140N or the equivalent) to reduce migration of fines into the bedding which can result in severe, isolated settlements.

Development of site grading plans should consider the subsurface transfer of water in utility trenches and the pipe bedding. Sandy pipe bedding materials can function as efficient conduits for re-distribution of natural and applied waters in the subsurface. Cut-off walls in utility trenches or other water-stopping measures should be implemented to reduce the rates and volumes of water transmitted along utility alignments and toward buildings, pavements and other structures where excessive wetting of the underlying soils will be damaging. Incorporation of water cut-offs and/or outlet mechanisms for saturated bedding materials into development plans could be beneficial to the project. These measures also will reduce the risk of loss of fine-grained backfill soils into the bedding material with resultant surface settlement.

10.3 Spread Footing Foundations

Perimeter footings should extend to 36 inches or more below the lowest exterior finished grade (for frost protection). Continuous wall footings should have a width of 18 inches or more and column footings should have a width of 24 inches or more. Footings should be reinforced in accordance with the recommendations of the Structural Engineer.

Footings bearing on the specialized ground improvement system will provide a substantially increased allowable bearing pressure (estimate at approximately 6,000 to 8,000 psf) while reducing total and differential settlement by providing uniform support conditions directly beneath the footings.

The bearing capacity may be increased by one-third when considering loads of short duration such as wind or seismic forces. The foundations should preferably be proportioned such that the resultant force from design loads, including lateral loads, falls within the kern (i.e., middle one-third of the footing base).

The base of foundation excavations should be free of water and loose soil prior to placing concrete. Concrete should be placed soon after subgrade compaction to reduce bearing soil disturbance. Should the soils at bearing level become excessively dry, disturbed, or saturated, the affected soil should be moisture conditioned and recompacted. It is recommended that Ninyo & Moore be retained to observe, test, and evaluate the soil foundation bearing materials.

Based on our knowledge of the ground improvement system recommended, it is our opinion total and differential settlements of foundations bearing on an intermediate ground improvement system should be on the order of about 1 inch and ½- inch, respectively.

10.4 Slab-On-Grade Floors

The design of the floor slabs (including jointing and reinforcement) is the responsibility of the Structural Engineer. Joints should be constructed at intervals designed by the Structural Engineer to help reduce random cracking of the slab. Recommendations based on structural considerations for slab thickness, jointing, and steel reinforcement should be developed by the structural engineer in accordance with American Concrete Institute (ACI) recommendations. Soils underlying the slabs should be improved in accordance with the recommendations provided in Section 10.2.1. Moisture conditioning of subgrade soils should be performed prior to slab placement.

For slab design, a design modulus of subgrade reaction (K) of 150 pci (pounds per square inch per inch of deflection) may also be used for the subgrade soils in evaluating such deflections. This value is based on a unit square foot area and can be adjusted for large slabs.

The slab should be constructed so that it “floats” independent of the foundations. The need for a moisture-retarding system should be considered by the structural engineer or architect based on the moisture sensitivity of the anticipated flooring. The placement of a vapor retarder is recommended in areas where moisture-sensitive floor coverings are anticipated.

Floor slabs should be separated from bearing walls and columns with expansion joints, which allow unrestrained vertical movement. Joints should be observed periodically, particularly during the first several years after construction. Slab movement can cause previously free-slipping joints

to bind. Measures should be taken so that slab isolation is maintained in order to reduce the likelihood of damage to walls and other interior improvements.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates that any differential movement between the walls and slabs will probably be observed in adjacent slab expansion joints or floor slab cracks that occur beyond the length of the structural dowels. The Structural Engineer should account for this potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

10.5 Earth Pressures and Foundation Walls

Earth pressures are used to compute the lateral forces acting on below-grade walls. These pressures can be classified as at-rest, active, and passive. The direction and magnitude of the soil/wall movement just before failure affects the resulting pressure condition. At-rest conditions exist when there is no movement, such as for a restrained wall. Active stresses are exerted when the wall moves out and the soil moves toward the wall away from the soil mass, thereby mobilizing the shear strength of the soil. Passive stresses exist when the wall moves toward the soil mass.

The recommended equivalent fluid pressures in Table 2 assume on-site fill and eolian with an angle of internal friction (ϕ) of 28 degrees and a unit weight of 125 pcf. The values listed below are for static conditions.

Table 2 – Lateral Earth (Equivalent Fluid) Pressures

Soil Condition	Active Pressure (pcf)	At-Rest Pressure (pcf)	Passive Pressure (pcf)
Overburden Deposits	45	66	340

The maximum passive pressure should be limited to 3,400 psf per foot for drained soil conditions. This is assuming the ground is horizontal for a distance of 10 feet or three times the height generating the passive pressure. The passive pressure values may be increased by one-third when considering loads of short duration such as wind and seismic forces. For frictional resistance to lateral loads, we recommend that an ultimate coefficient of friction of 0.35 be used between soil and concrete.

We recommend that the upper 24 inches of soil that is not protected by pavement or a concrete slab, be neglected when calculating passive resistance. The 24 inches of backfill placed in

landscaped areas should consist of clayey soils to reduce the infiltration of surface water into the backfill.

10.6 Pavement Design

We assumed the project pavements will be privately maintained. Pavement section alternatives for the paved surfaces were developed in general accordance with the guidelines and procedures of the American Association of State Highway and Transportation Officials (AASHTO), CDOT, and CCOD.

The subgrade materials underlying the project pavements should be improved to a depth of 12 inches or more in accordance with the recommendations provided in Section 10.2.1.

Specific traffic loadings for these areas were not available at the time of this report preparation. The design of rigid pavements was based on an equivalent 18-kip single axel application of 100,000 for a 20-year design life was assumed for the pavement areas. The following parameters were also utilized:

Initial Serviceability:	4.5
Terminal Serviceability:	2.0
28-Day Mean PCC Modulus Rupture:	650 psi
28-Day Mean Elastic Modulus of Slab:	3.6×10^6 psi
Mean Effective k value:	150 psi/in
Reliability:	80%
Overall Standard Deviation:	0.35
Load Transfer Coefficient:	4.2
Overall Drainage Coefficient:	1

Based on the above-mentioned design traffic and input parameters, and following the AASHTO method of pavement design, we recommend utilizing 5 or more inches of Portland cement concrete pavement (PCCP) for the proposed paved areas. We also recommend that a qualified structural or civil engineer be consulted for appropriate reinforcement of concrete pavement.

We recommend PCCP be utilized in dumpster pads, loading areas, or other areas where extensive wheel maneuvering are expected. PCCP in the areas of the dumpster pads and loading zones should be increased to 6 or more inches. The dumpster pads should be large enough to support the wheels of the truck which will bear the load of the dumpster. Consideration should be given to the placement of 6 inches or more inches of aggregate base course (ABC) below PCCP.

Although the use of ABC is not integral for structural support in PCCP pavements, their use will develop a more stable subgrade for concrete truck traffic associated with the pavement construction and help reduce potential slab curl, shrinkage cracking, and subgrade "pumping" through joints. Adequate joint spacing is recommended to prevent loss of load transfer across saw-cut crack control joints. Joints should be sealed to reduce water infiltration.

Adequate surface drainage should be provided to reduce ponding and infiltration of water into the pavement and subgrade materials. We suggest that the paved areas have a surface gradient of 2 percent or more. In addition, surface runoff from surrounding areas should be intercepted, collected, and not permitted to flow onto the pavement or infiltrate the subgrade. We recommend that perimeter swales, edge drains, curbs and gutters, or combination of these drainage devices, be constructed to reduce the adverse effects of surface water runoff.

PCCP should consist of a plant mix composed of a mixture of aggregate, Portland cement and appropriate admixtures meeting the requirements of CCOD. Concrete should have a modulus of rupture of third point loading of 650 psi or more. The concrete should be air-entrained with approximately 6 percent air and should have a cement content of six or more sacks per cubic yard. Allowable slump should be approximately 4 inches.

The ABC material placed beneath pavements should meet the criteria of CDOT Class 6 aggregate base. Requirements for CDOT Class 6 aggregate base can be found in Section 703 of the current CDOT Standards and Specifications for Road and Bridge Construction (CDOT, 2021).

The geotechnical engineer should be retained to review the proposed pavement mix designs, grading, and lift thicknesses prior to construction.

The contractor should be prepared either to dry the subgrade materials or moisten them, as needed, prior to compaction. Some site soils may pump or deflect during compaction if moisture levels are not carefully monitored. The contractor should be prepared to process and compact such soils to establish a stable platform for paving, including use of chemical stabilization or geotextiles, where needed.

The prepared subgrade should be protected from the elements prior to pavement placement. Subgrades that are exposed to the elements may need additional moisture conditioning and compaction, prior to pavement placements.

Immediately prior to paving, the subgrade should be proof-rolled with a fully loaded water truck. Areas that show excessive deflection during proof rolling should be excavated and replaced

and/or stabilized. Areas allowed to pond prior to paving may need to be re-worked prior to proof rolling.

The collection and diversion of surface drainage away from paved areas is vital to satisfactory performance of the pavements. The subsurface and surface drainage systems should be carefully designed to facilitate removal of the water from paved areas and subgrade soils. Allowing surface waters to pond on pavements will cause premature pavement deterioration. Where topography, site constraints or other factors limit or preclude adequate surface drainage, pavements should be provided with edge drains to reduce loss of subgrade support. The long-term performance of the pavement also can be improved greatly by backfilling and compaction behind curbs, gutters, and sidewalks so that ponding is not permitted and water infiltration is reduced.

10.7 Concrete Flatwork

Exterior walkways and flatwork should be 4 or more inches thick. The slab edges should be deepened by two or more inches where exterior slabs-on-grade are placed adjacent to landscaping areas and taper to the recommended thickness 12 inches inward from the edge.

Ground-supported flatwork, such as walkways, will be subject to soil-related movements resulting from heave/settlement, frost, etc. Thus, where these types of elements abut rigid building foundations or isolated/suspended structures, differential movements should be anticipated. We recommend that flexible joints be provided where such elements abut the main structure to allow for differential movement at these locations. Positive drainage should be established and maintained adjacent to flatwork. Water should not be allowed to pond on flatwork.

To reduce the potential manifestation of distress to exterior concrete flatwork due to movement of the underlying soil, we recommend that such flatwork be installed with crack-control joints at appropriate spacing as designed by the Structural Engineer.

In no case should exterior flatwork extend under any portion of the buildings where there is less than 2 inches of clearance between the flatwork and any element of the building. Exterior flatwork in contact with brick, rock facades, or any other element of the building can cause damage to the structure if the flatwork experiences movements.

10.8 Corrosion Considerations

The corrosion potential of on-site soils to concrete and buried metal was evaluated in the laboratory using selected samples obtained from the exploratory borings. Laboratory testing was performed to assess the effects of sulfate on concrete and the effects of soil resistivity on buried

metal. Results of these tests are presented in Appendix B. Recommendations regarding concrete to be utilized in construction of proposed improvements and for buried metal pipes are provided in the following sections.

10.8.1 Concrete

The test for water-soluble sulfate content of the soils was performed using CDOT Test Method CP-L 2104. The laboratory test results are presented in Appendix B. The percentage of water-soluble sulfates in water ranged from 0.001 to .007 percent, and approximately 13 to 68 parts per million. Based on Table 601-2 of the CDOT 2021 Standard Specifications for Road and Bridge Construction, the on-site soils represent a Class 0 severity of sulfate exposure to concrete on a scale that ranges between Class 0 and Class 3. Therefore, we recommend that the concrete used for this project should have a maximum water to cementitious material ratio of 0.45 and the cementitious materials should meet one of the below outlined requirements.

- ASTM C 150 Type I, II or V
- ASTM C 595 Type IP, IP(MS) or IP(HS)
- ASTM C 1157 Type GU, MS or HS
- ASTM C 150 Type III cement if it is allowed, as in Class E concrete

The Structural Engineer should ultimately select the concrete design strength based on the project specific loading conditions. However, higher strength concrete may be selected for increased durability, resistance to slab curling and shrinkage cracking. We recommend the use of concrete with a design 28-day compressive strength of 4,000 psi or more, for concrete slabs at this site. Concrete exposed to the elements should be air-entrained.

10.8.2 Buried Metal Pipes

The corrosion potential of the on-site materials was analyzed to evaluate its potential effects on buried metals. Corrosion potential was evaluated using the results of laboratory testing of samples obtained during the subsurface evaluation that were considered representative of soils at the subject site.

The results of the laboratory testing indicate the on-site materials have low resistivity and could potentially be extremely corrosive to ferrous metals. Therefore, special consideration should be given to the use of heavy gauge, corrosion protected, underground steel pipe or culverts, if any are planned. As an alternative, plastic pipe or reinforced concrete pipe could be considered. A corrosion specialist should be consulted for further recommendations.

10.9 Scaling

Climatic conditions in the project area including relatively low humidity, large temperature changes and repeated freeze-thaw cycles, may cause surficial scaling and spalling of exterior concrete. Occurrence of surficial scaling and spalling can be aggravated by poor workmanship during construction, such as “over-finishing” concrete surfaces and the use of de-icing salts on exterior concrete flatwork, particularly during the first winter after construction. The use of de-icing salts on nearby roadways, which can be transferred by vehicle traffic onto newly placed concrete, can be sufficient to induce scaling.

The measures below can be beneficial for reducing the concrete scaling. However, because of the other factors involved, including workmanship, surface damage to concrete can develop even though the measures provided below were followed. The mix design criteria should be coordinated with other project requirements including the criteria for soluble sulfate resistance presented in Section 10.8.1.

- Curing concrete in accordance with applicable codes and guidelines.
- Maintaining a water/cement ratio of 0.45 by weight for exterior concrete mixes.
- Including Type F fly ash in exterior concrete mixes as 20 percent of the cementitious material.
- Specifying a 28-day, compressive strength of 4,500 or more psi for exterior concrete that may be exposed to de-icing salts.
- Avoiding the use of de-icing salts through the first winter after construction.
- If colored concrete is being proposed for use at this site, Ninyo & Moore should be consulted for additional recommendations.

10.10 Frost Heave

Site soils are susceptible to frost heave if allowed to become saturated and exposed to freezing temperatures and repeated freeze/thaw cycling. The formation of ice in the underlying soils can result in two or more inches of heave of pavements, flatwork and other hardscaping in sustained cold weather. A portion of this movement may be recovered when the soils thaw, but due to loss of soil density some degree of displacement will remain. Frost heave of hardscaping could also result in areas where the subgrade soils were placed on engineered fill.

In areas where hardscape movements are a design concern (i.e. exterior flatwork located adjacent to the building within the doorway swing zone), replacement of the subgrade soils with 2 or more feet of clean, coarse sand or gravel, or supporting the element on foundations similar

to the building, or spanning over a void should be considered. Detailed recommendations in this regard can be provided upon request.

10.11 Construction in Cold or Wet Weather

During construction, the site should be graded such that surface water can drain readily away from the building areas. Given the soil conditions, it is important to avoid ponding of water in or near excavations. Water that accumulates in excavations should be promptly pumped out or otherwise removed and these areas should be allowed to dry out before resuming construction. Berms, ditches, and similar means should be used to decrease stormwater entering the work area and to efficiently convey it off site.

Earthwork activities undertaken during the cold weather season may be difficult and should be done by an experienced contractor. Fill should not be placed on top of frozen soils. The frozen soils should be removed prior to the placement of fill or other construction material. Frozen soil should not be used as engineered fill or backfill. The frozen soil may be reused (provided it meets the selection criteria) once it has thawed completely. In addition, compaction of the soils may be more difficult due to the viscosity change in water at lower temperatures.

If construction proceeds during cold weather, foundations, slabs, or other concrete elements should not be placed on frozen subgrade soil. Frozen soil should either be removed from beneath concrete elements, or thawed and recompacted. To limit the potential for soil freezing, the time passing between excavation and construction should be minimized. Blankets, straw, soil cover, or heating may be used to discourage the soil from freezing.

10.12 Site Drainage

Infiltration of water into subsurface soils can lead to soil movement and associated distress, and chemically and physically related deterioration of concrete and masonry structures. To reduce the potential for infiltration of moisture into subsurface soils at the site, we recommend the following:

- Positive drainage should be established and maintained away from the proposed buildings. Positive drainage may be established by providing a surface gradient for paved areas of 2 to 5 percent or more for a distance of 10 feet or more away from structures. Where concrete flatwork is placed adjacent to structures and other considerations are required by law, such as ADA requirements, slopes of 1 percent or more are considered acceptable. For unpaved areas, positive drainage may be established by a slope of 5 to 10 percent for 10 feet or more away from structures, where possible.

- Adequate surface drainage should be provided to channel surface water away from on-site structures and off paved surfaces to a suitable outlet such as a storm drain. Adequate surface drainage may be enhanced by utilization of graded swales, area drains, and other drainage devices. Surface run-off should not be allowed to pond near structures.

- Building roof drains should have downspouts tightlined to an appropriate outlet, such as a storm drain or the street, away from structures, pavements, and flatwork. If tightlining of the downspouts is not practicable, they should discharge 5 feet or more away from structures and onto surfaces that slope away from the structure. Downspouts should not be allowed to discharge onto the ground surface adjacent to building foundations or on exterior walkways.

- Irrigated landscaping, consisting of sprinklers to water plants with high demands for water, should not be placed within 5 feet of the building(s). Drip irrigation is considered acceptable within this zone.

- Planters, if any, should be maintained 5 feet or more from the building and constructed with closed bottoms or with drainage systems to drain excess irrigation away from the building.

10.13 Construction Observation and Testing

A qualified geotechnical consultant should perform appropriate observation and testing services during grading and construction operations. These services should include observation of any soft, loose, or otherwise unsuitable soils, evaluation of subgrade conditions where soil removals are performed, evaluation of the suitability of proposed borrow materials for use as fill, evaluation of the stability of open temporary excavations, evaluation of the results of any subgrade stabilization or dewatering activities, and performance of observation and testing services during placement and compaction of engineered fill and backfill soils.

The geotechnical consultant should also perform observation and testing services during placement of concrete, mortar, grout, asphalt concrete, and steel reinforcement. If another geotechnical consultant is selected to perform observation and testing services for the project, we request that the selected consultant provide a letter to the owner, with a copy to Ninyo & Moore, indicating that they fully understand our recommendations and they are in full agreement with the recommendations contained in this report. Qualified subcontractors utilizing appropriate techniques and construction materials should perform construction of the proposed improvements.

10.14 Plan Review

The recommendations presented in this report are based on preliminary design information for the proposed project and on the findings of our geotechnical evaluation. When finished, project plans and specifications should be reviewed by the geotechnical consultant prior to submitting the plans and specifications for bid. Additional field exploration and laboratory testing may be needed upon review of the project design plans.

10.15 Pre-Construction Meeting

We recommend a pre-construction meeting be held. The owner or the owner's representative, the architect, the contractor, and the geotechnical consultant should be in attendance to discuss the plans and the project.

11 LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analyses presented in this geotechnical report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please also note that our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of structural issues, environmental concerns, or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur

due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

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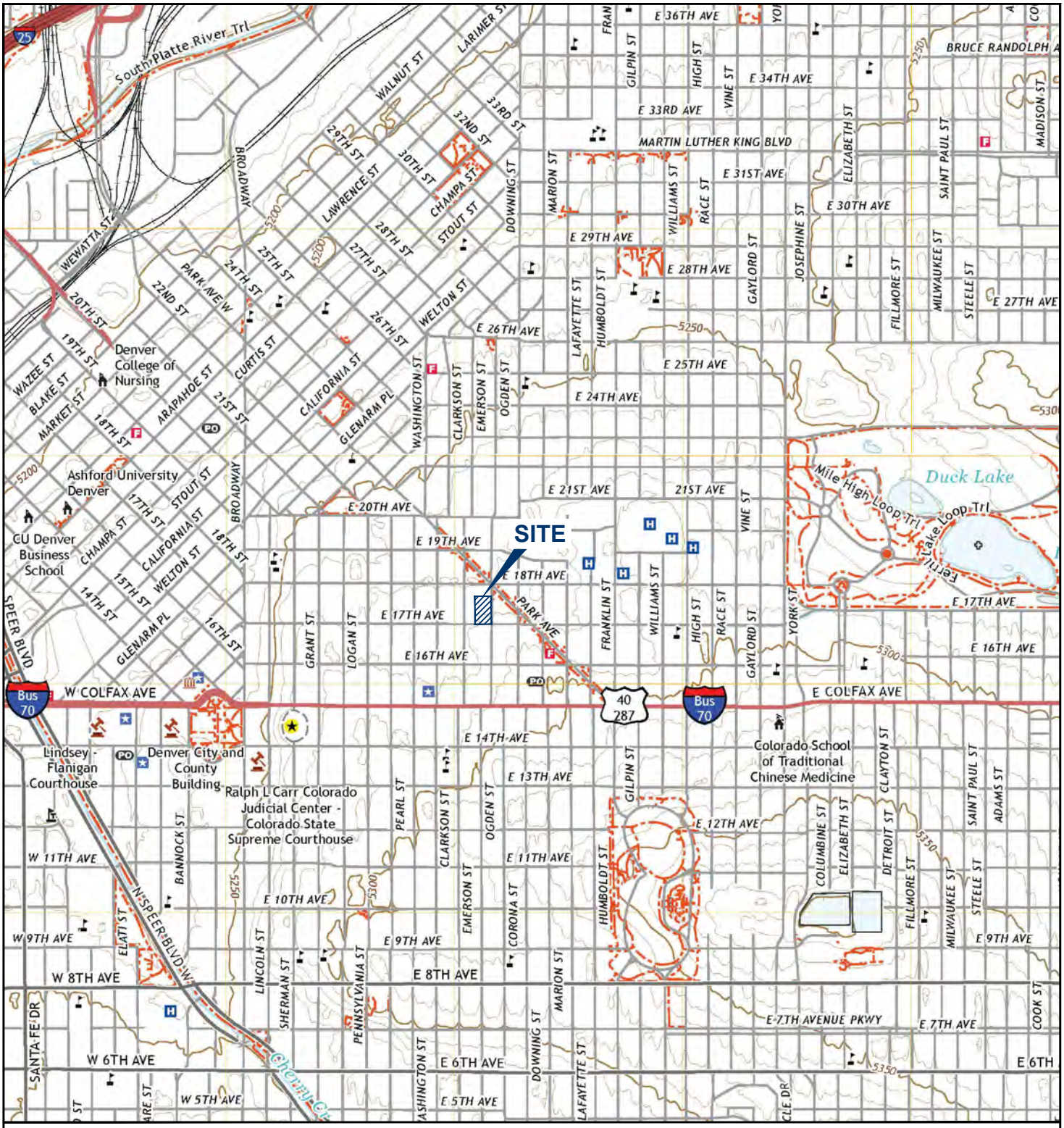
FIGURES



REFERENCE: USGS, COMMERCE CITY AND ENGLEWOOD, COLORADO, 2022.

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

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FIGURE 1

Ninyo & Moore

Geotechnical & Environmental Sciences Consultants

SITE LOCATION

PROPOSED MULTI-FAMILY DEVELOPMENT
1717 NORTH GRANT STREET
DENVER, COLORADO

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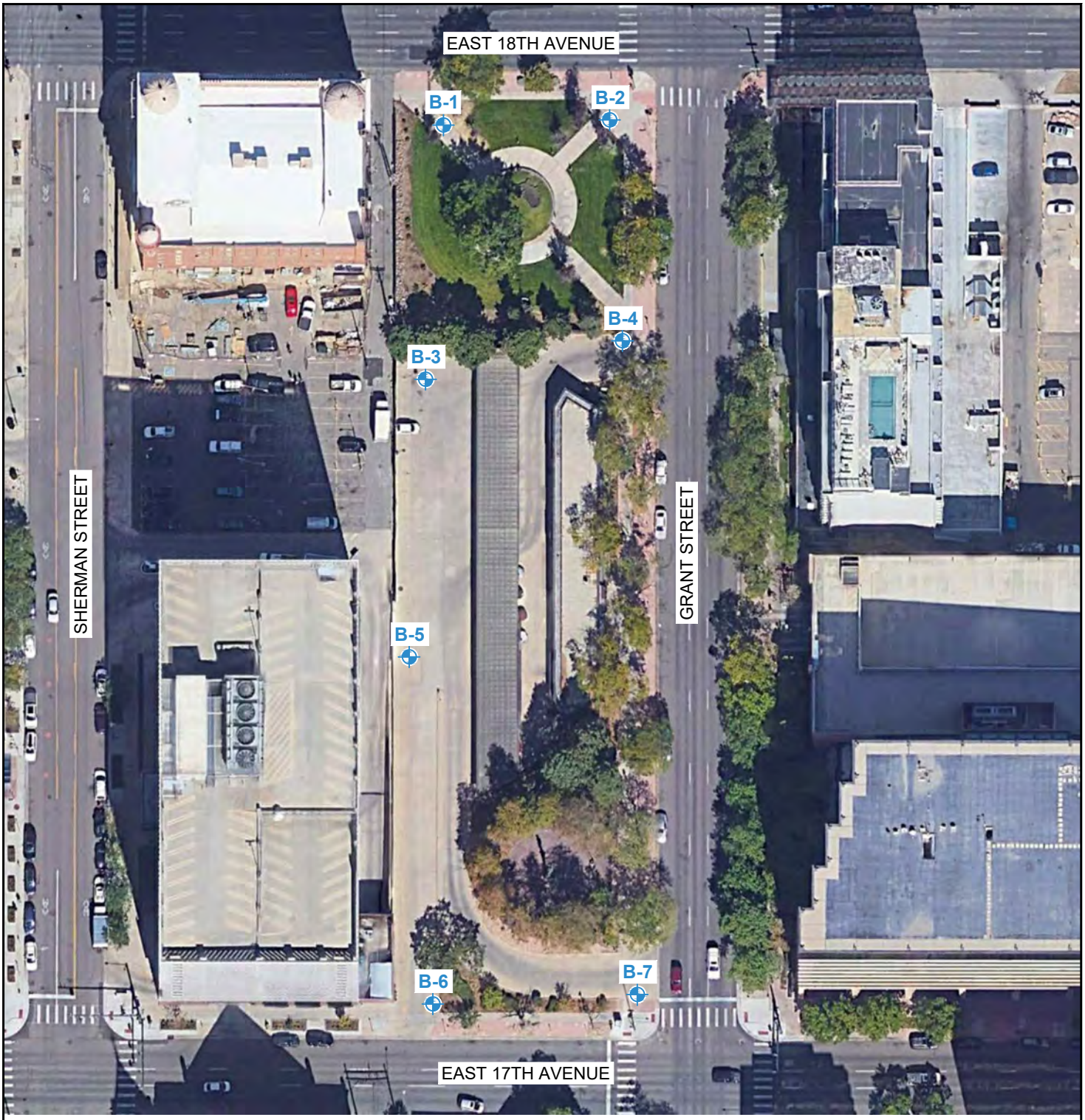

LEGEND

B-7 BORING

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE:

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FIGURE 2

Ninyo & Moore

Geotechnical & Environmental Sciences Consultants

BORING LOCATIONS

PROPOSED MULTI-FAMILY DEVELOPMENT
1717 NORTH GRANT STREET
DENVER, COLORADO

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APPENDIX A

Boring Logs

APPENDIX A

BORING LOGS

Field Procedure for the Collection of Disturbed Samples
Disturbed soil samples were obtained in the field using the following method.

Bulk Samples
Bulk samples of representative earth materials were obtained from the exploratory borings. The samples were bagged and transported to the laboratory for testing.

The Standard Penetration Test (SPT) Sampler
Disturbed drive samples of earth materials were obtained by means of a Standard Penetration Test sampler. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of 1-3/8 inches. The sampler was driven into the ground 12 to 18 inches with a 140-pound hammer falling freely from a height of 30 inches in general accordance with ASTM D 1586. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are those for the last 12 inches of penetration. Soil samples were observed and removed from the sampler, bagged, sealed and transported to the laboratory for testing.

Field Procedure for the Collection of Relatively Undisturbed Samples
Relatively undisturbed soil samples were obtained in the field using the following method.

The California Drive Sampler
The sampler, with an external diameter of 2.4 inches, was lined with four, 4-inch long, thin brass rings with inside diameters of approximately 1.9 inches. The sample barrel was driven into the ground with the weight of a hammer in general accordance with ASTM D 3550. The driving weight was permitted to fall freely. The approximate length of the fall, the weight of the hammer, and the number of blows per foot of driving are presented on the boring logs as an index to the relative resistance of the materials sampled. The samples were removed from the sample barrel in the brass liners, sealed, and transported to the laboratory for testing.

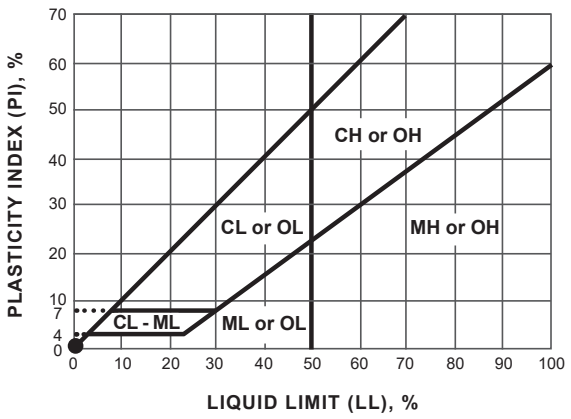
SOIL CLASSIFICATION CHART PER ASTM D 2488

PRIMARY DIVISIONS			SECONDARY DIVISIONS	
			GROUP SYMBOL	GROUP NAME
COARSE-GRAINED SOILS more than 50% retained on No. 200 sieve	**GRAVEL** more than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVEL less than 5% fines	GW	well-graded GRAVEL
			GP	poorly graded GRAVEL
		GRAVEL with DUAL CLASSIFICATIONS 5% to 12% fines	GW-GM	well-graded GRAVEL with silt
			GP-GM	poorly graded GRAVEL with silt
			GW-GC	well-graded GRAVEL with clay
			GP-GC	poorly graded GRAVEL with clay
		GRAVEL with FINES more than 12% fines	GM	silty GRAVEL
			GC	clayey GRAVEL
			GC-GM	silty, clayey GRAVEL
	SAND 50% or more of coarse fraction passes No. 4 sieve	CLEAN SAND less than 5% fines	SW	well-graded SAND
			SP	poorly graded SAND
		SAND with DUAL CLASSIFICATIONS 5% to 12% fines	SW-SM	well-graded SAND with silt
			SP-SM	poorly graded SAND with silt
			SW-SC	well-graded SAND with clay
			SP-SC	poorly graded SAND with clay
		SAND with FINES more than 12% fines	SM	silty SAND
			SC	clayey SAND
			SC-SM	silty, clayey SAND
FINE-GRAINED SOILS 50% or more passes No. 200 sieve	**SILT and CLAY** liquid limit less than 50%	INORGANIC	CL	lean CLAY
			ML	SILT
			CL-ML	silty CLAY
		ORGANIC	OL (PI > 4)	organic CLAY
			OL (PI < 4)	organic SILT
	SILT and CLAY liquid limit 50% or more	INORGANIC	CH	fat CLAY
			MH	elastic SILT
		ORGANIC	OH (plots on or above "A"-line)	organic CLAY
			OH (plots below "A"-line)	organic SILT
	Highly Organic Soils		PT	Peat

GRAIN SIZE

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		> 12"	> 12"	Larger than basketball-sized
Cobbles		3 - 12"	3 - 12"	Fist-sized to basketball-sized
Gravel	Coarse	3/4 - 3"	3/4 - 3"	Thumb-sized to fist-sized
	Fine	#4 - 3/4"	0.19 - 0.75"	Pea-sized to thumb-sized
Sand	Coarse	#10 - #4	0.079 - 0.19"	Rock-salt-sized to pea-sized
	Medium	#40 - #10	0.017 - 0.079"	Sugar-sized to rock-salt-sized
	Fine	#200 - #40	0.0029 - 0.017"	Flour-sized to sugar-sized
Fines		Passing #200	< 0.0029"	Flour-sized and smaller

PLASTICITY CHART



APPARENT DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPOOLING CABLE OR CATHEAD		AUTOMATIC TRIP HAMMER	
	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)
Very Loose	≤ 4	≤ 8	≤ 3	≤ 5
Loose	5 - 10	9 - 21	4 - 7	6 - 14
Medium Dense	11 - 30	22 - 63	8 - 20	15 - 42
Dense	31 - 50	64 - 105	21 - 33	43 - 70
Very Dense	> 50	> 105	> 33	> 70

CONSISTENCY - FINE-GRAINED SOIL

CONSIS-TENCY	SPOOLING CABLE OR CATHEAD		AUTOMATIC TRIP HAMMER	
	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)
Very Soft	< 2	< 3	< 1	< 2
Soft	2 - 4	3 - 5	1 - 3	2 - 3
Firm	5 - 8	6 - 10	4 - 5	4 - 6
Stiff	9 - 15	11 - 20	6 - 10	7 - 13
Very Stiff	16 - 30	21 - 39	11 - 20	14 - 26
Hard	> 30	> 39	> 20	> 26

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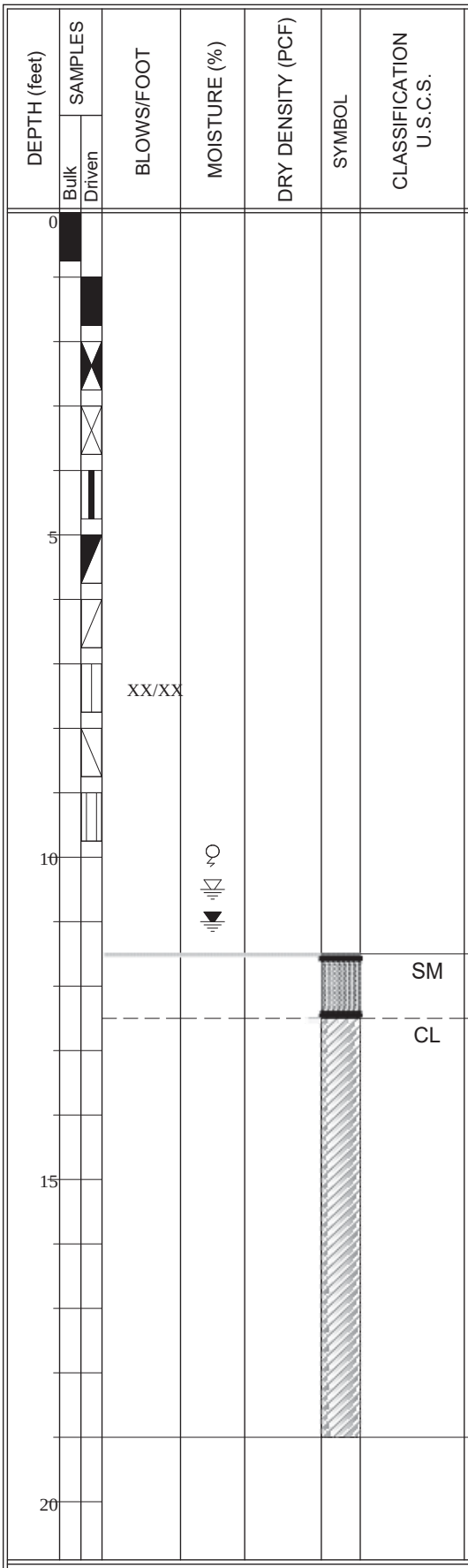
USCS METHOD OF SOIL CLASSIFICATION

Explanation of USCS Method of Soil Classification

PROJECT NO.	DATE	FIGURE

BORING LOG EXPLANATION SHEET



Bulk sample.

Modified split-barrel drive sampler.

2-inch inner diameter split-barrel drive sampler.

No recovery with modified split-barrel drive sampler, or 2-inch inner diameter split-barrel drive sampler.

Sample retained by others.

Standard Penetration Test (SPT).

No recovery with a SPT.

Shelby tube sample. Distance pushed in inches/length of sample recovered in inches.

No recovery with Shelby tube sampler.

Continuous Push Sample.

Seepage.

Groundwater encountered during drilling.

Groundwater measured after drilling.

MAJOR MATERIAL TYPE (SOIL):
Solid line denotes unit change.

Dashed line denotes material change.

Attitudes: Strike/Dip
b: Bedding
c: Contact
j: Joint
f: Fracture
F: Fault
cs: Clay Seam
s: Shear
bss: Basal Slide Surface
sf: Shear Fracture
sz: Shear Zone
sbs: Shear Bedding Surface

The total depth line is a solid line that is drawn at the bottom of the boring.

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BORING LOG

Explanation of Boring Log Symbols

PROJECT NO.	DATE	FIGURE

DATE DRILLED 5/18/2022 BORING NO. B-1

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING 4" Diameter Solid Stem Auger

DRIVE WEIGHT 140 lbs. (Spooling Cathead) DROP 30"

SAMPLED BY JMR LOGGED BY JMR REVIEWED BY BFG

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							CONCRETE: Approximately 5.5 inches thick.
							FILL:
						SC-SM	Brown to gray, moist, sandy lean CLAY.
		18	4.4	112.5			EOLIAN DEPOSIT: Light yellow and brown, moist, loose, silty, clayey SAND.
		15	5.5	112.1			
10		13	6.5	108.2			Orange and brown; increased clay content.
		12					
20		17					Light yellow and brown.
		21				SC	ALLUVIUM: Light yellowish gray, moist, loose, clayey SAND.
30		40					Light gray; medium dense.
							Total Depth: 30 feet. Groundwater was not encountered during drilling. Backfilled with on-site soil after drilling on 5/18/2022.
							Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
40							

FIGURE A- 1

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DATE DRILLED 5/17/2022 BORING NO. B-2

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING 4.25" Diameter Hollow Stem Auger

DRIVE WEIGHT 140 lbs. (Spooling Cathead) DROP 30"

SAMPLED BY JMR LOGGED BY JMR REVIEWED BY BFG

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							CONCRETE: Approximately 4 inches thick.
		7	16.7	112.9			FILL: Light gray, moist, firm, sandy lean CLAY; trace gravel.
		9	23.7	104.4			
10		10				SC	EOLIAN DEPOSIT: Orange and brown, moist, loose, clayey SAND.
		15	5.5	113.5			Decreased clay content.
20		9					
		11					Light yellow and brown, moist, loose, clayey SAND.
30		20					
		22					Medium dense.
							Total Depth: 31.5 feet, Groundwater was not encountered during drilling. Backfilled with on-site soil after drilling on 5/18/2022. Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
40							

DATE DRILLED 5/19/2022 BORING NO. B-3

GROUND ELEVATION -- SHEET 1 OF 3

METHOD OF DRILLING 4.25" Diameter Hollow Stem Auger

DRIVE WEIGHT 140 lbs. (Spooling Cathead) DROP 30"

SAMPLED BY JMR LOGGED BY JMR REVIEWED BY BFG

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							CONCRETE: Approximately 6.75 inches thick.
	Driven	40	7.9	115.5			FILL: Light yellow and brown, moist, silty, clayey SAND with brick fragments.
	Driven	11	7.5	108.8		SC	EOLIAN DEPOSIT: Light yellow and brown, moist, loose, clayey SAND.
10	Driven	10	5.8	108.8			
	Driven	15					
20	Driven	13					Light orange and brown; increased clay content.
	Driven	29				SC	ALLUVIUM: Light gray, moist, medium dense, clayey SAND.
30	Driven	20					Loose.
	Driven	32					Dense.
40	Driven	9				CL	Orange and brown, moist, stiff, sandy lean CLAY.

FIGURE A- 4

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DATE DRILLED 5/19/2022 BORING NO. B-3

GROUND ELEVATION -- SHEET 2 OF 3

METHOD OF DRILLING 4.25" Diameter Hollow Stem Auger

DRIVE WEIGHT 140 lbs. (Spooling Cathead) DROP 30"

SAMPLED BY JMR LOGGED BY JMR REVIEWED BY BFG

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
40						CL	ALLUVIUM: (Continued) Orange and brown, moist, stiff, sandy lean CLAY.
						GC	Gray, moist, clayey GRAVEL with cobbles.
						SC	Yellow and brown, moist, clayey SAND.
50							
60							
70						GC	Yellow and brown, wet, clayey GRAVEL with cobbles.
			▼			SC	Yellow and brown, wet, clayey SAND. @74.5': Groundwater measured after drilling.
80							

FIGURE A- 5

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DATE DRILLED 5/19/2022 BORING NO. B-3

GROUND ELEVATION -- SHEET 3 OF 3

METHOD OF DRILLING 4.25" Diameter Hollow Stem Auger

DRIVE WEIGHT 140 lbs. (Spooling Cathead) DROP 30"

SAMPLED BY JMR LOGGED BY JMR REVIEWED BY BFG

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
80						SC	ALLUVIUM: (Continued) Yellow and brown, wet, clayey SAND.
90		50/2"	16.2	118.7			DENVER FORMATION: Bluish gray, moist, very hard, clayey SANDSTONE. Total Depth: 92.2 feet. Groundwater was not encountered during drilling and measured at approximately 74.5 feet after drilling on 5/19/2022. Backfilled with on-site soil and patched after drilling on 5/19/2022. Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
100							
110							
120							

DATE DRILLED 5/18/2022 BORING NO. B-4

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING 4" Diameter Solid Stem Auger

DRIVE WEIGHT 140 lbs. (Spooling Cathead) DROP 30"

SAMPLED BY JMR LOGGED BY JMR REVIEWED BY BFG

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							CONCRETE: Approximately 5 inches thick.
							FILL: Brown, moist, clayey SAND with concrete and brick debris.
		12	10.4	112.1		SC	EOLIAN DEPOSIT: Yellow and brown, moist, loose, clayey SAND.
		9	8.0	108.8			
10		10	5.0	111.5			
		12					Orange and brown.
20		9	8.9	120.7			
		23				SC	ALLUVIUM: Light gray, moist, medium dense, clayey SAND.
30		28					Light yellow and gray; fine to coarse.
							Total Depth: 30 feet. Groundwater was not encountered during drilling. Backfilled with on-site soil and patched after drilling on 5/18/2022.
							Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
40							

FIGURE A- 7

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DATE DRILLED 5/18/2022 BORING NO. B-5

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING 4" Diameter Solid Stem Auger

DRIVE WEIGHT 140 lbs. (Spooling Cathead) DROP 30"

SAMPLED BY JMR LOGGED BY JMR REVIEWED BY BFG

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							CONCRETE: Approximately 9.25 inches thick.
	Driven	30	11.0	124.7			FILL: Reddish brown, moist, clayey SAND with brick fragments.
	Driven	13	10.4	112.8		SC	EOLIAN DEPOSIT: Yellow and brown, moist, loose, clayey SAND.
10	Driven	10					Fine.
	Driven	15					Light orange and brown.
20	Driven	9					Light yellow and brown.
	Driven	13					Orange and brown.
						SP	ALLUVIUM: Light gray, moist, medium dense, fine to coarse SAND with gravel; trace clay.
30	Driven	40	1.8	116.3			Total Depth: 30 feet. Groundwater was not encountered during drilling. Backfilled with on-site soil after drilling on 5/18/2022. Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
40							

DATE DRILLED 5/19/2022 BORING NO. B-6

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING 4" Diameter Solid Stem Auger

DRIVE WEIGHT 140 lbs. (Spooling Cathead) DROP 30"

SAMPLED BY JMR LOGGED BY JMR REVIEWED BY BFG

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							CONCRETE: Approximately 6.75 inches thick.
							FILL:
						SC	Brown, moist, clayey SAND; with brick fragments.
		7	8.8	108.7			EOLIAN DEPOSIT: Orange and brown, moist, very loose, clayey SAND.
		9	7.2	109.6			Light yellow and brown; loose.
10		13	5.7	111.2			
		19					Increased clay content.
20		11					Orange and brown.
		21	3.9	117.8		SP-SC	ALLUVIUM: Light yellow and gray, moist, loose, fine to medium SAND with clay.
30		50/11"					Medium dense.
							Total Depth: 29.9 feet. Groundwater was not encountered during drilling. Backfilled with on-site soil after drilling on 5/19/2022.
							Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
40							

FIGURE A- 9

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DATE DRILLED 5/18/2022 BORING NO. B-7

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING 4" Diameter Solid Stem Auger

DRIVE WEIGHT 140 lbs. (Spooling Cathead) DROP 30"

SAMPLED BY JMR LOGGED BY JMR REVIEWED BY BFG

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							CONCRETE: Approximately 6.5 inches thick.
	Driven	9	9.6	108.5			FILL: Orange and brown, moist, clayey SAND with gravel, brick, cobbles, and concrete clasts.
	Driven	7	12.9	113.0			
	Driven	6				SC	EOLIAN DEPOSIT: Light yellow and brown, moist, very loose, clayey SAND.
10	Driven	11					Orange and brown; loose.
	Driven	11					Increased clay content.
20	Driven	16					Yellow and brown; dry.
	Driven	23				SC	ALLUVIUM: Light gray, moist, medium dense, clayey SAND.
30							Total Depth: 30 feet. Groundwater was not encountered during drilling. Backfilled with on-site soil after drilling on 5/18/2022.
							Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
40							

FIGURE A- 10

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APPENDIX B

Laboratory Testing

APPENDIX B

LABORATORY TESTING

Classification
Soils were visually and texturally classified in accordance with the Unified Soil Classifications System (USCS) in general accordance with ASTM D2488. Soil classifications are indicated on the logs of the exploratory excavations in Appendix A.

In-Place Moisture and Density Tests
The moisture content and dry density of ring-lined samples obtained from the exploratory borings were evaluated in general accordance with ASTM D2837. These test results are presented on the logs of the exploratory borings in Appendix A.

Atterberg Limits
Tests were performed on selected representative fine-grained soil samples to evaluate the liquid limit, plastic limit, and plasticity index in general accordance with ASTM D 4318. These test results were utilized to evaluate the soil classification in accordance with the Unified Soil Classification System. The test results and classifications are shown on Figure B-1.

No. 200 Sieve Analysis
An evaluation of the percentage of particles finer than the No. 200 sieve in selected soil samples was performed in general accordance with ASTM D 1140. The results of the tests are presented on Figure B-2.

Gradation Analysis
Gradation analysis tests were performed on selected representative soil samples in general accordance with ASTM D6913. The grain size distribution curves are shown on Figures B-3 through B-12. These test results were utilized in evaluating the soil classifications in accordance with the USCS.

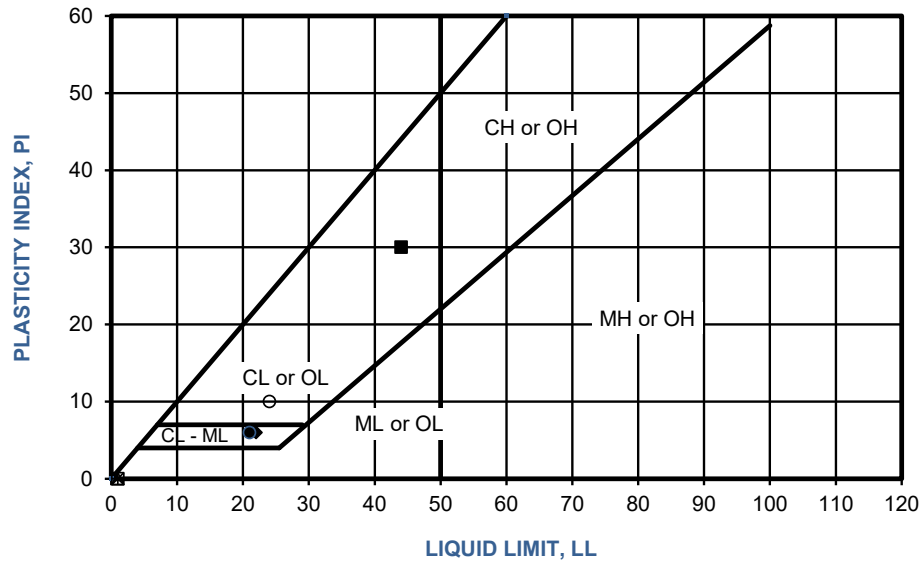
Consolidation/Swell Tests
The consolidation and/or swell potential of selected materials were evaluated in general accordance with ASTM D 4546. Specimens were loaded with a specified surcharge before inundation with water. Readings of volumetric consolidation/swell were recorded until completion of primary consolidation/swell. After the completion of primary swell, surcharge loads were increased incrementally to evaluate swell pressure. The results of the consolidation/swell tests are presented on Figures B-13 through B-14.

Direct Shear Tests
Direct shear tests were performed on relatively undisturbed samples in general accordance with ASTM D 3080 to evaluate the shear strength characteristics of selected materials. The samples were inundated during shearing to represent adverse field conditions. The results are shown on Figure B-15.

Soil Corrosivity Tests
Soil pH tests were performed on representative samples in general accordance with ASTM Test Method D4972. Soil minimum resistivity tests were performed on representative samples in general accordance with AASHTO T288. The sulfate content of selected samples was evaluated in general accordance with CDOT Test Method CP-L 2103. The chloride content of selected samples was evaluated in general accordance with CDOT Test Method CP-L 2104. The test results are presented on Figure B-16.

SYMBOL	LOCATION	DEPTH (ft)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	EQUIVALENT USCS
●	B-1	9.0-10.0	21	15	6	CL-ML	SC-SM
■	B-2	2.0-3.0	44	14	30	CL	CL
◆	B-3	2.0-3.0	22	16	6	CL-ML	SC-SM
○	B-6	2.0-3.0	24	14	10	CL	SC

NP - INDICATES NON-PLASTIC



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318

FIGURE B-1

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ATTERBERG LIMITS TEST RESULTS

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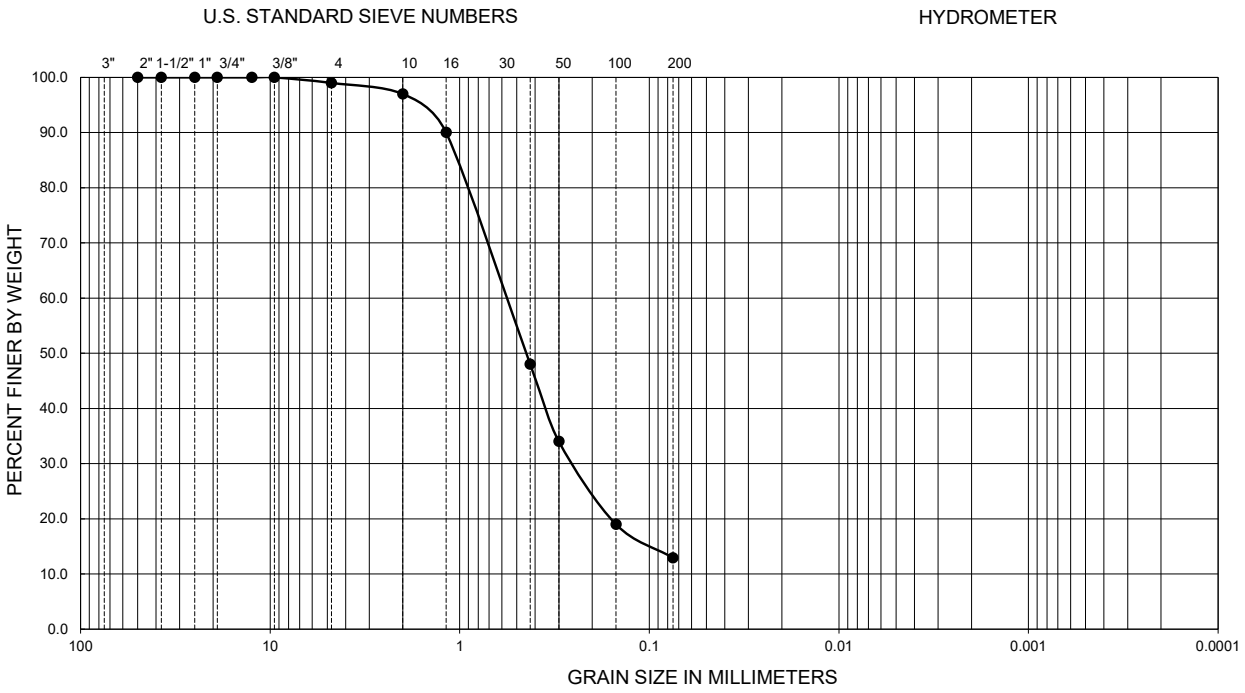
SAMPLE LOCATION	SAMPLE DEPTH (ft)	DESCRIPTION	PERCENT PASSING NO. 4	PERCENT PASSING NO. 200	EQUIVALENT USCS
B-1	9.0-10.0	Orange and Brown Silty, Clayey SAND	100	18	SC-SM
B-2	2.0-3.0	Light Gray Sandy Lean CLAY; Trace Gravel	98	55	CL
B-3	2.0-3.0	Light Yellow and Brown Silty, Clayey SAND	100	19	SC-SM
B-3	34.0-35.5	Light Gray Clayey SAND; Trace Gravel	98	13	SC
B-3	92.0-92.2	Bluish Gray Clayey SANDSTONE; DENVER FORMATION	100	39	SC
B-5	2.0-3.0	Reddish Brown Clayey SAND	100	35	SC
B-6	2.0-3.0	Orange and Brown Clayey SAND	100	28	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 1140

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	Equivalent USCS
●	B-1	19.0-20.0	--	--	--	--	--	--	--	--	13	~~SC~~

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913

SC-SM

FIGURE B-3

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GRADATION TEST RESULTS
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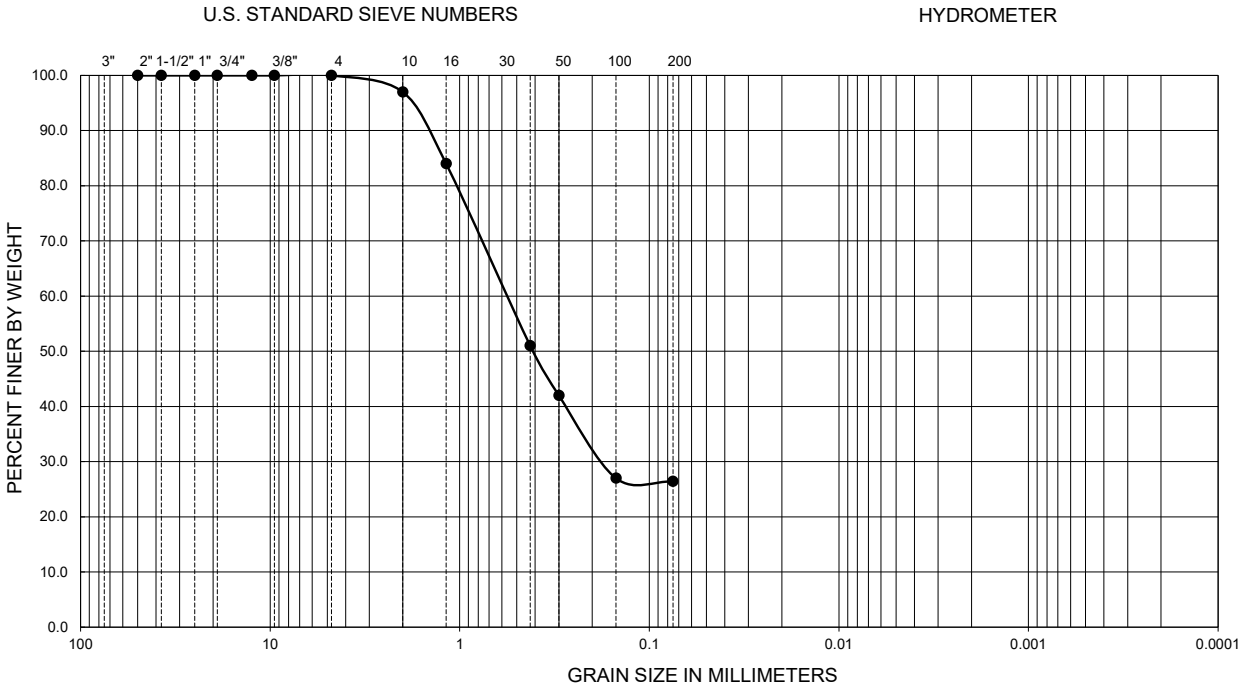
GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	Equivalent USCS
●	B-1	24.0-25.0	--	--	--	--	--	--	--	--	26	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913

FIGURE B-4

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GRADATION TEST RESULTS
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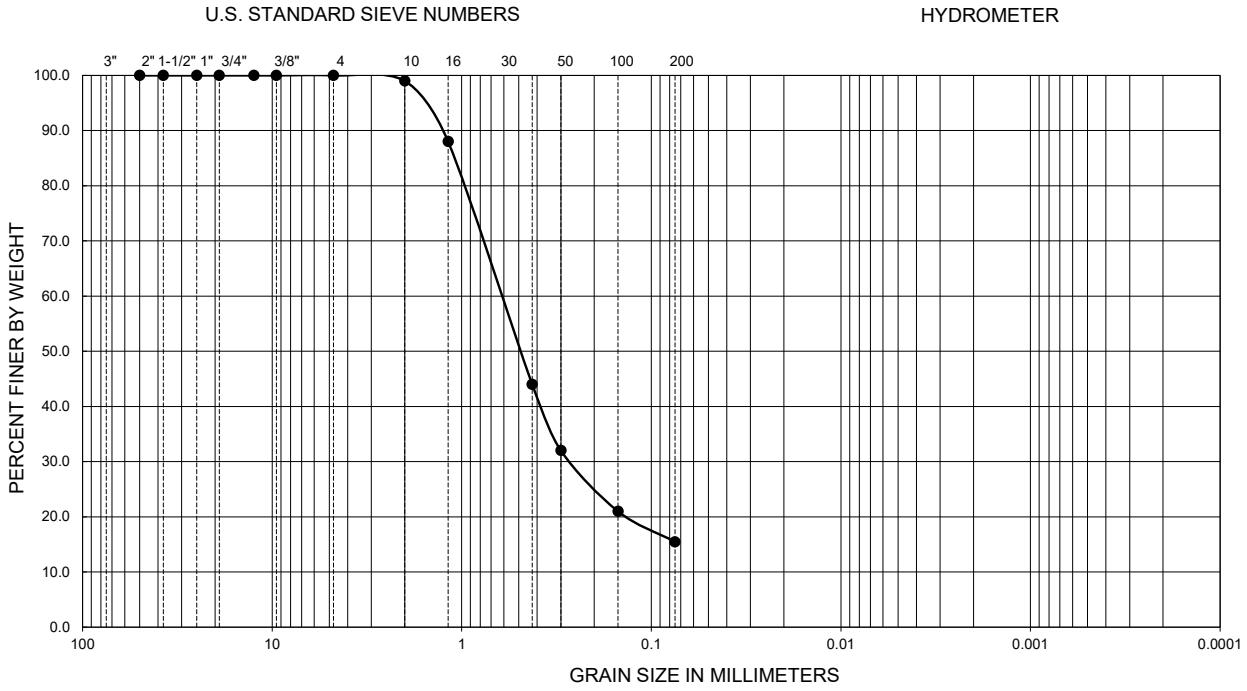
GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	Equivalent USCS
●	B-2	14.0-15.0	--	--	--	--	--	--	--	--	15	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913

FIGURE B-5

Ninyo & Moore
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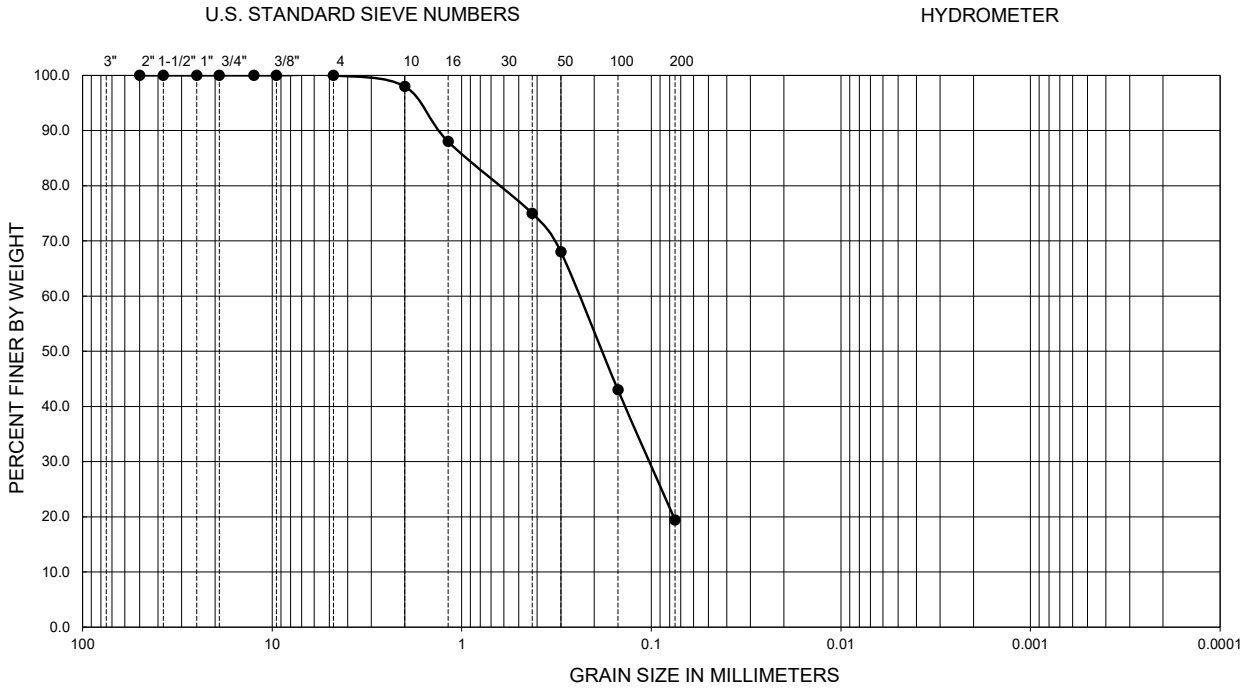
GRADATION TEST RESULTS
1717 GRANT STREET
DENVER, COLORADO
502427001 | 6/22

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	Equivalent USCS
●	B-3	4.0-5.0	--	--	--	--	--	--	--	--	19	SC

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FIGURE B-6

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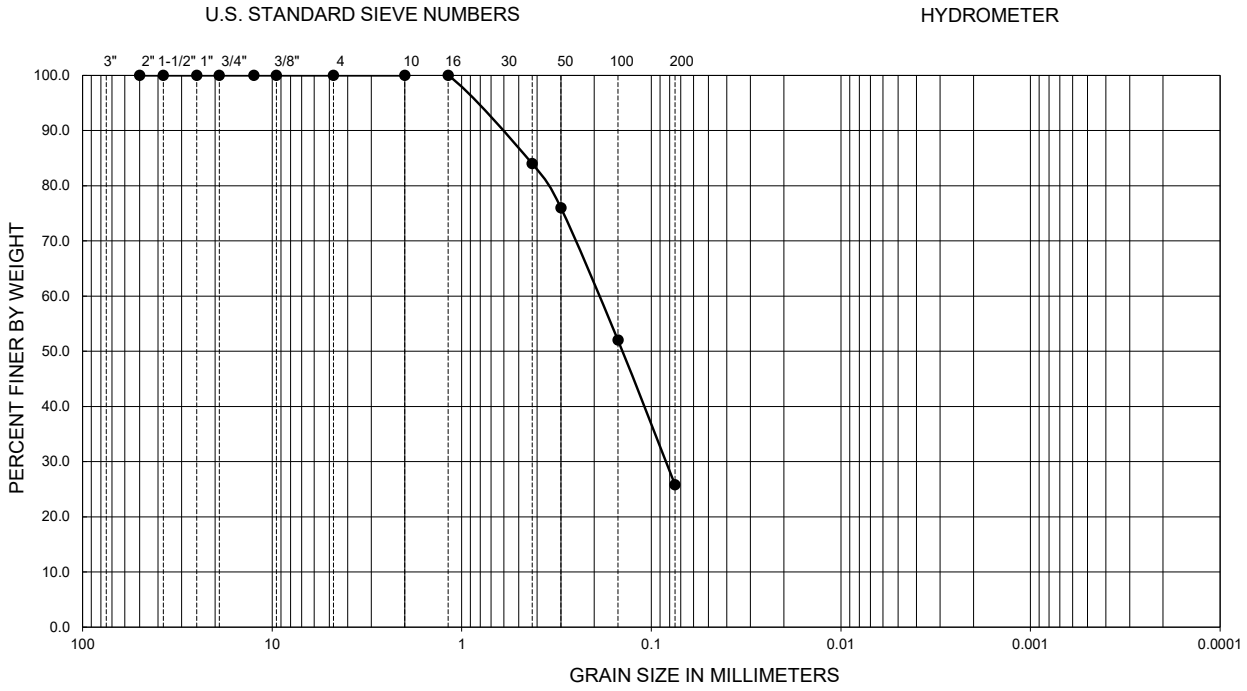
GRADATION TEST RESULTS
1717 GRANT STREET
DENVER, COLORADO
502427001 | 6/22

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	Equivalent USCS
●	B-4	2.0-3.0	--	--	--	--	--	--	--	--	26	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913

FIGURE B-7

Ninyo & Moore
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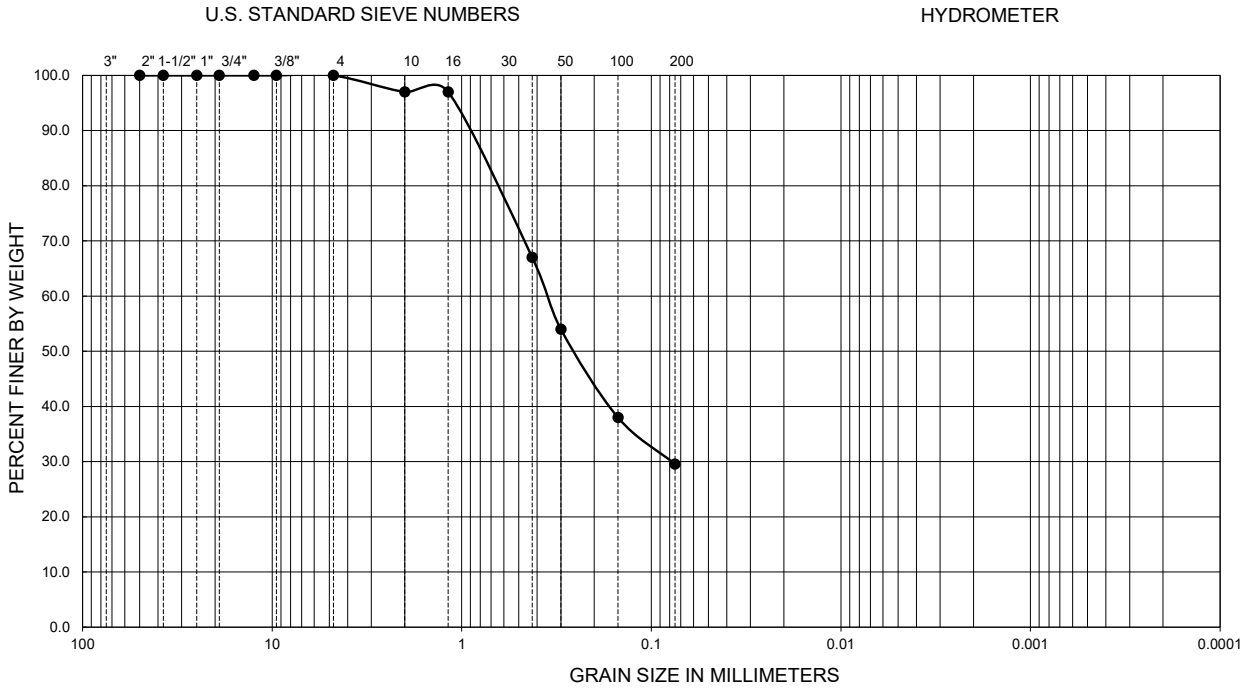
GRADATION TEST RESULTS
1717 GRANT STREET
DENVER, COLORADO
502427001 | 6/22

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	Equivalent USCS
●	B-4	19.0-20.0	--	--	--	--	--	--	--	--	30	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913

FIGURE B-8

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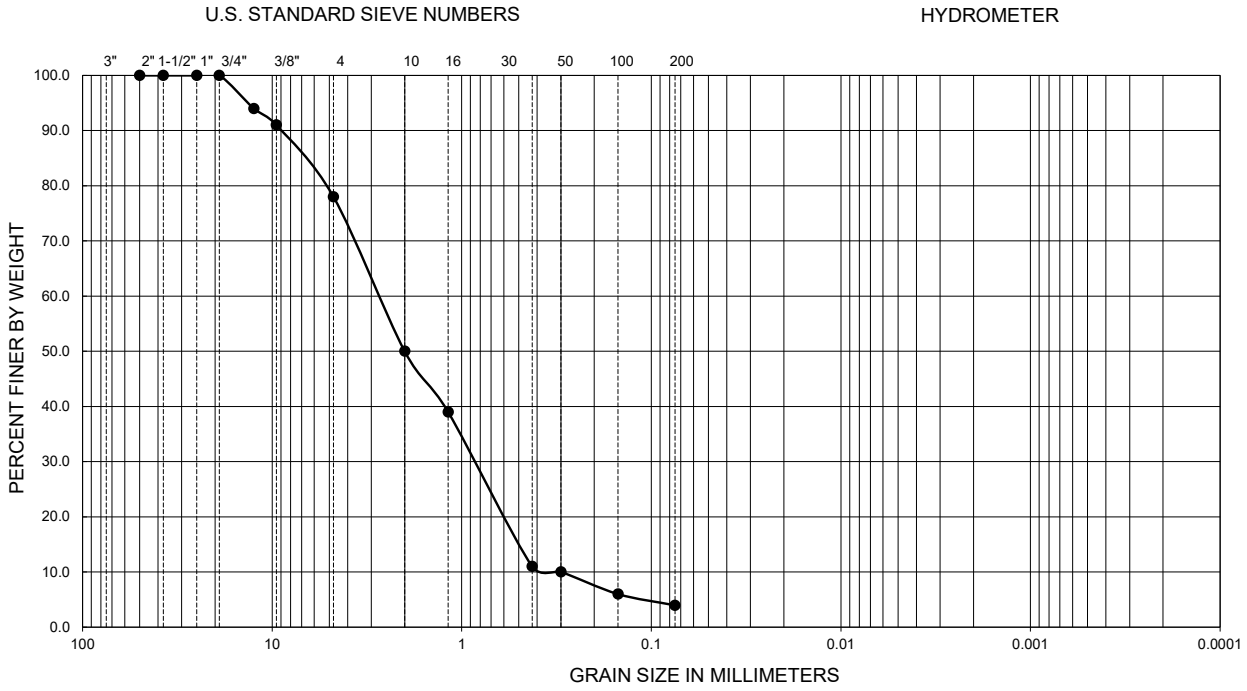
GRADATION TEST RESULTS
1717 GRANT STREET
DENVER, COLORADO
502427001 | 6/22

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	Equivalent USCS
●	B-5	29.0-30.0	--	--	--	0.30	0.85	2.75	9.2	0.9	4	SP

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913

FIGURE B-9

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GRADATION TEST RESULTS
1717 GRANT STREET
DENVER, COLORADO
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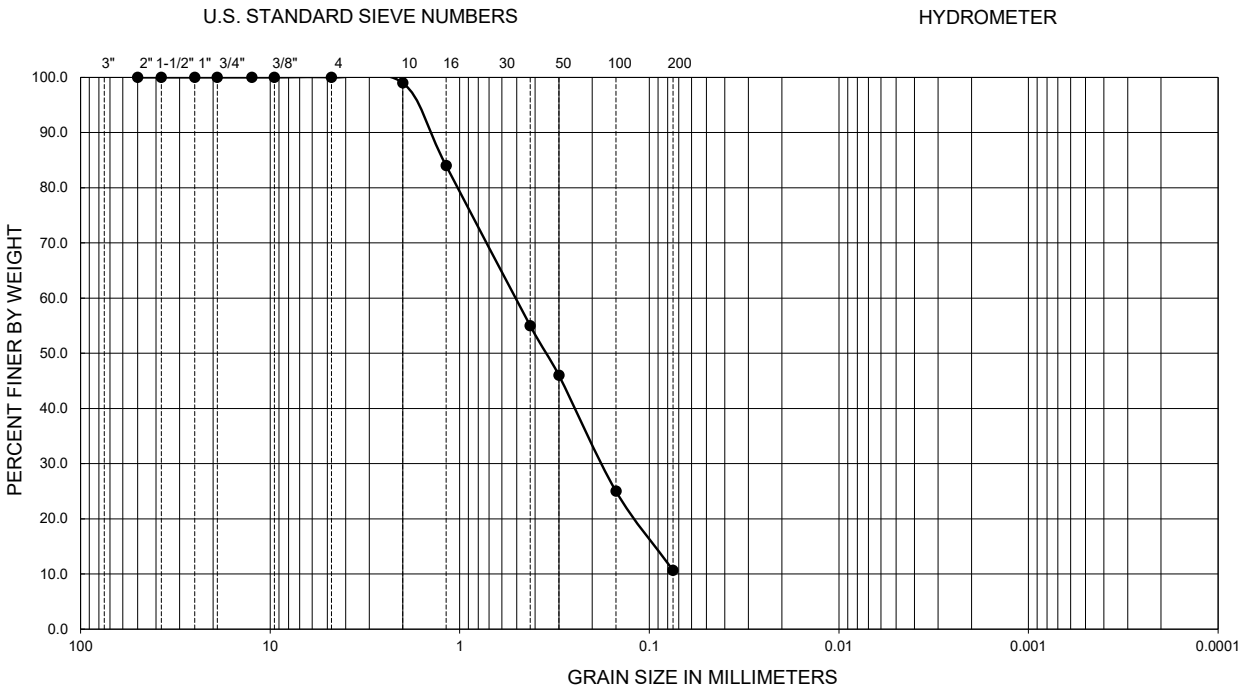
GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



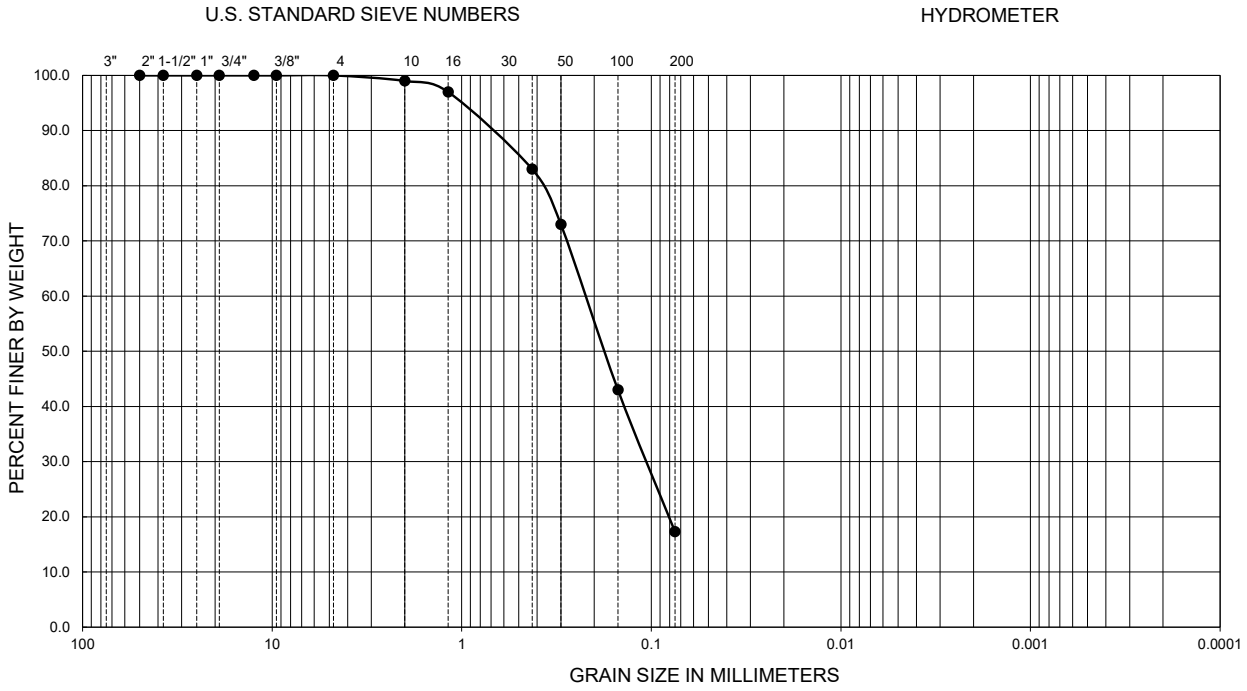
Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	Equivalent USCS
●	B-6	24.0-25.0	--	--	--	--	--	--	--	--	11	SP-SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913

FIGURE B-10

GRADATION TEST RESULTS
1717 GRANT STREET
DENVER, COLORADO

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	Equivalent USCS
●	B-7	9.0-10.0	--	--	--	--	--	--	--	--	17	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913

FIGURE B-11

Ninyo & Moore
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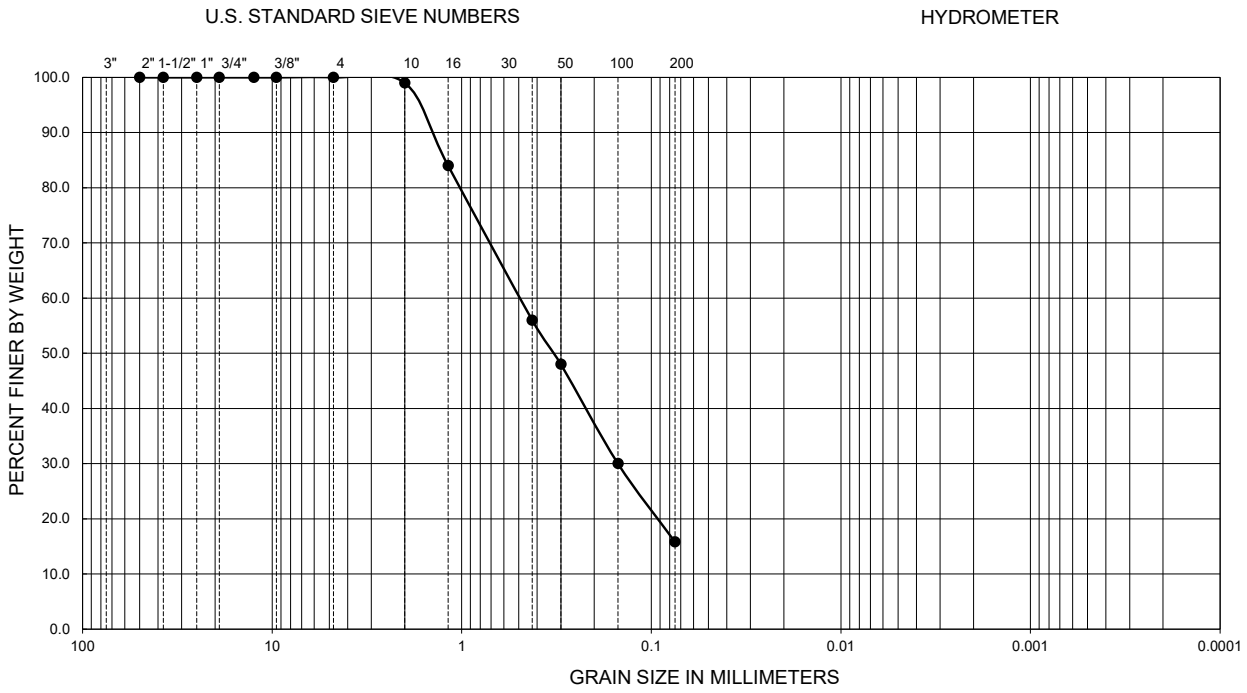
GRADATION TEST RESULTS
1717 GRANT STREET
DENVER, COLORADO
502427001 | 6/22

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	Equivalent USCS
●	B-7	29.0-30.0	--	--	--	--	--	--	--	--	16	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913

FIGURE B-12

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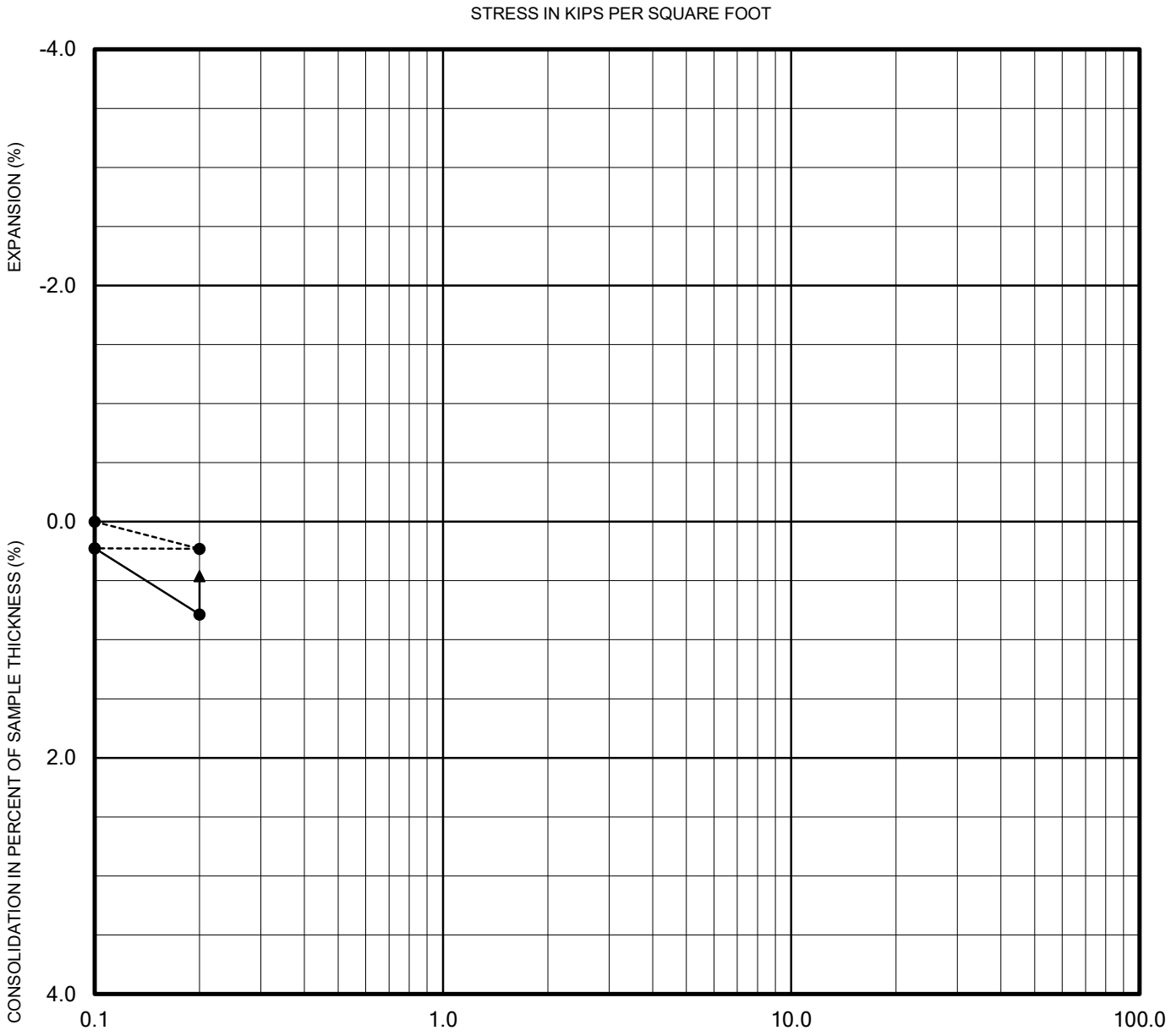
GRADATION TEST RESULTS
1717 GRANT STREET
DENVER, COLORADO
502427001 | 6/22



Seating Cycle
Loading Prior to Inundation
Loading After Inundation
Rebound Cycle

Moisture Increase (%):	2.4
Swell Percentage (%):	0.3
Swell Pressure (psf):	--

Sample Location: B-2
Depth (ft): 2.0-3.0
Soil Type: CL (Fill)

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

FIGURE B-13

CONSOLIDATION TEST RESULTS

1717 GRANT STREET
DENVER, COLORADO

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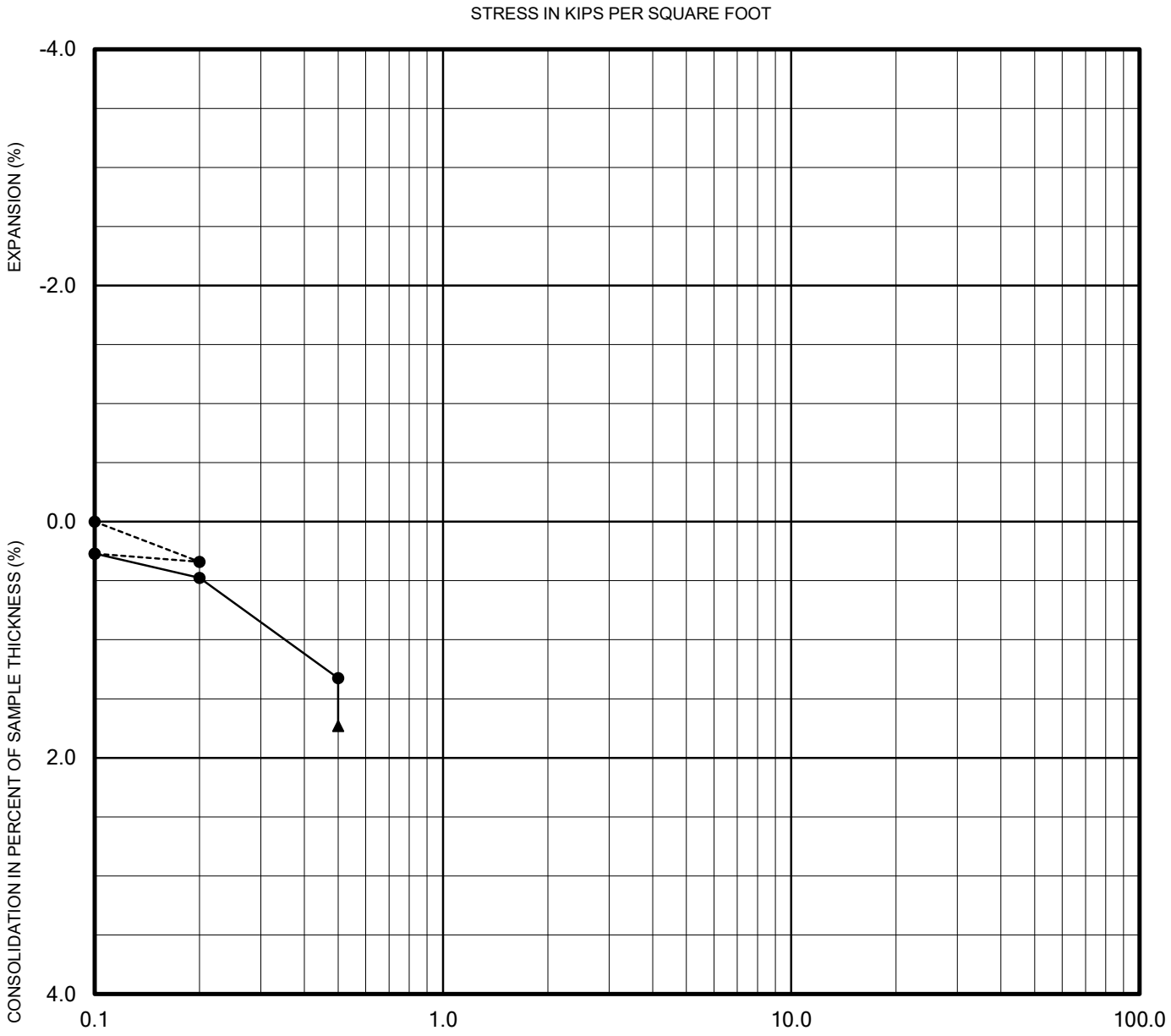

Seating Cycle
Loading Prior to Inundation
Loading After Inundation
Rebound Cycle

Moisture Increase (%):	2.9
Swell Percentage (%):	-0.4
Swell Pressure (psf):	--

Sample Location: B-2
Depth (ft): 4.0-5.0
Soil Type: CL (Fill)

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

FIGURE B-14

CONSOLIDATION TEST RESULTS

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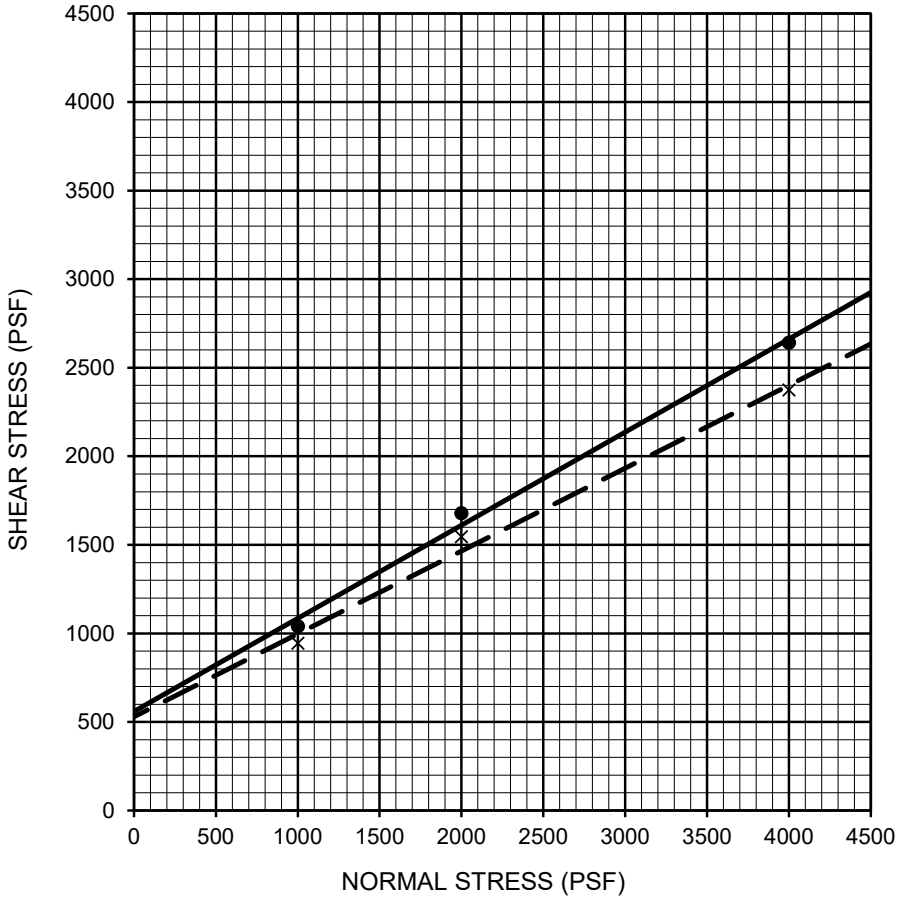


Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (degrees)	Equivalent USCS
Light Yellow and Brown Clayey SAND	—●—	B-1	2.0-3.0	Peak	559	28	SC
Light Yellow and Brown Clayey SAND	- - x - -	B-1	2.0-3.0	Ultimate	529	25	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

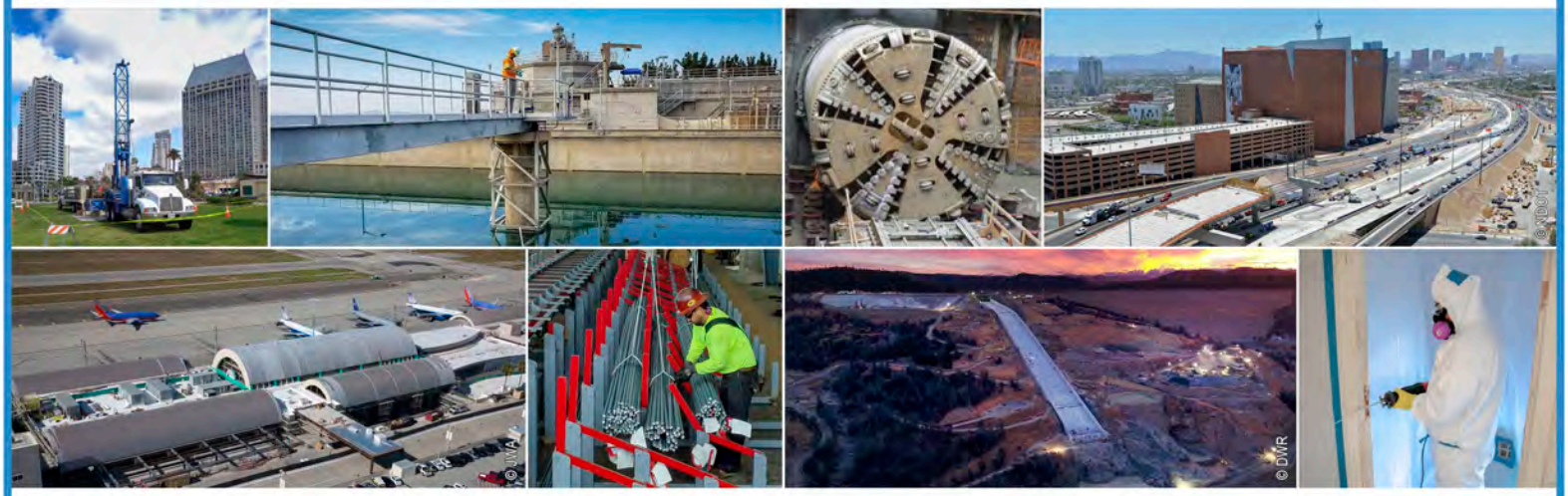
FIGURE B-15

DIRECT SHEAR TEST RESULTS

1717 GRANT STREET
DENVER, COLORADO

SAMPLE LOCATION	SAMPLE DEPTH (ft)	pH [1]	RESISTIVITY [2] (ohm-cm)	SULFATE CONTENT [3] (ppm)	(%)	CHLORIDE CONTENT [4] (ppm)
B-1, B-2	0.0-5.0	8.2	1,300	13	0.001	100
B-3, B-4, B-5, B-6, B-7	0.0-5.0	8.0	14	68	0.007	280

[1] PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4972
[2] PERFORMED IN GENERAL ACCORDANCE WITH AASHTO T288
[3] PERFORMED IN GENERAL ACCORDANCE WITH CDOT TEST METHOD CP-L 2103
[4] PERFORMED IN GENERAL ACCORDANCE WITH CDOT TEST METHOD CP-L 2104



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SECTION 03 15 13

CONCRETE ACCESSORIES - WATERSTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Waterstops for cast-in-place concrete.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, sequencing, and scheduling of the work.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of waterstop.

B. Shop Drawings: Indicate location of waterstops.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 WATERSTOPS

A. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete.

1. Product Quality of Standard: Waterstop-RX by CETCO

2. Acceptable Manufacturers: Subject to compliance with requirements, provide products from one of the following manufacturers:

a. Carlisle Coatings & Waterproofing, Inc.

b. CETCO, a Minerals Technologies company

c. Concrete Sealants, Inc.

d. Henry Company

e. JB Specialties, Inc.

f. Sika Corporation

g. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

PART 3 - EXECUTION

3.1 INSTALLATION OF WATERSTOPS

A. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated on Drawings, according to manufacturer's written instructions, by adhesive bonding, mechanically fastening, and firmly pressing into place.

1. Install in longest lengths practicable.

2. Locate waterstops in center of joint unless otherwise indicated in manufacture’s written instructions.

3. Protect exposed waterstops during progress of the Work.

END OF SECTION

SECTION 03 53 00

EXTERIOR CONCRETE TOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Exterior concrete topping used at above grade building corridors, breezeways, balconies and landings.

1.2 REFERENCES

A. ASTM C33 – Standard Specification for Concrete Aggregates

B. ASTM C150 – Standard Specification for Portland Cement

C. ASTM C260 – Standard Specification for Air Entraining Admixtures for Concrete.

D. ASTM C309 – Standard Specification for Liquid Membrane - Forming Compounds for Curing Concrete.

E. ASTM C1116 – Standard Specification for Fiber Reinforced Concrete

1.3 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Submit mix design to testing firm minimum 30 days prior to start of scheduled installation.

C. Submit manufacturer's data and installation instructions for curing compound.

D. If multiple mix designs / compressive strengths are being submitted, provide plans illustrating locations.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Do not place fill mix at ambient temperatures lower than 40 degrees F without heating mix water to 90 to 110 degrees F.

B. During low humidity conditions, sprinkle water over concrete surface to aid hydration and curing.

C. Exterior concrete topping shall not be placed when inclement weather is present or threatening.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Exterior concrete topping mixture:

1. Cement: ASTM C150, Portland Type I or Type II, Gray color.

2. Aggregate:

a. Course: Pea Gravel, maximum 3/8-inch size, ASTM C33

b. Fine: Sand, ASTM C33

3. Water: Potable, clean and free from contaminates, ASTM C94

4. Air Entrainment Agent: ASTM C260

5. Curing Compound: ASTM C309, Type I, Clear

6. Fly Ash – ASTM C618, Class C or Class F

7. Fiber Reinforcement – ASTM C1116, Type III, alkali resistant, non-absorptive, non-corrosive polypropylene micro fibers minimum of ¾-inch long.

   a. Acceptable Products:

      1) BASF Master Fiber F70

      2) BASF Fibril TUF

      3) Grace Fibers by Grace Construction Products

2.2 ACCESSORIES

A. Aluminum T-Bar Edge Closure:

1. Characteristics

   a. Material: Aluminum, 6063-T5

   b. Thickness: 0.050 inch

   c. Finish: Mill

   d. Pour Depth: 1-1/2 inch unless otherwise indicated

   e. Nail Fin: 1-7/8-inch minimum

   f. Provide removable, protective film on finished surfaces that will be exposed to view.

B. Drainage Mat: As specified in 07 13 00 Sheet Membrane Waterproofing.

C. Waterproofing Membrane: As specified in 07 13 00 Sheet Membrane Waterproofing.

2.3 MIXING

A. Twenty-eight (28) Day Compressive Strength:

1. Interior Building Corridors / Breezeways: 2,500 psi

2. Interior Stair Landings: 2,500 psi

3. Exterior Stair Landings / Balconies: 3,000 psi

B. Air Entrainment:

1. Temperate climates not subject to freeze/thaw cycle: 0-percent, +/- 1-percent.

2. Climates subject to freeze/thaw cycle: 5-percent to 6-percent, +/- 1.5-percent

C. Fly Ash: As required based on weather conditions to slow hydration process.

D. Fiber Reinforcement: 1-1/2 lb. per cu. yd., unless otherwise recommended by fiber reinforcement manufacturer.

1. Fiber reinforcement shall be introduced at batch plant.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify drainage mat, waterproofing membrane, aluminum T-bar edge, guardrail anchorage plate or sleeves and flashings are ready and suitable to receive work of this section.

B. Verify surface is broom clean and free of mud, oil and other contaminants.

3.2 INSTALLATION

A. Place concrete and screed to achieve indicated thickness, 1-1/2-inch minimum.

B. Slope concrete where indicated with a slope between ¼ inch-per-foot and 1/8 inch-per-foot. Provide crickets as required for proper drainage.

C. Provide light broom finish in direction of slope.

D. Provide tooled control joints at off-setting corners and at intervals not to exceed 6’-0” on center.

3.3 CURING

A. Air cure.

B. During hot weather application, apply curing compound in accordance with manufacturer's instructions.

END OF SECTION

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SECTION 03 54 13

GYPSUM CEMENT UNDERLAYMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Self-leveling, gypsum cement underlayment for application below interior floor coverings.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Gypsum cement underlayment

2. Primer

3. Sound control mat

B. Shop Drawings: Include plans indicating substrates, locations, and average depths of underlayment.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Test Reports:

1. For fire-resistant ratings, from a qualified testing agency.

2. For STC-rated assemblies, from a qualified testing agency.

3. For IIC-rated assemblies, from a qualified testing agency.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.

1. Place gypsum cement underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Provide materials and construction identical to those tested in assembly indicated. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

1. STC Rating: 50

C. IIC-Rated Assemblies: For IIC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E492 and classified according to ASTM E989 by an independent testing agency.

1. IIC Rating: 50

2.2 GYPSUM CEMENT UNDERLAYMENTS

A. Gypsum Cement Underlayment: Self-leveling, gypsum cement product.

1. Basis of Design: AccuCrete by Arcosa Specialty Materials

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Arcosa Specialty Materials

b. Hacker Industries

c. Maxxon Corporation

d. USG Corporation

e. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

3. Cement Binder: Gypsum or blended gypsum cement as defined by ASTM C219.

4. Compressive Strength: Not less than 2000 psi at 28 days when tested according to ASTM C472.

5. Thickness: Indicated on Drawings.

B. Aggregate: Coarse sand as recommended by underlayment manufacturer.

1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.

C. Water: Potable and at a temperature of not more than 70 deg F.

D. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

E. Corrosion-Resistant Coating: Recommended in writing by underlayment manufacturer for metal substrates.

2.3 ACCESSORIES

A. Sound Control Mat: As required to meet STC and IIC ratings, manufactured by gypsum cement underlayment manufacturer.

1. Basis of Design: AccuQuiet D25 by Arcosa Specialty Materials

a. Thickness: 1/4 inch

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for conditions affecting performance of the Work.

B. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare and clean substrate according to manufacturer's written instructions.

1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.

2. Fill substrate voids to prevent underlayment from leaking.

B. Wood Substrates: Mechanically fasten loose boards and panels to eliminate substrate movement and squeaks. Sand to remove coatings that might impair underlayment bond and remove sanding dust.

1. Install underlayment reinforcement if recommended in writing by manufacturer.

C. Metal Substrates: Mechanically remove, according to manufacturer's written instructions, rust, foreign matter, and other contaminants that might impair underlayment bond. Apply corrosion-resistant coating compatible with underlayment if recommended in writing by underlayment manufacturer.

D. Nonporous Substrates: For ceramic tile, quarry tile, and terrazzo substrates, remove waxes, sealants, and other contaminants that might impair underlayment bond; prepare surfaces according to manufacturer's written instructions.

E. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

F. Sound Control Mat: Install sound control materials according to manufacturer's written instructions.

1. Do not install mechanical fasteners that penetrate through the sound control materials.

3.3 INSTALLATION

A. Mix and install underlayment components according to manufacturer's written instructions.

1. Close areas to traffic during underlayment installation and for time period after installation recommended in writing by manufacturer.

2. Coordinate installation of components to provide optimum adhesion to substrate and between coats.

3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Install underlayment to produce uniform, level surface.

1. Feather edges to match adjacent floor elevations.

D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during installation and curing processes.

E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.

F. If required or recommended by manufacturer, apply surface sealer at rate recommended by manufacturer.

G. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.4 PROTECTION

A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION

SECTION 03 62 13

NON-METALLIC NON-SHRINK GROUTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-shrink, non-metallic, high strength cementitious grout for non-structural applications.

1.2 SUBMITTALS

A. Product Data: For each material and product.:

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Subject to compliance with requirements, provide products by the following manufacturers:

1. CTS Cement Manufacturing Corp.

2. Euclid Chemical Company

3. SAKCRETE of North America, LLC

4. Sika Corporation

5. QUIKRETE

2.2 MATERIALS:

A. High-Strength, Non-Metallic, Portland cement based non-shrink grout.

1. Comply with ASTM C1107 or CRD-C 621

2. Strength: 28-day compressive strength shall be 5,000 psi

a. Refer to Structural drawings and specifications for required strength values at structural conditions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to ensure bonding surfaces are clean, sound and free of materials that would inhibit bond.

3.2 PREPARATION

A. Protect adjacent surfaces from mixing, handling and application of materials.

3.3 INSTALLATION

A. Mix and install according to manufacturer’s printed instructions.

END OF SECTION

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SECTION 04 05 19

MASONRY ANCHORAGE AND REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes single wythe and cavity wall masonry anchorage and reinforcing

1.2 REFERENCES

A. TMS 602/ACI 530.1/ASCE 6 - Specifications for Masonry Structures.

B. ASTM A 82 - Standard Specification for Cold-Drawn Steel Wire for Concrete Reinforcement.

C. ASTM A 153 - Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware.

D. ASTM A 167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

E. ASTM A 366 - Standard Specification for Steel Sheet, Carbon, Cold-Rolled, Commercial Quality.

F. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.

G. ASTM A 569 - Standard Specification for Steel, Carbon (0.15 Maximum Percent), Hot-Rolled Sheet and Strip Commercial Quality.

H. ASTM A 580 - Standard Specification for Stainless and Heat-Resisting Steel Wire.

I. ASTM A 641 - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, mock-ups, sequencing, and scheduling of the work.

1.4 SUBMITTALS

A. Product Data: For each type of product.

B. Submit under provisions of Section 01 33 00.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products by manufacturer’s listed below, meeting the indicated requirements, are acceptable for use:

1. Hohmann & Barnard, Inc

2. Dur-O-Wall

3. Heckman Building Products

4. Wire-bond

5. Blok-Lok

6. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.2 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A1064, with ASTM A153, Class B-2 coating.

2. Stainless Steel Wire: ASTM A580, Type 304

3. Steel Sheet, Galvanized after Fabrication: ASTM A1008, Commercial Steel, with ASTM A153, Class B coating.

C. Masonry Veneer Anchors:

1. General:

a. Fabricate sheet metal anchor sections and other sheet metal parts from 0.0785-inch (14 gauge) thick steel sheet, galvanized after fabrication

b. Fabricate wire ties from 0.187-inch (3/16 inch) diameter, hot-dipped galvanized steel wire unless otherwise indicated.

2. Adjustable Masonry Veneer Anchors, Slotted Plate: Sheet metal anchor section, with screw holes at top and bottom, with raised rib-stiffened strap stamped into center to provide a slot between strap and base for wire tie.

a. Anchor Plate Basis of Design: DW-10HS Veneer Anchor by Hohmann & Barnard

b. Wire Tie Basis of Design (non-seismic): VBT – Vee Byna-Tie by Hohmann & Barnard

c. Wire Tie Basis of Design (seismic): Byna-Lok™ Wire Tie by Hohmann & Barnard

3. Adjustable Masonry Veneer Anchor, Single-Barrell Screw: Self-drilling, single-barrel screw designed to receive wire tie. Screw has a smooth barrel the same thickness as insulation with factory-installed gasketed washer to seal at face of insulation and sheathing.

a. Single-Barrell Screw Basis of Design: 2-Seal Tie by Hohmann & Barnard

b. Wire Ties Basis of Design: 2-Seal Byna-Lok by Hohmann & Barnard

4. Adjustable Masonry Veneer Anchor, Single-Barrell Screw with Double-Pintle Wingnut: Self-drilling, single-barrel screw with wingnut head designed to receive double-pintle wire tie. Screw has a smooth barrel the same thickness as insulation with factory-installed gasketed washer to seal at face of insulation and sheathing.

D. CMU Joint Reinforcement: Refer to 04 22 00 - Concrete Unit Masonry Section

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories in accordance with manufacturer's product data and TMS 602/ACI 530.1/ASCE 6 - Specifications for Masonry Structures.

B. Mechanically fasten masonry veneer wall anchors into studs after sheathing and weather resistive barrier installation using corrosion resistant fasteners. Coordinate with weather barrier manufacturer to ensure that installation of veneer anchors is completed per the weather barrier manufacturer's requirements.

END OF SECTION

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SECTION 04 05 23

MASONRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes miscellaneous masonry accessories.

1.2 REFERENCES

A. American Concrete Institute (ACI)

B. American Society for Testing and Materials (ASTM)

C. TMS 602/ACI 530.1/ASCE 6 - Specifications for Masonry Structures.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, mock-ups, sequencing, and scheduling of the work.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Submit manufacturer's product data and agency test reports of materials selected

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products of manufacturer’s listed below, meeting the indicated requirements, are acceptable for use:

1. Hohmann & Barnard, Inc

2. Dur-O-Wall

3. Heckman Building Products

4. Wire-Bond

5. Advanced Building Products

6. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.2 MATERIALS

A. Pressure Relief Joint Material: Pre-molded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 25 percent, of widths and thickness indicated; formulated from neoprene

1. Basis of Design: Hohmann & Barnard, Inc. NS Closed Cell Neoprene Sponge, 3/8” or 1/2” thickness as required. Provide pressure sensitive adhesive one side at indicated locations.

B. Cellular Plastic Weep Accessory: One-piece extrusion made from UV resistant polypropylene, full height and width of head joint and depth ½ inch less than depth of outer wythe, color as selected by Architect from manufacturer's standard selections

1. Basis of Design: Hohmann & Barnard, Inc.; QV Quadro-Vent.

C. Concrete Reglet: Hohmann & Barnard, Inc.; CR Masonry Reglet, PVC material with tear-off face piece; 10-foot lengths by 3/4 inch deep.

D. Mesh Hardware Cloth: Hohmann & Barnard, Inc.; MGS Mortar Grout Screen

E. Drip Plate: Hohmann & Barnard, Inc.; Standard Drip Plate (DP), Stainless steel (Type 304)

F. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within wall cavity. Full depth of cavity and 10 inches high, with dovetail-shaped notches 7 inches deep that prevent clogging with mortar droppings.

1. Basis of Design: Hohmann & Barnard, Inc.; Mortar Net

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrates are ready to receive work.

3.2 INSTALLATION

A. Weep Accessories

1. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

2. Install specified weep accessory in veneers in head joints of first course of masonry immediately above embedded flashing

3. Clean flashing and weep holes free of mortar droppings and debris.

4. Align exterior face of insert with exterior plane of mortar.

5. For head joints taller than height of mesh insert, coordinate installation of mortar above insert to prevent clogging.

B. Cavity Drainage

1. Place cavity drainage material in airspace behind veneers in compliance with manufacturer's installation instructions.

C. Concrete Reglets

1. Coordinate reglet work with work of other trades for proper time and sequence to avoid construction delays.

2. Install reglets in accordance with manufacturer's instructions.

3. Accurately fit, align, securely fasten and install free from distortion or defects.

END OF SECTION

SECTION 04 21 13

BRICK MASONRY VENEER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Brick

2. Mortar materials

3. Mortar mixes

4. Accessories

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, mock-ups, sequencing, and scheduling of the work.

1.3 SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each type and color of brick and colored mortar.

C. Material Certificates: For each type and size of product.

D. Brick manufacturer shall certify in writing that products, material and methods used in brick manufacturer do not contain lead, asbestos or polychlorinated biphenyls (PCB).

1.4 MOCKUPS

A. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects.

1. Build mockup of typical wall area as shown on Drawings.

2. When no mock-up is shown in Drawings, build mockup of typical wall area:

a. Size: 48 inches long by 60 inches high

b. Include outside corner on one end of mockup and inside corner on other end.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.5 DELIVERY, STORAGE AND HANDLING

A. Brick veneer, mortar materials and accessories shall be delivered to job site, stored and handled in accordance with Section 01 87 00.

1.6 FIELD CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602.

PART 2 - PRODUCTS

2.1 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602, except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects will be exposed in the completed Work.

2.2 BRICK

A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units.

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.

2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Clay Face Brick: Facing brick complying with ASTM C216 or hollow brick complying with ASTM C652, Class H40V (void areas between 25 and 40 percent of gross cross-sectional area

1. Grade SW

2. Type FBS for facing brick or Type HBS for hollow brick

3. Efflorescence: Provide brick that has been tested in accordance with ASTM C67 and is rated "not effloresced."

4. Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing in accordance with ASTM C67 with no observable difference in the applied finish when viewed from 10 ft.

5. Size (Actual Dimensions): King, 2-3/4 inches wide by 2-3/4 inches high by 9-5/8 inches long.

6. Color and Texture: As selected by Architect and verified at mock-up.

C. Clay Face Brick, Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Acme Brick Company

2. Belden Brick Company

3. Boral Bricks, Inc.

4. Endicott Clay Products Co.

5. General Shale Brick

6. Glen-Gery Corp.

7. Yankee Hill Brick & Tile

8. Hebron Brick

9. Interstate Brick

10. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.3 MORTAR MATERIALS

A. Portland Cement: ASTM C150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated

1. Low-Alkali: Not more than 0.60 percent total alkali when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: ASTM C91.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Argos USA LLC

b. Cemex SAB de CV

c. Fairborn Cement Company

d. Federal White Cement Ltd.

e. Holcim (US) Inc.

f. Lafarge North America Inc.

g. Lehigh Hanson, Heidelberg Cement Group

h. Lehigh White Cement Company

i. QUICKRETE

j. SAKRETE of North America LLC

E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979. Use only pigments with a record of satisfactory performance in masonry mortar.

F. Colored Cement Products: Packaged blend made from portland cement and hydrated lime or masonry cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.

G. Preblended Dry Mortar Mix: Packaged blend made from portland cement and hydrated lime or masonry cement, sand, mortar pigments, and admixtures and complying with ASTM C1714.

1. Preblended Dry Portland Cement Mortar Mix:

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1) Amerimix

2) QUIKRETE

3) SAKRETE of North America LLC

4) Spec Mix LLC

2. Preblended Dry Masonry Cement Mortar Mix:

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1) Amerimix

2) Spec Mix LLC

H. Aggregate for Mortar: ASTM C144.

1. White-Mortar Aggregates: Natural white sand or crushed white stone.

2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

I. Water: Potable.

2.4 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A1064, with ASTM A153, Class B-2 coating.

2. Stainless Steel Wire: ASTM A580, Type 304

3. Steel Sheet, Galvanized after Fabrication: ASTM A1008, Commercial Steel, with ASTM A153, Class B coating.

C. Masonry-Veneer Anchors: Refer to 04 05 19 – Masonry Anchorage and Reinforcing

2.5 ACCESSORIES

A. Compressible Filler: Refer to 04 05 53 - Masonry Accessories

B. Weep/Vent Products: Refer to 04 05 53 - Masonry Accessories

C. Cavity Drainage Material: Refer to 04 05 53 - Masonry Accessories

D. Thru-Wall Flashing: Refer to 07 65 00 – Flexible Flashing

E. Steel Angle Lintels: Galvanized steel, size and length as specified by Structural Engineer.

F. Brick Cleaner: Type as recommended by brick manufacturer designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces.

2.6 MORTAR MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

2. Use portland cement-lime or masonry cement mortar unless otherwise indicated.

3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry:

1. Comply with ASTM C270, Proportion Specification.

2. Use Type N unless another type is indicated.

3. Mortar Color: As selected by Architect from manufacturer’s full range

D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

1. Pigments shall not exceed 10 percent of portland cement by weight.

2. Pigments shall not exceed 5 percent of masonry cement by weight.

3. Application: Use pigmented mortar for exposed mortar joints.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

C. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested in accordance with ASTM C67. Allow units to absorb water so they are damp but not wet at time of laying.

3.2 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.

2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.

3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2-inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 ft., or 1/2-inch maximum.

2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 ft., 1/4 inch in 20 ft., or 1/2-inch maximum.

3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., or 1/2-inch maximum.

4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 ft., 1/4 inch in 20 ft., or 1/2-inch maximum.

5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., or 1/2-inch maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.

2. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

3.3 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

A. Lay masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.5 ANCHORED MASONRY VENEERS

A. Anchor masonry veneers to wall framing and concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:

1. Fasten anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.

2. Embed tie sections in masonry joints.

3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.

4. Veneer anchor spacing:

a. Metal Stud Construction: Space anchors as indicated, but not more than 18 inches o.c. vertically and 24 inches o.c. horizontally, with not less than one anchor for each 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.

b. Wood Frame Construction, less than 40 psf wind load: Space anchors as indicated, but not more than 16 inches o.c. vertically and 25 inches o.c. horizontally, with not less than one anchor for each 2.67 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.

c. Wood Frame Construction, 40 psf to 55 psf wind load: Space anchors as indicated, but not more than 18 inches o.c. vertically and horizontally. Install additional anchors within 12 inches of openings and at intervals, not exceeding 24 inches, around perimeter.

B. Provide not less than 2 inches of airspace between back of masonry veneer and face of sheathing or insulation.

3.6 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete to comply with the following:

1. Provide an open space not less than 1 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.

2. Anchor masonry with anchors embedded in masonry joints and attached to structure.

3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.7 FLASHING, WEEP HOLES, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

2. Extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches; integrate flashing with weather-resistive barrier or air barrier as indicated in Drawings.

3. At lintels and shelf angles, extend flashing 6 inches minimum at each end. At heads and sills, extend flashing 6 inches minimum and turn ends up not less than 2 inches to form end dams.

4. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.

5. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.

C. Install weep holes in veneers in head joints of first course of masonry immediately above embedded flashing.

1. Use specified weep/cavity vent products to form weep holes.

2. Weep hole spacing:

a. Base of walls: 20 inches o.c. unless otherwise indicated.

b. Above lintels over exterior windows, doors and other openings: Every fourth course.

D. Keep cavity air space clean of mortar. Place cavity drainage material in airspace behind veneers.

3.8 EXPANSION CONTROL

A. Brick Masonry Control Joints:

1. Make joints ½ inch wide, unless otherwise indicated

2. Keep joint clear of mortar and other rigid materials

3. Stop horizontal joint reinforcement 1 inch from control joint

4. Fill joint with sealant and backer rod as shown on Drawings

5. Provide control joint at following locations:

a. Where indicated in Drawings

b. Between brick veneer and structural steel or concrete

c. Between brick veneer and adjacent window and door frame

d. Between brick veneer and non-masonry finish materials

e. When brick veneer height changes by more than 20%

f. At uninterrupted veneer walls, place joints approximately 25 feet apart (max)

3.9 CLEANING

A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles or other non-metallic tools.

2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent brick and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.

4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

5. Clean brick by bucket-and-brush hand-cleaning method as described in BIA Technical Notes 20.

END OF SECTION

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SECTION 04 21 13.13

ADHERED THIN BRICK MASONRY VENEER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Thick-set thin brick masonry adhered to wood framing and sheathing.

1.2 REFERENCES

A. ASTM C 67 – Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile

B. ASTM C 1088 – Standard Specification for Thin Veneer Brick Units

C. TMS 602/ACI 530.1/ASCE 6 - Building Code Requirements and Specification for Masonry Structures

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, mock-ups, sequencing, and scheduling of the work.

1.4 ACTION SUBMITTALS

A. Product Data: For each variety of thin brick, brick accessory, and manufactured product.

B. Samples:

1. For each thin brick type indicated.

2. For each color of mortar indicated.

1.5 QUALITY ASSURANCE

A. Comply with TMS 602/ACI 530.1/ASCE 6

B. Comply with all applicable codes, regulations and standards.

C. Coordination with facing brick veneer:

1. Provide thin brick similar in texture, color and physical properties to facing brick veneer utilized on Project

2. Provide mortar color similar in texture, color and physical properties to mortar used at facing brick veneer locations

1.6 FIELD CONDITIONS

A. Protection of Thin Brick Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work.

B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until masonry has dried.

C. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 THIN BRICK MASONRY

A. Field Cut Thin Brick Masonry:

1. Refer to Brick Masonry Veneer Section

B. Manufactured Thin Brick Masonry:

1. Material Standard: Comply with ASTM C 1088

a. Grade: Exterior

b. Type: TBS

c. Thickness: 1-inch

d. Face Dimensions: Match brick masonry veneer face dimensions.

2.2 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II, except Type III may be used for cold-weather construction; natural color or white cement may be used as required to produce mortar color indicated.

1. Low-Alkali Cement: Not more than 0.60 percent total alkali when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Masonry Cement: ASTM C 91.

D. Aggregate: ASTM C 144 and as follows:

E. Water: Potable.

2.3 MORTAR MIXES

A. Mortar for scratch and bond coats shall comply with ASTM C 270, Type S

2.4 WEATHER RESISTIVE BARRIERS

A. Base Layer: As indicated at Section 07 27 08 “Mechanically Attached Water Resistive Barriers”

B. Second Layer: Asphalt-Saturated, Vapor Permeable Building Paper: FS UU-B-790a, Type I, Grade D, Style 2 vapor-permeable building paper; minimum 10 perms (ASTM E96)

2.5 REINFORCING LATH AND ACCESSORIES

A. Diamond-Mesh-Metal Lath: ASTM C847, cold-rolled carbon-steel sheet with ASTM A653, G60 (Z180), hot-dip galvanized-zinc coating. Self-furring, 2.5 lb/sq. yd.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

    a. Alabama Metal Industries Company (AMICO)

    b. CEMCO

    c. Clark Dietrich

    d. MarinoWARE

    e. Phillips Manufacturing Company

    f. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Architect approval. Comply with Section 01 25 13

B. Metal Accessories:

1. General: Comply with ASTM C1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

    a. Alabama Metal Industries Company (AMICO)

    b. Brand X Metals

    c. CEMCO

    d. Clark Dietrich

    e. MarinoWARE

    f. Phillips Manufacturing Company

    g. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Architect approval. Comply with Section 01 25 13

3. Foundation Weep Screed: Fabricated from zinc (ASTM B69).

    a. Basis of Design: Foundation Weep Screed No. 7 by AMICO

4. Cornerite: Fabricated from metal lath with ASTM A653, G60, hot-dip galvanized-zinc coating.

5. Outside-Corner Reinforcement: Fabricated from metal lath with ASTM A653, G60, hot-dip galvanized-zinc coating.

6. Cornerbeads: Fabricated from zinc, ASTM B69

    a. Smallnose cornerbead with expanded flanges; use unless otherwise indicated.

7. Casing Beads: Fabricated from zinc (ASTM B69); square-edged style; with expanded flanges. Provide weep holes at indicated locations.

    a. Basis of Design: X-66 Casing Bead by AMICO

C. Bonding Agent: Exterior integral bonding agent meeting ASTM C932

D. Sealer: Clear, water-based silane or siloxane water repellent, type as recommended by stone masonry manufacturer.

E. Fasteners for Attaching Metal Lath to Substrates: ASTM C1063.

F. Wire: ASTM A641, Class 1 zinc coating, soft temper, not less than 0.0475-inch diameter unless otherwise indicated.

2.6 MASONRY CLEANERS

A. Masonry Cleaner: Type as recommended by brick manufacturer designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces.

PART 3 - EXECUTION

3.1 PREPARATION / EXAMINATION

A. Surfaces receiving thin brick should be structurally sound and free of loose or deleterious debris or residue.

B. Surfaces receiving thin brick veneer must not vary from plane by more than 1/4 inch in 10 feet.

C. Ensure proper application of weather resistive barrier.

3.2 INSTALLATION

A. Install embedded flashing over sheathing and behind building paper or wrap by fastening through sheathing into framing.

B. Install lath over building paper or wrap by fastening through sheathing into framing to comply with ASTM C 1063.

C. Install scratch coat over metal lath ½ inch thick to comply with ASTM C 926.

D. Apply cement-based bond coat of mortar or modified mortar to scratch coat at nominal thickness 1/8 inch and groove with notched trowel.

E. Coat back of brick units with cement-based bond coat.

F. Firmly press or tap thin brick into mortar while maintaining joint width and coursing.

G. Movement Joints:

1. Space no more than 18 feet on center in either direction and where indicated on Drawings

2. Extend movement joints through thickness of entire veneer assembly

3.3 ADJUSTING AND CLEANING

A. In-Progress Cleaning: Clean brick masonry as work progresses. Remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean brick masonry as follows:

1. Remove large mortar particles by hand with wooden paddles or other non-metallic tools.

2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent brick and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.

4. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.

5. Clean brick by bucket-and-brush hand-cleaning method as described in BIA Technical Notes 20.

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SECTION 04 21 16

DECORATIVE CONCRETE MASONRY UNIT VENEER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Decorative Concrete Masonry Units

2. Mortar materials

3. Mortar mixes

4. Accessories

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, mock-ups, sequencing, and scheduling of the work.

1.3 SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each type and color of decorative concrete masonry unit and colored mortar.

C. Material Certificates: For each type and size of product.

D. Decorative concrete masonry unit manufacturer shall certify in writing that products, material and methods used in decorative CMU manufacturer do not contain lead, asbestos or polychlorinated biphenyls (PCB).

1.4 MOCKUPS

A. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects.

1. Build mockup of typical wall area as shown on Drawings.

2. When no mock-up is shown in Drawings, build mockup of typical wall area:

a. Size: 48 inches long by 60 inches high

b. Include outside corner on one end of mockup and inside corner on other end.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.5 DELIVERY, STORAGE AND HANDLING

A. Decorative concrete masonry units, mortar materials and accessories shall be delivered to job site, stored and handled in accordance with Section 01 87 00.

1.6 FIELD CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602.

PART 2 - PRODUCTS

2.1 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602, except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects will be exposed in the completed Work.

2.2 SOURCE LIMITATIONS

A. Obtain exposed masonry units from single source.

2.3 DECORATIVE CONCRETE MASONRY UNITS

A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units.

1. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Decorative CMUs: ASTM C90, normal weight

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Best Block, a Quikrete Company

b. Cemex

c. Texas Building Products, Inc.

d. Westbrook Concrete Block

e. York Building Products

f. Basalite Concrete Products

g. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Nominal Face Dimensions: 16 inches long x 6 inches high

3. Size: Manufactured to dimensions 3/8 inch less than nominal dimensions.

4. Pattern and Texture: Standard pattern, split-face finish

5. Colors: As selected by Architect from manufacturer’s full range.

6. Special Aggregate: Provide units made with aggregate matching aggregate in Architect's sample.

2.4 MORTAR MATERIALS

A. Portland Cement: ASTM C150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated

1. Alkali content will not be more than 0.1 percent when tested in accordance with ASTM C114.

B. Hydrated Lime: ASTM C207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: ASTM C91/C91M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Argos USA LLC

b. Cemex SAB de CV

c. Fairborn Cement Company

d. Federal White Cement Ltd.

e. Holcim (US) Inc.

f. Lafarge North America Inc.

g. Lehigh Hanson, Heidelberg Cement Group

h. Lehigh White Cement Company

i. QUICKRETE

j. SAKRETE of North America LLC

E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979. Use only pigments with a record of satisfactory performance in masonry mortar.

F. Colored Cement Products: Packaged blend made from portland cement and hydrated lime or masonry cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.

G. Preblended Dry Mortar Mix: Packaged blend made from portland cement and hydrated lime or masonry cement, sand, mortar pigments, and admixtures and complying with ASTM C1714.

1. Preblended Dry Portland Cement Mortar Mix:

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1) Amerimix

2) QUIKRETE

3) SAKRETE of North America LLc

4) Spec Mix LLC

2. Preblended Dry Masonry Cement Mortar Mix:

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1) Amerimix

2) Spec Mix LLC

H. Aggregate for Mortar: ASTM C144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

3. White-Mortar Aggregates: Natural white sand or crushed white stone.

4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

I. Water: Potable.

2.5 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A1064, with ASTM A153, Class B-2 coating.

2. Stainless Steel Wire: ASTM A580, Type 304.

3. Steel Sheet, Galvanized after Fabrication: ASTM A1008, Commercial Steel, with ASTM A153, Class B coating.

C. Masonry-Veneer Anchors: Refer to 04 05 19 – Masonry Anchorage and Reinforcing

2.6 ACCESSORIES

A. Compressible Filler: Refer to 04 05 53 - Masonry Accessories

B. Weep/Vent Products: Refer to 04 05 53 - Masonry Accessories

C. Cavity Drainage Material: Refer to 04 05 53 - Masonry Accessories

D. Thru-Wall Flashing: Refer to 07 65 00 – Flexible Flashing

E. Steel Angle Lintels: Galvanized steel**,** size and length as specified by Structural Engineer.

F. Masonry Cleaner: Type as recommended by masonry manufacturer designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces.

2.7 MORTAR MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

2. Use portland cement-lime or masonry cement mortar unless otherwise indicated.

3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry:

1. Comply with ASTM C270, Proportion Specification.

2. Use Type N unless another type is indicated.

3. Mortar Color: As selected by Architect from manufacturer’s full range

D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

1. Pigments shall not exceed 10 percent of portland cement by weight.

2. Pigments shall not exceed 5 percent of masonry cement by weight.

3. Application: Use pigmented mortar for exposed mortar joints.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

3.2 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.

2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.

3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 ft., or 1/2-inch maximum.

2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 ft., 1/4 inch in 20 ft., or 1/2-inch maximum.

3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., or 1/2-inch maximum.

4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 ft., 1/4 inch in 20 ft., or 1/2-inch maximum.

5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., or 1/2-inch maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.

2. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

3.3 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

A. Lay masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.5 ANCHORED MASONRY VENEERS

A. Anchor masonry veneers to wall framing and concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:

1. Fasten anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.

2. Embed tie sections in masonry joints.

3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.

4. Veneer anchor spacing:

a. Metal Stud Construction: Space anchors as indicated, but not more than 18 inches o.c. vertically and 24 inches o.c. horizontally, with not less than one anchor for each 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.

b. Wood Frame Construction, less than 40 psf wind load: Space anchors as indicated, but not more than 16 inches o.c. vertically and 25 inches o.c. horizontally, with not less than one anchor for each 2.67 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.

c. Wood Frame Construction, 40 psf to 55 psf wind load: Space anchors as indicated, but not more than 18 inches o.c. vertically and horizontally. Install additional anchors within 12 inches of openings and at intervals, not exceeding 24 inches, around perimeter.

B. Provide not less than 2 inches of airspace between back of masonry veneer and face of sheathing or insulation.

3.6 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete to comply with the following:

1. Provide an open space not less than 1 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.

2. Anchor masonry with anchors embedded in masonry joints and attached to structure.

3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.7 FLASHING, WEEP HOLES, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

2. Extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches; integrate flashing with weather-resistive barrier or air barrier as indicated in Drawings.

3. At lintels and shelf angles, extend flashing 6 inches minimum at each end. At heads and sills, extend flashing 6 inches minimum and turn ends up not less than 2 inches to form end dams.

4. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.

5. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.

C. Install weep holes in veneers in head joints of first course of masonry immediately above embedded flashing.

1. Use specified weep/cavity vent products to form weep holes.

2. Weep hole spacing:

a. Base of walls: 20 inches o.c. unless otherwise indicated.

b. Above lintels over exterior windows, doors and other openings: Every fourth course.

D. Keep cavity air space clean of mortar. Place cavity drainage material in airspace behind veneers.

3.8 EXPANSION CONTROL

A. Masonry Control Joints:

1. Make joints ½ inch wide, unless otherwise indicated

2. Keep joint clear of mortar and other rigid materials

3. Stop horizontal joint reinforcement 1 inch from control joint

4. Fill joint with sealant and backer rod as shown on Drawings

5. Provide control joint at following locations:

a. Where indicated in Drawings

b. Between masonry veneer and structural steel or concrete

c. Between masonry veneer and adjacent window and door frame

d. Between masonry veneer and non-masonry finish materials

e. When masonry veneer height changes by more than 20%

f. At uninterrupted veneer walls, please joints approximately 25 feet apart (max)

3.9 CLEANING

A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles or other non-metallic tools.

2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.

4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

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SECTION 04 22 00

CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units.

2. Steel reinforcing bars.

1.2 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For reinforcing steel. Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type and size of product. For masonry units, include data on material properties and material test reports substantiating compliance with requirements.

B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109 for compressive strength, ASTM C1506 for water retention, and ASTM C91 for air content.

2. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.

1.5 QUALITY ASSURANCE

A. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects.

1. Build sample panels for each type of decorative or pre-faced unit masonry construction in sizes approximately 48 inches long by 36 inches high by full thickness.

1.6 FIELD CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

1. If required by authority having jurisdiction, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction where fire-resistance-rated construction is indicated

2.2 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

B. Integral Water Repellent: Provide units made with integral water repellent where indicated.

C. Insulated CMUs: Where indicated, units shall contain rigid, specially shaped, molded-polystyrene insulation units complying with ASTM C578, Type I, designed for installing in cores of masonry units.

D. CMUs: ASTM C90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi

2. Density Classification: Medium weight or Normal weight unless otherwise indicated.

3. Nominal Face Dimensions: 16 inches long by 8 inches high

E. Concrete Building Brick: ASTM C55.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2500 psi.

2.3 CONCRETE LINTELS

A. Concrete Lintels: ASTM C1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength not less than that of CMUs.

2.4 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: ASTM C91.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Cemex SAB de CV

b. Essroc

c. Holcim (US) Inc.

d. Lafarge North America, Inc

e. Lehigh Hanson; Heidelberg Cement Group

E. Aggregate for Mortar: ASTM C144.

1. White-Mortar Aggregates: Natural white sand or crushed white stone.

2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

F. Aggregate for Grout: ASTM C404.

G. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.

H. Water: Potable.

2.5 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A615 or ASTM A996, Grade 60

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

C. Masonry-Joint Reinforcement, General: ASTM A951.

1. Interior Walls: Mill-galvanized, carbon steel.

2. Exterior Walls: Hot-dip galvanized carbon steel.

3. Wire Size for Side Rods: 0.148-inch (9 gauge) diameter.

4. Wire Size for Cross Rods: 0.148-inch (9 gauge) diameter.

5. Spacing of Cross Rods: Not more than 16 inches o.c.

6. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

2.6 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82, with ASTM A153, Class B-2 coating.

2. Steel Sheet, Galvanized after Fabrication: ASTM A1008, Commercial Steel, with ASTM A153, Class B coating.

3. Steel Plates, Shapes, and Bars: ASTM A36.

B. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, hot-dip galvanized-steel wire.

2. Tie Section: Triangular-shaped wire tie made from minimum 0.187-inch-diameter, hot-dip galvanized-steel wire.

C. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from steel sheet, galvanized after fabrication, thickness as required based on application, but not less than 0.060-inch-thick

2. Tie Section: Triangular-shaped wire tie made from 0.187-inch-diameter, hot-dip galvanized-steel wire.

D. Partition Top Anchors: 0.105-inch-thick metal plate with a 3/8-inch-diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

E. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4-inch-thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.

1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A153.

2.7 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide concealed / embedded metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

1. Stainless Steel: ASTM A240 or ASTM A666, Type 304, 0.016 inch (28 gauge) thick.

2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.

3. Fabricate metal drip edges from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.

4. Fabricate metal sealant stops from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch and down into joint 1/4 inch to form a stop for retaining sealant backer rod.

5. Fabricate metal expansion-joint strips from stainless steel to shapes indicated.

B. Single-Wythe CMU Flashing System: System of CMU cell flashing pans and interlocking CMU web covers made from UV-resistant, high-density polyethylene. Cell flashing pans have integral weep spouts designed to be built into mortar bed joints and that extend into the cell to prevent clogging with mortar.

C. Solder and Sealants for Sheet Metal Flashings: As specified in Section 07 60 00 "Metal Flashing and Sheet Metal."

D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.8 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: As specified in Section 04 05 23 “Masonry Accessories”

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 or PVC, complying with ASTM D2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226, Type I (No. 15 asphalt felt).

2.9 MASONRY-CELL FILL

A. Loose-Fill Insulation: Perlite complying with ASTM C549, Type II (surface treated for water repellency and limited moisture absorption) or Type IV (surface treated for water repellency and to limit dust generation).

B. Lightweight-Aggregate Fill: ASTM C331.

2.10 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

2. Use portland cement-lime or masonry cement mortar unless otherwise indicated.

3. For exterior masonry, use portland cement-lime or masonry cement mortar.

4. For reinforced masonry, use portland cement-lime or masonry cement mortar.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated in Structural Drawings.

1. For masonry below grade or in contact with earth, use Type M or Type S

2. For reinforced masonry, use Type M or Type S

3. For mortar parge coats, use Type S or Type N.

4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.

5. For interior non-load-bearing partitions, Type O may be used instead of Type N.

D. Grout for Unit Masonry: Comply with ASTM C476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.

2. Proportion grout in accordance with ASTM C476, paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.

3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.2 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.

2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.

3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2-inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.

2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.

3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.

5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.

2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.

3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.3 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

D. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

E. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.

F. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

A. Lay hollow CMUs as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.

2. Bed webs in mortar in all courses of piers, columns, and pilasters.

3. Bed webs in mortar in grouted masonry, including starting course on footings.

4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.

B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.5 MASONRY-CELL FILL

A. Pour loose-fill insulation or lightweight-aggregate fill into cavities to fill void spaces. Maintain inspection ports to show presence of fill at extremities of each pour area. Close the ports after filling has been confirmed. Limit the fall of fill to one story high, but not more than 20 feet.

B. Install molded-polystyrene insulation units into masonry unit cells before laying units.

3.6 MASONRY-JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement as indicated in Structural Drawings but not less than:

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:

1. Provide an open space not less than 1/2-inch-wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.

2. Anchor masonry with anchors embedded in masonry joints and attached to structure.

3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.8 EXPANSION AND CONTROL JOINTS

A. Expansion Joints:

1. Make joints 1 inch wide, unless indicated otherwise

2. Keep joint clear of mortar by temporarily filling with fiberboard as wall is laid.

3. Stop horizontal joint reinforcement 1 inch from expansion joint.

4. Build in expansion flashing as work progresses.

5. Leave joint open and clean for sealants in accordance with Joint Sealants Section.

B. Control Joints

1. Make joints ½ inch wide, unless otherwise indicated

2. Keep joint clear of mortar by temporarily filling with fiberboard as wall is laid

3. Stop horizontal joint reinforcement 1 inch from control joint

4. Provide control joints at following locations:

a. Where indicated in Drawings

b. At intersection of non-load-bearing CMU walls and concrete walls and columns

c. At intersection of non-load-bearing CMU walls and structural steel framing

d. At abrupt changes in wall height

e. At running CMU walls space joints 37’-4” apart maximum

3.9 FLASHING

A. General: Install embedded flashing at ledges and other obstructions to downward flow of water in wall where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape.

2. At lintels, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.

3. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.

C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

3.10 REINFORCED UNIT MASONRY

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

2. Limit height of vertical grout pours to not more than 60 inches.

3.11 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

3.12 PARGING

A. Parge exterior faces of below-grade masonry walls, where indicated, in two uniform coats to a total thickness of 3/4 inch. Dampen wall before applying first coat, and scarify first coat to ensure full bond to subsequent coat.

B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot. Form a wash at top of parging and a cove at bottom.

C. Damp-cure parging for at least 24 hours and protect parging until cured.

3.13 REPAIRING, POINTING, AND CLEANING

A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles or other non-metallic tools.

2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.

3. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

END OF SECTION

SECTION 04 43 13.13

ANCHORED STONE MASONRY VENEER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Stone masonry anchored to concrete backup.

2. Stone masonry anchored to unit masonry backup.

3. Stone masonry anchored to wood framing and sheathing.

4. Stone masonry anchored to cold-formed metal framing and sheathing.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, mock-ups, sequencing, and scheduling of the work.

1.3 ACTION SUBMITTALS

A. Product Data: For each variety of stone, stone accessory, and manufactured product.

B. Samples:

1. For each stone type indicated.

2. For each color of mortar required.

1.4 QUALITY ASSURANCE

A. Sample Panels: Provide sample panels to verify selections made and to demonstrate aesthetic effects of each type and to establish quality standards for installation.

1. Build mockup of typical wall area as shown on Drawings.

2. When no mock-up is shown in Drawings, build mockup of typical wall area:

a. Size: 48 inches long by 60 inches high

b. Include outside corner on one end of mockup and inside corner on other end.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.5 FIELD CONDITIONS

A. Protection of Stone Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work.

B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried.

C. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 LIMESTONE

A. Material Standard: Comply with ASTM C568.

1. Classification: II Medium Density

2.2 QUARTZ-BASED STONE

A. Material Standard: Comply with ASTM C616.

2.3 MORTAR MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I or Type II, except Type III may be used for cold-weather construction; natural color or white cement may be used as required to produce mortar color indicated.

1. Low-Alkali Cement: Not more than 0.60 percent total alkali when tested according to ASTM C114.

B. Hydrated Lime: ASTM C207, Type S.

C. Masonry Cement: ASTM C91.

D. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979. Use only pigments with a record of satisfactory performance in stone masonry mortar.

E. Colored Portland Cement-Lime Mix: Packaged blend of portland cement, hydrated lime, and mortar pigments. Mix shall produce color indicated or, if not indicated, as selected from manufacturer's standard colors. Pigments shall not exceed 10 percent of portland cement by weight.

F. Colored Masonry Cement Mix: Packaged blend of masonry cement and mortar pigments. Mix shall produce color indicated or, if not indicated, as selected from manufacturer's standard colors. Pigments shall not exceed 5 percent of masonry cement by weight.

G. Aggregate: ASTM C144 and as follows:

1. For pointing mortar, use aggregate graded with 100 percent passing No. 16 sieve.

2. Colored Aggregates for colored mortars: Natural-colored sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.

H. Water: Potable.

2.4 VENEER ANCHORS

A. Materials:

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A1064; with ASTM A153, Class B-2.

2. Stainless Steel Wire: ASTM A580, Type 304

3. Hot-Dip Galvanized-Steel Sheet: ASTM A1008, cold-rolled, carbon-steel sheet, hot-dip galvanized after fabrication to comply with ASTM A153, Class B-2.

4. Stainless Steel Sheet: ASTM A240 or ASTM A666, Type 304

B. Size: Sufficient to extend at least halfway, but not less than 1-1/2 inches through stone masonry and with at least a 5/8-inch cover on exterior face.

C. Corrugated-Metal Veneer Anchors: Not less than 0.060-inch- thick by 7/8-inch- wide hot-dip galvanized steel sheet with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch.

D. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.

2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.075-inch- (14 gauge) thick steel sheet, galvanized after fabrication

3. Fabricate wire ties from 0.187-inch- diameter, hot-dip galvanized-steel wire unless otherwise indicated.

4. Fabricate wire connector sections from 0.187-inch-diameter, hot-dip galvanized-steel wire.

2.5 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

1. Stainless Steel: ASTM A240, Type 304, 0.016 inch (28-gauge) thick.

2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.

3. Fabricate metal drip edges from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.

4. Fabricate metal sealant stops from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch and down into joint 1/4 inch to form a stop for retaining sealant backer rod.

5. Fabricate metal expansion-joint strips from stainless steel to shapes indicated.

2.6 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Refer to 04 05 53 - Masonry Accessories

B. Cementitious Dampproofing: Cementitious formulation recommended by ILI and non-staining to stone, compatible with joint sealants, and noncorrosive to veneer anchors and attachments.

C. Asphalt Dampproofing: Cut-back asphalt complying with ASTM D4479, Type I or asphalt emulsion complying with ASTM D1227, Type III or Type IV.

D. Weep/Vent Products: Refer to 04 05 53 - Masonry Accessories

E. Cavity Drainage Material: Refer to 04 05 53 - Masonry Accessories

2.7 FABRICATION

A. Cut, Split and Select stone to produce pieces of thickness, size, and shape indicated, including details on Drawings and pattern specified.

B. Thickness of Stone: Provide thickness indicated, but not less than the following:

1. Thickness: 4 inches plus or minus 1/4 inch

C. Finish exposed stone faces and edges to match approved samples.

2.8 MORTAR MIXES

A. General: Do not use admixtures unless otherwise indicated.

1. Do not use calcium chloride.

2. Use portland cement-lime or masonry cement mortar unless otherwise indicated.

3. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding water. Then mix again, adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for one to two hours. Add remaining water in small portions until mortar reaches required consistency. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.

B. Mortar for Stone Masonry: Comply with ASTM C270, Proportion Specification.

1. Mortar for Setting Stone: Type N

2. Mortar for Pointing Stone: Type N

3. Mortar Color: As selected by Architect from manufacturer’s full range

C. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

1. Pigments shall not exceed 10 percent of portland cement by weight.

2. Pigments shall not exceed 5 percent of masonry cement by weight.

PART 3 - EXECUTION

3.1 PREPARATION

A. Accurately mark stud centerlines on face of weather-resistant sheathing paper before beginning stone installation.

B. Coat concrete and unit masonry backup with asphalt dampproofing.

3.2 INSTALLATION OF STONE MASONRY

A. Perform necessary field cutting and trimming as stone is set.

1. Use power saws to cut stone that is fabricated with saw-cut surfaces. Cut lines straight and true, with edges eased slightly to prevent snipping.

2. Use hammer and chisel to split stone that is fabricated with split surfaces. Make edges straight and true, matching similar surfaces that were shop or quarry fabricated.

3. Pitch face at field-split edges as needed to match stones that are not field split.

B. Sort stone before it is placed in wall to remove stone that does not comply with requirements relating to aesthetic effects, physical properties, or fabrication, or that is otherwise unsuitable for intended use.

C. Arrange stones in pattern matching approved sample panel.

D. Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.

E. Maintain uniform joint widths except for variations due to different stone sizes and where minor variations are required to maintain bond alignment if any. Lay walls with joints not less than 3/8 inch at narrowest points or more than 5/8 inch at widest points.

F. Provide sealant joints of widths and at locations indicated.

1. Keep sealant joints free of mortar and other rigid materials.

2. Sealant joints are specified in Section 07 92 00 "Joint Sealants."

G. Install embedded flashing and weep holes at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

1. At lintels and shelf angles, extend flashing full length of angles but not less than 6 inches into masonry at each end.

2. At sills, extend flashing not less than 4 inches at ends.

3. At ends of head and sill flashing, turn up not less than 2 inches to form end dams.

4. Extend sheet metal flashing 1/2 inch beyond masonry face at exterior, and turn flashing down to form a drip and provide a hemmed edge.

5. Install metal drip edges with hemmed edge beneath flexible flashing at exterior wall face. Stop flexible flashing 1/2 inch back from exterior wall face and adhere flexible flashing to top of metal drip edge.

H. Place weep holes and vents in joints where moisture may accumulate, including at base of cavity walls, above shelf angles, and at flashing.

1. Use mesh weep holes/vents or open head joints to form weep holes.

2. Space weep holes 24 inches o.c.

3. Place cavity drainage material in cavities.

I. Coat limestone with cementitious dampproofing as follows:

1. Stone at Grade: Beds, joints, and back surfaces to at least 12 inches above finish-grade elevations.

2. Stone Extending below Grade: Beds, joints, back surfaces, and face surfaces below grade.

3.3 CONSTRUCTION TOLERANCES

A. Construction tolerances for natural-cleft and smooth finished stone:

1. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch in 40 feet or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.

2. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.

3. Variation of Linear Building Line: For position shown in plan, do not exceed 1/2 inch in 20 feet or 3/4 inch in 40 feet or more.

3.4 INSTALLATION OF ANCHORED STONE MASONRY

A. Anchor stone masonry to concrete with corrugated-metal veneer anchors unless otherwise indicated.

B. Anchor stone masonry to unit masonry with corrugated-metal veneer anchors unless otherwise indicated. Embed anchors in unit masonry mortar joints or grouted cells at a distance of at least one-half of unit masonry thickness.

C. Anchor stone masonry to stud framing with adjustable, screw-attached or seismic veneer anchors unless otherwise indicated. Fasten anchors through sheathing to framing with two screws.

D. Embed veneer anchors in mortar joints of stone masonry at least halfway, but not less than 1-1/2 inches, through stone masonry and with at least a 5/8-inch cover on exterior face.

1. If required by applicable Building Code (Generally in Seismic Zones 3 and 4): Install continuous wire reinforcement in horizontal joints and attach to seismic veneer anchors as stone is set.

E. Space anchors to provide not less than one anchor per 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings, sealant joints, and perimeter at intervals not exceeding 12 inches.

F. Set stone in full bed of mortar with full head joints unless otherwise indicated. Build anchors into mortar joints as stone is set.

G. Provide 2-inch (min) cavity between stone masonry and backup construction unless otherwise indicated. Keep cavity free of mortar droppings and debris.

1. Slope beds toward cavity to minimize mortar protrusions into cavity.

2. Do not attempt to trowel or remove mortar fins protruding into cavity.

H. Rake out joints for pointing with mortar to depth of not less than 1/2 inch before setting mortar has hardened. Rake joints to uniform depths with square bottoms and clean sides.

3.5 POINTING

A. Prepare stone-joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply pointing mortar in layers not more than 3/8 inch deep until a uniform depth is formed.

B. Point stone joints by placing and compacting pointing mortar in layers of not more than 3/8 inch deep. Compact each layer thoroughly and allow to it become thumbprint hard before applying next layer.

C. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce joint profile from approved sample panel.

3.6 ADJUSTING AND CLEANING

A. In-Progress Cleaning: Clean stone masonry as work progresses. Remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry as follows:

1. Remove large mortar particles by hand with wooden paddles or other non-metallic tools.

2. Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain approval of sample cleaning before cleaning stone masonry.

3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.

4. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.

5. Clean non-limestone masonry in accordance with the applicable option below:

a. Clean stone masonry with standard-strength, proprietary cleaner as recommended by stone manufacturer designed for removing mortar and grout stains, efflorescence, and other new construction stains from stone masonry surfaces without discoloring or damaging masonry surfaces. Apply according to manufacturer’s written instructions.

b. Clean stone masonry by bucket-and-brush hand-cleaning method as described in BIA Technical Notes 20, using job-mixed detergent solution.

6. Clean limestone masonry to comply with recommendations in ILI's "Indiana Limestone Handbook."

3.7 EXCESS MATERIALS AND WASTE

A. Excess Stone: Stack excess stone where directed by Owner for Owner's use.

END OF SECTION

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SECTION 04 72 00

CAST STONE MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Trim units.

2. Decorative elements.

3. Accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.

C. Samples:

1. For each color and texture of cast stone required, 4 inches square in size.

2. For each trim shape required, 4 inches in length.

3. For colored mortar.

1.3 INFORMATIONAL SUBMITTALS

A. Material test reports.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by CSI or APA or PCI for Group A, Category AT.

PART 2 - PRODUCTS

2.1 CAST STONE UNITS

A. Cast Stone Units: Comply with ASTM C1364.

1. Units shall be manufactured using the manufacturer's selected method.

2. Trim units including window sills, lintels, surrounds, mullions, copings, cornices, wall caps, belt courses, water tables, quoins, keystones and other items as indicated on Drawings.

3. Decorative elements including pilasters, column covers, medallions, balustrades, steps, steps and risers, bollards, benches, curbing and other items as indicated on Drawings.

B. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.

1. Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.

2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.

3. Provide drips on projecting elements unless otherwise indicated.

C. Cure Units as Follows:

1. Cure units in enclosed, moist curing room at 95 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.

2. Keep units damp and continue curing to comply with one of the following:

a. No fewer than five days at mean daily temperature of 70 deg F or above.

b. No fewer than seven days at mean daily temperature of 50 deg F or above.

D. Acid etch units after curing to remove cement film from surfaces to be exposed to view.

E. Colors and Textures: As selected by Architect from manufacturer's full range

2.2 ACCESSORIES

A. Anchors: Type and size indicated, fabricated from Type 304 stainless steel complying with ASTM A240, ASTM A276, or ASTM A666

B. Dowels: 1/2-inch-diameter round bars, fabricated from Type 304 stainless steel complying with ASTM A240, ASTM A276, or ASTM A666

C. Non-Acidic Cleaner: Non-acidic type as recommended by cast stone manufacturer designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces

2.3 MORTAR MIXES

A. Comply with requirements in Section 04 21 13 "Brick Masonry Veneer" for mortar mixes.

B. Comply with ASTM C270, Proportion Specification.

1. For setting mortar, use Type N.

2. For pointing mortar, use Type N

3. Mortar Color: As selected by Architect from manufacturer’s full range

C. Preblended dry mortar mix complying with ASTM C1714 and capable of producing mortar strength as indicated in ASTM C270.

1. For setting mortar, use Type N.

2. For pointing mortar, use Type N

3. Mortar Color: As selected by Architect from manufacturer’s full range

D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

PART 3 - EXECUTION

3.1 SETTING CAST STONE IN MORTAR

A. Set cast stone as indicated in TMS 604.

B. Set cast stone as indicated on Drawings. Set units accurately in locations indicated, with edges and faces aligned according to established relationships and indicated tolerances.

C. Set units in full bed of mortar with full head joints unless otherwise indicated.

1. Fill dowel holes and anchor slots with mortar.

2. Build concealed flashing into mortar joints as units are set.

3. Keep head joints in copings and between other units with exposed horizontal surfaces open to receive sealant.

4. Keep joints at shelf angles open to receive sealant.

D. Rake out joints for pointing with mortar to depths of not less than 3/4 inch. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.

E. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

F. Tool exposed joints slightly concave when thumbprint hard. Use a smooth plastic jointer larger than joint thickness.

G. Provide sealant joints at head joints of copings and other horizontal surfaces; at expansion, control, and pressure-relieving joints; and at locations indicated.

1. Keep joints free of mortar and other rigid materials.

2. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Section 07 92 00 "Joint Sealants."

3.2 SETTING ANCHORED CAST STONE WITH SEALANT-FILLED JOINTS

A. Set cast stone as indicated in TMS 604.

B. Set cast stone as indicated on Drawings. Set units accurately in locations indicated, with edges and faces aligned according to established relationships and indicated tolerances.

1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.

2. Shim and adjust anchors, supports, and accessories to set cast stone in locations indicated with uniform joints.

C. Fill anchor holes with sealant.

1. Where dowel holes occur at pressure-relieving joints, provide compressible material at ends of dowels.

D. Set cast stone supported on clip or continuous angles on resilient setting shims. Use material of thickness required to maintain uniform joint widths. Hold shims back from face of cast stone a distance at least equal to width of joint.

E. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Section 07 92 00 "Joint Sealants."

3.3 INSTALLATION TOLERANCES

A. Variation from Plumb: Do not exceed 1/8 inch in 10 ft., 1/4 inch in 20 ft., or 1/2 inch maximum.

B. Variation from Level: Do not exceed 1/8 inch in 10 ft., 1/4 inch in 20 ft., or 1/2 inch maximum.

C. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches or one-fourth of nominal joint width, whichever is less.

D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch, except where variation is due to warpage of units within tolerances specified.

3.4 ADJUSTING AND CLEANING

A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.

B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.

C. In-Progress Cleaning: Clean cast stone as work progresses.

1. Remove mortar fins and smears before tooling joints.

2. Remove excess sealant immediately, including spills, smears, and spatter.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain approval of sample cleaning before proceeding with cleaning of cast stone.

3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.

4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.

5. Clean cast stone by methods described in Cast Stone Institute Technical Bulletin #39.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel framing and supports for applications where framing and supports are not specified in other Sections.

2. Slotted channel framing.

3. Shelf angles.

4. Metal ladders.

5. Alternating tread devices.

6. Elevator pit sump covers.

7. Metal bollards.

8. Guardrails

9. Steel framed stairs

1.2 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Fasteners.

2. Shrinkage-resisting grout.

3. Slotted channel framing.

4. Manufactured metal ladders.

5. Alternating tread devices.

6. Metal bollards.

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:

1. Metal ladders.

2. Alternating tread devices.

3. Metal bollards.

4. Guardrails

5. Steel framed stairs

C. The following shop drawings shall be sealed by a professional engineer licensed to practice in the state where the project is located:

1. Guardrails

2. Steel framed stairs

3. Decorative metal assemblies

1.4 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance of Alternating Tread Devices: Alternating tread devices shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Uniform Load: 100 lbf/sq. ft.

2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.

3. Uniform and concentrated loads need not be assumed to act concurrently.

4. Alternating Tread Device Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.

5. Comply with applicable railing loadings for handrails guardrails.

B. Structural Performance of Handrails and Top Rails of Guardrails: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:

a. Uniform linear load of 50lb / liner foot applied in any direction.

b. Concentrated load of 200lb, applied in any direction.

c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Infill of Guards:

a. Concentrated load of 50lb, applied horizontally on an area of one (1) sq. ft.

b. Infill load and other loads need not be assumed to act concurrently.

C. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Uniform Load: 100 lbf/sq. ft.

2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.

3. Uniform and concentrated loads need not be assumed to act concurrently.

4. Stair Framing: Capable of withstanding stresses resulting from railing and guard loads in addition to loads specified above.

5. Limit deflection of treads, platforms, and framing members to L/360 or 1/4 inch, whichever is less.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A36.

C. Stainless Steel Sheet, Strip, and Plate: ASTM A240 or ASTM A666, Type 304

D. Stainless Steel Bars and Shapes: ASTM A276, Type 304

E. Rolled-Steel Floor Plate: ASTM A786, rolled from plate complying with ASTM A36 or ASTM A283, Grade C or D.

F. Rolled-Stainless Steel Floor Plate: ASTM A793.

G. Steel Tubing: ASTM A500, cold-formed steel tubing.

H. Steel Pipe: ASTM A53, Standard Weight (Schedule 40) unless otherwise indicated.

I. Zinc-Coated Steel Wire Rope: ASTM A741.

1. Wire Rope Fittings: Hot-dip galvanized-steel connectors with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.

J. Stainless Steel Wire Rope: Wire rope manufactured from stainless steel wire complying with ASTM A492, Type 316.

1. Wire Rope Fittings: Stainless steel connectors, Type 316, with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.

K. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.

1. Size of Channels: 1-5/8 by 1-5/8 inches

2. Material: Galvanized steel, ASTM A653, commercial steel, Type B, with G90 coating; 0.108-inch (12-gauge) nominal thickness.

L. Cast Iron: Either gray iron, ASTM A48, or malleable iron, ASTM A47, unless otherwise indicated.

M. Aluminum Plate and Sheet: ASTM B209, Alloy 6061-T6.

N. Aluminum Extrusions: ASTM B221, Alloy 6063-T6.

O. Aluminum-Alloy Rolled Tread Plate: ASTM B632, Alloy 6061-T6.

P. Aluminum Castings: ASTM B26, Alloy 443.0-F.

Q. Bronze Extrusions: ASTM B455, Alloy UNS No. C38500 (extruded architectural bronze).

R. Bronze Castings: ASTM B584, Alloy UNS No. C83600 (leaded red brass) or UNS No. C84400 (leaded semired brass).

S. Nickel Silver Extrusions: ASTM B151, Alloy UNS No. C74500.

T. Nickel Silver Castings: ASTM B584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless steel fasteners for fastening aluminum, stainless steel or nickel silver.

2. Provide bronze fasteners for fastening bronze.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.

C. High-Strength Bolts, Nuts, and Washers: ASTM F3125, Grade A325, Type 3, heavy-hex steel structural bolts; ASTM A563, Grade DH3, heavy-hex carbon-steel nuts; and where indicated, flat washers.

D. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593; with hex nuts, ASTM F594; and, where indicated, flat washers; Alloy Group 1.

E. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.

1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

F. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47 malleable iron or ASTM A27 cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329.

G. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.

2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

2.4 MISCELLANEOUS MATERIALS

A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

B. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.

C. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

D. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

E. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187.

G. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, non-staining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

H. Concrete: Comply with requirements in Section 03 30 00 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi.

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.6 SHELF ANGLES

A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c, unless otherwise indicated.

1. Provide mitered and welded units at corners.

2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches larger than expansion or control joint.

B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.

C. Galvanize and prime shelf angles located in exterior walls.

D. Prime shelf angles located in exterior walls with zinc-rich primer.

E. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.7 METAL LADDERS

A. General:

1. Comply with ANSI A14.3, except for elevator pit ladders.

2. For elevator pit ladders, comply with ASME A17.1/CSA B44.

B. Steel Ladders:

1. Space siderails 18 inches apart unless otherwise indicated.

2. Siderails: Continuous, 3/8-by-2-1/2-inch steel flat bars, with eased edges.

3. Rungs: 3/4-inch- diameter steel bars.

4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.

5. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.

6. Source Limitations: Obtain nonslip surfaces from single source from single manufacturer.

7. Provide platforms as indicated fabricated from welded or pressure-locked steel bar grating, supported by steel angles. Limit openings in gratings to no more than 1/2 inch in least dimension.

8. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted steel brackets.

9. Galvanize and prime ladders, including brackets.

2.8 GUARDRAILS

A. Steel guardrails integral to metal stair assemblies:

1. Top rail: 1-1/2-inch square by 11 gauge

2. Bottom rail: 1-1/2-inch square by 11 gauge

3. Post: 1-1/2-inch square by 11 gauge

4. Infill: 1/2-inch square pickets

5. Finish: Shop primed

B. Steel guardrails at unit balconies:

1. Top rail: 1-1/2-inch square by 11 gauge

2. Intermediate rail: 1-1/2-inch square by 14 gauge

3. Bottom rail: 1-1/2-inch square by 11 gauge

4. Post: 1-1/2-inch square by 11 gauge

5. Infill: 1-inch woven-wire mesh infill, intermediate-crimp, square pattern, made from 11-gauge (0.120-inch-diameter) galvanized steel wire complying with ASTM A510.

a. Basis of Design: McNichols Wire Mesh

6. Finish: Shop primed

C. Fasteners:

1. Fastener Materials:

a. Ungalvanized-Steel Railing Components: Plated steel fasteners complying with ASTM F1941, Class Fe/Zn 5 for zinc coating.

b. Many fasteners, such as small-diameter machine screws, are not available hot-dip galvanized.

c. Hot-Dip Galvanized Railing Components: Type 304 stainless steel or hot-dip zinc-coated steel fasteners complying with ASTM A153 or ASTM F2329 for zinc coating.

d. Aluminum Railing Components: Type 304 stainless steel fasteners.

e. Stainless Steel Railing Components: Type 304 stainless steel fasteners.

f. Retain subparagraph below if exposed fasteners are allowed, especially with color anodic finish.

g. Finish exposed fasteners to match appearance, including color and texture, of railings.

2. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction and capable of withstanding design loads.

2.9 STEEL-FRAMED STAIRS

A. NAAMM Stair Standard: Comply with NAAMM AMP 510, "Metal Stairs Manual," for Commercial or Service Class, unless more stringent requirements are indicated.

B. Steel-Framed Stairs, General: Provide complete stair assemblies, including metal framing, railing and guards, clips, brackets, bearing plates and other components necessary to support and anchor stairs and platforms on supporting structure.

1. Assemble stairs, railings and guards in shop to greatest extent possible.

2. Cut, drill and punch metals cleanly and accurately.

3. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated.

4. Remove sharp or rough areas on exposed surfaces.

5. Form exposed work with accurate angles and surfaces and straight edges.

C. Stair Framing:

1. Fabricate stringers from steel channels or steel rectangular tubes.

a. Stringer Size: As required to comply with "Performance Requirements" Article, but not less than 1-1/2-inch wide to facilitate guardrail anchorage.

b. Provide closures for exposed ends of channel and rectangular tube stringers.

c. Finish: Shop primed.

2. When not constructed from pre-fabricated wood trusses, construct platforms and landings from steel channel or rectangular tube headers and miscellaneous framing members as required to comply with "Performance Requirements" Article.

a. Provide closures for exposed ends of channel and rectangular tube framing.

b. Finish: Shop primed.

3. Weld or bolt stringers to headers; weld or bolt framing members to stringers and headers. If using bolts, fabricate and join so bolts are not exposed on finished surfaces.

D. Metal Pan Stairs: Form risers, sub-tread pans, and sub-platforms to configurations shown from steel sheet of thickness needed to comply with performance requirements, but not less than 0.067 inch.

1. Fabricate treads and landing sub-platforms of exterior stairs so finished walking surfaces slope to drain.

2. Steel Sheet: Uncoated, hot-rolled steel sheet unless otherwise indicated.

3. Metal Pan and Riser Attachment – Option 01: Directly weld metal pans to stringers; locate welds on top of sub-treads where they will be concealed by concrete fill. Do not weld risers to stringers.

4. Metal Pan and Rise Attachment – Option 02: Attach risers and sub-treads to stringers with brackets made of steel angles or bars. Weld brackets to stringers and attach metal pans to brackets by welding, riveting, or bolting.

5. Shape metal pans to include nosing integral with riser.

E. Precast Concrete Treads

1. Concrete Materials and Properties: Normal-weight, ready-mixed concrete with a minimum 28-day compressive strength of 5000 psi and a total air content of not less than 4 percent or more than 6 percent.

2. Reinforcement: Galvanized, welded-wire reinforcement, 2 by 2 inches by 0.062-inch-diameter steel wire; comply with ASTM A1064, except for minimum wire size.

3. Thickness: 2-1/4-inch min., thicker if indicated or if required based on span.

4. Finish: Non-slip, textured finish with smooth-finish border on 4-edges.

2.10 ALTERNATING TREAD DEVICES

A. Alternating Tread Devices: Fabricate alternating tread devices of open-type construction with channel or plate stringers and pipe and tube railings unless otherwise indicated. Provide brackets and fittings for installation.

1. Manufacturers: Subject to compliance with requirements, provide products by the following manufacturers:

a. Lapeyre, Inc.

b. Precision Ladders, LLC

c. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Tread depth shall be not less than 5 inches exclusive of nosing or less than 8-1/2 inches including the nosing, tread width shall be not less than 7 inches, and riser height shall be not more than 9-1/2 inches.

3. Fabricate from steel and assemble by welding or with stainless steel fasteners.

B. Galvanize steel alternating tread devices, including treads, railings, brackets, and fasteners.

2.11 ELEVATOR PIT SUMP COVERS

A. Fabricate from welded or pressure-locked steel bar grating. Limit openings in gratings to no more than 3/4 inch in least dimension.

B. Provide steel angle supports unless otherwise indicated.

2.12 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

C. Galvanize exterior miscellaneous steel trim.

2.13 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 80 steel pipe

1. Where bollards are indicated to receive controls for door operators, provide cutouts for controls and holes for wire.

2. Where bollards are indicated to receive light fixtures, provide cutouts for fixtures and holes for wire.

B. Mounting Bollards on Structural Slab: Fabricate bollards with 3/8-inch-thick, stainless steel, baseplates for bolting to concrete slab. Drill baseplates at all four corners for 3/4-inch anchor bolts.

1. Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.

C. Bollards utilized as vehicle barriers shall be anchored as indicated in Structural drawings.

2.14 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Galvanize bearing and leveling plates.

C. Prime plates with zinc-rich primer.

2.15 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches unless otherwise indicated.

C. Use galvanized loose steel lintels located in exterior walls.

2.16 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.17 GENERAL FINISH REQUIREMENTS

A. Finish metal fabrications after assembly.

B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.18 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153 for steel and iron hardware and with ASTM A123 for other steel and iron products.

1. When galvanized items are scheduled to receive a painted finish, do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

1. Shop prime with universal shop primer unless zinc-rich primer is indicated.

D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

4. Other Steel Items: SSPC-SP 3, "Power Tool Cleaning."

5. Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."

E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.19 ALUMINUM FINISHES

A. As-Fabricated Finish: AA-M12.

B. Clear Anodic Finish: AAMA 611, Class I or II, AA-M12C22A41.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

1. Cast Aluminum: Heavy coat of bituminous paint.

2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Anchor supports for overhead doors and overhead grilles securely to, and rigidly brace from, building structure.

C. Anchor shelf angles securely to existing construction.

3.3 INSTALLATION OF METAL BOLLARDS

A. Anchor bollards to existing construction with expansion anchors, anchor bolts or through bolts as indicated. Provide four 3/4-inch bolts at each bollard unless otherwise indicated.

1. Embed anchor bolts at least 4 inches in concrete.

B. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

C. Fill bollards solidly with concrete, mounding top surface to shed water.

3.4 INSTALLATION OF PIPE GUARDS

A. Provide pipe guards at exposed vertical pipes in parking garage and at locations indicated on Drawings where not protected by curbs or other barriers. Install by bolting to wall or column with expansion anchors. Provide four 3/4-inch bolts at each pipe guard. Mount pipe guards with top edge at height indicated in Drawings but not less than 26 inches above driving surface.

3.5 INSTALLATION OF BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with shrinkage-resistant grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.6 REPAIRS

A. Touchup Painting:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

a. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

END OF SECTION

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SECTION 05 73 13

GLAZED DECORATIVE METAL RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural glass, decorative metal railings.

1.2 COORDINATION AND SCHEDULING

A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver items to Project site in time for installation.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, mock-ups, sequencing, and scheduling of the work.

1.4 ACTION SUBMITTALS

A. Product Data: Manufacturer’s data sheets on each product to be used, including:

1. Metal railings assembled from standard components.

2. Glass products.

3. Glazing cement and accessories for structural glass railings.

4. Sealant and accessories for structural glass railings.

5. Fasteners.

6. Post-installed anchors.

7. Bituminous paint.

8. Nonshrink, nonmetallic grout.

9. Anchoring cement.

B. Shop Drawings: Include plans, elevations, sections, and attachment details.

1. Shop drawings shall be sealed by professional structural engineer licensed to practice in the state where project is located.

C. Samples for Verification: For each type of product to be used.

1. Assembled sample of railing system, made from full-size components, including top and bottom rail, post, and guard infill. Sample need not be full height.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For tests on railings performed by a qualified testing agency, in accordance with ASTM E894, ASTM E935, ASTM E2353, and ASTM E2358.

B. Evaluation Reports: From ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1. For glazed decorative metal railings.

2. For post-installed anchors.

1.6 QUALITY ASSURANCE

A. Mockups: Build mockups to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

1. Build mockups shown on Drawings.

2. When no mockups are shown on Drawings, build mockups for each form and finish of glass-infill panel railing consisting of two posts, top rail, bottom rail (if applicable), glass-infill panel, and anchorage system components that are full height and are not less than 36 inches in length.

3. When no mockups are shown on Drawings, build mockups for each form and finish of structural glass railing consisting of top rail, structural glass, base channel, and anchorage system components that are full height and are not less than 24 inches in length.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:

a. Uniform load of 50 lbf/ft. applied in any direction.

b. Concentrated load of 200 lbf applied in any direction.

c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Structural Glass Railings and Glass-Infill Panels at Post-Supported Railings:

a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.

b. Infill load and other loads need not be assumed to act concurrently.

3. Structural Glass Railings: Support each section of top rail by a minimum of three glass panels or by other means so railings will remain in place if any one glass panel fails.

a. Support top rail ends such that railings remains in place if end glass panel fails.

B. Wind Loads: For exterior glazed decorative metal railings, capable of withstanding the following wind loads in accordance with the IBC and ASTM E1300:

1. Wind Load: As indicated on Structural Drawings.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces

2.2 BASIS OF DESIGN

A. Basis of Design – Exterior Structural Glass Railing: Frameless Glass Fence by Styleguard

2.3 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ATR Technologies, Inc.

2. CR Laurence Co., Inc.

3. Crane Veyor Corp.

4. Feeney, Inc.

5. Greco, a CSW Industrials Company

6. Hollaender Architectural Railing Systems, Hollaender Mfg. Co.

7. R & B Wagner, Inc.

8. Trex Commercial Products, Inc.

9. Tritech, inc.

10. Ultralox

11. VIVA Railings, LLC

12. Styleguard Glass Fence & Railing Systems

13. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Source Limitations for Laminated Glass: Obtain from single source from single manufacturer.

C. Source Limitations for Decorative Metal Railing Components: Obtain from single source from single manufacturer for each component and installation method.

D. Product Options: Information on Drawings and in the Specifications establishes requirements for railing system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

2.4 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.

2.5 ALUMINUM

A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.

B. Extruded Bars and Shapes, Including Extruded Tubing: Alloy 6063-T5/T52.

C. Extruded Structural Pipe and Round Tubing: ASTM B429, Alloy 6063-T6.

1. Provide Standard Weight (Schedule 40) pipe unless otherwise indicated.

D. Drawn Seamless Tubing: ASTM B210, Alloy 6063-T832.

E. Plate and Sheet: ASTM B209, Alloy 5005-H32 or Alloy 6061-T6.

F. Die and Hand Forgings: ASTM B247, Alloy 6061-T6.

G. Castings: ASTM B26/B26M, Alloy A356.0-T6.

2.6 STAINLESS STEEL

A. Tubing: ASTM A554, Grade MT 304.

B. Pipe: ASTM A312, Grade TP 304.

C. Castings: ASTM A743, Grade CF 8 or Grade CF 20

D. Sheet, Strip, Plate, and Flat Bar: ASTM A666 or ASTM A240, Type 304

E. Bars and Shapes: ASTM A276, Type 304

2.7 GLASS AND GLAZING PRODUCTS, GENERAL

A. Glazing Publications: Comply with written instructions of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. NGA/GANA Publications: "GANA Laminated Glazing Reference Manual" and "GANA Glazing Manual."

B. Safety Glazing: Glazing shall comply with 16 CFR 1201, Category II.

C. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear), Class 1 and low-iron clear, or Class 2 (tinted) as indicated, Quality-Q3.

D. Glazing Cement and Accessories for Structural Glass Railings: Glazing cement, setting blocks, shims, and related accessories as recommended or supplied by railing manufacturer for installing structural glazing in metal base channels.

E. Sealant and Accessories for Structural Glass Railings: Sealant, gaskets, setting blocks, shims, and related accessories as recommended or supplied by railing manufacturer for installing structural glazing in metal base channels.

F. Glazing Gaskets for Glass-Infill Panels at Post-Supported, Glass-Infill Railings: Glazing gaskets and related accessories as recommended or supplied by railing manufacturer for installing glass-infill panels in post-supported railings.

2.8 GLASS GUARDS

A. Structural Glass Guards: Laminated glass guards, ASTM C1172, Type II with two plies of glass bonded together by an interlayer.

1. Construction: Laminate glass with polyvinyl butyral interlayer or ionoplast polymer interlayer to comply with interlayer manufacturer's written instructions.

2. Interlayer Thickness: 0.060 inch (min)

3. Kind: LHS (laminated heat strengthened) or LT (laminated tempered).

4. Glass Color, Inner-ply: clear

5. Glass Color, Outer-ply: clear

6. Interlayer Color: Clear

7. Glass Plies for Structural Glass: Thickness required by structural loads, but not less than 1/4-inch (6.0 mm) thick each.

2.9 FASTENERS

A. Fastener Materials: Unless otherwise indicated, provide the following:

1. Aluminum Components: Type 304 stainless steel fasteners.

2. Stainless Steel Components: Type 304 stainless steel fasteners.

3. Dissimilar Metals: Type 304 stainless steel fasteners.

B. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

C. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work unless exposed fasteners are unavoidable or exposed fasteners are the standard fastening method for railings indicated.

D. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to design load, in accordance with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or ICC-ES AC308.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.

2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts; ASTM F594.

2.10 MISCELLANEOUS MATERIALS

A. Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.

B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187.

C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

D. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

1. Water-Resistant Anchoring Cement: At exterior locations provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.11 FABRICATION OF METAL RAILINGS

A. Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately.

1. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated.

2. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that will be exposed to weather in a manner to exclude water.

1. Provide weep holes where water may accumulate.

2. Locate weep holes in inconspicuous locations.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.

H. Close exposed ends of hollow railing members with prefabricated end fittings.

I. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, handrail brackets, miscellaneous fittings, and anchors to interconnect railing members to other work where indicated.

1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and to prevent bracket or fitting rotation and crushing of substrate.

J. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

K. For railing posts set in concrete, provide steel sleeves not less than 6 inches long with metal plate forming bottom closure.

2.12 FABRICATION OF GLASS PANELS

A. Fabricate glass to sizes and shapes required; provide for proper edge clearance and bite on glazing panels.

B. Glass-Infill Panels: Provide tempered, laminated, heat-strengthened or laminated, tempered glass-infill panels.

1. Edge Finish: Clean-cut or flat-grind edges to produce smooth, square edges with slight chamfers at junctions of edges and faces

2.13 METAL FINISH REQUIREMENTS, GENERAL

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

B. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.14 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

B. Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.

1. Color: As selected by Architect from full range of industry colors and color densities.

C. Siliconized Polyester Finish: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil for primer and 0.8 mil for topcoat.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

2. Siliconized Polyester finish is acceptable at interior locations only.

D. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

2. Baked-Enamel or Powder-Coat finishes are acceptable at interior locations only.

E. Superior-Performance Organic Finish, Three-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

2.15 STAINLESS STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run grain of directional finishes with long dimension of each piece.

2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

C. Stainless Steel Tubing Finishes:

1. 180-Grit Polished Finish: Uniform, directionally textured finish.

2. 320-Grit Polished Finish: Oil-ground, uniform, fine, directionally textured finish.

3. Polished and Buffed Finish: 320-grit finish followed by buffing to a mirrorlike finish.

D. Stainless Steel Sheet, Strip, Plate, and Bar Finishes:

1. Directional Satin Finish: ASTM A480, No. 4.

2. High Luster Finish: ASTM A480, No. 7.

3. Mirror Finish: ASTM A480, No. 8.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with Drawings and manufacturer's written instructions for installing glazed decorative metal railings, accessories, and other components.

B. Windborne-Debris Resistance: Anchor glazed decorative metal railings to structure using anchoring method, fastener type, and fastening frequency identical to that used in windborne-debris-resistance testing.

C. Perform cutting, drilling, and fitting required for installing metal railings.

1. Fit exposed connections together to form tight, hairline joints.

2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.

3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.

4. Do not weld, cut, or abrade surfaces of metal railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.

5. Set posts plumb within a tolerance of 1/16 inch in 3 feet.

6. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with bituminous paint.

E. Adjust railings before anchoring to ensure matching alignment at abutting joints.

F. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 RAILING CONNECTIONS

A. Nonwelded Connections:

1. Use mechanical or adhesive joints for permanently connecting railing components.

2. Use wood blocks and padding to prevent damage to railing members and fittings.

3. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

B. Expansion Joints: Install expansion joints at locations indicated, but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.3 ANCHORING POSTS

A. Anchorage to concrete surfaces:

1. Surface Mounted Anchorage:

2. Pipe Sleeve Anchorage: Use stainless steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted in sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

3. Core-Drilled Anchorage: Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

4. Anchorage Joints: Cover anchorage joint with flange of same metal as post.

B. Anchorage to metal surfaces:

1. Use flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:

a. For aluminum railings, attach posts as indicated using fittings designed and engineered for this purpose.

b. For stainless steel railings, weld flanges to posts and bolt to metal-supporting surfaces.

3.4 INSTALLATION OF STRUCTURAL GLASS AND POST-SUPPORTED RAILINGS

A. Structural Glass Railings:

1. Install assembly to comply with railing manufacturer's written instructions.

2. For factory-fabricated and assembled glass balusters, attach base channel to building structure, then insert and connect factory-fabricated and -assembled glass balusters.

3. For field-assembled balusters, attach base channel to building structure, insert glass in base channel, and bond with glazing cement or approved sealant.

   a. Support glass balusters in base channel at quarter points with channel-shaped setting blocks that also act as shims to maintain uniform space for glazing cement.

   b. Fill remaining space in base channel with glazing cement or approved sealant for uniform support of glass.

4. Adjust spacing of glass balusters so gaps between balusters are equal before securing in position.

B. Post-Supported Railings with Glass-Infill Panels:

1. Install assembly to comply with railing manufacturer's written instructions and with requirements in other Part 3 articles.

2. Erect posts and other metal railing components, and set factory-cut glass-infill panels.

3. Do not cut, drill, or alter glass-infill panels in field. Protect edges from damage.

3.5 CLEANING

A. Clean aluminum and stainless steel by washing thoroughly with water and soap, rinsing with clean water, and wiping dry.

B. Clean and polish glass as recommended in writing by manufacturer. Wash both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion.

3.6 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Wood framing at wall, floor, ceiling, and roof.
2. Prefabricated floor and roof trusses.
3. Roof truss and floor truss bracing.
4. Subflooring.
5. Exterior wall sheathing.
6. Roof sheathing.
7. Wood nailers, blocking, and furring.
8. Anchorage in foundation for wood framing.

1.2 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal size or greater but less than 5 inches nominal size in least dimension.

C. Exposed Framing: Framing not concealed by other construction.

D. OSB: Oriented strand board.

E. Timber: Lumber of 5 inches nominal size or greater in least dimension.

F. Lumber grading agencies, and abbreviations used to reference them, include the following:

1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NLGA: National Lumber Grades Authority.
3. SPIB: The Southern Pine Inspection Bureau.
4. WCLIB: West Coast Lumber Inspection Bureau.
5. WWPA: Western Wood Products Association.

1.3 REFERENCES

A. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

B. ASTM C 1177 – Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing

C. ASTM C 1280 – Standard Specification for Application of Gypsum Sheathing

D. ASTM C1396 - Standard Specification for Gypsum Board

E. ASTM D 5664 - Standard Test Method for Evaluating the Effects of Fire-Retardant Treatments and Elevated Temperatures on Strength Properties of Fire-Retardant Treated Lumber

F. ASTM D 5516 - Standard Test Method for Evaluating the Flexural Properties of Fire-Retardant Treated Softwood Plywood Exposed to Elevated Temperatures

G. ANSI-AF & PA NDS-2005 – National Design Specification for Wood Construction.

H. APA: The Engineered Wood Association *(Formerly - American Plywood Association.)*

I. AWPA: American Wood Preservers Association Standard U1 - All Products Preservative Treatment by Pressure Process.

J. ANSI/TPI 1 – National Design Standard for Metal Plate Connected Wood Truss Construction.

K. BCSI 1 – Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses.

1.4 COORDINATION

A. Coordination: In the event of conflicting requirements, the requirements set forth within the structural engineer's Drawings and Specifications shall govern.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: For each type of process and factory-installed product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative.

2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.

3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.

4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

C. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee Board of Review.

D. Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.

2. Fire-retardant-treated wood

3. Engineered wood products.

4. Power-driven fasteners.

5. Powder-actuated fasteners.

6. Expansion anchors.

7. Metal framing anchors.

E. Shop Drawings: Submit prefabricated floor and roof truss shop drawings and calculations.

1. Floor and roof truss shop drawings and calculations shall be signed and sealed by professional engineer licensed to practice in State where the project is located.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with the following agencies:

1. Lumber Grading Agency: Certified by ALSC.

2. Plywood Grading Agency: Certified by APA.

3. Treated Lumber: Certified by AWPA.

B. Truss Design, Fabrication, and Installation: In accordance with Truss Plate Institute, ANSI-TPI 1

C. Shear Walls: Refer to Structural Drawings for details.

1.7 QUALIFICATIONS

A. Prefabricated Wood Trusses:

1. Truss Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years' experience.

2. Design trusses under direct supervision of Professional Structural Engineer experienced in design of the Work and Licensed in State where Project is located.

1.8 DELIVERY, STORAGE AND HANDLING

A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Wood Products General:

1. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

a. Factory mark each piece of lumber with grade stamp of grading agency.

b. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.

c. Provide dressed lumber, S4S, unless otherwise indicated.

2. Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

a. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer that meet or exceed those indicated.

B. Dimension Lumber Framing

1. Maximum Moisture Content: 19 percent

2. Non-Load Bearing Interior partitions: Standard, Stud or No. 3 grade of any species

3. Framing other than non-load bearing Interior Partitions: Reference structural engineer's drawings.

4. Provide fire retardant treated wood (FRTW) at locations indicated on Drawings.

C. Decking: Plywood or Oriented-Strand Board (OSB).

1. Subfloor: APA rated sheathing 48/24, Exposure 1, thickness as noted.

a. Provide fire retardant treated wood (FRTW) floor decking at locations indicated on drawings.

b. Adhesive for subflooring: Conform to performance specification AFG-01 as developed by APA.

2. Roof Deck: APA rated sheathing 32/16, Exposure 1, thickness as noted.

a. Include metal 'H' clips at joints not over trusses.

D. Wall Sheathing: Typical:

1. Plywood or OSB Wall Sheathing:

a. APA rated, Exposure l, thickness as noted.

2. Paper-Faced Exterior Gypsum Wall Sheathing: Refer to Gypsum Sheathing Section.

3. Fiberglass-mat Faced Exterior Gypsum Wall Sheathing: Refer to Gypsum Sheathing Section.

E. Wall Sheathing: Intumescent Coated Wood Structural Panel:

1. Characteristics:

a. Fire-retardant treatment shall be impregnated by pressure process or by other means during manufacturer

b. Flame Spread Index of 25 or less (ASTM E84) with no significant progressive combustion for additional 20 minutes.

c. Shall be labeled in accordance with IBC Section 2303.

d. Wood Structural panels: ASTM D5516-01

2. Acceptable Products:

   a. Barrier Technology Corp. — Type Blazeguard 2-Side

   b. Louisiana Pacific Corp — Type LP FlameBlock 2-Side

3. Substitutions: Products meeting the indicated standards of this section as well as the standards set forth in the applicable listed fire rated assembly, shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

D. Wood Preservative Treated Lumber

1. Pressure Treated Products: In accordance with AWPA Standard U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

   a. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

   b. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

   c. After treatment, redry dimension lumber to 19 percent maximum moisture content.

2. Mark lumber with treatment quality mark of inspection agency by the ASLC Board of Review.

3. Locations: Treat items indicated on Drawings and at the following locations:

   a. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.

   b. Wood sills, sleepers, blocking, furring, stripping and similar concealed members in contact with masonry or concrete.

   c. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.

   d. Wood framing members that are less than 6 inches (150 mm) above the ground in crawlspaces or unexcavated areas.

   e. Wood floor plates that are installed over concrete slabs-on-grade.

G. Fire Retardant Treated Materials:

1. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

   a. Treated materials shall be in accordance with IBC Section 2303.

2. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and

with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

a. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.

b. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.

3. Lumber: Comply with ASTM D5664

a. Kiln-dry lumber after treatment to maximum moisture content of 19 percent.

4. Plywood: Comply with ASTM D5516

a. Kiln-dry plywood after treatment to maximum moisture content of 15 percent.

5. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

H. Engineered Wood Products

1. Laminated-Veneer Lumber (LVL): Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D5456 and manufactured with an exterior-type adhesive complying with ASTM D2559 and containing no urea formaldehyde.

a. Provide engineered wood (LVL) wall plates at locations indicated on Structural Drawings.

2. Parallel Strand Lumber (PSL): Structural composite lumber made from wood strand elements with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D5456 and manufactured with an exterior-type adhesive complying with ASTM D2559 and containing no urea formaldehyde.

3. Wood I-Joists: Prefabricated units, I-shaped in cross section, made with solid or structural composite lumber flanges and wood-based structural panel webs, let into and bonded to flanges. Comply with material requirements of and with structural capacities established and monitored according to ASTM D5055.

4. Rim Boards: Product designed to be used as a load-bearing member and to brace wood I-joists at bearing ends, complying with research or evaluation report for I-joists.

a. Manufacturer: Provide products by same manufacturer as I-joists

I. Fasteners and Anchors:

1. General: Provide fasteners of size and type indicated that comply with requirements specified

2. Where rough carpentry is exposed to weather, in ground contact, IS pressure- preservative treated or in areas of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M of Type304 stainless steel.

3. Power-Driven Fasteners: NES NER-272.

4. Bolts: Steel bolts complying with ASTM A307, Grade A (ASTM F568M, Property Class 4.6); with ASTM A563 (ASTM A563M) hex nuts and, where indicated, flat washers.

J. Metal Framing Anchors

1. Basis-of-Design Products: Subject to compliance with requirements, provide Simpson Strong Tie Hardware indicated on Drawings or comparable products by one of the following:

a. Alpine Engineered Products, Inc.

b. Cleveland Steel Specialty Co.

c. Harlen Metal Products, Inc.

d. KC Metals Products, Inc.

e. Southeastern Metals Manufacturing Co., Inc.

f. USP Structural Connectors.

g. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

PART 3 - EXECUTION

3.1 FRAMING

A. Set structural members level and plumb, in correct position.

B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Place horizontal members flat, crown side up.

D. Splicing of load bearing members only as allowed in Structural Plans and Specifications.

E. Double members at openings. Space short studs over and under opening to stud spacing.

F. Install wood blocking, nailers, ground, furring, etc. required for securing work of other trades. Secure blocking to receive, engage or support other work.

G. Truss handling, installation, and bracing in accordance with BCSI 1-03.

3.2 DECKING GLUE AND NAIL

A. Secure floor and roof decking perpendicular to framing members with ends staggered and sheet ends over firm bearing. Gap ends in accordance with manufacturer's instructions.

B. Secure floor decking to trusses with construction adhesive and No. 6d ringed shank nails, adhesive applied as 3/8-inch diameter bead to top chord of trusses and grooved edges of decking.

3.3 EXTERIOR WALL SHEATHING

A. Install in accordance with ASTM C 1280, GA 253 and manufacturer's specifications.

B. Attach over wood studs with corrosion resistant nails. Fastener size and spacing as noted in Structural Drawings.

C. Unless otherwise indicated on structural drawings/specifications, secure wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered.

D. Provide gap between sheets.

1. Size gap as required based on scheduled exterior finish – 1/16" to 1/8" min.

2. At wall areas to receive exterior stucco finish, verify required gap between sheets with stucco manufacturer's installation instructions and specifications as well as that required by applicable metal lath installation standard.

E. Shear Walls: Install sheathing where indicated, in strict accordance with local Building Code requirements and per Structural Engineer.

F. Provide fire resistant and / or non-combustible exterior sheathing at locations indicated on Drawings.

3.4 WOOD TREATMENT

A. Field treat cuts and holes with swabbing of concentrated solution of same preservative as originally applied in accordance with AWPA Standards.

END OF SECTION

SECTION 06 16 43

GYPSUM SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes gypsum board exterior wall sheathing.

1.2 REFERENCES

A. ASTM E 136 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C

B. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.

C. ASTM C 1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing

D. ASTM C 1280 Standard Specification for Application of Gypsum Sheathing

E. ASTM C 473 Standard Test Methods for Physical Testing of Gypsum Panel Products.

F. ASTM C 1002 Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

G. ASTM E 72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

H. ASTM C 1396 Standard Specification for Gypsum Board

I. Gypsum Association (GA): GA-253 Application of Gypsum Sheathing.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Submit manufacturer’s published product data and installation instructions.

1.4 DELIVERY, STORAGE AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: As tested according to ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 GYPSUM WALL SHEATHING

A. Exterior Wall Sheathing:

1. Paper-Faced Exterior Gypsum Wall Sheathing: ASTM C 1396

a. Water resistant treated core with water repellant paper face

b. Thickness: ½ inch unless noted otherwise.

c. Non-combustible in accordance with ASTM E 136

d. Fire code, Type X core, where indicated

2. Fiberglass-mat Faced Exterior Gypsum Wall Sheathing: ASTM C 1177

a. Water resistant treated core with fiberglass mat face at both sides

b. Thickness: ½ inch unless noted otherwise

c. Non-combustible in accordance with ASTM E 136

d. Fire code, Type X core, where indicated

2.3 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. For wall and parapet sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153.

B. Nails, Brads, and Staples: ASTM F1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Screws for Fastening Sheathing to Wood Framing: ASTM C1002.

E. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.

1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C1002.

2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C954.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Installer to verify that project conditions and substrates are acceptable to begin installation of work of this section.

B. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

C. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

D. At Wood Frame Construction: Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

E. Coordinate wall and parapet sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 GYPSUM SHEATHING INSTALLATION

A. Install in accordance with ASTM C 1280, GA 253 and manufacturer's specifications.

B. Fasten to wood framing with corrosion resistant nails or screws. Fastener type, size and spacing as noted in Structural Drawings.

C. Fasten to cold-formed metal framing with corrosion resistant screws. Fastener size and spacing as noted in Structural Drawings.

D. Install panels with a 3/8-inch gap where non-load-bearing construction abuts structural elements.

E. Install panels with ¼-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

F. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

G. Unless otherwise indicated on structural drawings/specifications, secure wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered.

H. Provide gap between sheets when applied over wood framing.

1. Size gap as required based on scheduled exterior finish – 1/16" to 1/8" min.

2. At wall areas to receive exterior stucco finish, verify required gap between sheets with stucco manufacturer's installation instructions and specifications as well as that required by applicable metal lath installation standard.

END OF SECTION

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SECTION 06 20 00

FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes selections for finish carpentry at interior trim items and built-in shelving exposed to view within dwelling units.

B. Refer to Interior Design for all finish carpentry selections within building corridors, tenant amenity spaces and leasing facility.

1.2 REFERENCES

A. Architectural Woodwork Institute (AWI) Quality Standards, 8th Edition, Version 2.0

B. Federal Specifications (FS) MM-L-736 – Lumber and Hardwood

C. PS 1 – Structural Plywood

D. PS 20 - American Softwood Lumber Standard

E. Federal Specifications (FS) MMM-A-130A – Adhesive, contact

F. ANSI A208.1 – Particleboard

G. ANSI A208.2 – Medium Density Fiberboard (MDF) for Interior Applications

H. ASTM C1288 – Standard Specification for Discrete Non-Asbestos Fiber Cement Interior Substrate Sheets

I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials

1.3 SUBMITTALS

A. Submit under provisions of Section 01 33 00

B. Product Data: For each type of trim item. Indicate component materials, dimensions, profiles, textures and include location where component is being utilized.

C. Samples: If requested / required by Owner, submit samples for each type of trim item minimum 30 days prior to scheduled installation.

1.4 PERFORMANCE STANDARDS

A. Fire Performance Classification:

1. Within Dwelling Units: ASTM E84, Class C

    a. Flame Spread: 76-200 and Smoke Developed Index: 0-450

2. Within Exit and Exit Access Enclosures: ASTM E84, Class B

    a. Flame Spread: 26-75 and Smoke Developed Index: 0-450

3. Within Leasing Center and Tenant Amenity: ASTM E84, Class B

    a. Flame Spread: 26-75 and Smoke Developed Index: 0-450

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and protect products under provisions of Section 01 66 00 and as indicated below.

B. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation.

1. Protect materials from weather by covering with waterproof sheeting, securely anchored.

2. Provide for air circulation around stacks and under coverings.

C. Deliver interior finish carpentry materials only when environmental conditions comply with requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions comply with requirements specified for installation areas.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Standard for fabrication and products: Architectural Woodworking Institute Quality Standards, premium grade unless noted otherwise.

B. Materials General:

1. Lumber: DOC PS 20.

2. Softwood Plywood: DOC PS 1.

3. Hardboard: AHA A135.4.

4. Medium Density Fiber Board (MDF): ANSI A208.2, Grade 130

5. Particleboard: ANSI A208.1, Grade M-2

6. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.

C. Materials: Interior Finish Carpentry (Apartments):

1. General: Medium density fiberboard (MDF), Flat profile, sizes as indicated below:

a. Built-in Shelving: Medium-density fiberboard (MDF) with 1x2 MDF face trim.

b. Interior Door Trim: 3-1/4” x ¾”

c. Base Trim: 6” x ¾”

d. Window Stool – 5-1/4” x ¾”

e. Window / Bar Apron – 3-1/4” x ¾”

f. Miscellaneous Paneling, Molding, and Trim: Refer to Interior Designer’s Drawings for types and locations.

2.2 ACCESSORIES

A. Fasteners: Nails, screws and other anchoring devices of type, size. Material and finish required for application indicated to provide secure attachment, concealed where possible.

B. Bolts, Nuts, Washers, Blind Fasteners, Lags, and Screws: Size and type to suit application.

C. Lumber for Shimming and Blocking, Softwood lumber.

D. Primer: Refer Section 09 90 00 - Painting.

E. Wood Filler: Tinted to match surface finish color.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify surfaces and openings are ready to receive work.

B. Verify mechanical, electrical, and building items affecting work of this Section are in place and ready to receive this work.

3.2 PREPARATION

A. Clean substrates of projection and substances detrimental to application.

B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

3.3 INSTALLATION, GENERAL

A. Do not use materials that are unsound; warped; improperly treated or finished; inadequately seasoned; too small to fabricate with proper joint arrangements; or with defective surfaces, sizes or patterns.

B. Set and secure materials and components in place, plumb, level and aligned with adjacent materials and in accordance with manufacturer’s instructions, where applicable. Blind nail wherever possible. Where not possible, use casing or finish nails and set for putty.

C. Where dissimilar materials join, work is to be performed in such a manner that neat joints are obtained without use of molds unless detailed specifically.

D. Install shoe mold where hard surfaced floor finish material abuts base cabinets.

3.4 INSTALLATION, STANDING AND RUNNING TRIM

A. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available.

1. Do not use pieces less than 24 inches long, except where necessary.

2. Stagger joints in adjacent and related standing and running trim.

3. Cope or miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint.

4. Use scarf joints for end-to-end joints.

5. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.

6. Install trim after gypsum-board joint finishing operations are completed.

7. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting.

8. Fasten to prevent movement or warping.

9. Countersink fastener heads on exposed carpentry work and fill holes.

10. Leave joints in suitable condition for paint to completely conceal without use of non-detailed moldings.

3.4 PROTECTION

A. Protect installed products from damage from weather and other causes during construction.

B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 06 41 00

CABINETWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes pre-fabricated cabinetwork within dwelling units.

1.2 PRODUCT HANDLING AND FIELD CONDITIONS

A. Field Conditions: Do not deliver or install cabinets until building is enclosed, wet work is complete and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels.

B. Product Handling:

1. During shipment, sufficiently protect and brace cabinets to avoid damage.

2. Store in dry place and protect from moisture and damage until project completion.

1.3 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.4 STANDARDS

A. Architectural Woodwork Institute (AWI) Quality Standards, 8th Edition, Version 2.0

B. KCMA - Kitchen Cabinet Manufacturer's Association

C. KCMA A161.1 – Performance and Construction Standards for Kitchen and Vanity Cabinets

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.6 SUBMITTALS

A. Product Data: Submit manufacturer's product data for each type of product.

B. Shop Drawings: Submit cabinet shop drawings sufficient to show:

1. Cabinet construction.

2. Plans and elevations illustrating cabinet layout and sizes.

a. Clearly illustrate location of removable base cabinets where applicable.

1.7 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to replace or repair cabinet work that fail in materials and workmanship within the specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PRE-FABRICATED CABINETS - MANUFACTURERS

A. Leedo Cabinetry

B. Mikada Inc.

C. Master Woodcraft

D. Republic Industries

E. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.2 PRE-FABRICATED CABINETS – GENERAL

A. Door Style: As selected by Owner

B. Finish / Color at Exposed Surfaces:

1. Finish: As selected by Owner from manufacturer’s standard selections.

2. Color: As selected by Owner from manufacturer’s standard selections.

C. Exposed Hardware Style and Finish: As selected by Owner from manufacturer’s standard selections.

D. Cabinet Box Construction:

1. End, Top and Bottom Panels: 1/2-inch thick (min) wood-based composite with laminate finish.

2. Back Panel: 1/8-inch thick hardboard.

3. Shelves: 1/2-inch thick (min) wood-based composite with laminate finish.

E. Drawers:

1. Drawer Box: 1/2-inch thick (min) wood-based composite with laminate finish.

2. Drawer Bottom: 1/8-inch thick laminate composite panel.

F. Hinges: Adjustable, concealed steel hinges with soft-close feature.

G. Glazing at Cabinet Doors: ASTM C 1048, Kind FT (Fully-tempered), Condition A, Type I, Class 1 (clear), Quality-Q3, 1/4-inch (6 mm) thick unless otherwise indicated.

H. Undercabinet Lights: Provide recess at upper cabinet to receive under cabinet lights.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Coordinate with other trades for sink cutout, plumbing access, etc. Make cabinet cutouts required for plumbing and electrical outlets small enough to be covered by cover plates.

B. Install cabinets level, plumb and true in line to a tolerance of 1/8 inch in 60 inches using concealed shims as required.

C. Anchor cabinets to anchors or blocking built in or directly to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with cabinet surface.

1. For shop finished items, use filler matching finish of items being installed.

D. Provide shims at floor where necessary to avoid future cabinet sag.

E. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c.

1. At wood construction: Use No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking or hanging strips.

2. At cold-formed steel framing: Use No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

F. Wall cabinets should be spaced equally around windows.

G. Cabinet face frames shall be screwed together at the time of installation and shall be flush with adjacent cabinet face frames.

H. Doors and drawer fronts shall be level, tops of doors and drawer fronts shall be aligned.

I. Install scotia mold at all upper cabinets at furr downs.

3.2 ADJUSTING AND CLEANING

A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defect. Where not possible to repair, replace cabinets.

B. Adjust joinery for uniform appearance.

C. Completely clean all cabinets, inside and out, and make ready for use.

END OF SECTION

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SECTION 06 61 16

SOLID SURFACE FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes solid surface and plastic laminate countertops and backsplashes within dwelling units.

B. Refer to Interior Design for selections at clubhouse.

1.2 RELATED SECTIONS

A. 06 20 00 – Finish Carpentry

B. 06 41 00 – Cabinetwork

C. 07 92 00 – Joint Sealants

D. 09 30 00 - Tiling

E. 22 06 40 – Schedules for Plumbing (by MEP Engineer)

1.3 REFERENCES

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials

B. AWI – Architectural Woodwork Institute

C. AWS – Architectural Woodwork Standards

D. KCMA A161.11 – Performance and Construction Standards for Kitchen and Vanity Cabinets

1.4 PRODUCT HANDLING

A. During shipment, sufficiently protect and brace materials to avoid damage.

B. Store in dry place and protect from moisture and damage until project completion.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.6 SUBMITTALS

A. Submit counter top shop drawings and product data sufficient to show:

1. Counter top plans illustrating layouts and sizes.

2. Typical counter top edge type.

3. Typical sections at kitchen and bath base cabinets illustrating typical counter top dimensions, overhangs and installation method.

4. Coordinate layouts and sizes with final cabinet shop drawings.

B. If indicated in Drawings, provide samples of plastic laminates used.

C. Take appropriate field measurements and coordinate with counter top shop drawings to ensure fitting of materials.

PART 2 - PRODUCTS

2.1 MATERIALS – GENERAL

A. Cultured Marble

a. Material: Gel-coated solid fabrication of filled plastic resin complying with ANSI Z124.3, Type 4 with pre-coated finish.

b. Color: Selected by Interior Design and approved by Owner

c. Thickness: As indicated in SCHEDULE Article

B. Granite

1. Material: Natural granite

2. Color: Selected by Interior Design and approved by Owner

3. Thickness: As indicated in SCHEDULE Article

C. Quartz

1. Material: Quartz aggregate, polyester resin and color pigments formed into flat surface

2. Color: Selected by Interior Design and approved by Owner

3. Thickness: As indicated in SCHEDULE Article

4. Acceptable Manufacturers:

a. Cosentino USA, Silestone

b. LGViatera USA

c. Dupont, Zodiaq Quartz

d. Caesarstone Internationalk

e. Cambria USA

f. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

D. Plastic Laminate

1. Material: General purpose laminate

2. Color / Pattern: Selected by Interior Design and approved by Owner

3. Gloss: Selected by Interior Design and approved by Owner

4. Acceptable Manufacturers:

a. Wilsonart

b. Formica Corp.

c. Nevamar

d. Arborite

e. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.2 SCHEDULE

A. Kitchens at dwelling units:

1. Material: Solid quartz countertop, 3 cm minimum thickness.

2. Back / End Splash: None.

3. Openings: Furnish tops with cut-outs for undermount sink.

4. Color: As selected by Owner.

B. Bathrooms in dwelling units:

1. Material: Solid quartz countertop, **2** cm minimum thickness.

2. Back / End Splash: 4" high at adjacent walls, same material as countertop.

3. Openings: Furnish tops with cut-outs for undermount vanity bowls.

4. Color: As selected by Owner.

C. Computer desks in dwelling units:

1. Material: Solid quartz countertop, 3 cm minimum thickness.

2. Back / End Splash: None

3. Openings: Furnish tops with 2" dia. holes to receive grommet, at indicated locations.

4. Color: As selected by Owner.

D. Utility Rooms in dwelling units:

1. Material: Solid quartz countertop, 2 cm minimum thickness**.**

2. Back / End Splash: 4" high at adjacent walls, same material as countertop.

3. Color: As selected by Owner.

E. Window Sills at wet areas in dwelling unit kitchens and baths:

1. Material: Solid quartz, 2 cm minimum thickness**.**

2. Color: As selected by Owner.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation – General:

1. Coordinate with other trades for sink cutout, plumbing access, etc.

2. Install level and plumb and secured rigidly in place.

3. Provide consistent overhang beyond cabinets below. Ensure overhang allows adequate space for scheduled trim.

4. Provide appropriate supplemental support at extended overhangs. Coordinate type and location with Architect.

5. Adhere backsplashes and side splashes with approved adhesive.

6. Seal perimeter with scheduled sealant in accordance with Joint Sealers Section.

a. Tile splashes: Joint between counter top and tile splash shall receive scheduled sealant joint. Grouted joint will not be accepted.

B. Installation – Plastic Laminate

1. Install in strict conformance with laminate manufacturer’s recommendations and specifications.

2. Utilize laminate manufacturer’s standard adhesive or adhesive approved by laminate manufacturer.

3.2 CLEANING

A. Completely clean all counter tops prior to Substantial Completion. Coordinate with Owner’s punch walk schedule.

END OF SECTION

SECTION 07 06 27

SCHEDULES FOR WEATHER RESISTIVE BARRIERS AND AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Schedules for weather resistive barriers and air barriers.

PART 2 - PRODUCTS

2.1 SCHEDULE:

A. Behind Brick Masonry Veneer:

1. Mechanically Attached Water Resistive Barrier

a. Basis of Design: Refer to 07 27 08 “Mechanically Attached Water Resistive Barriers”

2. Fluid Applied Membrane Air Barrier

a. Basis of Design: Refer to 07 27 26 “Fluid Applied Membrane Barriers”

B. Behind Adhered Thin Brick Masonry Veneer:

1. Base Layer: Mechanically Attached Water Resistive Barrier

a. Basis of Design: Refer to 07 27 08 “Mechanically Attached Water Resistive Barriers”

2. Second Layer: Refer to 04 21 13.13 “Adhered Thin Brick Masonry”

C. Behind Fiber Cement Panel:

1. Mechanically Attached Water Resistive Barrier

a. Basis of Design: Refer to 07 27 08 “Mechanically Attached Water Resistive Barriers”

D. Behind Fiber Cement Siding:

1. Mechanically Attached Water Resistive Barrier

a. Basis of Design: Refer to 07 27 08 “Mechanically Attached Water Resistive Barriers”

E. Behind Cement Plastering / Stucco:

1. Base Layer: Mechanically Attached Water Resistive Barrier

a. Basis of Design: Refer to 07 27 08 “Mechanically Attached Water Resistive Barriers”

2. Second Layer: Refer to 09 24 00 “Cement Plastering”

F. Behind Water-drainage Exterior Insulation Finish System:

1. Fluid Applied Membrane Air Barrier

a. Basis of Design: As indicated at Section 07 27 26 “Fluid Applied Membrane Barriers”

G. Behind Formed Metal Wall Panels:

1. Base Layer: Fluid Applied Membrane Air Barrier

a. Basis of Design: As indicated at Section 07 27 26 “Fluid Applied Membrane Barriers”

SECTION 07 06 27

SCHEDULES FOR WEATHER RESISTIVE BARRIERS AND AIR BARRIERS

PART 3 - EXECUTION – (Not Used)

END OF SECTION

SECTION 07 11 13

BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cold-applied, cut-back-asphalt dampproofing.

2. Cold-applied, emulsified-asphalt dampproofing.

1.2 SUBMITTALS

A. Product Data: For each type of product.

B. Indicate locations where dampproofing is being proposed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction unless otherwise indicated.

2.2 COLD-APPLIED, CUT-BACK-ASPHALT DAMPPROOFING

A. Acceptable Manufacturers:

1. W.R. Meadows, Inc.

2. Karnak Corp.

3. Henry Company

4. ChemMasters, Inc.

5. Brewer Company

6. APOC, Inc. a division of Gardner Industries

7. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Trowel Coats: ASTM D4586/D4586M, Type I, Class 1, fibered.

C. Brush and Spray Coats: ASTM D4479/D4479M, Type I, fibered or nonfibered.

2.3 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. Acceptable Manufacturers:

1. W.R. Meadows, Inc.

2. Karnak Corp.

3. Henry Company

4. ChemMasters, Inc.

5. Brewer Company

6. APOC, Inc. a division of Gardner Industries

7. BASF Corp.; Construction Systems

8. Mar-flex Waterproofing & Building Products

9. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Trowel Coats: ASTM D1227, Type II, Class 1.

C. Fibered Brush and Spray Coats: ASTM D1227, Type II, Class 1.

D. Brush and Spray Coats: ASTM D1227, Type III, Class 1.

2.4 AUXILIARY MATERIALS

A. Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.

B. Cut-Back-Asphalt Primer: ASTM D41/D41M.

C. Emulsified-Asphalt Primer: ASTM D1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.

D. Asphalt-Coated Glass Fabric: ASTM D1668/D1668M, Type I.

E. Protection Course: ASTM D6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners.

1. Thickness: As recommended by dampproofing manufacturer but not less than nominal 1/8 inch

F. Protection Course: Fan folded, with a core of extruded-polystyrene board insulation faced on one side or both sides with plastic film, nominal thickness 1/4 inch (6 mm), with a compressive strength of not less than 8 psi (55 kPa) per ASTM D1621, and maximum water absorption by volume of 0.6 percent per ASTM C272/C272M.

G. Protection Course: Extruded-polystyrene board insulation, unfaced, ASTM C578, Type X, 1/2 inch (13 mm) thick.

H. Protection Course: Smooth-surfaced roll roofing complying with ASTM D6380/D6380M, Class S, Type III.

PART 3 - EXECUTION

3.1 APPLICATION, GENERAL

A. Comply with manufacturer's written instructions for dampproofing application, cure time between coats, and drying time before backfilling unless otherwise indicated.

1. Apply dampproofing to provide continuous plane of protection.

2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.

B. Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches (150 mm) over outside face of footing.

1. Extend dampproofing 12 inches (300 mm) onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.

2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where indicated as "reinforced," by embedding an 8-inch- (200-mm-) wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.

C. Where dampproofing exterior face of inner wythe of exterior masonry cavity walls, lap dampproofing at least 1/4 inch (6 mm) onto flashing, masonry reinforcement, veneer ties, and other items that penetrate inner wythe.

1. Extend dampproofing over outer face of structural members and concrete slabs that interrupt inner wythe.

2. Lap dampproofing at least 1/4 inch (6 mm) onto shelf angles supporting veneer.

D. Where dampproofing interior face of above-grade, exterior concrete and masonry single-wythe masonry walls, continue dampproofing through intersecting walls by keeping vertical mortar joints at intersection temporarily open or by dampproofing wall before constructing intersecting walls.

3.2 COLD-APPLIED, CUT-BACK-ASPHALT DAMPPROOFING

A. Concrete Foundations and Parged Masonry Foundation Walls: Apply two brush or spray coats at not less than 1.25 gal./100 sq. ft. (0.5 L/sq. m) for first coat and 1 gal./100 sq. ft. (0.4 L/sq. m) for second coat or one trowel coat at not less than 4 gal./100 sq. ft. (1.6 L/sq. m)].

B. Unparged Masonry Foundation Walls: Apply primer and two brush or spray coats at not less than 1.25 gal./100 sq. ft. (0.5 L/sq. m) for first coat and 1 gal./100 sq. ft. (0.4 L/sq. m) for second coat or primer and one trowel coat at not less than 4 gal./100 sq. ft. (1.6 L/sq. m).

C. Unexposed Face of Concrete Retaining Walls: Apply one brush or spray coat at not less than 1.25 gal./100 sq. ft. (0.5 L/sq. m).

D. Unexposed Face of Masonry Retaining Walls: Apply primer and one brush or spray coat at not less than 1.25 gal./100 sq. ft. (0.5 L/sq. m).

E. Concrete Backup for Brick Veneer Assemblies Stone Veneer Assemblies and Dimension Stone Cladding: Apply one brush or spray coat at not less than 1 gal./100 sq. ft. (0.4 L/sq. m).

F. Masonry Backup for Brick Veneer Assemblies Stone Veneer Assemblies and Dimension Stone Cladding: Apply primer and one brush or spray coat at not less than 1 gal./100 sq. ft. (0.4 L/sq. m).

G. Exterior Face of Inner Wythe of Cavity Walls: Apply primer and one brush or spray coat at not less than 1 gal./100 sq. ft. (0.4 L/sq. m).

3.3 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. Concrete Foundations and Parged Masonry Foundation Walls: Apply two brush or spray coats at not less than 1.5 gal./100 sq. ft. (0.6 L/sq. m) for first coat and 1 gal./100 sq. ft. (0.4 L/sq. m) for second coat one fibered brush or spray coat at not less than 3 gal./100 sq. ft. (1.2 L/sq. m) or one trowel coat at not less than 4 gal./100 sq. ft. (1.6 L/sq. m).

B. Unparged Masonry Foundation Walls: Apply primer and two brush or spray coats at not less than 1.5 gal./100 sq. ft. (0.6 L/sq. m) for first coat and 1 gal./100 sq. ft. (0.4 L/sq. m) for second coat primer and one fibered brush or spray coat at not less than 3 gal./100 sq. ft. (1.2 L/sq. m) or primer and one trowel coat at not less than 5 gal./100 sq. ft. (2 L/sq. m).

C. Unexposed Face of Concrete Retaining Walls: Apply one brush or spray coat at not less than 1.25 gal./100 sq. ft. (0.5 L/sq. m).

D. Unexposed Face of Masonry Retaining Walls: Apply primer and one brush or spray coat at not less than 1.25 gal./100 sq. ft. (0.5 L/sq. m).

E. Concrete Backup for Brick Veneer Assemblies Stone Veneer Assemblies and Dimension Stone Cladding: Apply one brush or spray coat at not less than 1 gal./100 sq. ft. (0.4 L/sq. m).

F. Masonry Backup for Brick Veneer Assemblies Stone Veneer Assemblies and Dimension Stone Cladding: Apply primer and one brush or spray coat at not less than 1 gal./100 sq. ft. (0.4 L/sq. m).

G. Exterior Face of Inner Wythe of Cavity Walls: Apply primer and one brush or spray coat at not less than 1 gal./100 sq. ft. (0.4 L/sq. m).

3.4 PROTECTION COURSE INSTALLATION

A. Install protection course over completed-and-cured dampproofing. Comply with dampproofing-material and protection-course manufacturers' written instructions for attaching protection course.

END OF SECTION

SECTION 07 13 26

SELF-ADHERING SHEET MEMBRANE WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Self-adhering sheet membrane waterproofing systems for:

1. Wood-framed balconies, stair landings and breezeways

2. Below-grade, cast-in-place concrete foundation walls

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.

2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

B. Shop Drawings:

1. Indicate locations and extent of waterproofing.

2. Include details of substrate joints and cracks, expansion joints, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

B. Mock-Ups: Build mockups to verify product selections, and to set quality standards for installation.

1. Build typical balcony waterproofing installation including accessories.

a. Demonstrate substrate preparation, installation of base flashings including inside and outside corner treatments and laps, guardrail embeds, edge flashing, concrete topping accessory (aka T-bar), waterproofing membrane, drainage mat, and integration of base flashing with adjacent water-resistive barrier.

b. Size: 60 inches long by 48 inches deep minimum, or as indicated on Drawings.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

1. Do not apply waterproofing in snow, rain, fog, or mist.

B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.6 WARRANTY

A. Manufacturer's Warranty:

1. Waterproofing Warranty: Manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.

a. Warranty Period: Five years from date of Substantial Completion.

B. Installer’s Special Warranty: Installer agrees to remove and replace concrete topping, protection board, drainage composite, and waterproofing material for assembly that does not comply with requirements or that fails to remain watertight within the specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Source Limitations for Waterproofing System: Obtain self-adhering sheet membrane waterproofing, auxiliary materials, drain mat, and molded sheet drain panels from single source from single manufacturer. If auxiliary material is not available from sheet membrane waterproofing manufacturer, furnish materials recommended by waterproofing manufacturer for intended use and compatible with sheet membrane waterproofing.

1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.

2.2 MODIFIED BITUMINOUS SHEET WATERPROOFING

A. Modified Bituminous Sheet Waterproofing at Wood-Framed Balconies: Minimum 60-mil nominal thickness, self-adhering sheet consisting of 56 mils (of rubberized asphalt laminated on one side to a 4-mil-thick, polyethylene-film reinforcement, and with release liner on adhesive side.

1. Basis of Design at wood-framed balconies, weather-exposed stair landings, weather-exposed breezeways, and other indicated locations:

a. Balconyguard by Polyguard Products

2. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Keene Building Envelope Products

b. Formulated Materials

c. Polyguard Products

d. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

3. Physical Properties:

a. Tensile Strength, Membrane: 250 psi minimum; ASTM D412

b. Low-Temperature Flexibility: Pass at maximum temperature of -15 deg F; ASTM D1970.

c. Puncture Resistance: 60 lbf minimum; ASTM E154.

d. Water Vapor Permeance: 0.03 perm maximum; ASTM E96

4. Auxiliary Materials:

a. Provide liquid primer, surface conditioner and/or membrane adhesive as required and recommended for substrate by sheet membrane waterproofing manufacturer.

b. Liquid Waterproofing Membrane: Sheet membrane waterproofing manufacturer's standard formulation.

c. Sealant: ASTM C920, Type S, Silyl Terminated Polyether Elastomeric (STPE)

d. Self-Adhering Membrane Flashing: 60-mil thick, self-adhesive sheet, compatible with sheet membrane waterproofing.

1) Provide foil facing when exposed to ultra-violet (UV)

e. Self-Adhering Membrane Base Flashing: 105 mil thick, self-adhesive sheet, compatible with sheet membrane waterproofing.

1) Provide foil facing when exposed to ultra-violet (UV)

f. Aluminum T-Bar Edge Closure: As specified in 07 53 00 Exterior Concrete Topping.

g. T-Bar Trough: As indicated in Drawings.

5. Drainage Mat: Sheet membrane waterproofing manufacturer's standard drain mat for horizontal applications.

a. Basis of Design: Polyflow BD by Polyguard Products

b. Physical Properties:

1) Thickness: 0.25-inch (min) to 0.31-inch (max)

2) Compressive Strength: Not less than 5,000 lbs/ft^2

B. Modified Bituminous Sheet Waterproofing at Concrete Foundation Walls: Minimum 60-mil nominal thickness, self-adhering sheet consisting of 56 mils (of rubberized asphalt laminated on one side to a 4-mil-thick, polyethylene-film reinforcement, and with release liner on adhesive side.

1. Basis of Design at foundation walls:

a. 650 Membrane by Polyguard Products

2. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Carlisle Coatings & Waterproofing, Inc.

b. CETCO, A Mineral Technologies company

c. GCP Applied Technologies, Inc.

d. Henry Company

e. Mapei Corporation

f. Polyguard Products, Inc.

g. Soprema, Inc.

h. Tamko Building Products, Inc.

i. W.R. Meadows

j. York Manufacturing, Inc.

k. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

3. Physical Properties:

a. Tensile Strength, Membrane: 250 psi minimum; ASTM D412

b. Ultimate Elongation: 300 percent minimum; ASTM D412

c. Low-Temperature Flexibility: Pass at maximum temperature of -15 deg F; ASTM D1970.

d. Puncture Resistance: 60 lbf minimum; ASTM E154.

e. Water Absorption: 0.2 percent weight-gain maximum; ASTM D570.

f. Water Vapor Permeance: 0.05 perm maximum; ASTM E96, Water Method.

g. Hydrostatic-Head Resistance: 200 feet minimum; ASTM D5385.

4. Auxiliary Materials:

a. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

b. Primer: Liquid primer recommended for substrate by sheet waterproofing material manufacturer.

c. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet waterproofing material manufacturer.

d. Sealant: ASTM C920, Type S, Silyl Terminated Polyether Elastomeric (STPE)

e. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.

f. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.

g. Metal Termination Bar: Aluminum or stainless steel, approximately 1 by 1/8 inch, predrilled at 9-inch centers.

h. Protection Course: At locations indicated or as recommended by waterproofing membrane manufacturer.

1) Thickness: Nominal 1/8 inch for vertical applications; 1/4 inch elsewhere.

2) Adhesive: Rubber-based solvent type recommended by waterproofing manufacturer for protection course type.

5. Molded-Sheet Drainage Panels

a. Non-woven-Geotextile-Faced, Molded-Sheet Drainage Panel with Polymeric Film: Composite subsurface drainage panel consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing laminated to one side of the core and a polymeric film bonded to the other side.

b. Basis of Design: Polyflow 15 by Polyguard Products

1) Thickness: 0.40-inch

2) Vertical Flow Rate: Not less than 21 gpm per ft.

3) Compressive Strength: As recommended by manufacturer for intended application but not less than 15,000 lbs per sq. ft.

c. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1) Carlisle Coatings & Waterproofing, Inc.

2) CETCO, A Mineral Technologies company

3) Henry Company

4) Polyguard Products, Inc.

5) Soprema, Inc.

6) Tamko Building Products, Inc.

7) W.R. Meadows

8) Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

6. Insulation Drainage Panels

a. Geotextile-Faced, Wall-Insulation Drainage Panels: Extruded-polystyrene board insulation according to ASTM C578; fabricated with tongue-and-groove edges and with one side having grooved drainage channels faced with nonwoven geotextile filter fabric.

b. Compressive Strength: As recommended by manufacturer based on application, but not less than 25 psi (Type IV)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of waterproofing.

1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.

2. Verify that concrete substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D4263.

3. Verify that wood structural panel substrate is visibly dry and free from grease and oil.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions.

B. Provide clean, dust-free, and dry substrates for waterproofing application.

C. Protect adjoining surfaces not receiving waterproofing.

D. Concrete Substrate Preparation:

1. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

2. Remove fins, ridges, mortar, and other projections.

3. Fill form tie holes, honeycomb, aggregate pockets, holes, and other voids.

4. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D4258.

a. Install sheet strips of width according to manufacturer's written instructions and center over treated construction and contraction joints and cracks. Joint widths requiring sheet strip treatment shall be as indicated in waterproofing manufacturer’s written instruction.

5. Bridge and cover isolation joints, expansion joints, and discontinuous deck-to-wall and deck-to-deck joints with overlapping sheet strips of widths according to manufacturer's written instructions.

6. Corners: Prepare, prime, and treat inside and outside corners in accordance with manufacturer's instructions.

a. Install membrane strips centered over vertical inside corners. Install 3/4-inch fillets of liquid membrane on horizontal inside corners and as follows:

1) At footing-to-wall intersections, extend liquid membrane in each direction from corner or install membrane strip centered over corner.

2) At plaza-deck-to-wall intersections, extend liquid membrane or sheet strips onto deck waterproofing and to finished height of sheet flashing.

E. Wood Substrate Preparation:

1. Remove dust, dirt, and debris.

2. Remove irregularities that present a membrane puncture hazard.

F. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions.

3.3 INSTALLATION OF MODIFIED BITUMINOUS SHEET WATERPROOFING

A. Concrete Foundation Walls:

1. Install modified bituminous sheets according to waterproofing manufacturer's written instructions.

2. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.

3. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch- minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.

4. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.

5. Seal edges of sheet waterproofing terminations with mastic.

6. When terminating into other waterproofing, install sheet waterproofing and auxiliary materials to tie into adjacent waterproofing.

7. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions.

8. Immediately install protection course with butted joints over waterproofing membrane.

a. Molded-sheet drainage panels or insulation drainage panels may be used in place of a separate protection course at vertical applications when approved by waterproofing manufacturer and installed immediately.

B. Wood-Framed Balconies, Weather-Exposed Stair Landings, and Other Indicated Locations

1. Install modified bituminous sheets after installation of base flashings, edge flashing, T-bar troughs, and according to waterproofing manufacturer's written instructions.

2. Apply primer or surface conditioner to substrates at required rate and allow it to dry. Limit application to areas that will be covered by sheet waterproofing in same day.

3. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 3-inch- minimum lap widths and end laps. Provide increased lap dimensions if recommended by sheet membrane manufacturer. Overlap and seal seams, and stagger end laps to ensure watertight installation.

4. Apply sheets from low to high points of decks to ensure that laps shed water.

5. Seal edges of sheet waterproofing terminations with waterproofing membrane manufacturer’s approved STPE sealant or liquid waterproofing.

6. Repair tears, voids, and lapped seams in waterproofing not complying with requirements.

3.4 INSTALLATION OF DRAIN MAT

A. Install drain mat over sheet membrane waterproofing in accordance with manufacturer’s installation instructions.

3.5 INSTALLATION OF MOLDED-SHEET DRAINAGE PANELS

A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according to manufacturer's written instructions. Use adhesive or another method that does not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

3.6 INSTALLATION OF INSULATION DRAINAGE PANELS

A. Install insulation drainage panels over waterproofed surfaces. Cut and fit to within 3/4 inch of projections and penetrations.

B. Ensure that drainage channels are aligned and free of obstructions.

C. On vertical surfaces, set insulation drainage panels in adhesive or tape applied according to manufacturer's written instructions.

D. On horizontal surfaces, loosely lay insulation drainage panels according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.7 PROTECTION, REPAIR, AND CLEANING

A. Do not permit foot or vehicular traffic on unprotected sheet membrane waterproofing.

B. Protect sheet membrane waterproofing from damage and wear during remainder of construction period.

C. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

D. Correct deficiencies in or remove sheet membrane waterproofing and auxiliary materials that do not comply with requirements; repair substrates, reapply sheet membrane waterproofing and auxiliary materials, and repair sheet flashings.

E. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION

SECTION 07 14 16

COLD, FLUID-APPLIED WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Cold, fluid-applied waterproofing systems for below-grade foundation walls and plaza / courtyard decks.

1. Polyurethane waterproofing.

2. PUMA waterproofing

3. Protection course.

4. Molded-sheet drainage panels.

5. Insulation drainage panels.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.

2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

B. Shop Drawings:

1. Indicate locations and extent of waterproofing.

2. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer.

1. Do not apply waterproofing in snow, rain, fog or mist, or when such weather conditions are imminent during application and curing period.

B. Maintain adequate ventilation during application and curing of waterproofing materials.

1.6 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace waterproofing that fails in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

B. Installer’s Special Warranty: Installer agrees to remove and replace decorative topping or paver system, protection board, drainage composite, and waterproofing material for assembly that does not comply with requirements or that fails to remain watertight within the specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain waterproofing materials, protection course, and molded-sheet drainage panels from single source and from single manufacturer.

2.2 POLYURETHANE WATERPROOFING

A. Single-Component, Modified Polyurethane Waterproofing: ASTM C836 and coal-tar free.

1. Basis of Design:

a. Foundation Walls: CCW-525-V by Carlisle Coatings & Waterproofing, Inc.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. BASF Corp.

b. Carlisle Coatings & Waterproofing, Inc.

c. CETCO, A Mineral Technologies company

d. Mapei Corporation

e. Polyguard Products, Inc.

f. Tremco Incorporated

g. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Single-Component, Reinforced, Modified Polyurethane Waterproofing: ASTM C836 and coal-tar free.

1. Basis of Design:

a. Plaza / Courtyard Decks: CCW-525-H by Carlisle Coatings & Waterproofing, Inc.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. BASF Corp.

b. Carlisle Coatings & Waterproofing, Inc.

c. Urethane Polymers International, Inc.

d. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

C. Two-Component, Polyurethane Waterproofing: ASTM C836.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Carlisle Coatings & Waterproofing, Inc.

b. Urethane Polymers International, Inc.

c. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

D. Two-Component, Reinforced, Polyurethane Waterproofing: ASTM C836.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Kemper System, Inc.

b. Urethane Polymers International, Inc.

c. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

E. PUMA Waterproofing: Two-component, polyurethane-methacrylate; ASTM C1305; with the following properties measured in accordance with standard test methods referenced:

1. Basis of Design, Plaza / Courtyard Decks: Pumadeq System by Henry Company

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Henry Company

b. Tremco Incorporated

c. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

3. Tensile Strength: 900 psi minimum; ASTM D638.

4. Elongation at Break: 400 percent minimum; ASTM D638.

5. Water Vapor Permeance: 0.003 perm (0.172 ng/Pa x s x sq. m), maximum, ASTM E96/E96M.

F. PMMA Waterproofing: Two-component, polymethyl methacrylate, reinforced with polyester fleece layer.

2.3 AUXILIARY MATERIALS

A. General: Provide auxiliary materials recommended in writing by waterproofing manufacturer for intended use and compatible with one another and with waterproofing.

1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.

B. Primer: Manufacturer's standard primer, sealer, or surface conditioner; factory-formulated.

C. Sheet Flashing: Type as recommended by waterproofing manufacturer, 50-mil-minimum, non-staining.

1. Adhesive: Manufacturer's recommended contact adhesive.

D. Membrane-Reinforcing Fabric: Manufacturer's recommended fiberglass mesh or polyester fabric, manufacturer's standard weight.

E. Joint Reinforcing Strip: Manufacturer's recommended fiberglass mesh or polyester fabric.

F. Joint Sealant: Multicomponent polyurethane sealant, compatible with waterproofing; ASTM C920, Type M, Class 25 or greater; Grade NS for sloping and vertical applications and Grade P for deck applications; Use NT exposure; and as recommended by manufacturer for substrate and joint conditions.

1. Backer Rod: Closed-cell polyethylene foam.

2.4 PROTECTION COURSE

A. Protection Course: As recommended by waterproofing membrane manufacturer.

1. Thickness:

a. 1/8-inch, nominal, for vertical applications; 1/4-inch, nominal, elsewhere.

2. Adhesive: Rubber-based solvent type recommended in writing by waterproofing manufacturer.

2.5 MOLDED-SHEET DRAINAGE PANELS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. BASF Corp.

2. Carlisle Coatings & Waterproofing, Inc.

3. CETCO, A Mineral Technologies company

4. Henry Company

5. Polyguard Products, Inc.

6. Urethane Polymers International, Inc.

7. Tremco Incorporated

8. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. At Foundation Walls:

1. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel with Polymeric Film: Composite subsurface drainage panel consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing laminated to one side of the core and a polymeric film bonded to the other side.

a. Thickness: 1/4-inch (min) to 1/2-inch (max)

b. Vertical Flow Rate: Not less than 9 to 21 gpm per ft.

c. Compressive Strength: As recommended by manufacturer for intended application but not less than 10,000 lbs/sq. ft.

C. At Plaza / Courtyard Decks:

1. Woven-Geotextile-Faced, Molded-Sheet Drainage Panel with Polymeric Film: Composite subsurface drainage panels consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a woven-geotextile facing, laminated to one side of the core and a polymeric film bonded to the other side

a. Thickness: 1/4-inch (min) to 1/2-inch (max)

b. Horizontal Flow Rate: Not less than 2.8 gpm per ft.

c. Compressive Strength: As recommended by manufacturer for intended application but not less than 11,000 lbs/sq. ft.

2.6 INSULATION DRAINAGE PANELS

A. Geotextile-Faced, Wall-Insulation Drainage Panels: Extruded-polystyrene board insulation in accordance with ASTM C578; fabricated with tongue-and-groove edges and with one side having grooved drainage channels faced with a nonwoven-geotextile filter fabric.

1. Compressive Strength: As recommended by manufacturer based on application, but not less than 25 psi (Type IV)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.

2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method in accordance with ASTM D4263.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean, prepare, and treat substrates in accordance with manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Close off deck drains and other deck penetrations to prevent spillage and migration of waterproofing fluids.

D. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, acid residues, and other penetrating contaminants or film-forming coatings from concrete.

1. When controlled, substrate surface is required for waterproofing adhesion, abrasive blast clean concrete surfaces uniformly to expose top surface of fine aggregate in accordance with ASTM D4259 with a self-contained, recirculating, blast-cleaning apparatus. Remove material to provide a sound surface free of laitance, glaze, efflorescence, curing compounds, concrete hardeners, or form-release agents. Remove remaining loose material and clean surfaces in accordance with ASTM D4258.

E. Remove fins, ridges, and other projections, and fill honeycomb, aggregate pockets, holes, and other voids.

3.3 PREPARATION AT TERMINATIONS, PENETRATIONS, AND CORNERS

A. Prepare surfaces at terminations and penetrations through waterproofing and at expansion joints, drains, sleeves, and corners in accordance with waterproofing manufacturer's written instructions and to recommendations in ASTM C898 for plaza and horizontal decks and ASTM C1471 for vertical surfaces.

B. Apply waterproofing in two separate applications, and embed a joint reinforcing strip in the first preparation coat when recommended by waterproofing manufacturer.

3.4 JOINT AND CRACK TREATMENT

A. Prepare, treat, rout, and fill joints and cracks in substrate in accordance with waterproofing manufacturer's written instructions and to recommendations in ASTM C898 for plaza and horizontal decks and ASTM C1471 for vertical surfaces. Before coating surfaces, remove dust and dirt from joints and cracks in accordance with ASTM D4258.

1. Comply with ASTM C1193 for joint-sealant installation.

2. Apply bond breaker on sealant surface, beneath preparation strip.

3. Prime substrate along each side of joint and apply a single thickness of preparation strip at least 6 inches wide along each side of joint. Apply waterproofing in two separate applications and embed a joint reinforcing strip in the first preparation coat.

3.5 INSTALLATION OF WATERPROOFING

A. Apply waterproofing in accordance with manufacturer's written instructions and to recommendations in ASTM C898 for plaza and horizontal decks and ASTM C1471 for vertical surfaces

B. Start installing waterproofing in presence of manufacturer's technical representative.

C. Apply primer over prepared substrate unless otherwise instructed in writing by waterproofing manufacturer.

D. Unreinforced Waterproofing Applications: Mix materials and apply waterproofing by spray, roller, notched squeegee, trowel, or other application method suitable to slope of substrate.

1. Apply one or more coats of waterproofing to obtain a seamless membrane free of entrapped gases and pinholes.

a. Dry film thickness:

1) Foundation Walls: 60 mils

2) Plaza / Courtyard Decks: 120 mils

2. Apply waterproofing to prepared wall terminations and vertical surfaces.

3. Verify manufacturer's recommended wet film thickness of waterproofing every 100 sq. ft.

E. Reinforced Waterproofing Applications: Mix materials and apply waterproofing by roller, notched squeegee, trowel, or other suitable application method.

1. Apply first coat of waterproofing, embed membrane-reinforcing fabric, and apply second coat of waterproofing to completely saturate reinforcing fabric and to obtain a seamless reinforced membrane free of entrapped gases and pinholes.

a. Dry film thickness:

1) Foundation Walls: 70 mils

2) Plaza / Courtyard Decks: 120 mils

2. Apply reinforced waterproofing to prepared wall terminations and vertical surfaces.

3. Verify manufacturer's recommended wet film thickness of waterproofing every 100 sq. ft.

F. Cure waterproofing, taking care to prevent contamination and damage during application and curing.

G. Install protection course with butted joints over waterproofing before starting subsequent construction operations.

1. For horizontal applications, install protection course loose laid over fully cured membrane.

2. For vertical applications, set protection course in nominally cured membrane, which will act as an adhesive. If membrane cures before application of protection course, use adhesive.

3. Molded-sheet drainage panels or insulation drainage panels may be used in place of a separate protection course for vertical applications when approved in writing by waterproofing manufacturer.

3.6 INSTALLATION OF MOLDED-SHEET DRAINAGE PANELS

A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, in accordance with manufacturer's written instructions. Use adhesive or another method that does not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

3.7 INSTALLATION OF INSULATION DRAINAGE PANELS

A. Install drainage panels over waterproofed surfaces. Cut and fit to within 3/4 inch of projections and penetrations.

B. Ensure that drainage channels are aligned and free of obstructions.

C. On vertical surfaces, set insulation drainage panels in adhesive or tape applied in accordance with manufacturer's written instructions.

D. On horizontal surfaces, loosely lay insulation drainage panels in accordance with manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections:

1. Testing agency to verify thickness of waterproofing during application for each 600 sq. ft. of installed waterproofing or part thereof.

2. Leak-Detection for Horizontal Applications:

   a. Flood Testing: Flood test each deck area for leaks, in accordance with procedures in ASTM D5957, after completing waterproofing but before placing overlaying construction. Install temporary containment assemblies, plug or dam drains, and flood with potable water.

      1) Flood to an average depth of 2-1/2 inches with a minimum depth of 1 inch and a maximum depth of 4 inches. Maintain 2 inches of clearance from top of sheet flashings.

      2) Flood each area for 24 hours.

      3) Testing agency to observe flood testing and examine underside of decks and terminations for evidence of leaks during flood testing.

      4) After flood testing, repair leaks, repeat flood tests, and make further repairs until waterproofing installation is watertight.

   b. Electronic Leak-Detection Testing:

      1) Testing agency to test each deck area for leaks using an electronic leak-detection method that locates discontinuities in the waterproofing membrane.

      2) Testing agency to perform tests on abutting or overlapping smaller areas as necessary to cover entire test area.

      3) Testing agency to create a conductive electronic field over the area of waterproofing to be tested and electronically determine locations of discontinuities or leaks, if any, in the waterproofing.

      4) Testing agency to provide survey report indicating locations of discontinuities, if any.

B. Waterproofing will be considered defective if it does not pass tests and inspections.

3.9 PROTECTION

A. Do not permit foot or vehicular traffic on unprotected membrane.

B. Protect waterproofing from damage and wear during remainder of construction period.

C. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

D. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION

SECTION 07 18 00

TRAFFIC COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes traffic coatings for the following applications:

1. Pedestrian traffic.

2. Vehicular traffic.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, mock-ups, sequencing, and scheduling of the work.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include installation instructions and details, material descriptions, dry or wet film thickness requirements, and finish.

B. Shop Drawings: For traffic coatings.

1. Include details for treating substrate joints and cracks, flashings, deck penetrations, and other termination conditions that are not included in manufacturer's product data.

2. Include drawings indicating locations where traffic coatings will be provided.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of traffic coating.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For traffic coatings to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Apply traffic coatings within the range of ambient and substrate temperatures recommended in writing by manufacturer. Do not apply traffic coatings to damp or wet substrates, when temperatures are below 40 deg F, when relative humidity exceeds 85 percent, or when temperatures are less than 5 deg F above dew point.

1. Do not apply traffic coatings in snow, rain, fog, or mist, or when such weather conditions are imminent during the application and curing period. Apply only when frost-free conditions occur throughout the depth of substrate.

B. Do not install traffic coating until items that penetrate membrane have been installed.

1.8 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace traffic coating that fails in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Adhesive or cohesive failures.

b. Abrasion or tearing failures.

c. Surface crazing or spalling.

d. Intrusion of water, oils, gasoline, grease, salt, deicer chemicals, or acids into deck substrate.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations:

1. Obtain traffic coatings from single source from single manufacturer.

2. Obtain primary traffic-coating materials, including primers, from traffic-coating manufacturer. Obtain accessory materials including aggregates, sheet flashings, joint sealants, and substrate repair materials of types and from sources recommended in writing by primary material manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Material Compatibility: Provide primers; base coat, intermediate coat, and topcoat; and accessory materials that are compatible with one another and with substrate under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

2.3 TRAFFIC COATING

A. Traffic Coating: Manufacturer's standard, traffic-bearing, slip-resistant, seamless, high-solids-content, cold liquid-applied, elastomeric, water-resistant membrane system with integral wearing surface for pedestrian traffic and vehicular traffic service condition; according to ASTM C957.

1. Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Advanced Polymer Technology Corp.

b. BASF

c. Neoguard; a division of Jones-Blair, Inc.

d. Pecora Corp.

e. Sherwin-Williams Company

f. Soprema, Inc.

g. Tremco Incorporated

h. Urethane Polymers International, Inc.

i. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

B. Product Quality of Standard – Above Unfinished Space: Vulkem 350/351 by Tremco

1. Primer: Liquid primer as recommended in writing for substrate and conditions by traffic-coating manufacturer.

2. Base Coat: Single-component urethane.

a. Basis of Design: Tremco Vulken 350

3. Topcoat: Aliphatic, single-component polyurethane.

a. Basis of Design: Tremco Vulkem 351

b. Color: As selected by Architect from manufacturer's full range.

C. Product Quality of Standard – Above Finished Space: Vulkem EWS with PUMA by Tremco

1. Primer: Polymethyl-methacrylate (PMMA), two-component liquid primer.

a. Basis of Design: Tremco PUMA Primer

2. Base Coats: Polyurethane-methacrylate (PUMA) base coat.

a. Basis of Design: Tremco PUMA BC

b. Thicknesses: Minimum thickness as recommended in writing by manufacturer for substrate and service conditions indicated.

3. Intermediate / Wear Coat: Polyurethane-methacrylate (PUMA) wear coat.

a. Basis of Design: Tremco PUMA WC

b. Thicknesses: Minimum thickness as recommended in writing by manufacturer for substrate and service conditions indicated, measured excluding aggregate.

c. Aggregate Content: As recommended in writing by traffic-coating manufacturer for substrate and service conditions indicated.

4. Topcoat: Polymethyl-methacrylate (PMMA), UV stable top coat.

a. Basis of Design: Tremco PUMA TC

b. Thicknesses: Minimum thickness as recommended in writing by manufacturer for substrate and service conditions indicated, measured excluding aggregate.

c. Aggregate Content: As recommended in writing by traffic-coating manufacturer for substrate and service conditions indicated.

d. Color: As selected by Architect from manufacturer's full range.

D. Aggregate: Manufacturer's standard aggregate for each use indicated of particle sizes, shape, and minimum hardness recommended in writing by traffic-coating manufacturer.

2.4 ACCESSORY MATERIALS

A. Joint Sealants: As specified in Section 07 92 00 Joint Sealants, ASTM C920.

B. Sheet Flashing: Nonstaining sheet material recommended in writing by traffic-coating manufacturer.

C. Adhesive: Traffic coating manufacturer’s proprietary contact adhesive, or other type as recommended in writing by traffic-coating manufacturer.

D. Reinforcing Strip: Traffic coating manufacturer’s proprietary fiberglass mesh, or other type as recommended in writing by traffic-coating manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, surface smoothness, and other conditions affecting performance of traffic-coating work.

B. Verify that substrates are visibly dry and free of moisture.

1. Test for moisture content by method recommended in writing by traffic-coating manufacturer.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of traffic-coating work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Begin coating application only after substrate construction and penetrating work have been completed.

2. Begin coating application only after minimum concrete-curing and -drying period recommended in writing by traffic-coating manufacturer has passed and after substrates are dry.

3. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Clean and prepare substrates according to ASTM C1127 and manufacturer's written instructions to produce clean, dust-free, dry substrate for traffic-coating application. Remove projections, fill voids, and seal joints if any, as recommended in writing by traffic-coating manufacturer.

B. Priming: Unless manufacturer recommends in writing against priming, prime substrates according to manufacturer's written instructions.

1. Limit priming to areas that will be covered by traffic-coating material on same day. Reprime areas exposed for more time than recommended by manufacturer.

C. Schedule preparation work so dust and other contaminants from process do not fall on wet, newly coated surfaces.

D. Mask adjoining surfaces not receiving traffic coatings to prevent overspray, spillage, leaking, and migration of coatings. Prevent traffic-coating materials from entering deck substrate penetrations and clogging weep holes and drains.

E. Concrete Substrates: Mechanically abrade surface to a uniform profile acceptable to manufacturer, according to ASTM D4259. Do not acid etch.

1. Remove grease, oil, paints, and other penetrating contaminants from concrete.

2. Remove concrete fins, ridges, and other projections.

3. Remove laitance, glaze, efflorescence, curing compounds, concrete hardeners, form-release agents, and other incompatible materials that might affect coating adhesion.

4. Remove remaining loose material to provide a sound surface, and clean surfaces according to ASTM D4258.

3.3 TERMINATIONS AND PENETRATIONS

A. Prepare vertical and horizontal surfaces at terminations and penetrations through traffic coatings and at expansion joints, drains, and sleeves according to ASTM C1127 and manufacturer's written instructions.

B. Provide sealant cants at penetrations and at reinforced and nonreinforced, deck-to-wall butt joints.

C. Terminate edges of deck-to-deck expansion joints with preparatory base-coat strip.

D. At indicated locations, or as recommended by traffic coating manufacturer, install sheet flashings at deck-to-wall expansion and dynamic joints, and bond to deck and wall substrates according to manufacturer's written recommendations.

3.4 JOINT AND CRACK TREATMENT

A. Prepare, treat, rout, and fill joints and cracks in substrates according to ASTM C1127 and manufacturer's written recommendations. Before coating surfaces, remove dust and dirt from joints and cracks according to ASTM D4258.

1. Comply with recommendations in ASTM C1193 for joint-sealant installation.

B. Apply reinforcing strip in traffic-coating system where recommended in writing by traffic-coating manufacturer.

3.5 TRAFFIC-COATING APPLICATION

A. Apply traffic coating according to ASTM C1127 and manufacturer's written instructions.

B. Apply coats of specified compositions for each type of traffic coating at locations as indicated on Drawings.

C. Uniformly broadcast and embed aggregate in each coat indicated to receive aggregate according to manufacturer's written instructions. After coat dries, sweep away excess aggregate.

D. Apply traffic coatings to prepared wall terminations and vertical surfaces to height indicated; omit aggregate on vertical surfaces.

E. Cure traffic coatings. Prevent contamination and damage during coating application and curing.

3.6 PROTECTING AND CLEANING

A. Protect traffic coatings from damage and wear during remainder of construction period.

B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07 19 00

WATER REPELLENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes penetrating water-repellent treatments for the following vertical and horizontal surfaces:

1. Cast-in-place concrete.

2. Precast concrete.

3. Concrete unit masonry.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's printed statement of VOC content.

2. Include manufacturer's recommended number of coats for each type of substrate and spreading rate for each separate coat.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Applicator.

B. Product Certificates: For each type of water repellent.

C. Sample Warranty: For special warranty.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: An employer of workers trained and approved by manufacturer.

B. Mockups: Prepare mockups of each required water repellent on each type of substrate required to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Locate mockups in locations that enable viewing under same conditions as the completed Work.

a. Size: 10 sq. ft. each.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 PERFORMANCE REQUIREMENTS

A. The application of water repellent shall provide finished surfaces uniform in color without altering the natural texture of substrate and shall resist water penetration.

1.7 FIELD CONDITIONS

A. Limitations: Proceed with application only when the following existing and forecasted weather and substrate conditions permit water repellents to be applied according to manufacturers' written instructions and warranty requirements:

1. Concrete surfaces and mortar have cured for not less than 28 days.

2. Building has been closed in for not less than 30 days before treating wall assemblies.

3. Ambient temperature is above 40 deg F and below 100 deg F and will remain so for 24 hours.

4. Substrate is not frozen and substrate-surface temperature is above 40 deg F and below 100 deg F.

5. Rain or snow is not predicted within 24 hours.

6. Not less than 24 hours have passed since surfaces were last wet.

7. Windy conditions do not exist that might cause water repellent to be blown onto vegetation or surfaces not intended to be treated.

PART 2 - PRODUCTS

2.1 PENETRATING WATER REPELLENTS

A. Silane, Penetrating Water Repellent: Clear, containing 20 percent or more solids of alkyltrialkoxysilanes; with alcohol, mineral spirits, water, or other proprietary solvent carrier; and with 400 g/L or less of VOCs.

1. Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Advanced Chemical Technologies, Inc.

b. BASF Construction Chemicals

c. Chemical Products Industries, Inc.

d. Dayton Superior

e. Euclid Chemical Company

f. Evonik Degussa Corp.

g. Kelly-Moore Paint Company

h. LymTal International, Inc.

i. Nox-Crete Products Group

j. Pecora Corp.

k. PROSOCO, Inc.

l. Specco Industries, Inc.

m. Textures Coatings of America, Inc.

n. Tnemec Company, Inc.

o. Vexcon Chemicals, Inc.

p. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

B. Siloxane, Penetrating Water Repellent: Clear, containing 10 percent or more solids of oligomerous alkylalkoxysiloxanes; with alcohol, ethanol, mineral spirits, water, or other proprietary solvent carrier; and with 400 g/L or less of VOCs.

1. Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Conproco Corporation

b. Dayton Superior

c. Evonik Degussa Corp.

d. Fabrikem Manufacturing, Ltd.

e. Price Research, Ltd.

f. Specco Industries, Inc.

g. Textures Coatings of America, Inc.

h. TK Products

i. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

C. Silane/Siloxane-Blend, Penetrating Water Repellent: Clear, silane and siloxane blend with 400 g/L or less of VOCs.

1. Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Advanced Chemical Technologies, Inc.

b. BASF Construction Chemicals

c. Chemical Products Industries, Inc.

d. Euclid Chemical Company

e. Karnak Corporation

f. LymTal International, Inc.

g. Pecora Corp.

h. PROSOCO, Inc.

i. Sika corporation, Inc.

j. TK Products

k. Tnemec Company, Inc.

l. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work.

1. Verify that surfaces are clean and dry according to water-repellent manufacturer's requirements. Check moisture content in three representative locations by method recommended by manufacturer.

2. Verify that there is no efflorescence or other removable residues that would be trapped beneath the application of water repellent.

3. Verify that required repairs are complete, cured, and dry before applying water repellent.

B. Test pH level according to water-repellent manufacturer's written instructions to ensure chemical bond to silica-containing or siliceous minerals.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. New Construction and Repairs: Allow concrete and other cementitious materials to age before application of water repellent, according to repellent manufacturer's written instructions.

B. Cleaning: Before application of water repellent, clean substrate of substances that could impair penetration or performance of product according to water-repellent manufacturer's written instructions and as follows:

1. Cast-in-Place Concrete, Precast Concrete and Concrete Unit Masonry: Remove oil, curing compounds, laitance, and other substances that inhibit penetration or performance of water repellents according to ASTM E1857.

C. Protect adjoining work, including mortar and sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of water repellent being deposited on surfaces. Cover live vegetation.

D. Coordination with Sealant Joints: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.

1. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those required.

3.3 APPLICATION

A. Apply coating of water repellent on surfaces to be treated using manufacturer’s recommended method to the point of saturation. Apply coating in dual passes of uniform, overlapping strokes. Remove excess

material; do not allow material to puddle beyond saturation. Comply with manufacturer's written instructions for application procedure unless otherwise indicated.

1. Precast Concrete: At Contractor's option, first application of water repellent may be completed before installing units. Mask mortar and sealant bond surfaces to prevent water repellent from migrating onto joint surfaces. Remove masking after repellent has cured.

B. For porous surfaces, apply a second saturation coating, repeating first application. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

3.4 CLEANING

A. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Correct damage to work of other trades caused by water-repellent application, as approved by Architect.

B. Comply with manufacturer's written cleaning instructions.

END OF SECTION

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SECTION 07 21 00

BUILDING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board insulation (XPS).
2. Molded (expanded) polystyrene foam-plastic board insulation (EPS).
3. Polyisocyanurate foam-plastic board insulation.
4. Glass-fiber blanket insulation.
5. Mineral-wool blanket insulation.
6. Loose-fill insulation.
7. Insulation Schedules

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.
2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Extruded polystyrene foam-plastic board insulation (XPS).
2. Molded (expanded) polystyrene foam-plastic board insulation (EPS).
3. Polyisocyanurate foam-plastic board insulation.
4. Glass-fiber blanket insulation.
5. Mineral-wool blanket insulation.
6. Loose-fill insulation.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

B. Research Reports: For foam-plastic insulation, from ICC-ES.

C. Schedule: Clearly identify where each insulation product being submitted will be installed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.

2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.

3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE (XPS) FOAM-PLASTIC BOARD INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. DiversiFoam Products

2. Dow Chemical Company

3. MBCI

4. Owens Corning

5. Kingspan Insulation, Ltd.

6. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

B. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

C. Extruded Polystyrene (XPS) Board Insulation: ASTM C578, unfaced

1. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.

2. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.

3. Fire Propagation Characteristics: Requirements for Type I, II and III Construction:

a. Passes NFPA 285 testing as part of an approved exterior wall assembly.

4. Thickness: As indicated.

5. Types: As indicated or as recommended by manufacturer for application.

a. Type X: 15-psi minimum compressive strength

b. Type IV: 25-psi minimum compressive strength

c. Type VI: 40-psi minimum compressive strength.

d. Type VII: 60-psi minimum compressive strength.

e. Type V:100-psi minimum compressive strength.

2.2 MOLDED (EXPANDED) POLYSTYRENE (EPS) FOAM-PLASTIC BOARD INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. ACH Foam Technologies, Inc.

2. Amvic Building System

3. Atlas Molded Products; a Division of Atlas Roofing Corp.

4. DiversiFoam Products

5. Insulfoam; a Carlisle Materials Company

6. Plymouth Foam, Inc.

7. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

B. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

C. Molded (Expanded) Polystyrene (EPS) Board Insulation: ASTM C578

1. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.

2. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.

3. Fire Propagation Characteristics: Requirements for Type I, II and III Construction:

a. Passes NFPA 285 testing as part of an approved exterior wall assembly.

4. Types: As indicated or as recommended by manufacturer for application.

a. Type I: 10-psi minimum compressive strength

b. Type VIII: 13-psi minimum compressive strength.

c. Type II: 15-psi minimum compressive strength

d. Type IX: 25-psi minimum compressive strength.

e. Type XIV: 40-psi minimum compressive strength.

f. Type XV: 60-psi minimum compressive strength.

2.3 POLYISOCYANURATE FOAM-PLASTIC BOARD INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Atlas Molded Products; a Division of Atlas Roofing Corp.

2. Carlisle Coatings & Waterproofing

3. Dow Chemical Company

4. Firestone Building Products

5. Johns Manville

6. Rmax, Inc.

7. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

B. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

C. Polyisocyanurate Board Insulation, Foil Faced: ASTM C1289, foil faced, Type I, Class 1 or 2.

1. Fire Propagation Characteristics: Requirements for Type I, II and III Construction:

a. Passes NFPA 285 testing as part of an approved exterior wall assembly.

D. Polyisocyanurate Board Insulation, Glass-Fiber-Mat Faced: ASTM C1289, glass-fiber-mat faced, Type II, Class 2.

1. Fire Propagation Characteristics: Requirements for Type I, II and III Construction:

a. Passes NFPA 285 testing as part of an approved exterior wall assembly.

2.4 GLASS-FIBER BLANKET INSULATION

A. Manufacturers:

1. CertainTeed Corporation

2. Johns Manville

3. Knauf Insulation

4. Owens Corning

5. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

B. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

C. Glass-Fiber Blanket Insulation (**GFB-01**), Unfaced: ASTM C665, Type I,

1. Non-combustible in accordance with ASTM E136

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.

3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.

4. Formaldehyde free

D. Glass-Fiber Blanket Insulation (**GFB-02**), Polypropylene-Scrim-Kraft Faced: ASTM C665, Type II (nonreflective)

1. Flame-Spread Index: Class A, faced surface with a flame-spread index of 25 or less

2. Water Vapor Permeance: Category 1, membrane is a vapor barrier

a. Class II, Perm rating greater than 0.1 and less than or equal to 1.0

3. Formaldehyde free

2.5 MINERAL-WOOL BLANKET INSULATION

A. Manufacturers:

1. Johns Manville

2. Rockwool International

3. Thermafiber, Inc.; an Owens Corning Company

4. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

B. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

C. Mineral-Wool Blanket Insulation (**MWB-01**), Unfaced: ASTM C665, Type I (blankets without membrane facing)

1. Non-combustible in accordance with ASTM E136

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.

3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.

2.6 ACCESSORIES

A. Insulation for Miscellaneous Voids:

1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.

2. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.

3. Polyurethane Pour-In-Place Insulation: Closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84, specifically formulated for pour-in-place applications.

B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

C. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Install insulation with manufacturer's R-value label exposed after insulation is installed.

D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF SLAB INSULATION

A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.

1. If not otherwise indicated, extend insulation a minimum of 24 inches below exterior grade line.

B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

1. If not otherwise indicated, extend insulation a minimum of 24 inches in from exterior walls.

3.4 INSTALLATION OF FOUNDATION WALL INSULATION

A. Butt panels together for tight fit.

B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:

1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions.

2. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application.

3. Apply insulation standoffs to each spindle to create cavity width indicated on Drawings between concrete substrate and insulation.

4. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation.

5. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

3.5 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Glass-Fiber or Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.

2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.

4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.

5. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

6. For wood-framed construction, install blankets according to ASTM C1320 and as follows:

a. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

7. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.

a. Exterior Walls: Set units with facing placed as indicated on Drawings.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.

2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

C. Loose-Fill Glass-Fiber or Cellulosic Insulation: Apply according to ASTM C1015 and manufacturer's written instructions.

1. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.

2. For cellulosic-fiber loose-fill insulation, comply with CIMA's Bulletin #2, "Standard Practice for Installing Cellulose Insulation."

D. Spray-Applied Cellulosic Insulation: Apply spray-applied insulation according to manufacturer's written instructions.

1. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked.

2. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.

3.6 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

3.7 SCHEDULE – APARTMENT BUILDING

A. Thermal Envelope, Exterior Assemblies:

1. Framed Exterior Walls:
    a. Type: GFB-02
    b. Thickness: Full thick, 5-1/2 inches (min)
    c. R-Value: R-21 minimum
    d. Provide continuous foam poly gasket seal below sill plate
2. Roof / Ceilings (Attics):
    a. Type: GFB-01
    b. Thickness: Provide thickness to achieve required R-Value
    c. R-Value: R-49 minimum
3. Floor Ceiling Assemblies Over Non-Conditioned Space:
    a. Type: GFB-01
    b. Thickness: Provide thickness to achieve required R-Value
    c. R-Value: R-30 minimum

B. Non-Thermal Envelope, Interior Assemblies

1. Framed Tenant Separation Walls:
    a. Type: GFB-01
    b. Thickness: Full thick at both stud cavities
2. Framed Unit / Corridor Walls:
    a. Type: GFB-01
    b. Thickness: Full thick
3. Floor Ceiling Assemblies between Conditioned Spaces:
    a. Type: GFB-01
    b. Thickness: 3-1/2 inches

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SECTION 07 21 19

FOAMED-IN-PLACE (SPRAY APPLIED) INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Closed-cell spray polyurethane foam insulation.

2. Accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Test and Evaluation Reports:

1. Product Test Reports: For each product, for tests performed by qualified testing agency.

2. Research Reports: For spray-applied polyurethane foam-plastic insulation, from ICC-ES or an agency acceptable to authorities having jurisdiction showing compliance with.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

PART 2 - PRODUCTS

2.1 CLOSED-CELL SPRAY POLYURETHANE FOAM INSULATION

A. Closed-Cell Spray Polyurethane Foam: ASTM C1029, Type II, minimum density of 1.5 lb/cu. ft. and minimum aged R-value of 6.0, at 1-inch thickness.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. BASF Corporation

b. Carlisle Spray Foam Insulation

c. Demilec (USA), LLC

d. Henry Company

e. Icynene-Lapolla; Icynene

f. Johns Manville

g. SWD Urethane Company

h. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

2. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

a. Flame-Spread Index: 25 or less.

b. Smoke-Developed Index: 450 or less.

3. Fire Propagation Characteristics at roof assemblies: Passes NFPA 276 testing as part of an approved assembly.

2.2 ACCESSORIES

A. Primer: Material recommended by insulation manufacturer where required for adhesion of insulation to substrates.

B. Thermal Barriers and Ignition Barriers, General:

1. Thermal barriers are required to separate spray foam from most occupied interior spaces.

2. Ignition barriers are required to separate spray foam from limited-access spaces such as attics and crawl spaces.

C. Thermal Barrier: Material barrier intended to prevent flame-source access to foam and delay temperature-rise of foam during a fire event.

1. Gypsum Wallboard: 0.5-inch minimum thickness.

2. Materials tested in accordance with and complying with acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.

3. Thermal Barrier Coating: Fire-protective intumescent coating formulated for application over polyurethane foam plastics, compatible with insulation, and passes NFPA 275 testing as part of an approved assembly.

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1) Flame Control Coatings, LLC

2) International Fireproof Technology, Inc.

3) No-Burn, Inc.

4) TPR2 Corporation

5) Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

4. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

a. Flame-Spread Index: 25 or less.

b. Smoke-Developed Index: 50 or less.

5. Topcoat: 8- to 12-mil-thick, water-based latex-based paint or heavy-duty protective coating recommended in writing by intumescent thermal barrier manufacturer as compatible with substrate materials.

D. Ignition Barrier: Material providing a 15-minute minimum fire-ignition barrier.

1. Mineral-Fiber Insulation: 1.5-inch minimum thickness.

2. Wood Structural Panel, Particleboard or Hardboard: 0.25-inch minimum thickness.

3. Gypsum Wallboard: 0.325-inch minimum thickness.

4. Corrosion-Resistant Steel: 0.016-inch base metal thickness.

5. Cellulose Insulation: 1.5-inch minimum thickness, self-supported spray-applied; for attic spaces only.

6. Ignition Barrier Coating: Fire-protective coating formulated for application over polyurethane foam plastics, compatible with insulation, and in compliance with ICC-ES AC377, Appendix X.

   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

      1) Flame Seal Products, Inc.

      2) No-Burn, Inc.

      3) TPR2 Corporation

      4) Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

7. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

   a. Flame-Spread Index: 25 or less.

   b. Smoke-Developed Index: 50 or less.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify that substrates are clean, dry, and free of substances that are harmful to insulation.

B. Priming: Prime substrates where recommended by insulation manufacturer. Apply primer to comply with insulation manufacturer's written instructions. Confine primers to areas to be insulated; do not allow spillage or migration onto adjoining surfaces.

3.2 INSTALLATION

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Spray insulation to envelop entire area to be insulated and fill voids.

C. Apply in multiple passes to not exceed maximum thicknesses recommended by manufacturer. Do not spray into rising foam.

D. Framed Construction: Install into cavities formed by framing members to achieve thickness indicated on Drawings.

E. Cavity Walls: Install into cavities to thickness indicated on Drawings.

F. Miscellaneous Voids: Apply according to manufacturer's written instructions.

G. Install indicated thermal or ignition barrier material.

1. Do not cover insulation prior to any required spray foam insulation inspections.

H. Apply barrier coatings in accordance with manufacturer's written instructions and to comply with requirements for listing and labeling for fire-propagation characteristics and surface-burning characteristics specified.

1. Use equipment and techniques best suited for substrate and type of material applied as recommended by coating manufacturer.

2. Apply coatings to prepared surfaces as soon as practical after preparation and before subsequent surface soiling or deterioration.

3. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Produce sharp lines and color breaks.

3.3 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

END OF SECTION

SECTION 07 22 00

ROOF AND DECK INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Flat and tapered roof insulation.

1.2 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D1079 and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to Work of this Section.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, mock-ups, sequencing, and scheduling of the work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:

1. Layout and thickness of insulation.

2. Tapered insulation layout, thickness, and slopes.

3. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

C. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Product Test Reports: For roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

C. Evaluation Reports: For components of roofing system, from ICC-ES.

D. Sample Warranties: For manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roof insulation to be installed according to manufacturer's written instructions and warranty requirements.

1.10 WARRANTY

A. Warrant roof insulation as component of roofing system. Refer to 07 54 23 “Thermoplastic-Polyolefin Roofing”

1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roof insulation shall withstand specified uplift pressures, thermally induced movement without failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Material Compatibility: Roof insulation materials and accessories shall be compatible with one another and adjacent materials under conditions of service and application required.

C. Wind Uplift Resistance: Resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:

1. Zone 1 (Roof Area Field): +10.0/-21.3 PSF (10 S.F.)

2. Zone 2 (Roof Area Perimeter): +10.0/-33.4 PSF (10 S.F.)

a. Location: From roof edge to 54 feet inside roof edge.

3. Zone 3 (Roof Area Corners): +10.0/-33.4 PSF (10 S.F.)

a. Location: 54 feet in each direction from each building corner, 18 feet inside roof edge.

2.2 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by roof membrane manufacturer.

B. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Carlisle SynTec Incorporated

b. Firestone Building Products

c. GAF

d. Hunter Panels

e. Insulfoam – a division of Carlisle Construction Materials, Inc.

f. Johns Manville

g. Mule-Hide

h. Rmax

i. Versico Roofing Systems

j. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Compressive Strength: 20 psi (Grade 2) minimum

3. Size: 48 by 48 inches or 48 by 96 inches

4. Thickness:

a. Base Layer: 1-1/2 inches

b. Upper Layer: Provide thickness required to achieve required R-value.

C. Tapered Insulation: Provide factory-tapered insulation boards.

1. Material: Match roof insulation

2. Minimum Thickness: 1/4 inch

3. Slope:

a. Roof Field: 1/4 inch per foot unless otherwise indicated on Drawings.

b. Saddles and Crickets: 1/2 inch per foot unless otherwise indicated on Drawings.

2.3 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.

B. Fasteners: Factory-coated steel fasteners with metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer.

D. Cover Board: Refer to 07 72 00 “Roof Substrate Board”

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.

2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

B. Concrete Roof Decks:

1. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.

2. Verify that concrete substrate is visibly dry and free of moisture, and that minimum concrete internal relative humidity is not more than 75 percent, or as recommended by roofing system manufacturer, when tested according to ASTM F2170.

a. Test Frequency: One test probe per each 1000 sq. ft., or portion thereof, of roof deck, with not less than three tests probes.

b. Submit test reports within 24 hours after performing tests.

3. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.

4. Verify that joints in precast concrete roof decks have been grouted flush with top of concrete.

5. Verify that minimum curing period recommended by roofing system manufacturer for lightweight insulating concrete roof decks has passed.

C. Wood Roof Decks:

1. Verify any damaged sections of wood decks have been repaired or replaced.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Perform fastener-pullout tests according to roof system manufacturer's written instructions.

1. Submit test result within 24 hours after performing tests.

a. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

3.3 INSTALLATION OF INSULATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.

B. Comply with roofing system and roof insulation manufacturer's written instructions for installing roof insulation.

C. Installation Over Metal Decking:

1. Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows for 48-by-48-inch insulation boards or not less than 12 inches in adjacent rows for 48-by-96-inch insulation boards.

a. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.

b. When installed directly over metal decking, locate end joints over crests of decking.

c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.

d. Make joints between adjacent insulation boards not more than 1/4 inch in width.

e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.

1) Trim insulation so that water flow is unrestricted.

f. Fill gaps exceeding 1/4 inch with insulation.

g. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

h. Mechanically attach base layer of insulation using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.

1) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.

2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.

a. For 48-by-48-inch Insulation Boards: Staggered end joints within each layer not less than 24 inches in adjacent rows.

b. For 48-by-96-inch Insulation Boards: Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.

c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.

d. Make joints between adjacent insulation boards not more than 1/4 inch in width.

e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.

1) Trim insulation so that water flow is unrestricted.

f. Fill gaps exceeding 1/4 inch with insulation.

g. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

h. Adhere each layer of insulation to substrate using adhesive according to applicable standards, and FM Global Property Loss Prevention Data Sheet 1-29, as follows:

1) Hot Asphalt Application: Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.

2) Low-rise Urethane Adhesive Application: Set each layer of insulation in ribbons of bead-applied or in uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

D. Installation Over Wood Decking:

1. Where indicated, and when required based on adhesive or hot asphalt attachment, mechanically fasten slip sheet to roof deck using mechanical fasteners specifically designed and sized for fastening slip sheet to wood decks.

a. Fasten slip sheet to resist specified uplift pressure at corners, perimeter, and field of roof.

1. Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows for 48-by-48-inch insulation boards or not less than 12 inches in adjacent rows for 48-by-96-inch insulation boards.

a. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.

b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.

c. Make joints between adjacent insulation boards not more than 1/4 inch in width.

d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.

1) Trim insulation so that water flow is unrestricted.

e. Fill gaps exceeding 1/4 inch with insulation.

f. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

2. Mechanically attach base layer of insulation using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to wood decks.

a. Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.

3. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.

a. For 48-by-48-inch Insulation Boards: Staggered end joints within each layer not less than 24 inches in adjacent rows.

b. For 48-by-96-inch Insulation Boards: Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.

c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.

d. Make joints between adjacent insulation boards not more than 1/4 inch in width.

e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.

1) Trim insulation so that water flow is unrestricted.

f. Fill gaps exceeding 1/4 inch with insulation.

g. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

h. Adhere each layer of insulation to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:

1) Hot Asphalt Application: Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.

1) Low-rise Urethane Adhesive Application: Set each layer of insulation in ribbons of bead-applied or in uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

E. Installation Over Concrete Decks:

1. Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows for 48-by-48-inch insulation boards or not less than 12 inches in adjacent rows for 48-by-96-inch insulation boards.

a. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.

b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.

c. Make joints between adjacent insulation boards not more than 1/4 inch in width.

d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.

1) Trim insulation so that water flow is unrestricted.

e. Fill gaps exceeding 1/4 inch with insulation.

f. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

g. Adhere base layer of insulation to concrete roof deck according to applicable standards, and FM Global Property Loss Prevention Data Sheet 1-29, as follows:

1) Prime surface of concrete deck with asphalt primer at rate of 3/4 gal./100 sq. ft., and allow primer to dry.

2) Hot Asphalt Application: Set insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.

3) Low-rise Urethane Adhesive Application: Set each layer of insulation in ribbons of bead-applied or in uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.

a. For 48-by-48-inch Insulation Boards: Staggered end joints within each layer not less than 24 inches in adjacent rows.

b. For 48-by-96-inch Insulation Boards: Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.

c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.

d. Make joints between adjacent insulation boards not more than 1/4 inch in width.

e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.

1) Trim insulation so that water flow is unrestricted.

f. Fill gaps exceeding 1/4 inch with insulation.

g. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

h. Adhere each layer of insulation to substrate using adhesive according to applicable standards, and FM Global Property Loss Prevention Data Sheet 1-29, as follows:

1) Hot Asphalt Application:Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.

1) Low-rise Urethane Adhesive Application: Set each layer of insulation in ribbons of bead-applied or in uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

END OF SECTION

SECTION 07 24 23

DIRECT -APPLIED EXTERIOR FINISH SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Direct-Applied Exterior Finish System (DEFS) utilized at exterior, weather-protected soffits.

1.2 SUBMITTALS

A. Product Data: For each product.

1. Include installation instruction and details, as well as material descriptions.

B. Shop Drawings: For DEFS finish.

1. Include plans showing locations where finish system will be provided.

C. Samples: Provide samples, prepared on rigid backing, to illustrate finish texture and color.

1.3 QUALITY ASSURANCE

A. Installer requirements: Experience in application of the DEFS or similar systems for a minimum of three (3) years.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product.

B. Protect coatings from freezing and temperatures in excess of 90°F. Store away from direct sunlight.

C. Protect portland cement-based materials from moisture and humidity. Store under cover and off the ground in a dry location.

D. Store gypsum board materials inside and protect from damage by the elements. Protect ends, edges, and faces of boards from damage and surface contamination.

1.5 PROJECT/SITE CONDITIONS

A. Maintain ambient and surface temperatures above 40°F during application and for 24 hours after set of base coat and finish materials.

B. Provide supplementary heat for installation in temperatures less than 40°F. Prevent concentration of heat on uncured base coat and finish coat and vent fumes and other products of combustion to exterior to prevent contact with base coat and finish coat.

C. Protect soffit board, base coat, or primed base coat from contact with oils, salts, or other surface contamination from the atmosphere that could adversely affect adhesion.

D. Protect surrounding areas and adjacent surfaces from application of materials.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATION

A. Provide DEFS system components from single manufacturer or manufacturer approved by DEFS manufacturer.

2.2 MANUFACTURERS

A. Basis of Design: Quick Gold System for Soffits by Sto Corp.

B. Acceptable Manufacturers:

1. Omega Products International, Inc.

2. DuRock

3. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.3 ACCESSORIES

A. Primer: Type recommended by manufacturer based on project conditions and application method.

B. Type: Casing bead, soffit vent, expansion joint and control joint accessories.

C. Material: Rigid vinyl (PVC)

1. Interior Applications: ASTM D 4216, Cell classification 13244C

2. Exterior Applications: ASTM D 1784, Cell classification 13244C

D. Accessories shall encase the terminating edge of the soffit board, and shall have perforated flanges for keying of the base coat/mesh materials to the soffit board surface

2.4 SOFFIT BOARD SHEATHING

A. Minimum 1/2-inch-thick glass mat faced gypsum sheathing complying with ASTM C 1177.

2.5 BASE COAT

A. Base Coat, Type as recommended by manufacturer based on project conditions:

1. One-component polymer modified cement based base coat

2. One component acrylic non-cementitious, fiber reinforced acrylic base coat

3. Two component fiber reinforced acrylic based waterproof base coat mixed with portland cement - (for environments with extreme exposure to wind driven rain and moisture)

2.6 REINFORCING MESHES

A. Standard Mesh

1. DEFS manufacturer’s standard alkaline resistant woven glass fiber fabric

2. Weight: Nominal 4.5 oz./yd^2

B. Specialty Meshes

1. DEFS manufacturer’s standard alkaline resistant, flexible woven glass fiber fabric

2. Weight: As recommended by DEFS manufacturer

3. Typical for back wrapping, joints and detail work.

2.7 FINISH COAT

A. DEFS manufacturer’s acrylic-based or silicone enhanced acrylic based textured wall finish.

B. Color and texture as selected by Architect.

2.8 JOB MIXED INGREDIENTS

A. Water: Potable.

B. Portland Cement: ASTM C 150, Type I or Type II

2.9 MIXING

A. Mix materials in strict conformance with manufacturer’s specifications.

B. Mix only as much material as can readily be used.

C. Do not use anti-freeze compounds or other additives.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect sheathing surfaces for compliance with manufacturer’s minimum installation requirements.

B. Report deviations from the requirements of project specifications or other conditions that might adversely affect the installation.

3.2 SURFACE PREPARATION

A. Replace damaged sheathing and repair damaged or cracked surf aces.

3.3 INSTALLATION

A. Accessory Installation

1. Install appropriate casing beads, soffit vents and joint accessories at system terminations.

2. Maintain a gap of minimum 3/8" between the accessory and abutments with dissimilar construction to form a sealant joint.

3. Provide expansion joints in sheathing at minimum intervals of 30 feet (9.1 m) up to a maximum area of 900 square feet (82.8 m^2), wherever the system abuts dissimilar construction or an existing joint occurs in construction. Fit sheathing snugly into accessories prior to attachment.

B. Base Coat Application

1. Apply base coat over the sheathing with proper spray equipment or stainless-steel trowel to uniform thickness of approximately 1/16 inch.

2. Apply base coat in 40-inch strips and immediately embed reinforcing mesh into wet base coat by troweling from the center to the edge of the mesh. Avoid wrinkles in the mesh. Overlap the mesh minimum 2-1/2 inches at mesh joints and stagger mesh overlaps minimum 8 inches from sheathing joints.

3. Install base coat and mesh over perforated accessory flanges.

4. Do not install base coat and mesh over un-perforated accessory flanges.

5. Fully embedded mesh so no mesh color shows through the base coat when it is dry. Feather mesh overlaps to avoid reading the mesh through the finish coating.

6. Allow base coat to thoroughly dry before applying primer or finish.

C. Finish Coat Application

1. Apply finish directly over the base coat, or primed base coat.

2. Apply the finish by spraying, or troweling with stainless-steel trowel, depending on finish specified. General rules for application of finishes are as follows:

a. Avoid application in direct sunlight.

b. Apply finish in a continuous application, always working to a wet edge.

c. Do not install finish on accessories.

d. Do not install separate batches of finish side-by-side.

e. Do not apply finish over irregular or unprepared surfaces, or surfaces not in compliance with the project specifications.

3.4 PROTECTION

A. Protect installed materials from water infiltration.

B. Protect installed materials from dust, dirt, precipitation, freezing and continuous high humidity until they are fully dry.

3.5 CLEANING, REPAIR AND MAINTENANCE

A. Clean soffit or ceiling finish for a fresh appearance.

B. Repair cracks, impact damage, spalls or delamination promptly.

END OF SECTION

SECTION 07 26 00

VAPOR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Vapor barriers under slab-on-grade cast-in-place concrete foundations.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.3 ACTION SUBMITTALS

A. Product Data: For vapor barriers.

B. Shop Drawings: Indicate location of vapor barriers.

PART 2 - PRODUCTS

2.1 VAPOR RETARDERS

A. Sheet Vapor Retarder:

1. ASTM E1745, Class A, except with maximum water-vapor permeance of 0.03

2. Thickness: Not less than 10 mils thick.

3. Tensile Strength: Not less than 45 lb/in

4. Puncture Resistance: Not less than 2200 grams

5. Include manufacturer's recommended adhesive or pressure-sensitive tape.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Americover

2. Fortifiber Building Systems, group

3. Poly-America

4. Stego Industries

5. Tex-Trude

6. W.R. Meadows

7. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

PART 3 - EXECUTION

3.1 INSTALLATION OF VAPOR RETARDER

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.

1. Install vapor retarder with longest dimension parallel with direction of concrete pour.

2. Face laps away from exposed direction of concrete pour.

3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.

4. Lap joints 6 inches and seal with manufacturer's recommended tape.

5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.

6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.

7. Protect vapor retarder during placement of reinforcement and concrete.

    a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.

END OF SECTION

SECTION 07 27 08

MECHANICALLY ATTACHED WATER-RESISTIVE BARRIERS (WRB)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mechanically attached, flexible sheet water resistive barrier (WRB) building wrap.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review installation requirements including surface preparation, substrate condition and pretreatment, forecasted weather conditions, special details, adhered flashing material compatibility, installation procedures, testing and inspection procedures, maximum exposure duration, and protection and repairs.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For building wrap, include data on air permeance, water-vapor permeance, and drainage efficiency based on testing according to referenced standards.

B. Shop Drawings: Show details of building wrap at terminations, openings, and penetrations. Show details of flexible flashing applications.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For building wrap, from ICC-ES.

B. Flame Propagation Test: Include test data or reports indicating building wrap material is a component of an assembly that has been tested in accordance with NFPA 285.

1. NFPA 285 compliance shall be illustrated at each exterior wall type indicated in Drawings.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to set quality standards for materials and execution.

1. Build integrated mockups of exterior wall assembly incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of building wrap, and sealing of gaps, terminations, and penetrations of building wrap assembly.

a. Coordinate construction of mockups to permit inspection of building wrap before external insulation and cladding are installed.

b. If Architect or Owner’s envelope consultant determines mockups do not comply with requirements, reconstruct mockups and apply building wrap until mockups are approved.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.6 FIELD CONDITIONS

A. Temperature: Install building wrap material within range of ambient and substrate temperatures and moisture content recommended by material manufacturer. Do not apply to a damp or wet substrate.

B. Field Conditions: Do not install building wrap in snow, rain, fog, or mist.

C. Sequencing: Do not install building wrap material before the roof assembly has been sufficiently installed to prevent a buildup of water in the interior of the building.

D. Compatibility: Prevent building wrap from coming into contact with chemically incompatible materials.

E. Ultra-violet exposure: Do not expose building wrap materials to sunlight longer than as recommended by the material manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Source Limitations:

1. Obtain building wrap material from single manufacturer.

2. Obtain building wrap accessories, and flexible flashing from building wrap manufacturer, or from manufacturer approved by building wrap manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General:

1. ASTM E1677, Type I air barrier.

2. Water resistance equal to or greater than ASTM E2556, Type II.

3. Surface Burning Characteristics (ASTM E84):

a. Flame-spread index of less than 25.

b. Smoke-developed index of less than 450.

4. Flame Propagation: Building wrap shall be a component of an assembly, matching the scheduled exterior wall assembly and exterior finish combinations, that has been tested in accordance with NFPA 285

2.3 BUILDING WRAP / WATER-RESISTIVE BARRIER

A. Manufacturers: Subject to compliance with requirements, provide products from one of the following manufacturers:

1. Barricade Building Products

2. Berry Global, Inc, - Typar

3. Dupont

4. Henry

5. Perma ‘R’ Products

6. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Product Quality of Standard – Behind Brick Masonry Veneer: Tyvek CommercialWrap by Dupont.

1. Water-Vapor Permeance: Not less than **20 perms** per ASTM E96, Desiccant Method (Procedure A).

2. Air Permeance: Not more than **0.004 cfm/sq. ft**. at 0.3-inch water gauge (0.02 L/s x sq. m at 75 Pa) when tested according to ASTM E2178.

3. Drainage Efficiency: Not less than **90%** according to ASTM E2273.

4. Allowable UV Exposure Time: Not less than three months.

C. Product Quality of Standard – Behind Adhered Manufactured Stone Masonry Veneer (Dual WRB System): Tyvek CommercialWrap D by Dupont.

1. Water-Vapor Permeance: Not less than **20 perms** per ASTM E96, Desiccant Method (Procedure A).

2. Air Permeance: Not more than **0.004 cfm/sq. ft**. at 0.3-inch water gauge (0.02 L/s x sq. m at 75 Pa) when tested according to ASTM E2178.

3. Drainage Efficiency: Not less than **98%** according to ASTM E2273.

4. Allowable UV Exposure Time: Not less than three months.

D. Product Quality of Standard – Behind Fiber Cement Panel Siding: Tyvek DrainWrap by Dupont.

1. Water-Vapor Permeance: Not less than **20 perms** per ASTM E96, Desiccant Method (Procedure A).

2. Air Permeance: Not more than **0.004 cfm/sq. ft**. at 0.3-inch water gauge (0.02 L/s x sq. m at 75 Pa) when tested according to ASTM E2178.

3. Drainage Efficiency: Not less than **98%** according to ASTM E2273.

4. Allowable UV Exposure Time: Not less than three months.

E. Product Quality of Standard – Behind Fiber Cement Siding: Tyvek CommercialWrap by Dupont.

1. Water-Vapor Permeance: Not less than **20 perms** per ASTM E96, Desiccant Method (Procedure A).

2. Air Permeance: Not more than **0.004 cfm/sq. ft**. at 0.3-inch water gauge (0.02 L/s x sq. m at 75 Pa) when tested according to ASTM E2178.

3. Drainage Efficiency: Not less than **90%** according to ASTM E2273.

4. Allowable UV Exposure Time: Not less than three months.

F. Product Quality of Standard – Behind Cement Plastering / Stucco (Rainscreen Drain Mat System): Tyvek CommercialWrap by Dupont.

1. Water-Vapor Permeance: Not less than **20 perms** per ASTM E96, Desiccant Method (Procedure A).

2. Air Permeance: Not more than **0.004 cfm/sq. ft**. at 0.3-inch water gauge (0.02 L/s x sq. m at 75 Pa) when tested according to ASTM E2178.

3. Drainage Efficiency: Not less than **90%** according to ASTM E2273.

4. Allowable UV Exposure Time: Not less than three months.

2.4 FLEXIBLE FLASHING

A. Flexible Flashing, General: Composite, self-adhesive, flexible flashing product manufactured or approved by building wrap manufacturer.

B. Flexible Flashing, Manufacturers: Refer to 07 65 00 ‘Flexible Flashing’

2.5 ACCESSORIES

A. Primer: Type recommended by building wrap manufacturer for scheduled substrate.

B. Fasteners: Type recommended by building wrap manufacturer for scheduled substrate.

C. Seam Tape: Pressure-sensitive plastic tape recommended by building wrap manufacturer for sealing joints and penetrations in building wrap.

D. Inside and Outside Corner Treatment:

1. Polyethylene Sheeting: ASTM D4397, 6 mil (0.15 mm) thick sheet

2. Building Paper: Asphalt-saturated, vapor permeable building paper, FS UU-B-790a, Type I, Grade D, Style 2

PART 3 - EXECUTION

3.1 WATER-RESISTIVE BARRIER INSTALLATION

A. General: Install in accordance with manufacturer’s instructions and in accordance with ASTM E2112.

B. Cover exposed exterior surface of sheathing with water-resistive barrier securely fastened to framing immediately after sheathing is installed.

C. Comply with manufacturer's written instructions and warranty requirements.

1. Seal seams, edges, fasteners, and penetrations with manufacturer’s building wrap tape.

2. Extend into jambs of openings and seal corners with tape.

3. Overlaps: Provide the following unless otherwise indicated in manufacturer’s written instructions:

a. Corners: Not less than 12 inches

b. Vertical Seams: Not less than 6 inches

c. Horizontal Seams: Not less than 6 inches

END OF SECTION

SECTION 07 27 13

SELF-ADHERED SHEET AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Self-adhering, vapor-permeable, nonbituminous sheet air barriers.

1.2 DEFINITIONS

A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.

B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.

C. Air-Barrier Assembly: The collection of air-barrier materials and accessories applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; and tested physical and performance properties of products.

B. Shop Drawings: For air-barrier assemblies.

1. Show locations and extent of air-barrier materials, accessories, and assemblies specific to Project conditions.

2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.

3. Include details of interfaces with other materials that form part of air barrier.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.

C. Flame Propagation Test: Include test data or reports indicating building wrap material is a component of an assembly that has been tested in accordance with NFPA 285.

1. NFPA 285 compliance shall be illustrated at each exterior wall type indicated in Drawings.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Mockups: Build mockups to set quality standards for materials and execution.

1. Build integrated mockups of exterior wall assembly incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.

a. Coordinate construction of mockups to permit inspection of air barrier before external insulation and cladding are installed.

b. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Remove and replace liquid materials that cannot be applied within their stated shelf life.

B. Protect stored materials from direct sunlight.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended in writing by air-barrier manufacturer.

1. Protect substrates from environmental conditions that affect air-barrier performance.

2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

3. Prevent air barrier from coming into contact with chemically incompatible materials.

4. Do not expose air barrier to sunlight longer than as recommended by the material manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Source Limitations: Obtain primary self-adhered air-barrier materials and air-barrier accessories from single source, and from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. Flame Propagation: Air barrier shall be a component of an assembly, matching the scheduled exterior wall assembly and exterior finish combinations, that has been tested in accordance with NFPA 285.

2.3 NONBITUMINOUS SHEET AIR BARRIER

A. Vapor-Permeable Nonbituminous Sheet: Self-adhering sheet consisting of a breathable carrier film or fabric and an adhesive with release liner on adhesive side.

1. Product Quality of Standard: Blueskin VP by Henry

2. Manufacturers: Subject to compliance with requirements, provide products from one of the following manufacturers:

a. Cosella-Dorken Products, Inc.

b. GCP Applied Technologies, WR Grace & Co.

c. Henry Company

d. VaproShield

e. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

3. Physical and Performance Properties:

a. Thickness: Minimum 20-mil

b. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. (0.02 L/s x sq. m of surface area at 75-Pa) pressure difference; ASTM E2178.

c. Puncture Resistance: Minimum 40 lbf; ASTM E154

d. Vapor Permeance: Minimum 15 perms ASTM E96, Desiccant Method, Procedure A.

e. Adhesion to Substrate: Minimum 16 lbf/sq. in. when tested according to ASTM D4541 as modified by ABAA.

f. UV Resistance: Can be exposed to sunlight for 150 days according to manufacturer's written instructions.

2.4 ACCESSORY MATERIALS

A. Requirement: Provide primers, transition strips, termination strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.

B. Primer: Liquid primer recommended for substrate by air-barrier material manufacturer.

C. Preformed Silicone Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.

2. Verify that substrates have cured and aged for minimum time recommended in writing by air-barrier manufacturer.

3. Verify that substrates are visibly dry and free of moisture.

4. Verify that masonry joints are flush and completely filled with mortar.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.

B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.

E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

H. Bridge isolation joints, expansion joints, and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

3.3 INSTALLATION

A. Install materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.

1. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.

B. Prepare, treat, and seal inside and outside corners and vertical and horizontal surfaces at terminations and penetrations with termination mastic.

C. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier sheet on same day. Reprime areas exposed for more than 24 hours.

D. Apply and firmly adhere air-barrier sheets over area to receive air barrier. Accurately align sheets and maintain uniform 2-1/2-inch-minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure airtight installation.

1. Apply sheets in a shingled manner to shed water.

2. Roll sheets firmly to enhance adhesion to substrate.

E. Apply continuous air-barrier sheets over accessory strips bridging substrate cracks, construction, and contraction joints.

F. CMU: Install air-barrier sheet horizontally against the CMU beginning at base of wall. Align top edge of air-barrier sheet immediately below protruding masonry ties or joint reinforcement or ties, and firmly adhere in place.

1. Overlap horizontally adjacent sheets a minimum of 2 inches and roll seams.

2. Apply overlapping sheets with bottom edge slit to fit around masonry reinforcing or ties. Roll firmly into place.

3. Seal around masonry reinforcing or ties and penetrations with termination mastic.

4. Continue the sheet into all openings in the wall, such as doors and windows, and terminate at points to maintain an airtight barrier that is not visible from interior.

G. Seal top of through-wall flashings to air-barrier sheet with an additional 6-inch-wide, transition strip.

H. Seal exposed edges of sheet at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

I. Install air-barrier sheet and accessory materials to form a seal with adjacent construction and to maintain a continuous air barrier.

1. Coordinate air-barrier installation with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.

2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.

J. Connect and seal exterior wall air-barrier sheet continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

K. At end of each working day, seal top edge of air-barrier material to substrate with termination mastic.

L. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

M. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip or preformed silicone extrusion so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.

1. Transition Strip: Roll firmly to enhance adhesion.

2. Preformed Silicone Extrusion: Set in full bed of silicone sealant applied to walls, frame, and air-barrier material.

N. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous penetrations of air-barrier material with foam sealant.

O. Repair punctures, voids, and deficient lapped seams in air barrier. Slit and flatten fishmouths and blisters. Patch with air-barrier sheet extending 6 inches beyond repaired areas in all directions.

P. Do not cover air barrier until it has been tested and inspected by testing agency.

Q. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.4 FIELD QUALITY CONTROL

A. Owner's Inspection and Testing: Cooperate with Owner's testing agency. Allow access to work areas and staging. Notify Owner's testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection. Do not cover Work of this Section until testing and inspection is accepted.

3.5 CLEANING AND PROTECTION

A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Protect air barrier from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed materials according to air-barrier manufacturer's written instructions.

2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed Work, using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION

SECTION 07 27 26

FLUID APPLIED MEMBRANE AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Vapor-permeable, fluid-applied air barriers.

1.2 DEFINITIONS

A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.

B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.

C. Air-Barrier Assembly: The collection of air-barrier materials and accessories applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; dry film thickness; and tested physical and performance properties of products.

B. Shop Drawings: For air-barrier assemblies.

1. Show locations and extent of air-barrier materials, accessories, and assemblies specific to Project conditions.

2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.

3. Include details of interfaces with other materials that form part of air barrier.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.

C. Flame Propagation Test: Include test data or reports indicating building wrap material is a component of an assembly that has been tested in accordance with NFPA 285.

1. NFPA 285 compliance shall be illustrated at each exterior wall type indicated in Drawings.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Mockups: Build mockups to set quality standards for materials and execution.

1. Build integrated mockups of exterior wall assembly, incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.

a. Coordinate construction of mockups to permit inspection of air barrier before external insulation and cladding are installed.

b. If Architect or Owner's consultants determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Remove and replace liquid materials that cannot be applied within their stated shelf life.

B. Protect stored materials from direct sunlight.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended in writing by air-barrier manufacturer.

1. Protect substrates from environmental conditions that affect air-barrier performance.

2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

3. Prevent air barrier from coming into contact with chemically incompatible materials.

4. Do not expose air barrier to sunlight longer than as recommended by the material manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. Flame Propagation: Air barrier shall be a component of an assembly, matching the scheduled exterior wall assembly and exterior finish combinations, that has been tested in accordance with NFPA 285.

2.3 AIR BARRIERS, VAPOR PERMEABLE

A. Vapor-Permeable Air Barrier:

1. Product Quality of Standard: Tyvek Fluid Applied WB by Dupont

2. Manufacturers: Subject to compliance with requirements, provide products from one of the following manufacturers:

a. BASF Corporation

b. Dupont

c. Hohmann & Barnard, Inc.

d. Pecora Corporation

e. Polyguard Products, Inc.

f. PROSOCO, Inc.

g. Sto Corp.

h. W.R., Meadows, Inc.

i. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

3. Physical and Performance Properties:

a. Material: Synthetic polymer material

b. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. (0.02 L/s x sq. m of surface area at 75-Pa) pressure difference; ASTM E2178.

c. Vapor Permeance: Minimum 10 perms; ASTM E96, Desiccant Method, Procedure A.

d. Ultimate Elongation: Minimum 250 percent; ASTM D412, Die C.

e. Adhesion to Substrate: Minimum 25 lbf/sq. in. when tested according to ASTM D4541.

f. UV Resistance: Can be exposed to sunlight for 180 days according to manufacturer's written instructions.

2.4 ACCESSORY MATERIALS

A. Requirement: Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.

B. Primer: Liquid primer recommended for substrate by air-barrier material manufacturer.

C. Preformed Silicone Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.

2. Verify that substrates have cured and aged for minimum time recommended in writing by air-barrier manufacturer.

3. Verify that substrates are visibly dry and free of moisture.

4. Verify that masonry joints are flush and completely filled with mortar.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.

B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.

E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

H. Bridge isolation joints, expansion joints, and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

3.3 ACCESSORIES INSTALLATION

A. Install accessory materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.

1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.

2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.

3. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.

4. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.

B. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

C. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.

D. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

E. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip or preformed silicone extrusion so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.

1. Transition Strip: Roll firmly to enhance adhesion.

2. Preformed Silicone Extrusion: Set in full bed of silicone sealant applied to walls, frame, and air-barrier material.

F. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.

G. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.

H. Seal top of through-wall flashings to air barrier with an additional 6-inch-wide, transition strip.

I. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

J. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

3.4 PRIMARY AIR-BARRIER MATERIAL INSTALLATION

A. Apply air-barrier material to form a seal with strips and transition strips and to achieve a continuous air barrier according to air-barrier manufacturer's written instructions and details. Apply air-barrier material within manufacturer's recommended application temperature ranges.

1. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.

2. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.

3. Where multiple prime coats are needed to achieve required bond, allow adequate drying time between coats.

B. Medium-Build Air Barriers: Apply continuous unbroken air-barrier material to substrates according to the following thickness. Apply an increased thickness of air-barrier material in full contact around protrusions such as masonry ties.

1. Vapor-Retarding, Medium-Build Air Barrier: Total dry film thickness as recommended in writing by manufacturer to comply with performance requirements, but not less than **17 mils** applied in one or more equal coats. Apply additional material as needed to achieve void- and pinhole-free surface, but do not exceed thickness on which required vapor permeability is based.

C. Low-Build Air Barriers: Apply continuous unbroken air-barrier material to substrates according to the following thickness. Apply an increased thickness of air-barrier material in full contact around protrusions such as masonry ties.

1. Vapor-Retarding, Low-Build Air Barrier: Total dry film thickness as recommended in writing by manufacturer to comply with performance requirements, but not less than **6 mils** applied in one or more equal coats. Apply additional material as needed to achieve void- and pinhole-free surface, but do not exceed thickness on which required vapor permeability is based.

D. Do not cover air barrier until it has been tested and inspected by testing agency.

E. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.5 FIELD QUALITY CONTROL

A. Owner’s Inspection and Testing: Cooperate with Owner’s testing agency. Allow access to work areas and staging. Notify Owner’s testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection. Do not cover Work of this Section until testing and inspection is accepted.

3.6 CLEANING AND PROTECTION

A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Protect air barrier from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed materials according to air-barrier manufacturer's written instructions.

2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

C. Remove masking materials after installation.

END OF SECTION

SECTION 07 27 36

RAINSCREEN DRAINAGE MAT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rainscreen drainage mat drainage material.

1.2 PREINSTALLATION MEETING

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.3 ACTION SUBMITTALS

A. Product Data Submittals: For drainage material, include data on drainage efficiency based on testing in accordance with referenced standards.

B. Evaluation Report: For drainage material from third-party approved evaluation service.

C. Shop Drawings: Show details of drainage material at terminations, openings, and penetrations.

1.4 QUALITY ASSURANCE

A. Mockups: Build integrated mockups of exterior wall assembly as shown on Drawings, incorporating backup wall construction, finish cladding, window and door openings, masonry anchors, flashing, and rainscreen drainage mat.

1. When no mock-up is shown in Drawings, mock-up of typical wall area shall be of adequate size to incorporate the above components and to demonstrate substrate preparation, application of WRBs, sealing of gaps and penetrations, and continuity of air-barrier assembly.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

B. Source Limitations: Provide water-resistive barrier, self-adhered flashing, rainscreen drainage mat material, and system accessories produced by a single manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver rainscreen drainage mat materials and components in manufacturer’s original, unopened containers with identification labels intact.

B. Comply with Section 01 66 00 – Delivery, Storage, and Protection.

PART 2 - PRODUCTS

2.1 RAINSCREEN DRAIN MAT MATERIAL

A. Rainscreen Drainage Mat: Free-draining polymer-strand mesh sheets or strips with thickness not less than 1/4 inch (nom) and installed to maintain a continuous open space behind exterior cladding.

B. Basis of Design: Tyvek Drainvent Rainscreen by Dupont.

1. Performance Characteristics:

   a. Surface Burning: Flame spread-index not exceeding 25 and smoke-developed index not exceeding 450 when tested in accordance with ASTM E84.

   b. Drainage Efficiency: Minimum drainage efficiency of 90-percent, when tested in accordance with ASTM E2273.

C. Manufacturers: Subject to compliance with requirements, provide products from one of the following manufacturers:

1. Advanced Building Products, Inc.

2. CavClear; a division of Archovations, Inc.

3. Dorken Systems, Inc.

4. Dupont

5. Keene Building Products

6. Mortar Net Solutions

7. Stuc-O-Flex International, Inc.

8. Wire-Bond

9. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

1.2 RAINSCREEN DRAIN MAT ACCESSORIES

A. Seam Tape: Minimum 2-inch-wide, pressure-sensitive tape recommended by rainscreen drain mat manufacturer.

B. Fasteners: Minimum ½-inch long, corrosion-resistant staples or nails, as recommended by rainscreen drain mat manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements.

B. Verify that substrate and surface conditions, and water-resistive barrier installation are in accordance with rainscreen drainage mat manufacturer recommendations prior to installation.

3.2 INSTALLATION OF DRAINAGE MATERIAL

A. Install drainage material over water-resistive barrier and flashing to comply with manufacturer's written instructions.

END OF SECTION

SECTION 07 42 13.13

FORMED METAL WALL PANELS

PART 1 - ENERAL

1.1 SUMMARY

A. Section Includes:

1. Concealed-fastener, lap-seam metal wall panels.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.

C. Samples: For each type of metal panel indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Warranties: Samples of special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:

1. Wind Loads: As indicated on Drawings.

2. Deflection Limits: For wind loads, no greater than 1/240 of the span.

B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E 283 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).

C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces

2.2 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS

A. General: Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.

B. Reveal-Joint, Concealed-Fastener Metal Wall Panels: Formed with vertical panel edges and a flat pan between panel edges; with narrow reveal joint between panels.

1. Basis of Design: Versa by MAC Metal Architectural

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. AEP Span

b. Berridge Manufacturing Company

c. CENTRIA Architectural Systems

d. Fabral

e. MBCI

f. Morin – A Kingspan Group Company

g. PAC-CLAD

h. MAC Metal Architectural

i. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

3. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792, Class AZ50 (Class AZM150) coating designation; structural quality. Pre-painted by the coil-coating process to comply with ASTM A 755.

a. Nominal Thickness: 24 gauge minimum

b. Exterior Finish: Two-coat fluoropolymer

c. Color: As selected by Architect from manufacturer's full range

4. Panel Coverage: 12 inches

5. Panel Height: 1.0 inch

2.3 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.

2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/2-inch-wide and 1/8 inch thick.

2. Joint Sealant: ASTM C 920; as recommended in writing by metal panel manufacturer.

3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.4 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.

C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

2.5 FINISHES

A. Panels and Accessories:

1. Two-Coat Fluoropolymer: AAMA 621 or AAMA 2605. Two-coat fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat.

2. Concealed Finish: White or light-colored acrylic or polyester backer finish.

PART 3 - EXECUTION

3.1 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.2 METAL PANEL INSTALLATION

A. General: Install metal panel system in accordance with manufacturer's written instructions, approved shop drawings, project drawings, and referenced publications. Install metal panels in orientation, sizes, and locations indicated. Anchor panels and other components securely in place. Provide for thermal and structural movement

B. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.

1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.

2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.

3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.

4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.

5. Flash and seal panels with weather closures at perimeter of all openings.

C. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

D. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

3.3 CLEANING

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

END OF SECTION

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SECTION 07 46 46

FIBER CEMENT SIDING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Fiber-cement siding and trim

2. Pre-finished fiber-cement siding and trim

3. Fiber-cement soffit

4. Accessories.

1.2 COORDINATION

A. Coordinate siding installation with flashings and other adjoining construction to ensure proper sequencing.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, mock-ups, sequencing, and scheduling of the work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples: For each type, color, texture, and pattern required.

1. 12-inch-long-by-actual-width Sample of siding.

2. 12-inch-long-by-actual-width Samples of trim and accessories.

1.5 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of fiber-cement siding and soffit.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fiber-cement siding.

C. Research/Evaluation Reports: For each type of fiber-cement siding required, from ICC-ES.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of product, including related accessories, to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for fabrication and installation.

1. Build mockup of typical wall area as shown on Drawings.

2. When no mock-up is shown in Drawings, build mockups for fiber-cement siding, including accessories.

    a. Size: 48 inches long by 60 inches high

    b. Include outside corner on one end of mockup and inside corner on other end.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with labels intact until time of use.

B. Store materials on elevated platforms, under cover, and in a dry location.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace products that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

    a. Structural failures including cracking and deforming.

    b. Deterioration of materials beyond normal weathering.

2. Warranty Period: 25 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain products, including related accessories, from single source from single manufacturer.

2.2 FIBER-CEMENT SIDING

A. General: ASTM C1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E136; with a flame-spread index of 25 or less when tested according to ASTM E84.

1. Manufacturers: Subject to compliance with requirements, provide products from one of the following manufacturers:

    a. Allura USA

    b. James Hardie Building Products

    c. Nichiha Fiber Cement

    d. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Labeling: Provide fiber-cement siding that is tested and labeled according to ASTM C1186 by a qualified testing agency acceptable to authorities having jurisdiction.

C. Horizontal Siding: Boards 5/16-inch-thick min., width as required to achieve indicated exposure, plain edge

1. Basis of Design: HardiePlank Lap Siding by James Hardie Building Products

2. Texture: Smooth

3. Factory Priming: Manufacturer's standard acrylic primer.

D. Vertical Panel Siding: 5/16-inch thick by 48-inch-wide sheets

1. Basis of Design: HardiePanel Vetical Siding by James Hardie Building Products

2. Texture: Smooth

3. Factory Priming: Manufacturer’s standard acrylic primer.

2.3 FIBER-CEMENT TRIM

A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.

1. Basis of Design: HardieTrim Boards by James Hardie Building Products

a. Thickness: 5/4 (1-inch actual thickness)

b. Sizes: Indicated on drawings.

c. Texture: Smooth

d. Factory Priming: Manufacturer's standard acrylic primer.

2. Factory Priming: Manufacturer's standard acrylic primer.

2.4 ACCESSORIES

A. Siding Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration.

1. Provide accessories matching color and texture of adjacent siding unless otherwise indicated.

B. Flashing: Provide metal flashing complying with Section 07 60 00 " Metal Flashing and Sheet Metal" at window and door heads and where indicated.

C. Rainscreen Accessories:

1. Furring: Pressure treated wood furring, 3/8-inch-thick minimum, of sufficient width to assure adequate fastener connection

2. Bug Screen / Rainscreen ventilation accessory: SV-5 Siding Vent by Cor-A-Vent.

D. Fasteners:

1. For fastening to wood, use siding nails or ribbed bugle-head screws as recommended by siding manufacturer, of sufficient length to penetrate a minimum of 1 inch into substrate.

2. For fastening to metal, use ribbed bugle-head screws of sufficient length to penetrate a minimum of 1/4 inch, or three screw-threads, into substrate.

3. For fastening fiber cement, use hot-dip galvanized or stainless-steel fasteners.

E. Insect Screening for Soffit Vents: Aluminum, 18-by-16 mesh or stainless steel, 18-by-18 mesh.

F. Continuous Soffit Vents: Provide continuous soffit vents complying with Section 07 31 13 “Asphalt Shingles”

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of fiber-cement siding, trim, and soffit and related accessories.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION

A. General: Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

1. Do not install damaged components.

2. Install fasteners no more than 24 inches o.c.

B. Install joint sealants as specified in Section 07 92 00 "Joint Sealants" and to produce a weathertight installation.

C. Rainscreen Cavity: Where indicated in Drawings and when required by manufacturer’s written installation instructions, install flat to wall fiber cement panel products on a drained and vented rainscreen cavity, with a minimum 3/8-inch air cavity. Cavity vent materials shall be incorporated into the design to prevent insect and pest entry.

3.4 ADJUSTING AND CLEANING

A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.

B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION

SECTION 07 54 23

THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mechanically fastened, thermoplastic polyolefin (TPO) roofing system.

2. Walkways.

1.2 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D1079 and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to Work of this Section.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, mock-ups, sequencing, and scheduling of the work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:

1. Base flashings and membrane termination details.

2. Flashing details at penetrations.

3. Roof plan showing orientation of steel roof deck and orientation of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.

4. Tie-in with adjoining air barrier.

C. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

B. Evaluation Reports: For components of roofing system, from ICC-ES.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes roof membrane, base flashings, roof insulation, fasteners, cover boards, substrate board, and other components of roofing system.

2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing system and flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings shall remain watertight.

1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.

2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746, ASTM D4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:

1. Zone 1 (Roof Area Field): +10.0/-21.3 PSF (10 S.F.)

2. Zone 2 (Roof Area Perimeter): +10.0/-33.4 PSF (10 S.F.)

a. Location: From roof edge to 54 feet inside roof edge.

3. Zone 3 (Roof Area Corners): +10.0/-33.4 PSF (10 S.F.)

a. Location: 54 feet in each direction from each building corner, 18 feet inside roof edge.

D. Energy Performance: Roofing system shall have an initial solar reflectance of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.

E. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class B; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

F. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.2 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

A. TPO Sheet: ASTM D6878, internally fabric- or scrim-reinforced, TPO sheet.

1. Basis of Design: Sure-Weld TPO by Carlisle SynTec

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Carlisle SynTec Inc.

b. Firestone Building Products

c. GAF

d. GenFlex Roofing Systems

e. Johns Manville

f. Mule-Hide Products

g. Versico Roofing Systems

h. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

3. Source Limitations: Obtain components for roofing system from roof membrane manufacturer or manufacturers approved by roof membrane manufacturer.

4. Thickness: 60 mils, nominal.

5. Exposed Face Color: White

2.3 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.

1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.

B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 55 mils thick, minimum, of same color as TPO sheet.

C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

D. Roof Vents: As recommended by roof membrane manufacturer.

1. Size: Not less than 4-inch diameter.

E. Slip Sheet: If required or recommended by membrane manufacturer, provide manufacturer's standard, of thickness required for application.

F. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8-inch-thick; with anchors.

G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.

H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.4 SUBSTRATE BOARDS

A. Refer to Section 07 72 00 “Roof Substrate Board”

2.5 ROOF INSULATION

A. Refer to Section 07 22 00 “Roof and Deck Insulation”

2.6 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, acceptable to roofing system manufacturer.

1. Size: Not less than 30-inches wide.

2. Thickness: Not less than 90 mils thick

3. Color: Contrasting with roof membrane.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.

2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 INSTALLATION OF ROOFING, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions, SPRI's Directory of Roof Assemblies listed roof assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning Work on adjoining roofing.

3.4 INSTALLATION OF MECHANICALLY FASTENED ROOF MEMBRANE

A. Mechanically fasten roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

B. Unroll roof membrane and allow to relax before installing.

C. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Mechanically fasten or adhere roof membrane securely at terminations, penetrations, and perimeter of roofing.

E. Apply roof membrane with side laps shingled with slope of roof deck where possible.

F. In-Seam Attachment: Secure one edge of TPO sheet using fastening plates or metal battens centered within seam, and mechanically fasten TPO sheet to roof deck.

G. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and flashing sheet.

2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.

3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.

H. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.5 INSTALLATION OF BASE FLASHING

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.6 INSTALLATION OF WALKWAYS

A. Flexible Walkways:

1. Install flexible walkways at the following locations:

a. Perimeter and between each rooftop unit location, creating a continuous path connecting rooftop unit locations.

b. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.

c. Top and bottom of each roof access ladder.

d. Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.

e. Locations indicated on Drawings.

f. As required by roof membrane manufacturer's warranty requirements.

2. Provide 6-inch clearance between adjoining pads.

3. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.7 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

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SECTION 07 60 00

METAL FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Formed low-slope roof sheet metal fabrications.

2. Formed steep-slope roof sheet metal fabrications.

3. Formed wall sheet metal fabrications.

B. Refer to 07 71 23 “Roof Drainage Fabrications” for gutters, downspouts and scupper fabrications.

1.2 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.4 ACTION SUBMITTALS

A. Product Data: For each of the following

1. Underlayment materials.

2. Sealants.

3. Butyl sealant.

4. Epoxy seam sealer.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include details for forming, including profiles, shapes, seams and dimensions

2. Include details for joining, supporting and securing, including layout of spacing of fasteners, cleats, clips and other attachments.

3. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, flashings and counter-flashings.

4. Include identification of material, thickness, weight and finish for each item.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

2. Protect stored sheet metal flashing and trim from contact with water.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standards for Flashing and Trim: Comply with requirements for dimensions and profiles shown unless more stringent requirements are indicated:

1. The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing"

2. SMACNA - Architectural Sheet Metal Manual

C. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested in accordance with ANSI/SPRI/FM 4435/ES-1 and capable of resisting the following design pressure:

1. Design Pressure: As indicated on Drawings.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces

2.2 SHEET METALS

A. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Metallic-Coated Steel Sheet: ASTM A653, Galvanized (zinc-coated) steel sheet, G90 coating designation

1. Thickness: **0.028** inches (24-gauge), minimum

a. Provide thicker material at indicated locations or where recommended by NRCA Roofing Manual or SMACNA - Architectural Sheet Metal Manual.

b. Provide thinner material only where indicated in Drawings.

2. Surface: Smooth, flat

3. Field-Painted Finish: Mill phosphatized for field painting

4. Exposed Coil-Coated Finish, where indicated as pre-finished:

a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat.

b. Color: As selected by Architect from manufacturer's full range.

C. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.

1. Thickness: **0.027** inches, minimum

a. Provide thicker material at indicated locations or where recommended by NRCA Roofing Manual or SMACNA - Architectural Sheet Metal Manual.

b. Provide thinner material only where indicated in Drawings.

2. As-Milled Finish: One-side bright mill.

3. Factory Prime Coating: Where painting after installation is required, pretreat metal with white or light-colored, factory-applied, baked-on epoxy primer coat, 0.2 mil dry-film thick minimum.

4. Exposed Coil-Coated Finish, where indicated as pre-finished:

a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat.

b. Color: As selected by Architect from manufacturer's full range.

D. Stainless Steel Sheet: ASTM A240, Type 304, dead soft, fully annealed; with smooth, flat surface.

1. Thickness: **0.025** inches, minimum

a. Provide thicker material at indicated locations or where recommended by NRCA Roofing Manual or SMACNA - Architectural Sheet Metal Manual.

b. Provide thinner material only where indicated in Drawings.

2. Finish: ASTM A480, No. 2D (dull, cold rolled) or ASTM A480, No. 2B (bright, cold rolled)

a. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

b. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1) When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

E. Lead Sheet: ASTM B749 lead sheet.

2.3 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet Underlayment: Minimum 30 mils thick, butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing.

1. Source Limitations: Obtain underlayment from single source from single manufacturer.

2. Provide slip-resistant polyethylene- or polypropylene-film top surface where required.

3. Provide primer in accordance with underlayment manufacturer's written instructions.

4. Low-Temperature Flexibility: ASTM D1970; passes after testing at minus 20 deg F or lower.

2.4 MISCELLANEOUS MATERIALS

A. Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.

b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.

c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

3. Fasteners for Stainless Steel Sheet: Series 300 stainless steel.

4. Fasteners for Galvanized (Zinc-Coated) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153 or ASTM F2329.

C. Solder:

1. For Stainless Steel: ASTM B32, Grade Sn60 or Grade Sn96, with acid flux of type recommended by stainless steel sheet manufacturer.

2. For Galvanized (Zinc-Coated) Steel: ASTM B32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2-inch-wide and 1/8 inch thick.

E. Elastomeric Sealant: ASTM C920, elastomeric polyurethane or silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt emulsion in accordance with ASTM D1187.

I. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.

J. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated.

1. Source Limitations: Obtain reglets from single source from single manufacturer.

2. Material: Stainless steel, 0.018-inch-thick, Aluminum, 0.024-inch-thick or Galvanized steel, 0.022 inch thick.

3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.

4. Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.

5. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.

6. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.

7. Accessories:

a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.

b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing's lower edge.

2.5 FABRICATION, GENERAL

A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.

1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.

4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.

5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances:

1. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

2. Use lapped expansion joints only where indicated on Drawings.

D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Seams:

1. Seams for Metals being Soldered: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

2. Seams for Metals with Painted or Coated Finish: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

3. Seams for Aluminum Sheet without Painted or Coated Finish: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

2.6 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long sections. Furnish with 6-inch- wide, joint cover plates. Shop fabricate interior and exterior corners.

1. Joint Style: Butted with expansion space and 6-inch-wide, concealed backup plate or butted with expansion space and 6-inch-wide, exposed cover plate. Utilize one joint style throughout entire project.

2. Fabricate from the following materials:

a. Aluminum: 0.050 inch thick, minimum

b. Galvanized Steel: 0.028 inch thick (24-ga.), minimum

B. Copings (Shop Fabricated): Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and interior leg. Miter corners, fasten and seal watertight. Shop fabricate interior and exterior corners.

1. Joint Style: Butted with expansion space and 6-inch-wide, concealed backup plate or butted with expansion space and 6-inch-wide, exposed cover plate. Utilize one joint style throughout entire project.

2. Fabricate from the following materials:

a. Aluminum: As recommended by SMACNA based on indicated dimensions, but not less than 0.050 inch thick, minimum

b. Galvanized Steel: As recommended by SMACNA based on indicated dimensions, but not less than 0.028 inch thick (24-ga), minimum

3. Finish: Two-Coat Fluoropolymer: AAMA 621

4. Color: As selected by Architect from manufacturer's full range.

C. Copings (Manufactured): Basis of Design: PermaSnap by Hickman Edge Systems

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Hickman Edge Systems

b. Metal Era, Inc.

c. MM Systems, Corp.

d. PAC Clad; Petersen Aluminum Company

e. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Materials:

a. Aluminum: As recommended by SMACNA based on indicated dimensions, but not less than 0.050 inch thick, minimum

b. Galvanized Steel: As recommended by SMACNA based on indicated dimensions, but not less than 0.028 inch thick (24-ga), minimum

3. Finish: Two-Coat Fluoropolymer: AAMA 621

4. Color: As selected by Architect from manufacturer's full range.

D. Roof-to-Wall Transition Expansion-Joint Cover: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Aluminum: 0.050 inch thick, minimum

2. Galvanized Steel: 0.034 inch thick (22-ga), minimum

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF UNDERLAYMENT

A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim.

1. Install in shingle fashion to shed water.

2. Lap joints not less than 2 inches.

B. Self-Adhering, High-Temperature Sheet Underlayment:

1. Install self-adhering, high-temperature sheet underlayment; wrinkle free.

2. Prime substrate if recommended by underlayment manufacturer.

3. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures.

4. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses.

5. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller.

6. Roll laps and edges with roller.

7. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.

1. Install fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, or sealant.

3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.

4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.

5. Install continuous cleats with fasteners spaced not more than 12 inches o.c.

6. Space individual cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.

7. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.

8. Do not field cut sheet metal flashing and trim by torch.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.

2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.

1. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.

2. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.

3. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated.

a. Embed hooked flanges of joint members not less than 1 inch into sealant.

b. Form joints to completely conceal sealant.

c. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way.

d. Adjust setting proportionately for installation at higher ambient temperatures.

1) Do not install sealant-type joints at temperatures below 40 deg F.

2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter.

1. Pretin edges of sheets with solder to width of 1-1/2 inches; however, reduce pretinning where pretinned surface would show in completed Work.

2. Do not solder metallic-coated steel and aluminum sheet.

3. Do not use torches for soldering.

4. Heat surfaces to receive solder, and flow solder into joint.

a. Fill joint completely.

b. Completely remove flux and spatter from exposed surfaces.

5. Stainless Steel Soldering:

a. Tin edges of uncoated sheets, using solder for stainless steel and acid flux.

b. Promptly remove acid-flux residue from metal after tinning and soldering.

c. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

H. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

3.4 INSTALLATION OF ROOF FLASHINGS

A. Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard.

1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.

2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing:

1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.

2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.

C. Copings:

1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.

2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated.

a. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 24-inch centers.

b. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch centers.

D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless steel draw band and tighten.

E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing.

1. Insert counterflashing in reglets or receivers and fit tightly to base flashing.

2. Extend counterflashing 4 inches over base flashing.

3. Lap counterflashing joints minimum of 4 inches.

4. Secure in waterproof manner by means of snap-in installation and sealant or lead wedges and sealant unless otherwise indicated.

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.5 INSTALLATION OF WALL FLASHINGS

A. Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

3.6 INSTALLATION OF MISCELLANEOUS FLASHING

A. Equipment Support Flashing:

1. Coordinate installation of equipment support flashing with installation of roofing and equipment.

2. Weld or seal flashing with elastomeric sealant to equipment support member.

3.7 INSTALLATION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.8 CLEANING

A. At unpainted and uncoated metals, clean exposed, metal surfaces of substances that interfere with uniform oxidation and weathering.

B. At soldered joints, clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

3.9 PROTECTION

A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

B. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended in writing by sheet metal flashing and trim manufacturer.

C. Maintain sheet metal flashing and trim in clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION

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SECTION 07 65 00

FLEXIBLE FLASHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Self-adhered, flexible flashing:

1. Butyl Rubber Flashing

2. Rubberized Asphalt Flashing

3. EPDM Flashing

4. Flexible Flashing Schedule

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review self-adhered flexible flashing requirements and installation, special details, mockups, and work scheduling.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For self-adhered, flexible flashing, provide product data identifying adhesive composition, material thickness, and width.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For flexible flashing, from ICC-ES.

B. Schedules: Submit schedule indicating where each type of flexible flashing is being used.

C. Compatibility: Provide flexible flashing materials that are adhesively and chemically compatible with submitted weather barrier and related system components. Submit test report, evaluation report or written statement from flexible flashing manufacturer in order to illustrate compliance.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to set quality standards for materials and execution.

1. Build integrated mockups of exterior wall assembly, incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing.

a. Coordinate construction of mockups to permit inspection of flashing before external insulation and cladding are installed.

b. If Architect or Owner’s consultants determines mockups do not comply with requirements, reconstruct mockups and apply flashing until mockups are approved.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Source Limitations: Obtain flexible flashing from building wrap manufacturer, or from manufacturer approved by building wrap manufacturer.

B. Performance Requirements:

a. Self-adhered, flexible flashing shall comply with AAMA 711 – Specification for Self-Adhered Flashing Used for Installation of Exterior Wall Fenestration Products

2.2 FLEXIBLE FLASHING

A. Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. DuPont Building Innovations

b. Grace Construction Products; a WR Grace company

c. Protecto Wrap Company

d. Raven Industries

e. Wire-Bond

f. Substitutions: Products meeting standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Rubberized-Asphalt Flashing: Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Advanced Building Products

b. Carlisle Coatings & Waterproofing, Inc.

c. Fiberweb

d. Fortifiber Building Systems Group

e. Grace Construction Products; a WR Grace company

f. Heckman Building Products, Inc.

g. Hohmann & Barnard (H&B)

h. MFM Building Products Corp.

i. Polyguard Products, Inc.

j. Sandell Manufacturing Co., Inc.

k. Wire-Bond

l. Substitutions: Products meeting standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

C. EPDM Flashing: Sheet flashing product made from ethylene-propylene-diene terpolymer, complying with ASTM D4637

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Carlisle Coatings & Waterproofing, Inc.

b. Firestone Specialty Products

c. Heckman Building Products, Inc.

d. Hohmann & Barnard (H&B)

e. Wire-Bond

f. Substitutions: Products meeting standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

D. Primer for Flexible Flashing: Product recommended in writing by flexible flashing manufacturer for substrate.

E. Nails and Staples: Product recommended in writing by flexible flashing manufacturer and complying with ASTM F1667.

F. Sealant: As recommended by flashing manufacturer and compatible with flexible flashing.

PART 3 - EXECUTION

3.1 FLEXIBLE FLASHING INSTALLATION

A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.

1. Prime substrates as recommended by flashing manufacturer.

2. Lap seams and junctures with other materials at least 4 inches except that at flashing flanges of other construction, laps need not exceed flange width.

3. Lap flashing over water-resistive barrier at bottom and sides of openings.

4. Lap water-resistive barrier over flashing at heads of openings.

5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

6. Provide metal termination bar as recommended by manufacturer and where indicated.

B. Replace delaminated flashing prior to application of exterior finish.

3.2 SCHEDULE

A. Window, Flanged - Jamb and Head Conditions:

1. Basis of Design: Dupont Flashing Tape

2. Thickness: 20 mil

B. Window, Non-Flanged - Jamb and Head Conditions:

1. Basis of Design: Dupont Flashing Tape

2. Thickness: 20 mil

C. Window – Sill Condition (at punched openings):

1. Basis of Design: Dupont FlexWrap

2. Thickness: 64 mil

D. Storefront / Curtainwall / Window Wall - Jamb and Head Conditions:

1. Basis of Design: Dupont Flashing Tape

2. Thickness: 20 mil

E. Storefront / Curtainwall / Window Wall - Sill Condition (at punched openings):

1. Basis of Design: Dupont FlexWrap

2. Thickness: 64 mil

F. Non-Flanged Door - Jamb and Head Conditions:

1. Basis of Design: Dupont StraightFlash VF - VersaFlange

2. Thickness: 30 mil

G. Thru-Wall Conditions:

1. Basis of Design: Textroflash by Hohmann & Barnard (H&B)

2. Thickness: 40 mil

H. Miscellaneous Conditions:

1. Basis of Design: Dupont Flashing Tape

2. Thickness: 20 mil

END OF SECTION

SECTION 07 72 00

ROOF SUBSTRATE BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof substrate board used above roof and deck insulation in preparation for application of single-ply roof membrane.

1.2 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D1079 and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to Work of this Section.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site**.**

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, mock-ups, sequencing, and scheduling of the work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installer and manufacturer.

B. Evaluation Reports: For components of roofing system, from ICC-ES.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.10 WARRANTY

A. Warrant roof substrate board as component of roofing system. Refer to 07 54 23 “Thermoplastic-Polyolefin Roofing”

1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roof substrate board shall withstand specified uplift pressures, thermally induced movement without failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Material Compatibility: Roof substrate board and accessories shall be compatible with one another and adjacent materials under conditions of service and application required.

C. Wind Uplift Resistance: Resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:

1. Zone 1 (Roof Area Field): +10.0/-21.3 PSF (10 S.F.)

2. Zone 2 (Roof Area Perimeter): +10.0/-33.4 PSF (10 S.F.)

a. Location: From roof edge to 54 feet inside roof edge.

3. Zone 3 (Roof Area Corners): +10.0/-33.4 PSF (10 S.F.)

a. Location: 54 feet in each direction from each building corner, 18 feet inside roof edge.

2.2 SUBSTRATE BOARDS

A. Substrate Board, General: Provide type as indicated in Drawings or as recommended by roof membrane manufacturer.

B. Substrate Board: ASTM C1177, glass-mat, water-resistant gypsum board or ASTM C1278, cellulosic-fiber-reinforced, water-resistant gypsum board.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. CertainTeed Corp.

b. Georgia-Pacific Gypsum LLC

c. Johns Manville

d. National Gypsum Company

e. USG Corp.

f. Substitutions: Products meeting the indicated standards of this section as well as standards set forth in roof membrane manufacturer’s specifications, shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Thickness: 1/2 inch thick.

C. Substrate Board: ASTM C728, perlite board, seal coated.

1. Thickness: 1/2 inch thick.

D. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

E. Adhesives: As recommended by roof system manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 INSTALLATION OF ROOF SUBSTRATE ‘COVER’ BOARDS

A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction.

1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.

2. At internal roof drains, conform to slope of drain sump.

a. Trim cover board so that water flow is unrestricted.

3. Cut and fit cover board tight to nailers, projections, and penetrations.

4. Adhere cover board to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:

a. Hot Asphalt Application: Set cover board in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.

b. Low-Rise Urethane Adhesive Application: Set cover board in ribbons of bead-applied or in uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

B. Where indicated, and when required based on adhesive or hot asphalt attachment, install slip sheet over cover board and beneath roof membrane.

END OF SECTION

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SECTION 07 76 00

ROOF AND PLAZA DECK PAVERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Roof and plaza deck pavers and paver pedestals.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, and tested physical and performance properties.

B. Shop Drawings:

1. Indicate locations and extent of roof pavers.

2. Include setting drawings indicating layout, sizes, sections, profiles, and joint details of pedestal-supported pavers.

C. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain pavers and paver pedestals from single source and from single manufacturer.

2.2 ROOF PAVERS

A. Concrete Roof and Plaza-Deck Pavers: Solid, hydraulically pressed, standard-weight concrete units, square edged, manufactured for use as roof and plaza-deck pavers; minimum compressive strength of 6500 psi, ASTM C140; absorption not greater than 5 percent, ASTM C140; no breakage and maximum 1 percent mass loss when tested for freeze-thaw resistance in accordance with ASTM C67.

1. Basis of Design: Refer to Landscape Architect drawings.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Hanover Architectural Products

b. Roofblok Limited

c. Sunny Brook Pressed Concrete Company

d. Wausau Tile, Inc.

e. Westile Roofing Products

f. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

3. Thickness: Refer to Landscape Architect drawings.

4. Face Size: Refer to Landscape Architect drawings.

5. Color and Texture: As selected by Architect from manufacturer's full range.

B. Paver Pedestals: Paver-support assembly, standard with paver manufacturer, including adjustable or stackable pedestals, shims, and spacer tabs for joint spacing of 1/8 to 3/16 inch.

1. Basis of Design: Refer to Landscape Architect drawings.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Hanover Architectural Products

b. Roofblok Limited

c. Sunny Brook Pressed Concrete Company

d. Wausau Tile, Inc.

e. Westile Roofing Products

f. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

3. Fill: As recommended in writing by pedestal manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.

2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method in accordance with ASTM D4263.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF ROOF AND PLAZA-DECK PAVERS

A. Install pavers in accordance with manufacturer's written instructions.

B. Install paver pedestals and accessories to required elevations. Adjust for final level and slope of paved surface.

C. Loosely lay pavers on pedestals, maintaining a uniform open joint width. Tightly seat pavers against spacers to eliminate lateral movement or drift of paving assembly. Align joint patterns parallel in each direction.

1. Lay out pavers to avoid less-than-half-width pavers at perimeter or other terminations.

D. Install pavers to vary no more than 1/16 inch in elevation between adjacent pavers and no more than 1/16 inch from surface plane elevation of individual paver.

E. Limit variation in paving installation to within 1/4 inch in 10 ft. of surface plane in any direction; noncumulative.

END OF SECTION

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SECTION 07 81 23

INTUMESCENT FIRE PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mastic and intumescent fire-resistive coatings.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work. Review products, design ratings, restrained and unrestrained conditions, thicknesses, and other performance requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Mastic and intumescent fire-resistive coatings.

2. Substrate primers.

3. Reinforcing fabric.

4. Reinforcing mesh.

5. Topcoat.

B. Shop Drawings: Framing plans or schedules, or both, indicating the following:

1. Extent of fire protection for each construction and fire-resistance rating.

2. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.

3. Minimum mastic and intumescent fire-resistive coating thicknesses needed to achieve required fire-resistance rating of each structural component and assembly.

4. Treatment of mastic and intumescent fire-resistive coating after application.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of mastic and intumescent fire-resistive coating.

B. Evaluation Reports: For mastic and intumescent fire-resistive coating, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by mastic and intumescent fire-resistive coating manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not apply fire protection when ambient or substrate temperature is 50 deg F or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.

B. Ventilation: Ventilate building spaces during and after application of fire protection, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fire protection dries thoroughly.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Assemblies: Provide fire protection, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.

B. Source Limitations: Obtain fire protection for each fire-resistance design from single source.

C. Fire-Resistance Design: Indicated on Drawings, tested according to ASTM E119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Steel members are to be considered unrestrained unless specifically noted otherwise.

D. Asbestos: Provide products containing no detectable asbestos.

2.2 MASTIC AND INTUMESCENT FIRE-RESISTIVE COATINGS

A. Mastic and Intumescent Fire-Resistive Coating: Manufacturer's standard, factory-mixed formulation or factory-mixed, multicomponent system consisting of intumescent base coat and topcoat, and complying with indicated fire-resistance design.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Albi Manufacturing

b. Carboline Company

c. Hilti, Inc.

d. International Protective Coatings

e. Isolatek International

f. No-Burn, Inc.

g. Sherwin-Williams Company

h. Substitutions: Products by manufacturers meeting indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Application: Designated for "exterior", "interior general purpose", or "conditioned interior space purpose" use, based on expected conditions of service, by a qualified testing agency acceptable to authorities having jurisdiction.

3. Thickness: As required for indicated hourly rating or fire-resistance design indicated, measured according to requirements of fire-resistance design.

4. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

    a. Flame-Spread Index: 25 or less.

    b. Smoke-Developed Index: 50 or less.

5. Finish: As selected by Architect from manufacturer's standard finishes.

    a. Color and Gloss: As selected by Architect from manufacturer's full range.

2.3 AUXILIARY MATERIALS

A. Provide auxiliary materials that are compatible with mastic and intumescent fire-resistive coating and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.

B. Substrate Primers: Primers approved by mastic and intumescent fire-resistive coating manufacturer and complying with required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

C. Reinforcing Fabric: Glass- or carbon-fiber fabric of type, weight, and form required to comply with fire-resistance designs indicated; approved and provided by mastic and intumescent fire-resistive coating manufacturer.

D. Reinforcing Mesh: Metallic mesh reinforcement of type, weight, and form required to comply with fire-resistance design indicated; approved and provided by mastic and intumescent fire-resistive coating manufacturer. Include pins and attachment.

E. Topcoat: At indicated locations, and when required by coating manufacturer, provide topcoat suitable for application over mastic and intumescent fire-resistive coating; of type recommended in writing by mastic and intumescent fire-resistive coating manufacturer for each fire-resistance design.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design.

1. Verify that substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fire protection with substrates under conditions of normal use or fire exposure.

2. Verify that objects penetrating fire protection, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.

3. Verify that substrates receiving fire protection are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fire protection application.

B. Conduct tests according to mastic and intumescent fire-resistive coating manufacturer's written instructions to verify that substrates are free of substances capable of interfering with bond.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Cover other work subject to damage from fallout or overspray of fire protection materials during application.

B. Clean substrates of substances that could impair bond of fire protection.

C. Prime substrates where included in fire-resistance design and where recommended in writing by mastic and intumescent fire-resistive coating manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fire protection.

D. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of fire protection. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

3.3 APPLICATION

A. Construct fire protection assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, topcoats, finishing, and other materials and procedures affecting fire protection Work.

B. Comply with mastic and intumescent fire-resistive coating manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fire protection; as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.

C. Coordinate application of fire protection with other construction to minimize need to cut or remove fire protection.

1. Do not begin applying fire protection until clips, hangers, supports, sleeves, and other items penetrating fire protection are in place.

2. Defer installing ducts, piping, and other items that would interfere with applying fire protection until application of fire protection is completed.

D. Install auxiliary materials as required, as detailed, and according to fire-resistance design and mastic and intumescent fire-resistive coating manufacturer's written instructions for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by mastic and intumescent fire-resistive coating manufacturer.

E. Spray apply fire protection to maximum extent possible. After the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by mastic and intumescent fire-resistive coating manufacturer.

F. Extend fire protection in full thickness over entire area of each substrate to be protected.

G. Install body of fire protection in a single course unless otherwise recommended in writing by mastic and intumescent fire-resistive coating manufacturer.

H. Provide a uniform finish complying with description indicated for each type of fire protection material and matching finish approved for required mockups.

I. Cure fire protection according to mastic and intumescent fire-resistive coating manufacturer's written instructions.

J. Do not install enclosing or concealing construction until after fire protection has been applied, inspected, and tested and corrections have been made to deficient applications.

K. Finishes: Where indicated, apply fire protection to produce the following finishes:

1. Manufacturer's Standard Finishes: Finish according to manufacturer's written instructions for each finish selected.

2. Spray-Textured Finish: Finish left as spray applied with no further treatment.

3. Rolled, Spray-Textured Finish: Even finish produced by rolling spray-applied finish with a damp paint roller to remove drippings and excessive roughness.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:

1. Test and inspect as required by the IBC, Subsection 1705.14, "Mastic and Intumescent Fire-Resistant Coatings."

B. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of fire protection for the next area until test results for previously completed applications of fire protection show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.

C. Fire protection will be considered defective if it does not pass tests and inspections.

1. Remove and replace fire protection that does not pass tests and inspections, and retest.

2. Apply additional fire protection, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.

D. Prepare test and inspection reports.

3.5 CLEANING

A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.

3.6 PROTECTION

A. Protect fire protection, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fire protection is without damage or deterioration at time of Substantial Completion.

3.7 REPAIRS

A. As installation of other construction proceeds, inspect fire protection and repair damaged areas and fire protection removed due to work of other trades.

B. Repair fire protection damaged by other work before concealing it with other construction.

C. Repair fire protection by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

END OF SECTION

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SECTION 07 84 13

PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Penetrations in fire-resistance-rated walls.

2. Penetrations in horizontal assemblies.

3. Penetrations in smoke barriers.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 REFERENCED STANDARDS

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials

B. ASTM E 814 - Standard Test Method for Fire Tests of Penetration Firestop Systems

C. ASTM E 2174 - Standard Practice for On-Site Inspection of Installed Firestops

D. UL 1479 – Standard for Fire Tests of Penetration Firestops

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

1.5 INFORMATIONAL SUBMITTALS

A. Product test reports.

1.6 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.

2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:

a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.

1) UL in its "Fire Resistance Directory."

2) Intertek Group in its "Directory of Listed Building Products."

2.2 PENETRATION FIRESTOPPING SYSTEMS

A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

1. Acceptable Manufacturers:

a. 3M Fire Protection Products

b. A/D Fire Protection Systems, Inc.

c. Emseal

d. Hilti, Inc.

e. Rectorseal Firestop; a CSW Industrials Company

f. Specified Technologies, Inc. (STI)

g. Tremco, Inc.

h. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect Approval. Comply with Section 01 25 13.

B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.

2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.

3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.

D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg (7.47 Pa).

1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at and no more than 50-cfm (0.024-cu. m/s) cumulative total for any 100 sq. ft. (9.3 sq. m) at both ambient and elevated temperatures.

E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.

F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.

1. Mineral Wool Batt Insulation: ASTM C 665, Type I (unfaced), ASTM E 136 non-combustible, minimum density outlined within penetration firestop system

a. Acceptable Manufacturers:

1) Johns Manville

2) Rockwool International

3) Thermafiber, Inc; an Owens Corning Company

4) Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Architect Approval. Comply with Section 01 25 13.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.

C. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.

D. Install fill materials by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.

2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.2 FIELD QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2174.

B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.

C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

END OF SECTION

SECTION 07 84 43

JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Joints in or between fire-resistance-rated constructions.

2. Joints at exterior curtain-wall/floor intersections.

3. Joints in smoke barriers.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 REFERENCED STANDARDS

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials

B. ASTM E 1966 – Standard Test Method for Fire-Resistive Joint Systems

C. ASTM E 2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus

D. ASTM E 2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers

E. UL 2079 – Standard for Tests for Fire Resistance of Building Joint Systems

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.5 INFORMATIONAL SUBMITTALS

A. Product test reports.

1.6 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.

2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:

    a. Joint firestopping systems shall bear classification marking of a qualified testing agency.

        1) UL in its "Fire Resistance Directory."

        2) Intertek Group in its "Directory of Listed Building Products."

2.2 JOINT FIRESTOPPING SYSTEMS

A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

1. Acceptable Manufacturers:

    a. 3M Fire Protection Products

    b. A/D Fire Protection Systems, Inc.

    c. Hilti, Inc.

    d. RectorSeal

    e. ROCKWOOL (ROXUL Inc.)

    f. Specified Technologies, Inc. (STI)

    g. Thermafiber, Inc.; an Owens Corning company

    h. Tremco, Inc.

    i. Sika Corp.

    j. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect Approval. Comply with Section 01 25 13.

B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E 1966 or UL 2079.

1. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.

C. Joints at Exterior Curtain-Wall/Floor Intersections: Provide joint firestopping systems with rating determined per ASTM E 2307.

1. F-Rating: Equal to or exceeding the fire-resistance rating of the floor assembly.

D. Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079 based on testing at a positive pressure differential of 0.30-inch wg (7.47 Pa).

1. L-Rating: Not exceeding 5.0 cfm/ft. (0.00775 cu. m/s x m) of joint at both ambient and elevated temperatures.

E. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

F. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

1. Mineral Wool Batt Insulation: ASTM C 665, Type I (unfaced), ASTM E 136 non-combustible, minimum density outlined within joint firestop system

a. Acceptable Manufacturers:

1) Johns Manville

2) Rockwool

3) Thermafiber, Inc.; an Owens Corning company

4) Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Architect Approval. Comply with Section 01 25 13.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.

B. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

C. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.

D. Install elastomeric fill materials for fire-resistive joint systems by proven techniques to produce the following results:

1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.

2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.

3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.2 FIELD QUALITY CONTROL

A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2393.

B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.

C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.

2. Urethane joint sealants.

3. Mildew-resistant joint sealants.

4. Latex joint sealants.

1.2 REFERENCES

A. ASTM C 510 - Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants.

B. ASTM C 719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).

C. ASTM C 794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.

D. ASTM C 834 - Standard Specification for Latex Sealants.

E. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.

F. ASTM C 1193 - Standard Guide for Use of Joint Sealants.

G. ASTM C 1247 - Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids.

H. ASTM C 1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants.

I. ASTM C 1311 - Standard Specification for Solvent Release Sealants.

J. ASTM D 2203 - Standard Test Method for Staining from Sealants.

K. ASTM D 5893 – Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Pavements

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, mock-ups, sequencing, and scheduling of the work.

1.4 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples: For each kind and color of joint sealant required.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.

2. Joint-sealant manufacturer and product name.

3. Joint-sealant formulation.

4. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Field-adhesion-test reports.

C. Sample warranties.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.7 WARRANTY

A. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

B. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates. Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

B. Basis of Design, Urethane: BASF or Sika

C. Basis of Design, Silicone: Dow Corning

D. Acceptable Manufacturers:

1. Pecora

2. Tremco

3. Emseal

4. GE Sealants and Adhesives

5. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.2 SILICONE JOINT SEALANTS

A. Silicone (**SS-1**), Single-component, nonsag, neutral-curing silicone joint sealant

1. ASTM C 920, Type S, Grade NS

2. Federal Specification TT-S-00230C, Type II, Class A

B. Silicone (**SS-2**), Single-component, pourable, neutral-curing silicone joint sealant

1. ASTM C 920, Type S, Grade P, ASTM D 5893, Type SL

2. Federal Specification TT-S-00230C & TT-S-001543

2.3 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.

B. Silicone (**SS-3**), Nonstaining, single-component, nonsag, neutral-curing silicone joint sealant

1. ASTM C 920, Type S, Grade NS, Class 25

2. Federal Specification TT-S-00230C, Type II, Class A

C. Silicone (**SS-4**), Nonstaining, multicomponent, nonsag, neutral-curing silicone joint sealant

1. ASTM C 920, Type M, Grade NS

2.4 URETHANE JOINT SEALANTS

A. Urethane (**US-1**), Single-component, nonsag, urethane joint sealant

1. ASTM C 920, Type S, Grade NS, Class 25

2. Federal Specification TT-S-00230C, Type II, Class A

B. Urethane (**US-2**), Single-component, pourable, urethane joint sealant

1. ASTM C 920, Type S, Grade P, Class 25

2. Federal Specification TT-S-00230C, Type I, Class A

C. Urethane (**US-3**), Multicomponent, nonsag, urethane joint sealant

1. ASTM C 920, Type M, Grade NS, Class 25

2. Federal Specification TT-S-00227E, Type II, Class A

D. Urethane (**US-4**), Multicomponent, pourable, urethane joint sealant

1. ASTM C 920, Type M, Grade P, Class 25

2. Federal Specification TT-S-00227E, Type I, Class A

2.5 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone (**SS-5**), Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, nontraffic-use, acid-curing silicone joint sealant

1. ASTM C 920, Type S, Grade NS, Use NT.

2.6 BUTYL JOINT SEALANTS

A. Butyl (**BS-1**), ASTM C 1311, FS TT-S-001657

2.7 LATEX JOINT SEALANTS

A. Acrylic Latex(**AL-1**): Acrylic latex or siliconized acrylic latex

1. ASTM C 834, Type OP, Grade NF.

2.8 JOINT-SEALANT BACKING

A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.9 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove laitance and form-release agents from concrete.

2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

3.2 INSTALLATION OF JOINT SEALANTS

A. General: Comply with ASTM C 1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.

2. Completely fill recesses in each joint configuration.

3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

1. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.3 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Where sealant is the primary waterproofing component within a weather exposed joint, field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.

b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.4 JOINT-SEALANT SCHEDULE, EXTERIOR

EXTERIOR LOCATION	TYPE	COLOR
Joint at vertical surface - Dissimilar materials	(**SS-3**) Non-staining silicone, single-component, nonsag	Selected by Architect
Joint at vertical surface - Similar materials	(**SS-3**) Non-staining silicone, single-component, nonsag	Selected by Architect
Joint at vertical surface – Masonry veneer control joints	(**SS-3**) Non-staining silicone, single-component, nonsag	Selected by Architect
Behind window flange at exterior wall	(**US-1**) Urethane, Single-component, nonsag	Selected by Architect
Concealed mastics / Beneath thresholds	(**BS-1**) Butyl	Black
Horizontal traffic surfaces	(**US-2**) Urethane, Single-component, pourable	Selected by Architect
Joint at vertical surface - Storefront / window wall / curtain wall glazing system	(**SS-3**) Non-staining silicone, single-component, nonsag	Selected by Architect
Pavement joint filler	Resilient, pre-molded asphalt impregnated fiberboard	N/A

3.5 JOINT-SEALANT SCHEDULE, INTERIOR

INTERIOR LOCATION	TYPE	COLOR
Bathtub / Shower	(**SS-5**) Silicone, Mildew Resistant, nonsag	White
Water closet to floor	(**SS-5**) Silicone, Mildew Resistant, nonsag	White
Counter top to backsplash (Kitchen and bath)	(**SS-5**) Silicone, Mildew Resistant, nonsag	Selected by Architect
Counter top to wall	(**AL-1**) Acrylic Latex, nonsag	White
Miscellaneous interior joints	**(AL-1**) Acrylic Latex, nonsag	White
Fire sealant	Refer to Firestopping Section	N/A

END OF SECTION

SECTION 07 95 13.13

INTERIOR EXPANSION JOINT COVER ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes interior expansion joint cover assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for expansion joint cover assemblies.

B. Shop Drawings: For each expansion joint cover assembly.

1. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams showing entire route of each expansion joint.

2. Where expansion joint cover assemblies change planes, provide isometric or clearly detailed drawing depicting how components interconnect.

C. Expansion Joint Cover Assembly Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:

1. Manufacturer and model number for each expansion joint cover assembly.

2. Expansion joint cover assembly location cross-referenced to Drawings.

3. Nominal, minimum, and maximum joint width.

4. Materials, colors, and finishes.

5. Product options.

6. Fire-resistance ratings.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each fire-resistance-rated expansion joint cover assembly, for tests performed by a qualified testing agency.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

A. Furnish units in longest practicable lengths to minimize field splicing.

B. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: For projects requiring seismic design, Expansion joint cover assemblies shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Fire-Resistance Ratings: When part of a fire-resistance rated assembly, provide expansion joint cover assemblies with fire barriers identical to those of systems tested for fire resistance according to UL 2079 or ASTM E1966 by a qualified testing agency.

1. Hose Stream Test: Wall-to-wall and wall-to-ceiling assemblies shall be subjected to hose stream testing.

2.3 MANUFACTURERS:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Balco, Inc.

2. Construction Specialities, Inc.

3. InPro Corp (IPC)

4. MM Systems Corp.

5. Nystrom, Inc.

6. Watson Bowman Acme Corp.

7. Sika Corp.

8. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.4 FLOOR EXPANSION JOINT COVERS

A. Metal-Plate Floor Joint Cover: Metal cover plate fixed on one side of joint gap and free to slide on other.

1. Basis of Design: Wabo HingeMount (HDH) over Emshield DFR2 System by Sika Corp.

2. Application: Floor to floor at interior corridor joints.

3. Installation: Surface mounted.

4. Load Capacity: As recommended by manufacturer based on application.

5. Fire-Resistance Rating: As indicated on Drawings.

6. Cover-Plate Design: Abrasive covered

7. Exposed Metal:

a. Aluminum: Manufacturer's standard.

B. Metal-Plate Floor Joint Cover: Metal cover plate fixed on one side of joint gap and free to slide on other.

1. Basis of Design: SJS-FR Seismic Joint System by Sika Corp.

2. Application: Floor to floor at interior garage joints.

3. Installation: Surface mounted.

4. Load Capacity: As recommended by manufacturer based on application.

5. Fire-Resistance Rating: As indicated on Drawings.

6. Cover-Plate Design: Sandblasted cover

7. Exposed Metal:

a. Stainless steel: Manufacturer's standard.

C. Metal-Plate Floor Joint Cover: Metal cover plate fixed on one side of joint gap and free to slide on other.

1. Basis of Design: Wabo FlameGuard II by Sika Corp.

2. Application: Floor to floor at podium joints.

3. Installation: Surface mounted.

4. Load Capacity: As recommended by manufacturer based on application.

5. Fire-Resistance Rating: As indicated on Drawings.

6. Cover-Plate Design: Smooth cover

7. Exposed Metal:

a. Stainless steel: Manufacturer's standard.

2.5 WALL EXPANSION JOINT COVERS

A. Metal-Plate Wall Joint Cover: Metal cover plate fixed on one side of joint gap and free to slide on other.

1. Basis of Design: Wabo FastWall (EWH) over Emshield WFR1 System by Sika Corp.

2. Application: Wall to wall or wall to corner, as indicated on Drawings.

3. Fire-Resistance Rating: As indicated on Drawings.

4. Exposed Metal:

a. Aluminum: Manufacturer's standard.

2.6 CEILING EXPANSION JOINT COVERS

A. Metal-Plate Ceiling Joint Cover: Metal cover plate fixed on one side of joint gap and free to slide on other.

1. Basis of Design: Wabo FastWall (EWH) over Emshield WFR1 System by Sika Corp.

2. Application: Ceiling to ceiling.

3. Fire-Resistance Rating: As indicated on Drawings.

4. Exposed Metal:

a. Aluminum: Manufacturer's standard.

2.7 MATERIALS

A. Aluminum: ASTM B221 Alloy 6063-T5 for extrusions; ASTM B209, Alloy 6061-T6 for sheet and plate.

1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.

B. Stainless Steel: ASTM A240 or ASTM A666, Type 304 for plates, sheet, and strips.

C. Elastomeric Seals: Manufacturer's standard preformed elastomeric membranes or extrusions to be installed in metal frames.

D. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to comply with performance criteria for required fire-resistance rating.

E. Moisture Barrier: Manufacturer's standard, flexible elastomeric material.

F. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

2.8 ALUMINUM FINISHES

A. Mill finish.

B. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

2.9 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run grain of directional finishes with long dimension of each piece.

2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

3. Directional Satin Finish: No. 4.

C. Bright, Cold-Rolled, Unpolished Finish: No. 2B.

2.10 ACCESSORIES

A. Manufacturer's standard attachment devices. Include anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces where expansion joint cover assemblies will be installed for installation tolerances and other conditions affecting performance of the Work.

B. Notify Architect where discrepancies occur that will affect proper expansion joint cover assembly installation and performance.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to expansion joint cover assembly manufacturer's written instructions.

B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion joint cover assemblies.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for storing, handling, and installing expansion joint cover assemblies and materials unless more stringent requirements are indicated.

B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.

1. Repair or grout block out as required for continuous frame support using nonmetallic, shrinkage-resistant grout.

2. Install frames in continuous contact with adjacent surfaces.

a. Shimming is not permitted.

3. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.

4. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation.

5. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.

6. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.

C. Seals: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.

1. Provide in continuous lengths for straight sections.

2. Seal transitions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.

3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.

D. Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.

E. Terminate exposed ends of expansion joint cover assemblies with field- or factory-fabricated termination devices.

F. Fire-Resistance-Rated Assemblies: Coordinate installation of expansion joint cover assembly materials and associated work so complete assemblies comply with performance requirements.

1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.

3.4 PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over expansion joint cover assemblies. Reinstall cover plates or seals prior to Substantial Completion.

END OF SECTION

SECTION 07 95 13.16

EXTERIOR EXPANSION JOINT COVER ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior expansion joint covers.

2. Exterior expansion joint cover schedule.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for expansion joint cover assemblies.

B. Shop Drawings: For each expansion joint cover assembly.

1. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams showing entire route of each expansion joint.

2. Where expansion joint cover assemblies change planes, provide isometric or clearly detailed drawing depicting how components interconnect.

C. Expansion Joint Cover Assembly Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:

1. Manufacturer and model number for each expansion joint cover assembly.

2. Expansion joint cover assembly location cross-referenced to Drawings.

3. Nominal, minimum, and maximum joint width.

4. Materials, colors, and finishes.

5. Product options.

6. Fire-resistance ratings.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each fire-resistance-rated expansion joint cover assembly, for tests performed by a qualified testing agency.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

A. Furnish units in longest practicable lengths to minimize field splicing.

B. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: For projects requiring seismic design, expansion joint cover assemblies shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Fire-Resistance Ratings: When part of a fire-resistance rated assembly, provide expansion joint cover assemblies with fire barriers identical to those of systems tested for fire resistance according to UL 2079 or ASTM E1966 by a qualified testing agency.

1. Hose Stream Test: Wall-to-wall and wall-to-soffit assemblies shall be subjected to hose stream testing.

2.3 EXTERIOR EXPANSION JOINT COVERS

A. Exterior Metal-Plate Joint Cover (**EJ-1**): Assembly consisting of sliding metal cover plate in continuous contact with gaskets mounted on metal frames fixed to sides of joint gap.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Balco; a CSW Industrials Company

b. BASF Corp.

c. Construction Specialties, Inc.

d. MM Systems Corp.

e. Nystrom

f. Sika Corp.

g. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Application: Floor to floor.

3. Installation: Surface mounted.

4. Fire-Resistance Rating: As indicated on Drawings.

5. Exposed Metal:

a. Aluminum: Manufacturer's standard.

b. Stainless Steel: Manufacturer's standard.

B. Preformed Foam Joint Seals (**EJ-2**): Manufacturer's standard joint seal manufactured from urethane or EVA (ethylene vinyl acetate) foam with minimum density of 10 lb/cu. ft. (160 kg/cu. m) and impregnated with a nondrying, water-repellent agent. Factory produce in pre-compressed sizes in roll or stick form to fit joint widths based on design criteria indicated, with factory- or field-applied adhesive for bonding to substrates.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Balco; a CSW Industrials Company

b. BASF Corp.

c. EMSEAL Joint Systems, Ltd.

d. LymTal International, Inc.

e. MM Systems Corp.

f. Nystrom

g. Sika Corp.

h. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Fire-Resistance Rating: As indicated on Drawings.

3. Design Criteria:

a. Movement Capability: -25 percent/+25 percent

4. Joint Seal Color: As selected by Architect from full range of manufacturer’s colors.

2.4 MATERIALS

A. Aluminum: ASTM B221 Alloy 6063-T5 for extrusions; ASTM B209, Alloy 6061-T6 for sheet and plate.

1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.

B. Stainless Steel: ASTM A240 or ASTM A666, Type 304 for plates, sheet, and strips.

C. Elastomeric Seals: Manufacturer's standard preformed elastomeric membranes or extrusions to be installed in metal frames.

D. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to comply with performance criteria for required fire-resistance rating.

E. Moisture Barrier: Manufacturer's standard, flexible elastomeric material.

2.5 ALUMINUM FINISHES

A. Mill finish.

B. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

2.6 STAINLESS STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run grain of directional finishes with long dimension of each piece.

2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

3. Directional Satin Finish: No. 4.

C. Bright, Cold-Rolled, Unpolished Finish: No. 2B.

2.7 ACCESSORIES

A. Moisture Barriers: Manufacturer's standard continuous, waterproof membrane within joint and attached to substrate on sides of joint.

1. Provide where indicated on Drawings.

B. Manufacturer's standard attachment devices. Include anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces where expansion joint cover assemblies will be installed for installation tolerances and other conditions affecting performance of the Work.

B. Notify Architect where discrepancies occur that will affect proper expansion joint cover assembly installation and performance.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to expansion joint cover assembly manufacturer's written instructions.

B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion joint cover assemblies.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for storing, handling, and installing expansion joint cover assemblies and materials unless more stringent requirements are indicated.

B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.

1. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.

2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation.

3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.

4. Install frames in continuous contact with adjacent surfaces.

a. Shimming is not permitted.

5. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.

C. Elastomeric Seals: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.

1. Provide in continuous lengths for straight sections.

2. Seal transitions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.

3. Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.

D. Preformed Foam Joint Seals: Install in compliance with manufacturer's written instructions. Install with minimum number of end joints.

1. Install each length of seal immediately after removing protective wrapping.

2. Firmly secure compressed joint seals to joint gap side to obtain full bond using exposed pressure-sensitive adhesive or field-applied adhesive as recommended by manufacturer.

3. Do not pull or stretch material. Produce seal continuity at splices, ends, turns, and intersections of joints.

4. For applications at low ambient temperatures, heat foam joint seal material in compliance with manufacturer's written instructions.

E. Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.

F. Terminate exposed ends of expansion joint cover assemblies with field- or factory-fabricated termination devices.

G. Fire-Resistance-Rated Assemblies: Coordinate installation of expansion joint cover assembly materials and associated work so complete assemblies comply with performance requirements.

1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.

3.4 PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

B. Protect the installation from damage by work of other Sections.

3.5 EXPANSION JOINT COVER ASSEMBLY SCHEDULE:

A. Exterior wall to wall locations: **EJ-2**

1. Basis of Design: Emseal Emshield DFR2 System by Sika Corp.

2. Joint Width: as indicted on drawings.

B. Exterior soffit to soffit locations: **EJ-2**

1. Basis of Design: Emseal Emshield DFR2 System by Sika Corp.

Joint Width: as indicted on drawings.

C. Podium at exterior courtyard deck locations: **EJ-1**

1. Basis of Design: Emseal Wabo Flameguard II by Sika Corp.

2. Joint Width: as indicted on drawings.

SECTION 07 95 13.16

EXTERIOR EXPANSION JOINT COVER ASSEMBLIES

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Interior standard steel doors and frames.

2. Exterior standard steel doors and frames.

1.2 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings in accordance with NAAMM-HMMA 803 or ANSI/SDI A250.8.

1.3 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door type.

2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.

3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.

4. Locations of reinforcement and preparations for hardware.

5. Details of each different wall opening condition.

6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.

7. Details of anchorages, joints, field splices, and connections.

8. Details of accessories.

C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Ceco Door, ASSA ABLOY

2. Curries Company, ASSA ABLOY

3. DCI Hollow Metal

4. Deansteel Manufacturing Company, Inc.

5. DKS Steel Door & Frame Systems, Inc.

6. Fleming Door Products, ASSA ABLOY

7. Gensteel Doors, Inc.

8. Hollow Metal, Inc.

9. Mesker Door, Inc.

10. North American Door Corp.

11. Pioneer Industries

12. Republic Door and Frames

13. Steelcraft; an Allegion brand

14. Steward Steel Door & Frames Division

15. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

B. Fire-Rated, Borrowed-Lite Assemblies: Assemblies complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing in accordance with NFPA 257 or UL 9.

2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Standard-Duty Doors and Frames: ANSI/SDI A250.8, Level 1; ANSI/SDI A250.4, Level C.

1. Locations: Provide at following locations unless otherwise indicated in Drawings:

a. Tenant storage closets, mechanical closets, storage closets, electrical closets, telecommunication closets, restrooms, and other similar spaces.

2. Doors:

a. Type: As indicated in the Door and Frame Schedule.

b. Thickness: 1-3/4 inches

c. Face: Uncoated steel sheet, minimum thickness of 0.032 inch (nominal 20-gauge).

d. Edge Construction: Model 2, Seamless.

e. Edge Bevel: Provide manufacturer's standard beveled or square edges.

f. Core: Manufacturer's standard.

g. Fire-Rated Core: Manufacturer's standard core for fire-rated doors.

3. Frames:

a. Materials: Uncoated steel sheet, minimum thickness of 0.042 inch (nominal 18-gauge).

b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.

c. Construction:

1) Framed Walls: Knocked down or Slip-on drywall

2) Masonry Walls: Face welded or Full profile welded.

4. Exposed Finish: Prime

C. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B.

1. Locations: Provide at following locations unless otherwise indicated in Drawings:
    a. Stair enclosures, fire walls
2. Doors:
    a. Type: As indicated in the Door and Frame Schedule.
    b. Thickness: 1-3/4 inches
    c. Face: Uncoated sheet, minimum thickness of 0.042 inch (nominal 18-gauge).
    d. Edge Construction: Model 2, Seamless.
    e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
    f. Core: Manufacturer's standard
    g. Fire-Rated Core: Manufacturer's standard core for fire-rated doors.
3. Frames:
    a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch (nominal 16 gauge).
    b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
    c. Construction:
        1) Framed Walls: Knocked down or Slip-on drywall
        2) Masonry Walls: Face welded or Full profile welded.
4. Exposed Finish: Prime

2.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B.

1. Locations: Provide at following locations unless otherwise indicated in Drawings:
    a. Exterior walls, parking garage, and other weather exposed locations.
2. Doors:
    a. Type: As indicated in the Door and Frame Schedule.
    b. Thickness: 1-3/4 inches
    c. Face: Metallic-coated steel sheet, minimum thickness of 0.042-inch (nominal 18 gauge), with minimum A40 (ZF120) coating.
    d. Edge Construction: Model 2, Seamless.
    e. Edge Bevel: Provide manufacturer's standard beveled or square edges.

f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.

g. Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.

h. Core: Manufacturer's standard insulation material.

i. Fire-Rated Core: Manufacturer's standard core for fire-rated doors.

3. Frames:

a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch (nominal 16 gauge), with minimum A40 (ZF120) coating.

b. Construction: Full profile welded.

4. Exposed Finish: Prime

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.

2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.

3. Postinstalled Expansion Anchor: Minimum 3/8-inch-diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

C. Material: ASTM A879, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A1008 or ASTM A1011; hot-dip galvanized in accordance with ASTM A153, Class B.

2.6 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A1008, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A1011, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A653, Commercial Steel (CS), Type B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A153.

E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

F. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

G. Glazing: Comply with requirements in Section 08 80 00 "Glass and Glazing."

2.7 FABRICATION

A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.

1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding, or by rigid mechanical anchors.

2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.

b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping in accordance with ANSI/SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.

1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated.

2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.

3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.

4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

2.8 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.9 LOUVERS

A. Provide louvers for interior doors, where indicated, which comply with SDI 111, with blades or baffles formed of 0.020-inch-thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame.

1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.

2. Lightproof Louver: Stationary louvers constructed with baffles to prevent light from passing from one side to the other.

3. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.

B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.

a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.

b. Install frames with removable stops located on secure side of opening.

2. Fire-Rated Openings: Install frames in accordance with NFPA 80.

3. Floor Anchors: Secure with postinstalled expansion anchors.

a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion

4. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

5. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:

   a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

   b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

   c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

   d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

6. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8

7. Fire-Rated Doors: Install doors with clearances in accordance with NFPA 80.

8. Smoke-Control Doors: Install doors in accordance with NFPA 105.

C. Glazing: Comply with installation requirements in Section 08 80 00 "Glass and Glazing" and with hollow-metal manufacturer's written instructions.

3.3 REPAIR

A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

C. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish according to manufacturer's written instructions.

D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION

SECTION 08 11 23

STEEL CLAD ENTRY DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Exterior standard steel edge, steel clad doors and frames.

1.2 COORDINATION

A. Coordinate requirements for installation of door hardware and access control systems.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door type.

2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.

3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.

4. Details of each different wall opening condition.

C. Product Schedule: For steel edge, steel clad doors and frames, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.

B. Store doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Jeld-Wen

2. Masonite International Corp.

3. Taylor Entrance Systems

4. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

2.3 EXTERIOR STEEL-CLAD ENTRY DOORS: GLAZED PATIO / BALCONY DOORS

A. Basis of Design: HD Steel-Edge by Masonite

B. Performance Requirements:

1. Thermal Performance:

a. Maximum whole fenestration product U-factor: 0.31, according to NFRC 100

b. Maximum whole fenestration product SHGC: 0.30, according to NFRC 200

2. Acoustical Performance: Minimum Sound Transmission Class (STC) of 26 when tested in accordance with ASTM E90 and determined by ASTM E413.

3. Wind Loads / Design Pressure: As indicated on Drawings.

C. Steel-Clad Doors and Frames:

1. Doors: Galvanized steel face over foam core

a. Style: Full lite with no grids

b. Thickness: 1-3/4 inches

c. Face: Galvanized steel sheet, minimum thickness of nominal 22-gauge.

d. Edge Bevel: Provide manufacturer's standard beveled or square edges.

e. Core: Manufacturer's standard.

f. Exposed Finish: Manufacturer’s standard factory-applied primer.

2. Glazing:

a. Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear), Quality-Q3, and complying with testing requirements in 16 CFR 1201, Category II

1) Safety Glazing Labeling: Permanently mark safety glazing with certification label indicating manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

b. Insulating-Glass Units (IGUs): ASTM E 2190

1) Filling: Air or argon as required to achieve thermal performance requirements

2) Insulated glass unit (IGU) with low-E glass

3. Frames:

a. Materials: Wood

b. Construction: Fabricated as a single-rabbit design machined to accept weather seal.

4. Miscellaneous:

a. Weather Seals: Include seals at all sides and sweep.

2.4 EXTERIOR STEEL-CLAD ENTRY DOORS: NON-GLAZED, NON-FIRE RATED

A. Basis of Design: HD Steel-Edge by Masonite

B. Performance Requirements:

1. Thermal Performance:

a. Maximum whole fenestration product U-factor: 0.27, according to NFRC 100

2. Acoustical Performance: Minimum Sound Transmission Class (STC) of 22 when tested in accordance with ASTM E90 and determined by ASTM E413.

3. Wind Loads / Design Pressure: As indicated on Drawings.

C. Steel-Clad Doors and Frames:

1. Doors: Galvanized steel face over foam core

a. Style: As indicated on drawings

b. Thickness: 1-3/4 inches

c. Face: Galvanized steel sheet, minimum thickness of nominal 22-gauge.

d. Edge Bevel: Provide manufacturer's standard beveled or square edges.

e. Core: Manufacturer's standard.

f. Exposed Finish: Manufacturer's standard factory-applied primer.

2. Frames:

a. Materials: Wood

b. Construction: Fabricated as a single-rabbit design machined to accept weather seal.

3. Miscellaneous:

a. Weather Seals: Include seals at all sides and sweep.

2.5 EXTERIOR STEEL-CLAD ENTRY DOORS: NON-GLAZED, FIRE RATED

A. Basis of Design: HD Steel-Edge by Masonite

B. Performance Requirements:

1. Thermal Performance:

a. Maximum whole fenestration product U-factor: 0.27, according to NFRC 100

2. Acoustical Performance: Minimum Sound Transmission Class (STC) of 22 when tested in accordance with ASTM E90 and determined by ASTM E413.

3. Wind Loads / Design Pressure: As indicated on Drawings.

4. Fire Rating: Ad indicated on Drawings.

C. Steel-Clad Doors and Frames:

1. Doors: Galvanized steel face over foam core

a. Style: As indicated on drawings

b. Thickness: 1-3/4 inches

c. Face: Galvanized steel sheet, minimum thickness of nominal 22-gauge.

d. Edge Bevel: Provide manufacturer's standard beveled or square edges.

e. Core: Manufacturer's standard core for fire-rated doors.

f. Exposed Finish: Manufacturer’s standard factory-applied primer.

g. Fire Rating: As indicated on Drawings.

2. Frames: Adjustable Split Frame

a. Material: Metallic coated steel sheet, minimum thickness of 0.042-inch (nominal 18-gauge) with minimum A60 galvannealed coating.

b. Construction: Adjustable split-metal frame designed to accept weather seal.

c. Fire Rating: Match door rating.

3. Miscellaneous:

a. Weather Seals: Include seals at all sides and sweep.

2.6 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

B. Installation - General:

1. Set doors and frames accurately in position; plumbed, aligned, and anchored securely in place.

2. Installation Tolerances: Adjust door frames to the following tolerances:

a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

3. Fire-Rated Doors: Install doors with clearances in accordance with NFPA 80.

4. Smoke-Control Doors: Install doors in accordance with NFPA 105.

END OF SECTION

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SECTION 08 14 23

ALUMINUM CLAD WOOD COMMERCIAL DOORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Aluminum-clad wood commercial out-swing French hinged doors.

1.2 RELATED SECTIONS

A. Section 07 92 00 - Joint Sealants

B. Section 08 70 00 - Hardware

1.3 REFERENCES

A. American Architectural Manufacturers Association (AAMA):

1. AAMA 502 - Voluntary Specification for Field Testing of Windows and Sliding Doors.

2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

3. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

B. American Society for Testing and Materials (ASTM):

1. ASTM C 1036 - Flat Glass.

2. ASTM C 1048 - Heat-Treated Flat Glass – Kind HS, Kind FT Coated and Uncoated Glass.

3. ASTM D 1149 - Rubber Deterioration – Surface Ozone Cracking in a Chamber.

4. ASTM D 2803 - Filiform Corrosion Resistance of Organic Coatings on Metal.

5. ASTM D 3656 - Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns.

6. ASTM D 4060 - Abrasion Resistance of Organic Coatings by the Taber Abraser.

7. ASTM E 283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Difference Across the Specimen.

8. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.

9. ASTM E 547 - Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Differential.

C. Window and Door Manufacturers Association (WDMA):

1. ANSI/AAMA/NWWDA 101/I.S.2 - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.

2. ANSI/AAMA/NWWDA 101/I.S.2/NAFS-02 - Voluntary Performance Specification for Windows, Skylights and Glass Doors.

3. WDMA I.S.4 - Industry Standard for Water-Repellent Preservative Non-Pressure Treatment for Millwork.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's product data, including installation instructions.

B. Shop Drawings: Submit manufacturer's shop drawings, indicating dimensions, construction, component connections and locations, anchorage methods and locations, hardware locations, and installation details.

C. Warranty: Submit manufacturer’s standard warranty.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site undamaged in manufacturers, unopened containers and packaging, with labels clearly identifying manufacturer and product name. Include installation instructions.

B. Storage: Store materials in an upright position, off ground, under cover, and protected from weather, direct sunlight, and construction activities.

C. Handling: Protect materials and finish during handling and installation to prevent damage.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Performance Requirements:

1. Thermal Performance:

a. Maximum whole fenestration product U-factor: 0.31, according to NFRC 100

b. Maximum whole fenestration product SHGC: 0.30, according to NFRC 200

2. Acoustical Performance: Minimum STC of 26 (ASTM E90)

3. Wind Loads / Design Pressure: As indicated on Drawings.

2.2 MANUFACTURERS

A. Acceptable Manufacturers:

1. Pella Corporation

2. Marvin Windows and Doors

3. Andersen Windows and Doors

4. Kolbe Windows and Doors

5. Alternates: Subject to compliance with the requirements of this Section, alternative manufacturers are acceptable for use, subject to Owner and Architect approval.

2.3 ALUMINUM-CLAD WOOD COMMERCIAL OUT-SWING FRENCH HINGED DOORS

A. Basis of Design: Architect Series by Pella

1. Factory-assembled aluminum-clad wood doors with outward-swing door panels.

B. Frame:

1. Select woods, water-repellent, preservative-treated in accordance with WDMA I.S.-4.

2. Interior Exposed Surfaces: Wood veneered and edge-banded with no visible fastener holes.

a. Wood Species: As selected by architect from manufacturer’s standard selections.

3. Exterior Surfaces: Clad with aluminum at head and jambs.

4. Metal Sill: Solid aluminum, ADA approved, low profile.

a. Finish: As selected Architect from manufacturer’s standard selections.

C. Door Panel:

1. Select woods, water-repellent, preservative-treated in accordance with WDMA I.S.-4.

2. Panels: Three-ply construction. Randomly finger-jointed blocks laminated with water-resistant glue.

3. Interior Exposed Surfaces: Veneered pine core veneered with pine glass stops.

a. Veneer Wood Species: As selected by Architect from manufacturer’s standard selections.

4. Exterior Surfaces: Aluminum clad.

5. Corners: Urethane-sealed and secured with metal fasteners.

D. Weather Strip:

1. Panel mounted, dual-durometer extruded polymer, one-piece design.

2.4 GLAZING

A. Glazing:

1. Fully-Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear), Quality-Q1, and complying with testing requirements in 16 CFR 1201, Category II

a. Safety Glazing Labeling: Permanently mark safety glazing with certification label indicating manufacturer’s name, type of glass, thickness, and safety glazing standard with which glass complies.

2. Type: ASTM E2190, Insulated Glass Unit (IGU), dual-seal, clear Low-E tempered glazing

a. Fill: Air or argon filled as required to meet performance rating requirements.

2.5 TOLERANCES

A. Doors shall accommodate the following opening tolerances:

1. Vertical Dimensions Between High and Low Points: Plus 1/8 inch, minus 0 inch.

2. Width Dimensions: Plus 1/8 inch, minus 0 inch.

3. Building Columns or Masonry Openings: Plus or minus 1/8 inch from plumb.

2.6 FINISH

A. Exterior Finish System: Baked-Enamel, AAMA 2603 expect with a minimum dry film thickness of 1.5 mils.

1. Color and Gloss: As selected by Architect.

B. Interior Finish: Unfinished, ready for site finishing

2.7 INSTALLATION ACCESSORIES

A. Interior Insulating-Foam Sealant: Low-expansion, low-pressure polyurethane insulating window and door foam sealant.

B. Exterior Perimeter Sealant: As specified in 07 92 00 “Joint Sealants”

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use.

B. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and approved shop drawings.

B. Install doors to be weather-tight and freely operating.

C. Maintain alignment with adjacent work.

D. Secure assembly to framed openings, plumb and square, without distortion.

E. Integrate door system installation with exterior weather-resistant barrier using flashing/sealant tape. Apply and integrate flashing/sealant tape with weather-resistant barrier using watershed principles in accordance with door manufacturer's instructions.

F. Place interior seal around door perimeter to maintain continuity of building thermal and air barrier using insulating-foam sealant.

G. Seal door to exterior wall cladding with sealant and related backing materials at perimeter of assembly.

3.3 CLEANING

A. Clean door frames and glass in accordance with manufacturer’s requirements.

B. Remove labels and visible markings.

3.4 PROTECTION

A. Protect installed doors to ensure doors will be without damage at time of substantial completion.

END OF SECTION

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SECTION 08 16 00

MOLDED COMPOSITE INTERIOR DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-core molded composite interior doors and frames.

2. Hollow-core molded composite interior doors and frames.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product, including the following:

1. Door core materials and construction.

2. Door edge construction

3. Door face type and characteristics.

4. Door frame construction.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:

1. Door schedule indicating door and frame location, type, size, and swing.

2. Door elevations, dimension and locations of hardware.

3. Details of frame for each frame type, including dimensions and profile.

4. Dimensions and locations of mortises and holes for hardware.

5. Clearances and undercuts.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Wood Door and Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.

B. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

2.2 MANUFACTURERS

A. Source Limitations: Obtain molded composite interior doors from single manufacturer.

B. Basis of Design: Carrara Series by Jeld-Wen

C. Manufacturers:

1. Haley Doors
2. Jeld-Wen
3. Masonite Corp.
4. MMI Door
5. Pro Source Builder Supply
6. Steves Doors
7. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.3 MOLDED COMPOSITE DOORS

A. Hollow-Core Interior Doors:

1. Construction: Molded composite with hollow-core.
2. Thickness: 1-3/8 inches
3. Panel Design: Indicated on Drawings.
4. Door Shape: Indicated on Drawings.
5. Finish: Smooth
6. Frame: Finger-joint (FJ) wood, double rabbet, width as required.
    a. Use of two-piece, adjustable wood frame subject to Architect and Owner approval

B. Solid-Core Interior Doors:

1. Construction: Molded composite with solid core.
    a. Core Material: Manufacturer’s standard core material.
2. Thickness: 1-3/8 inches
3. Panel Design: Indicated on Drawings.
4. Door Shape: Indicated on Drawings.
5. Finish: Smooth

6. Frame: Finger-joint (FJ) wood, double rabbet, width as required.

    a. Use of two-piece, adjustable wood frame subject to Architect and Owner approval

C. Solid-Core, Fire-Rated Interior Doors:

1. Fire-Resistance Rating: 20-minute, 45-minute, 60-minute

2. Construction: Molded composite with solid core.

    a. Core Material: Manufacturer’s standard core material for indicated fire rating.

3. Thickness: 1-3/8 inches and] 1-3/4 inches

4. Panel Design: Indicated on Drawings.

5. Door Shape: Indicated on Drawings.

6. Finish: Smooth

7. Frame: Finger-joint (FJ) wood or fire-retardant medium-density fiberboard, listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire ratings indicated in Drawings, single rabbet, width as required.

2.4 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated.

1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

2. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied.

1. Comply with final hardware schedules, door frame Shop Drawings, and hardware templates.

2.5 FACTORY PRIMING

A. Doors for Opaque Finish: Factory prime faces, all four edges, edges of cutouts, and mortises with one coat of wood primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.

2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install doors and frames to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

B. Install frames level, plumb, true, and straight.

1. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.

2. Anchor frames to anchors or blocking built in or directly attached to substrates.

a. Secure with countersunk, concealed fasteners and blind nailing.

b. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.

3. Install fire-rated doors and frames in accordance with NFPA 80.

4. Install smoke- and draft-control doors in accordance with NFPA 105.

C. Job-Fitted Doors:

1. Align and fit doors in frames with uniform clearances and bevels as indicated below.

a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.

2. Machine doors for hardware.

3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.

4. Clearances:

a. Provide 1/8 inch at heads, jambs, and between pairs of doors.

b. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.

c. Where threshold is shown or scheduled, provide1/4 inch from bottom of door to top of threshold unless otherwise indicated.

d. Comply with NFPA 80 for fire-rated doors.

5. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.

6. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.

D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

SECTION 08 16 00

MOLDED COMPOSITE INTERIOR DOORS

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SECTION 08 16 13

FIBERGLASS ENTRY DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Exterior fiberglass doors and frames.

1.2 COORDINATION

A. Coordinate requirements for installation of door hardware and access control systems.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door type.

2. Details of doors, including vertical- and horizontal-edge details and thicknesses.

3. Frame details for each frame type, including dimensioned profiles.

4. Details of each different wall opening condition.

C. Product Schedule: For fiberglass doors and frames, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.

B. Store doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Bayer Built, Inc.

2. Cambridge Doors & Windows

3. Jeld-Wen

4. Masonite International Corp.

5. PlastPro, Inc.

6. ProVia

7. Therma-Tru Corp.

8. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

B. Structural Performance, Exterior Doors: Capable of withstanding the following design wind loads:

1. Design Wind Load: As indicated on Drawings.

2. Testing: According to ASTM E330

2.3 EXTERIOR FIBERGLASS DOORS: GLAZED PATIO / BALCONY DOORS

A. Basis of Design: Smooth-Pro Fiberglass by Jeld-Wen

B. Performance Requirements:

1. Thermal Performance:

a. Maximum whole fenestration product U-factor: 0.31, according to NFRC 100

b. Maximum whole fenestration product SHGC: 0.28, according to NFRC 200

2. Acoustical Performance:

a. Sound Transmission Class (STC): Minimum 28 when tested in accordance with ASTM E90 and determined by ASTM E413.

b. Outside-Inside Transmission Class (OITC): Minimum 25 when tested in accordance with ASTM E90 and determined by ASTM E1332.

3. Wind Loads / Design Pressure: As indicated on Drawings.

C. Fiberglass Doors and Frames:

1. Doors: Smooth fiberglass face over polyurethane foam core

a. Style: Full lite with no grids

b. Thickness: 1-3/4 inches

c. Face: Smooth fiberglass

d. Core: Manufacturer's standard polyurethane foam

e. Top and Bottom Rail: Composite

f. Side Rails: Laminated veneer lumber (LVL) engineered wood with PVC cap

2. Glazing:

a. Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear), Quality-Q3, and complying with testing requirements in 16 CFR 1201, Category II

1) Safety Glazing Labeling: Permanently mark safety glazing with certification label indicating manufacturer’s name, type of glass, thickness, and safety glazing standard with which glass complies.

b. Insulating-Glass Units (IGUs): ASTM E 2190

1) Filling: Air or argon as required to achieve thermal performance requirements

2) Insulated glass unit (IGU) with low-E glass

3. Frames:

a. Materials: Wood

b. Construction: Fabricated as a single-rabbit design machined to accept weather seal.

4. Miscellaneous:

a. Weather Seals: Include seals at all sides and sweep.

2.4 EXTERIOR FIBERGLASS DOORS: NON-GLAZED, NON-FIRE RATED

A. Basis of Design: Smooth-Pro Fiberglass by Jeld-Wen

B. Performance Requirements:

1. Thermal Performance:

a. Maximum whole fenestration product U-factor: 0.15, according to NFRC 100

2. Acoustical Performance:

a. Sound Transmission Class (STC): Minimum 23 when tested in accordance with ASTM E90 and determined by ASTM E413.

b. Outside-Inside Transmission Class (OITC): Minimum 24 when tested in accordance with ASTM E90 and determined by ASTM E1332.

3. Wind Loads / Design Pressure: As indicated on Drawings.

C. Fiberglass Doors and Frames:

1. Doors: Smooth fiberglass face over polyurethane foam core
    a. Style: As indicated on drawings
    b. Thickness: 1-3/4 inches
    c. Face: Smooth fiberglass
    d. Core: Manufacturer's standard polyurethane foam
    e. Top and Bottom Rail: Composite
    f. Side Rails: Laminated veneer lumber (LVL) engineered wood with PVC cap
2. Frames:
    a. Materials: Wood
    b. Construction: Fabricated as a single-rabbit design machined to accept weather seal.
3. Miscellaneous:
    a. Weather Seals: Include seals at all sides and sweep.

2.5 EXTERIOR FIBERGLASS DOORS: NON-GLAZED, 20-MINUTE FIRE RATED

A. Basis of Design: Smooth-Pro Fiberglass by Jeld-Wen

B. Performance Requirements:

1. Thermal Performance:
    a. Maximum whole fenestration product U-factor: 0.15, according to NFRC 100
2. Acoustical Performance:
    a. Sound Transmission Class (STC): Minimum 29 when tested in accordance with ASTM E90 and determined by ASTM E413.
    b. Outside-Inside Transmission Class (OITC): Minimum 28 when tested in accordance with ASTM E90 and determined by ASTM E1332.
3. Wind Loads / Design Pressure: As indicated on Drawings.
4. Fire Rating: 20 minutes

C. Fiberglass Doors and Frames:

1. Doors: Smooth fiberglass face over polyurethane foam core
    a. Style: As indicated on drawings
    b. Thickness: 1-3/4 inches
    c. Face: Smooth fiberglass
    d. Core: Manufacturer's standard particle board

e. Top and Bottom Rail: Finger-joint (FJ) pine

f. Side Rails: Laminated veneer lumber (LVL) engineered wood with PVC cap

g. Fire Rating: 20 minutes

2. Frames:

a. Materials: Wood

b. Construction: Fabricated as a single-rabbit design machined to accept weather seal.

3. Miscellaneous:

a. Weather Seals: Include seals at all sides and sweep.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

B. Installation - General:

1. Set doors and frames accurately in position; plumbed, aligned, and anchored securely in place.

2. Installation Tolerances: Adjust door frames to the following tolerances:

a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

3. Fire-Rated Doors: Install doors with clearances in accordance with NFPA 80.

4. Smoke-Control Doors: Install doors in accordance with NFPA 105.

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SECTION 08 31 00

ACCESS DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Access doors and frames.

2. Fire-rated access doors and frames.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.

2. Include schedule identifying location for each access door.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver access doors and frames in their original, unopened packaging. Store in an enclosed location and provide protection from damage.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, according to NFPA 252 or UL 10B.

2.2 MANUFACTURERS:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. ACUDOR Products, Inc.

2. Babcock-Davis

3. Cendrex, Inc.

4. JL Industries; an Activar Construction Products Group, Inc. company

5. Karp Associates, Inc.

6. Lane-Aire Manufacturing Corp.

7. Larsens Manufacturing Company

8. MIFAB, Inc.

9. Nystrom

10. Williams Brothers Corp.

11. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.3 ACCESS DOORS AND FRAMES

A. Flush Access Doors with Exposed Flanges:

1. Basis of Design: NT by Nystrom
2. Description: Face of door flush with frame, with exposed flange and concealed hinge.
3. Optional Features: Piano hinges
4. Locations: Wall and ceiling
5. Door Size: As indicated on Drawings
6. Uncoated Steel Sheet for Door: Nominal 0.036-inch, 20-gauge, factory finished.
7. Frame Material: Same material and finish as door. Nominal 0.060-inch, 16-gauge.
8. Latch and Lock: Cam latch, hex-head wrench operated.

2.4 DRAFT STOP ACCESS DOORS AND FRAMES

A. Flush Access Doors with Exposed Flanges:

1. Basis of Design: DTK-Series, Non-Insulated, Self-Closing Draft Stop Access Door by Nystrom
2. Description: Door face flush with frame; with exposed flange, self-closing door, and concealed hinge.
3. Optional Features: Piano hinges, Gasketing
4. Locations: Wall
5. Door Size: As indicated on Drawings
6. Uncoated Steel Sheet for Door: Nominal 0.075-inch, 14-gauge, factory finished.
7. Frame Material: Same material and finish as door. Nominal 0.060-inch, 16-gauge.
8. Latch and Lock: Self-latching door hardware, operated by knurled-knob with interior release.

2.5 FIRE-RATED ACCESS DOORS AND FRAMES

A. Fire-Rated, Flush Access Doors with Exposed Flanges:

1. Basis of Design: I-Series, Insulated, Fire Rated Access Door by Nystrom
2. Description: Door face flush with frame, with a core of mineral-fiber insulation enclosed in sheet metal; with exposed flange, self-closing door, and concealed hinge.
3. Optional Features: Piano hinges, Gasketing
4. Locations: Wall and ceiling
5. Door Size: As indicated on Drawings

6. Fire-Resistance Rating: Not less than that of adjacent construction.

7. Uncoated Steel Sheet for Door: Nominal 0.036-inch, 20-gauge, factory finished.

8. Frame Material: Same material and finish as door. Nominal 0.060-inch, 16-gauge.

9. Latch and Lock: Self-latching door hardware, operated by key with interior release.

2.6 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A36.

B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879, with cold-rolled steel sheet substrate complying with ASTM A1008, Commercial Steel (CS), exposed.

C. Metallic-Coated Steel Sheet: ASTM A653, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

D. Stainless Steel Plate, Sheet, and Strip: ASTM A240 or ASTM A666, Type 304. Remove tool and die marks and stretch lines, or blend into finish.

E. Stainless Steel Flat Bars: ASTM A666, Type 304. Remove tool and die marks and stretch lines, or blend into finish.

F. Aluminum Extrusions: ASTM B221, Alloy 6063.

G. Aluminum Sheet: ASTM B209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

H. Frame Anchors: Same material as door face.

I. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153 or ASTM F2329.

2.7 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.

1. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.

D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling. Provide access sleeves for each latch operator and install in holes cut through finish.

E. Latch and Lock Hardware:

1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.

2. Keys: Furnish two keys per lock and key all locks alike.

F. Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

2.8 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

2. Factory Finished: Apply manufacturer's standard baked-enamel or powder-coat finish immediately after cleaning and pretreating, with minimum dry-film thickness of 1 mil for topcoat.

a. Color: As selected by Architect from full range of industry colors.

E. Stainless Steel Finishes:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

2. Polished Finish: ASTM A480 No. 4 finish. Grind and polish surfaces to produce uniform finish, free of cross scratches.

a. Run grain of directional finishes with long dimension of each piece.

b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

3. Bright, Cold-Rolled, Unpolished Finish: ASTM A480 No. 2B.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

SECTION 08 31 00

ACCESS DOORS

END OF SECTION

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SECTION 08 33 23

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Service doors.

2. Insulated service doors.

3. Fire-rated service doors.

4. Fire-rated, insulated service doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory.

1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.

2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

3. Include description of automatic-closing device and testing and resetting instructions.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include plans, elevations, sections, and mounting details.

2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.

3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.

4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.

5. Show locations of controls, locking devices, detectors or replaceable fusible links, and other accessories.

1.3 CLOSEOUT SUBMITTALS

A. Special warranty.

B. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

C. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.

1. Obtain operators and controls from overhead coiling-door manufacturer.

B. Manufacturers:

1. C.H.I. Overhead Doors, Inc.
2. Cookson; a CornellCookson Company
3. McKeon Rolling Steel Door Company
4. Overhead Door Corp.
5. Raynor
6. Southwest Rolling Steel Door Co.
7. Wayne-Dalton Corp.
8. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Complying with NFPA 80; listed and labeled by qualified testing agency, for fire-protection ratings indicated, based on testing at as close to neutral pressure as possible according to NFPA 252 or UL 10B.

B. Sound-Control Doors: Assemblies tested in a laboratory for sound-transmission-loss performance according to ASTM E90, calculated according to ASTM E413, and rated for not less than the STC value indicated.

C. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

D. Structural Performance, Exterior Doors: Capable of withstanding the following design wind loads:

1. Design Wind Load: As indicated on Drawings.
2. Testing: According to ASTM E330
3. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.

2.3 NON-FIRE RATED, MOTOR OPERATED DOOR ASSEMBLY

A. Basis of Design: Model 670 by Overhead Door Co.

B. Service Door: Overhead coiling door formed with curtain of interlocking metal slats.

C. Operation Cycles: Door components and operators capable of operating for not less than 20,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

D. Door Curtain Material: Aluminum.

E. Door Curtain Slats: Flat profile slats of 1-7/8-inch to 3-1/4-inch center-to-center height.

F. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8-inch-thick fabricated from aluminum extrusions and finished to match door.

G. Curtain Jamb Guides: Galvanized steel or stainless steel with exposed finish matching curtain slats.

H. Hood: Match curtain material and finish.

1. Shape: Round

2. Mounting: Between jambs

I. Electric Door Operator:

1. Usage Classification: Light duty, up to 10 cycles per hour.

2. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 ft. or lower.

3. Motor Exposure: Exterior, wet

4. Motor Electrical Characteristics:

a. Horsepower: 3 hp.

b. Voltage: 480 V ac, three phase, 60 Hz.

5. Emergency Manual Operation: Crank type.

6. Obstruction-Detection Device: Automatic photoelectric sensor and sensor edge on bottom bar; self-monitoring type.

a. Sensor Edge Bulb Color: Black

7. Control Station(s): Interior mounted.

J. Door Finish:

1. Aluminum Finish: Clear anodized

2. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range

3. Factory Prime Finish: Manufacturer's standard color.

4. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.4 MATERIALS, GENERAL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.5 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural-steel sheet; complying with ASTM A653, with G90 (Z275) zinc coating; nominal sheet thickness (coated) of 0.028 inch; and as required.

2. Aluminum Door Curtain Slats: ASTM B209 sheet or ASTM B221 extrusions, alloy and temper standard with manufacturer for type of use and finish indicated; thickness of 0.050 inch; and as required.

3. Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E84 or UL 723. Enclose insulation completely within slat faces.

4. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with minimum steel thickness of 0.010 inch and minimum aluminum thickness of 0.032 inch.

B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain**.**

1. When required based on wind loading, provide a continuous bar for holding windlocks.

2.6 HOODS

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

1. Galvanized Steel: Nominal 0.028-inch-thick, hot-dip galvanized-steel sheet with G90 (Z275) zinc coating, complying with ASTM A653.

2. Aluminum: 0.040-inch-thick aluminum sheet complying with ASTM B209, of alloy and temper recommended by manufacturer and finisher for type of use and finish indicated.

3. Include automatic drop baffle on fire-rated doors to guard against passage of smoke or flame.

4. Exterior-Mounted Doors: Fabricate hood to act as weather protection and with a perimeter sealant-joint-bead profile for applying joint sealant.

2.7 CURTAIN ACCESSORIES

A. Smoke Seals: Equip each fire-rated door with replaceable smoke-seal perimeter gaskets or brushes for smoke and draft control as required for door listing and labeling by a qualified testing agency.

B. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.

1. At door head, use 1/8-inch- thick, replaceable, continuous-sheet baffle secured to inside of hood or field-installed on the header.

2. At door jambs, use replaceable, adjustable, continuous, flexible, 1/8-inch- thick seals of flexible vinyl, rubber, or neoprene.

C. Astragal for Interior Doors: Equip each door bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.

D. Automatic-Closing Device: Equip each fire-rated door with an automatic-closing device or holder-release mechanism and governor unit complying with NFPA 80 and an easily tested and reset release mechanism. Testing for manually operated doors shall allow resetting by opening the door without retensioning the counterbalance mechanism. Release mechanism for motor-operated doors shall allow testing without mechanical release of the door. Automatic-closing device shall be designed for activation by the following:

1. Replaceable fusible links with temperature rise and melting point of 165 deg F interconnected and mounted on both sides of door opening.

2. Building fire-detection, smoke-detection, and -alarm systems.

2.8 COUNTERBALANCE MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless or welded carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.

1. Fire-Rated Doors: Equip with auxiliary counterbalance spring and prevent tension release from main counterbalance spring when automatic-closing device operates.

D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.9 ELECTRIC DOOR OPERATORS

A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

1. Comply with NFPA 70.

2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.

B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.

C. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated for each door assembly.

1. Electrical Characteristics: Minimum as indicated for each door assembly. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.

2. Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.

3. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.

D. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

E. Obstruction-Detection Devices: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. For non-fire-rated doors, activation of device immediately stops and reverses downward door travel. For fire-rated doors, activation delays closing.

1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.

a. Self-Monitoring Type: Designed to interface with door operator control circuit to detect damage to or disconnection of sensing device. When self-monitoring feature is activated, door closes only with sustained or constant pressure on close button.

2. Electric Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.

a. Self-Monitoring Type: Four-wire-configured device designed to interface with door operator control circuit to detect damage to or disconnection of sensor edge.

3. Pneumatic Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device.

F. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."

1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.

2. Exterior-Mounted Units: Full-guarded, standard-duty, surface-mounted, weatherproof type, NEMA ICS 6, Type 4 enclosure, key operated.

G. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.

H. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while

disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

I. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

J. Audible and Visual Signals: Audible alarm and visual indicator lights in compliance with the accessibility standard.

2.10 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.11 ALUMINUM FINISHES

A. Mill Finish: Manufacturer's standard.

B. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

C. Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.

D. Baked-Enamel or Powder-Coat Finish: AAMA 2603. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

2.12 STEEL AND GALVANIZED-STEEL FINISHES

A. Factory Prime Finish: Manufacturer's standard primer, compatible with field-applied finish. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

B. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Examine locations of electrical connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.

C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with the accessibility standard.

D. Fire-Rated Doors: Install according to NFPA 80.

E. Smoke-Control Doors: Install according to NFPA 80 and NFPA 105.

F. Power-Operated Doors: Install according to UL 325.

3.3 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

1. Adjust exterior doors and components to be weather resistant.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

C. Adjust seals to provide tight fit around entire perimeter.

END OF SECTION

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SECTION 08 41 13

ALUMINUM FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aluminum-framed storefront systems

2. Aluminum-framed entrance door systems

1.2 DEFINITIONS

A. Water Penetration: Any visible water beyond the inner-most plane of glazing, beyond integral sill starter / pan and / or the exterior perimeter joint sealant / flashing conditions.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, mock-ups, sequencing, and scheduling of the work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include project-specific plans, elevations, sections, full-size details, and attachments to other work, and addressing all surrounding weather resistive barrier and exterior finish conditions.

C. Samples: For each exposed finish required.

D. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.

1.5 INFORMATIONAL SUBMITTALS

A. Energy Performance Certificates: NFRC-certified energy performance values from manufacturer.

B. Product test reports.

C. Field quality-control reports.

D. Sample warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions,

arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures, including, but not limited to, excessive deflection.

b. Noise or vibration created by wind and thermal and structural movements.

c. Deterioration of metals, and other materials beyond normal weathering.

d. Water penetration through fixed glazing and framing areas.

e. Failure of operating components.

2. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.

2. Failure also includes the following:

a. Thermal stresses transferring to building structure.

b. Glass breakage.

c. Noise or vibration created by wind and thermal and structural movements.

d. Loosening or weakening of fasteners, attachments, and other components.

e. Failure of operating units.

f. Water penetration

B. Structural Loads:

1. Wind Loads: As indicated on Drawings.

2. Other Design Loads: As indicated on Drawings.

C. Deflection of Framing Members: At design wind pressure, as follows:

1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding 1/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.

2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller.

a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.

3. Cantilever Deflection: Where framing members overhang an anchor point, as follows:

a. Perpendicular to Plane of Wall: No greater than 1/240 of clear span plus 1/4 inch for spans greater than 11 feet 8-1/4 inches or 1/175 times span, for spans less than 11 feet 8-1/4 inches.

D. Structural: Test according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.

2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.

3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

E. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:

1. Fixed Framing and Glass Area:

a. Maximum air leakage of 0.06 cfm/sq. ft. (0.30 L/s per sq. m) at a static-air-pressure differential of 6.24 lbf/sq. ft. (300 Pa).

2. Entrance Doors:

a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. (5.08 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).

b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. (2.54 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).

F. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft. (480 Pa)

G. Condensation Resistance Factor (CRF):

a. Fixed Glazing and Framing Areas: CRF for the system of not less than 70 as determined according to AAMA 1503.

b. Entrance Doors: CRF of not less than 70 as determined according to AAMA 1503.

H. Energy Performance: Certify and label energy performance according to NFRC as follows:

1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.30 as determined according to NFRC 100.

2. Solar Heat Gain Coefficient (SHGC): Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.33 as determined according to NFRC 200.

I. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 MANUFACTURERS

A. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

B. Basis of Design: YES 45 TU by YKK AP America, Inc.

C. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Arcadia, Inc.

2. CMI Architectural

3. Coral Industries, Inc.

4. EFCO Corp.

5. Kawneer North America, an Arconic company

6. Oldcastle Building Envelope

7. Pittco Architectuarl Metals, Inc.

8. Tubelite Inc.

9. U.S. Aluminum; a brand of C.R. Lawrence

10. YKK AP America, Inc.

11. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.3 STOREFRONT FRAMING

A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Thermally broken

2. Glazing System: Retained mechanically with gaskets on four sides.

3. Glazing Plane: Front

4. Finish: Color anodic finish

5. Fabrication Method: Field-fabricated stick system.

a. Provide flat fillers at head and jamb framing.

B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Materials:

1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

a. Sheet and Plate: ASTM B 209

b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221

c. Extruded Structural Pipe and Tubes: ASTM B 429

d. Structural Profiles: ASTM B 308

2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

a. Structural Shapes, Plates, and Bars: ASTM A 36

b. Cold-Rolled Sheet and Strip: ASTM A 1008

c. Hot-Rolled Sheet and Strip: ASTM A 1011

2.4 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.

1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch-thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.

2. Door Design: Medium stile; 3-1/2-inch nominal width

a. Provide wide stile; 5-inch nominal width if required based on scheduled door hardware.

3. Glazing Stops and Gaskets: Beveled or square, snap-on, extruded-aluminum stops and preformed gaskets.

2.5 ENTRANCE DOOR HARDWARE

A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 08 70 00 "Door Hardware."

B. General: Provide entrance door hardware for each entrance door to comply with requirements in this Section.

1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products complying with BHMA standard referenced.

2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.

3. Opening-Force Requirements:

a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lbf (133 N) to set the door in motion and not more than 15 lbf (67 N) to open the door to its minimum required width.

b. Accessible Interior Doors: Not more than 5 lbf (22.2 N) to fully open door.

C. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:

1. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.

D. Pivot Hinges: BHMA A156.4, Grade 1.

1. Offset-Pivot Hinges: Provide top, bottom, and intermediate offset pivots at each door leaf.

E. Butt Hinges: BHMA A156.1, Grade 1, radius corner.

1. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while entrance door is closed.

2. Exterior Hinges: Stainless steel, with stainless-steel pin

3. Quantities:

a. For doors up to 87 inches high, provide three hinges per leaf.

b. For doors more than 87 and up to 120 inches high, provide four hinges per leaf.

F. Continuous-Gear Hinges: Manufacturer's standard with stainless-steel bearings between knuckles, fabricated to full height of door and frame.

G. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.

H. Automatic and Self-Latching Flush Bolts: BHMA A156.3, Grade 1.

I. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

J. Cylinders: BHMA A156.5, Grade 1.

1. Keying: Master key system. Permanently inscribe each key with a visual key control number and include notation "DO NOT DUPLICATE".

K. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.

L. Operating Trim: BHMA A156.6.

M. Removable Mullions: BHMA A156.3, extruded aluminum.

1. When used with panic exit devices, provide removable mullions listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305. Use only mullions that have been tested with exit devices to be used.

N. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to comply with field conditions and requirements for opening force.

O. Concealed Overhead Holders: BHMA A156.8, Grade 1.

P. Surface-Mounted Holders: BHMA A156.16, Grade 1.

Q. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.

R. Weather Stripping: Manufacturer's standard replaceable components.

S. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.

T. Silencers: BHMA A156.16, Grade 1.

U. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

2.6 GLAZING

A. Glazing: Comply with Section 08 80 00 "Glass and Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

C. Glazing Sealants: As recommended by manufacturer.

D. Structural Glazing Sealants: ASTM C1184, chemically curing silicone formulation that is compatible with system components with which it comes into contact, specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in curtain-wall assembly indicated.

1. Color: Black

2.7 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.

2. Accurately fitted joints with ends coped or mitered.

3. Physical and thermal isolation of glazing from framing members.

4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.

5. Provisions for field replacement of glazing from interior for vision glass and exterior for spandrel glazing panels.

6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

B. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

1. Color: Black

C. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

D. High-Performance Organic Finish, Two-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat.

1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

2. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.

2. Do not install damaged components.

3. Fit joints to produce hairline joints free of burrs and distortion.

4. Rigidly secure non-movement joints.

5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.

6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.

2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Unless otherwise recommended by manufacturer’s written recommendations, set continuous sill members and flashing in full sealant bed as specified in Section 07 92 00 "Joint Sealants" to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

F. Install glazing as specified in Section 08 80 00 "Glass and Glazing."

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.

2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.2 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Referenced Testing Standards:

1. Water-Spray Test, AAMA 501.2 – Quality Assurance and Water Field Check of Installed Storefronts, Curtain Walls and Sloped Glazing Systems

2. Water-Penetration Test, AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls, and Sloped Glazing Systems

C. Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed entrances and storefronts.

1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by testing agency shall be field tested according to AAMA 501.2, and shall not evidence water penetration.

a. Perform tests at mock-up (as applicable), 5-percent of assemblies installed.

b. Perform tests at a minimum of two (2**)** areas as selected by testing agency.

c. Failed assemblies shall be retested after corrective measures have been made. For each failed assembly, one (1) additional assembly or area shall be tested.

2. Water Penetration Test: Newly installed storefront shall be field tested in accordance with AAMA 503, and ASTM E 1105, Procedure A, at a minimum static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft. (300 Pa), and shall not evidence water penetration.

a. Perform tests at mock-up (as applicable), 5-percent of assemblies installed.

b. Perform tests at a minimum of two (2) areas as selected by testing agency.

1) Areas selected shall not include doors with accessible thresholds.

c. Failed assemblies shall be retested after corrective measures have been made. For each failed assembly, one (1) additional assembly or area shall be tested.

D. Storefronts will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

END OF SECTION

SECTION 08 41 23

FIRE RATED STEEL FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel-framed, fire-rated entrance and storefront system for interior locations.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, mock-ups, sequencing, and scheduling of the work.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include project-specific plans, elevations, sections, full-size details, and attachments to other work.

C. Samples: For each exposed finish required.

D. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.

1.4 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Field quality-control reports.

C. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of fire-rated entrance and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Comply with performance requirements specified, as determined by testing of steel-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Steel-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.

2. Failure also includes the following:

a. Thermal stresses transferring to building structure.

b. Glass breakage.

c. Noise or vibration created by wind and thermal and structural movements.

d. Loosening or weakening of fasteners, attachments, and other components.

e. Failure of operating units.

B. Fire-Resistance Ratings:

1. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are classified and labeled by UL, for fire ratings indicated, based on testing according to NFPA 257, ASTM E119. Assemblies must be factory-welded or come complete with factory-installed mechanical joints and must not require job site fabrication.

2. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by UL, for fire ratings indicated, based on testing according to NFPA 257, ASTM E119. Assemblies must be factory-welded or come complete with factory-installed mechanical joints and must not require job site fabrication.

3. Fire Rated Wall Assemblies: Assemblies complying with ASTM E119 that are classified and labeled by UL, for fire ratings indicated, based on testing in accordance with UL 263, ASTM E119.

4. Listings and Labels: Under current follow-up service by Underwriter's Laboratories (UL) maintaining a current listing and certification. Label assemblies in accordance with limits of manufacturer's listing.

2.2 FIRE RATED STOREFRONT FRAMING

A. Source Limitations: Obtain all components of steel-framed, fire rated entrance and storefront system, including framing and accessories, from single manufacturer. Use of alternate framing system products from listed basis of design subject to compliance with tested assembly requirements.

B. Basis of Design: Fireframes Heat Barrier Series by Technical Glass Products

C. Manufacturers: Subject to compliance with requirements, applicable fire-rated test reports, and fire-rated assemblies, provide products by one of the following manufacturers:

1. SAFTI FIRST Fire Rated Glazing Solutions

2. Technical Glass Products

3. Thermally Broken Steel, USA

4. Vetrotech Saint-Gobain

5. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

D. Framing Members: Manufacturer's fire-rated steel framing members of thickness required and reinforced as required to support imposed loads.

1. Fire Rating: 60 and 120 minutes.

2. Construction: Steel profiled formed tubing permanently joined with steel bolts.

3. Glazing System: Retained mechanically with extruded steel glazing beads on four sides.

4. Glazing Plane: Center

5. Finish: Baked-enamel or powder-coat finish

2.3 GLAZING

A. Source Limitations: Obtain glazing and accessories from single manufacturer. Use of alternate glazing products from listed basis of design subject to compliance with tested assembly requirements.

B. Basis of Design: Pilkington Pyrostop by Pilkington Group

C. Manufacturers: Subject to compliance with requirements, applicable fire-rated test reports, and fire-rated assemblies, provide products by one of the following manufacturers:

1. Pilkington North America

2. SAFTI FIRST Fire Rated Glazing Solutions

3. Schott North America, Inc.

4. Technical Glass Products

5. Vetrotech Saint-Gobain

6. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

D. Fire Rating: **60** and **120** minutes.

E. Nominal Thickness, Interior Glazing: 7/8 inch (23mm) and 1-1/16 inch (27mm)]

F. Glazing: Composed of multiple sheets of Pilkington Optiwhite™ low iron, high-visible-light transmission glass laminated with clear intumescent interlayers.

G. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II)

H. Glazing Accessories: Manufacturer’s standard compression gaskets, spacers, setting blocks and other accessories necessary for a complete installation.

2.4 STEEL FINISHES

A. Baked-Enamel or Powder-Coat Finish: AAMA 2604, with minimum dry film thickness as recommended by manufacturer for intended application.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

B. High-Performance Organic Finish, Two-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat.

1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

2. Color and Gloss: As selected by Architect from manufacturer's full range.

2.5 ACCESSORIES

A. Intumescent Sealant: Single component, latex based, paintable intumescent sealant tested in accordance with ASTM E814/UL 1479 and ASTM E1966/UL 2079.

1. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. 3M Fire Protection Products

b. DAP Products, Inc.

c. Hilti Firestop

d. Spec Seal SSS by Specified Technologies, Inc. (STI)

e. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Mineral Wool Insulation: Type as required by manufacturer’s tested assembly.

1. Mineral-Wool Blanket Insulation: Unfaced, ASTM C665, Type I

2. Mineral-Wool Board Insulation: Unfaced, ASTM C612

3. Characteristics:

a. Non-combustible in accordance with ASTM E136

b. Flame Spread Index: 0 (ASTM E84)

c. Smoke Developed Index: Not more than 15 (ASTM E84)

d. Density: As required by manufacturer’s tested assembly.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.

2. Do not install damaged components.

3. Fit joints to produce hairline joints free of burrs and distortion.

4. Rigidly secure non-movement joints.

5. Seal perimeter and other joints watertight unless otherwise indicated.

B. Install components plumb and true in alignment with established lines and grades.

C. Provide fire safing and fire sealant at edges of system.

D. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

E. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.

2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

END OF SECTION

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SECTION 08 44 13

GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes glazed aluminum curtain walls.

1. Conventionally glazed.

1.2 DEFINITIONS

A. Water Penetration: Any visible water beyond the inner-most plane of glazing, beyond integral sill starter / pan and / or the exterior perimeter joint sealant / flashing conditions.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, mock-ups, sequencing, and scheduling of the work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include project-specific plans, elevations, sections, full-size details, and attachments to other work, and addressing all surrounding weather resistive barrier and exterior finish conditions.

C. Samples: For each exposed finish required.

1.5 INFORMATIONAL SUBMITTALS

A. Energy Performance Certificates: NFRC-certified energy performance values from manufacturer.

B. Product test reports.

C. Field quality-control reports.

D. Sample warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.8 WARRANTY

A. Special Assembly Warranty: Manufacturer agrees to repair or replace components of glazed aluminum curtain wall that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including, but not limited to, excessive deflection.

b. Noise or vibration created by wind and thermal and structural movements.

c. Deterioration of metals, and other materials beyond normal weathering.

d. Water penetration through fixed glazing and framing areas.

e. Failure of operating components.

2. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of baked enamel, powder coat, or organic finishes within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Comply with performance requirements specified, as determined by testing of glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Glazed aluminum curtain walls shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.

2. Failure also includes the following:

a. Thermal stresses transferring to building structure.

b. Glass breakage.

c. Noise or vibration created by wind and thermal and structural movements.

d. Loosening or weakening of fasteners, attachments, and other components.

e. Failure of operating units.

f. Water penetration.

B. Structural Loads:

1. Wind Loads: As indicated on Drawings.

2. Other Design Loads: As indicated on Drawings.

C. Deflection of Framing Members: At design wind pressure, as follows:

1. Deflection Normal to Wall Plane: Limited to [edge of glass in a direction perpendicular to glass plane not exceeding 1/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.

2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller.

a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.

3. Cantilever Deflection: Where framing members overhang an anchor point, as follows:

a. Perpendicular to Plane of Wall: No greater than 1/240 of clear span plus 1/4-inch for spans greater than 11 feet 8-1/4 inches or 1/175 times span, for spans less than 11 feet 8-1/4 inches.

D. Structural: Test according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.

2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.

3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

E. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:

1. Fixed Framing and Glass Area:

a. Maximum air leakage of 0.06 cfm/sq. ft. (0.30 L/s per sq. m) at a static-air-pressure differential of 6.24 lbf/sq. ft. (300 Pa).

F. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft. (480 Pa)

G. Condensation Resistance Factor (CRF):

a. Fixed Glazing and Framing Areas: CRF for the system of not less than 70 as determined in accordance with AAMA 1503.

H. Energy Performance: Certify and label energy performance according to NFRC as follows:

1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.30 as determined according to NFRC 100.

2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.33 as determined according to NFRC 200.

I. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 MANUFACTURERS / CURTAIN WALL SYSTEMS

A. Source Limitations: Obtain all components of curtain wall system, including framing and accessories, from single manufacturer.

B. Basis of Design: YCW 750 SplineTech by YKK AP America, Inc.

C. Acceptable Manufacturers:

1. Arcadia, Inc.

2. Bruce Wall Systems

3. CMI Architectural

4. Coral Industries, Inc.

5. EFCO Corp.

6. Kawneer North America, an Arconic company

7. Oldcastle Building Envelope

8. Pittco Architectural Metals, Inc.

9. Shuco USA LP

10. Tubelite Inc.

11. U.S. Aluminum; a brand of C.R. Lawrence

12. YKK AP America, Inc.

13. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.3 FRAMING

A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Thermally broken.

2. Glazing System: Retained mechanically with gaskets on four sides.

3. Glazing Plane: Front.

4. Finish: Anodic color.

5. Fabrication Method: Either factory- or field-fabricated system.

B. Pressure Caps: Manufacturer's standard aluminum components that mechanically retain glazing.

1. Include snap-on aluminum trim that conceals fasteners.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Materials:

1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

a. Sheet and Plate: ASTM B 209.

b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.

c. Extruded Structural Pipe and Tubes: ASTM B 429.

d. Structural Profiles: ASTM B 308.

2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

a. Structural Shapes, Plates, and Bars: ASTM A 36.

b. Cold-Rolled Sheet and Strip: ASTM A 1008.

c. Hot-Rolled Sheet and Strip: ASTM A 1011.

2.4 GLAZING

A. Glazing: Comply with Section 08 80 00 "Glass and Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

C. Glazing Sealants: As recommended by manufacturer.

D. Structural Glazing Sealants: ASTM C1184, chemically curing silicone formulation that is compatible with system components with which it comes into contact, specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in curtain-wall assembly indicated.

1. Color: Black.

2.5 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.

2. Accurately fitted joints with ends coped or mitered.

3. Physical and thermal isolation of glazing from framing members.

4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.

5. Provisions for field replacement of glazing from interior for vision glass and exterior for spandrel glazing panels.

6. Where indicated, provisions for safety railings mounted between mullions at interior.

7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Fabricate components to resist water penetration as follows:

1. Internal guttering system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.

2. Pressure-equalized system or double barrier design with primary air and vapor barrier at interior side of glazed aluminum curtain wall and secondary seal weeped and vented to exterior.

E. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.6 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

B. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

1. Color: Black.

C. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm).

1. Color and Gloss: As selected by Architect from manufacturer's full range.

D. High-Performance Organic Finish, Two-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat.

1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

2. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.

2. Do not install damaged components.

3. Fit joints to produce hairline joints free of burrs and distortion.

4. Rigidly secure nonmovement joints.

5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.

6. Where welding is required, weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.

7. Seal joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with primer, applying sealant or tape, or installing nonconductive spacers as recommended by manufacturer for this purpose.

2. Where aluminum is in contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.

D. Install components plumb and true in alignment with established lines and grades.

E. Install glazing as specified in Section 08 80 00 "Glass and Glazing."

3.2 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Referenced Testing Standards:

1. Water-Spray Test, AAMA 501.2 – Quality Assurance and Water Field Check of Installed Storefronts, Curtain Walls and Sloped Glazing Systems

2. Water-Penetration Test, AAMA 503 - Voluntary Specification for Field *Testing* of Newly Installed Storefronts, Curtain Walls, and Sloped Glazing Systems

C. Field Quality-Control Testing: Perform the following test on representative areas of glazed aluminum curtain walls.

1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by testing agency shall be field tested according to AAMA 501.2, and shall not evidence water penetration.

a. Perform tests at mock-up (as applicable), 5-percent (5%) of assemblies installed.

b. Perform tests at a minimum of two (2) areas as selected by testing agency.

c. Failed assemblies shall be retested after corrective measures have been made. For each failed assembly, one (1) additional assembly or area shall be tested.

2. Water Penetration Test: Newly installed curtain walls shall be field tested in accordance with AAMA 503, and ASTM E 1105, Procedure A, at a minimum static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft. (300 Pa), and shall not evidence water penetration.

a. Perform tests at mock-up (as applicable), 5-percent (5) of assemblies installed.

b. Perform tests at a minimum of two (2) areas as selected by testing agency.

1) Areas selected shall not include doors with accessible thresholds.

c. Failed assemblies shall be retested after corrective measures have been made. For each failed assembly, one (1) additional assembly or area shall be tested.

D. Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

END OF SECTION

SECTION 08 53 00

VINYL WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes vinyl-framed windows.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contractor, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, special details, mock-ups, sequencing, and scheduling of the work.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for vinyl windows.

B. Shop Drawings: For vinyl windows.

1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

C. Samples: For each exposed product and for each color specified.

D. Product Schedule: For vinyl windows. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of vinyl window, for tests performed by a qualified testing agency.

1. Provide product test reports indicating compliance with specified performance class and performance grade for each scheduled individual and mulled window assembly type.

B. Sample Warranties: For manufacturer's warranties.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer capable of fabricating vinyl windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.

B. Installer Qualifications: An installer acceptable to vinyl window manufacturer for installation of units required for this Project.

C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockup of typical wall area as shown on Drawings.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.6 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace vinyl windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure to meet performance requirements.

b. Structural failures including excessive deflection, water leakage, and air infiltration.

c. Faulty operation of movable sash and hardware.

d. Deterioration of materials and finishes beyond normal weathering.

e. Failure of insulating glass.

2. Warranty Period:

a. Window: Five years from date of Substantial Completion.

b. Insulated Glazing Units: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain vinyl windows from single source from single manufacturer.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Andersen Windows

2. Gerkin Windows and Doors

3. Jeld-Wen, Inc.

4. MI Windows and Doors, Inc.

5. Milguard Manufacturing, Inc.

6. Plygem

7. Prime Window Systems

8. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

2.2 DESIGN CRITERIA

A. Wind Speed: 115mph

B. Exposure Category: B

C. Design Pressure:

1. Interior, Zone 4: Indicated in structural Drawings.

2. Edge, Zone 5: Indicated in structural Drawings.

2.3 WINDOW PERFORMANCE REQUIREMENTS

A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:

1. Minimum Performance Class: LC

2. Minimum Performance Grade: 25

C. Water Penetration Resistance Test Pressure: (ASTM E 547): 15% of design pressure, minimum.

D. Air Infiltration Resistance (ASTM E 283): 0.30 cfm/ft^2 maximum at 1.56 psf test pressure

E. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.30.

F. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.33.

G. Sound Transmission Class (STC): Rated for not less than 26 STC when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E413.

H. Outside-Inside Transmission Class (OITC): Rated for not less than 22 OITC when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E1332.

2.4 VINYL WINDOWS

A. Basis of Design: Series S-82 Single Hung and Series PW-83 Fixed by Trophy Windows

B. Operating Types: Provide the following operating types in locations indicated on Drawings:

1. Single hung.

2. Fixed.

C. Frames and Sashes: Impact-resistant, UV-stabilized PVC complying with ASTM D 4726 or AAMA/WDMA/CSA 101/I.S.2/A440.

1. Finish, Interior: Integral color, white.

2. Finish, Exterior: Integral color, black.

3. Gypsum Board Returns: Provide at interior face of frame.

D. Glass: Clear annealed glass, ASTM C1036, Type 1, Class 1, q3.

1. Kind: Fully tempered where indicated on Drawings.

E. Insulating-Glass Units: ASTM E2190.

1. Glass: ASTM C1036, Type 1, Class 1, Quality-Q3.

a. Tint: Clear

b. Kind: Fully tempered where indicated on Drawings.

2. Lites: Two

3. Filling: Fill space between glass lites with argon.

4. Low-E Coating: Pyrolytic or sputtered on second surface.

5. Interior Lite: ASTM C1172 clear laminated glass with two plies of float glass.

a. Float Glass: Annealed, heat strengthened, or fully tempered as required by performance requirements indicated.

b. Interlayer Thickness: As required by performance requirements indicated but not less than 0.090 inch.

6. Filling: Fill space between glass lites with argon.

7. Low-E Coating: Pyrolytic on second surface or sputtered on second surface.

F. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

G. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.

1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.

H. Limit Devices: ASTM F2090 compliant limit devices designed to restrict sash opening where indicated in Drawings.

1. Window Opening Control Device (WOCD): Device limits clear opening to 4 inches for ventilation and allows window to be fully open when manually disengaged. Device automatically re-engages when sash is fully closed.

I. Hung Window Hardware:

1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.

2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.

3. Tilt Hardware: Releasing tilt latch allows sash to pivot about horizontal axis to facilitate cleaning exterior surfaces from the interior.

J. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

K. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.5 INSECT SCREENS

A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.

B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.

1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.

2. Finish for Exterior Screens: Baked-on organic coating in color selected by Architect from manufacturer's full range.

C. Glass-Fiber Mesh Fabric: 18-by-14 or 18-by-16 mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D3656.

1. Mesh Color: Manufacturer's standard.

2.6 FABRICATION

A. Fabricate vinyl windows in sizes indicated. Include a complete system for installing and anchoring windows.

B. Glaze vinyl windows in the factory.

C. Weatherstrip each operable sash to provide weathertight installation.

D. Mullions: Provide mullions and cover plates, compatible with window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units. Provide manufacturer's standard finish to match window units.

E. Factory assemble mulled window assemblies.

F. Provide continuous head frame or built-in cap flashing at mulled window assemblies.

G. Hardware: Mount hardware through double walls of vinyl extrusions or provide corrosion-resistant reinforcement.

H. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.

B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

C. Pack fiberglass insulation, or otherwise seal shim spaces at perimeter of window to maintain continuity of thermal and air barrier.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.

B. Referenced Testing Standards:

1. AAMA 502 – Field Testing of Newly Installed Fenestration Products

C. Testing Services: Field testing and inspecting of installed windows shall take place as follows:

1. Testing Methodology: Field testing of windows for water resistance shall be performed according to AAMA 502.

2. Water-Resistance Testing: In accordance with ASTM E 1105, Procedure B

a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.

b. Allowable Water Infiltration: No water penetration.

3. Testing Extent: As indicated below and as selected by qualified independent testing agency. Windows shall be tested after perimeter sealants have cured.

a. Two windows of each type at each main elevation.

4. Failed windows shall be retested after corrective measures have been made. For each failed window, one (1) additional window shall be tested.

5. Test Reports: Prepare according to AAMA 502.

D. Windows will be considered defective if they do not pass tests and inspections.

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

B. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.

1. Keep protective films and coverings in place until final cleaning.

C. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.

D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION

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SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mechanical and electrified door hardware for swinging doors, sliding doors, and folding doors.

1.2 COORDINATION

A. Floor-Recessed Door Hardware: Coordinate layout and installation with floor construction.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.3 DEFINITIONS

A. Exit Device / Panic Hardware – Door-latching assembly incorporating a device that releases the latch upon application of a force in the direction of egress travel.

B. Fire Exit Device – Exit device / panic hardware that is listed for use on fire door assemblies.

C. Double Cylinder Deadbolt – Deadbolt is operated by key on both sides

D. Single Cylinder Deadbolt – Deadbolt is operated by key from outside and turn piece inside

E. One Sided Deadbolt – Deadbolt is operated by turn piece from inside only.

F. Passage Latch – Both levers operate latchbolt at all times. Does not allow for locking.

G. Privacy Lock – Both levers operate latchbolt unless outside lever is locked by push button inside. Inside lever always active.

H. Storeroom Lock – Latchbolt operated by lever inside and key in outside lever. Outside lever always locked. Inside lever always active.

I. Entry / Office Lock – Key lever outside and turn button or push-button lever inside. Inside lever always active. Either lever operates latchbolt unless outside lever is locked from inside by rotating turn button or pushing push-button. Key at outside lever unlocks turn button / push button inside.

J. Dummy Lever - Lever acts as pull only.

K. Automatic Flush Bolt – Inactive door remains latched until active door opened, releasing auto top and bottom bolts. Inactive door will automatically relatch when active leaf is closed.

L. Constant Latching Flush Bolt – Inactive door remains latched until active door opened, releasing auto bottom bolt, then top bolt can be manually released. Inactive door will automatically relatch when closed.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, fire ratings, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For electrified door hardware.

1. Include diagrams for power, signal, and control wiring.

2. Include details of interface of electrified door hardware and building safety and security systems.

C. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Submittal Sequence: Submit door hardware schedule after or concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.

2. Format: Use same scheduling sequence and format and use same door numbers as in door schedule in the Contract Documents.

3. Content: Include the following information:

a. Identification number, location, hand, fire rating, size, and material of each door and frame.

b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.

c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.

d. Fastenings and other installation information.

e. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.

f. Mounting locations for door hardware.

g. List of related door devices specified in other Sections for each door and frame.

1.6 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of electrified door hardware.

1. Certify that door hardware for use on each type and size of labeled fire-rated doors complies with listed fire-rated door assemblies.

B. Product Test Reports: For compliance with fire resistance rating and accessibility requirements, for tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on fire-resistance rated doors, and doors located in accessible routes.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of door hardware from single manufacturer.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.

B. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with requirements of assemblies tested in accordance with UL 1784 and installed in compliance with NFPA 105.

1. Air Leakage Rate: Maximum air leakage of 3.0 cfm/sq. ft. at the tested pressure differential of 0.10-inch wg of water.

C. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

E. Accessibility Requirements: For door hardware on doors in an accessible route, within public and common use areas, and within ICC A117.1 Type ‘A’ units, comply with the USDOJ's "2010 ADA Standards for Accessible Design", ICC A117.1, HUD's "Fair Housing Accessibility Guidelines".

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.

2. Comply with the following maximum opening-force requirements:

a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.

b. Sliding or Folding Doors: 5 lbf applied parallel to door at latch.

c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.

4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.

5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.3 HINGES

A. Butt Hinges: BHMA A156.1; Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Allegion

b. Bommer Industries, Inc.

c. Cal-Royal Products, Inc.

d. Design Hardware; Mesker Openings Group; dormakaba

e. Don-Jo Mfg., Inc.

f. Hager Companies

g. Ives; an Allegion brand

h. McKinney Products; an ASSA ABLOY Group company

i. PAMEX, Inc.

j. PBB, Inc.

k. Stanley Commercial Hardware; dormakaba USA, Inc.

l. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

2. Five (5) Knuckle, Plain Bearing Type

a. 1-3/8-inch-thick doors, up to and including 36 inches wide:

1) Interior: Standard weight, brass or steel, 3-1/2 inches high

b. 1-3/4-inch-thick doors, up to and including 36 inches wide:

1) Interior, Non-Fire Rated Doors, no Closer: Standard weight, steel, 4 inches high

2) Exterior Unit Doors: Standard weight, bronze or stainless steel, 4 inches high

c. Width of Hinges: 3-1/2 inches at 1-3/8-inch-thick doors, and 4-inches at 1-3/4-inch doors. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.

d. Provide three hinges per door leaf for doors 7 feet 6 inches (90 inches) or less in height, and one additional hinge for each 30 inches of additional door height.

1. Five Knuckle, Ball Bearing Type

a. 1-3/4-inch-thick doors, up to and including 36 inches wide:

1) Exterior Doors: Standard weight, bronze or stainless steel, 4-1/2 inches high

2) Interior, Fire Rated Doors: Standard weight, steel, 4-1/2 inches high

3) Interior, Non-Fire Rated Doors, with Closer: Standard weight, steel, 4 inches high

b. 1-3/4-inch-thick doors over 36 inches wide:

1) Exterior: Heavy weight, bronze or stainless steel, 5 inches high

2) Interior: Heavy weight, steel, 5 inches high

c. Provide three hinges per door leaf for doors 7 feet 6 inches (90 inches) or less in height, and one additional hinge for each 30 inches of additional door height.

d. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

1) Steel Hinges: Steel pins

2) Non-Ferrous Hinges: Stainless steel pins

3) Out-Swinging Exterior Doors: Non-removable pins

4) Out-Swinging Interior Lockable Doors: Non-removable pins

5) Interior Non-lockable Doors: Non-rising pins

e. Width of hinges: 4-1/2 inches at 1-3/4-inch-thick doors, and 5 inches (127 mm) at 2 inches or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.

f. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2. Three (3) Knuckle, Concealed Bearing Type

a. 1-3/4-inch-thick doors, up to and including 36 inches wide:

1) Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches high

2) Interior: Standard weight, steel, 4-1/2 inches high

b. 1-3/4-inch-thick doors over 36 inches wide:

1) Exterior: Heavy weight, bronze or stainless steel, 5 inches high

2) Interior: Heavy weight, steel, 5 inches high

c. Provide three hinges per door leaf for doors 7 feet 6 inches (90 inches) or less in height, and one additional hinge for each 30 inches of additional door height.

d. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

1) Steel Hinges: Steel pins

2) Non-Ferrous Hinges: Stainless steel pins

3) Out-Swinging Exterior Doors: Non-removable pins

4) Out-Swinging Interior Lockable Doors: Non-removable pins

5) Interior Non-lockable Doors: Non-rising pins

e. Width of hinges: 4-1/2 inches at 1-3/4-inch-thick doors, and 5 inches (127 mm) at 2 inches or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.

f. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.4 SELF-CLOSING HINGES AND PIVOTS

A. Self-Closing Hinges and Pivots: BHMA A156.17, Grade 1

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Allegion

b. Bommer Industries, Inc.

c. Cal-Royal Products, Inc.

d. Design Hardware; Mesker Openings Group; dormakaba

e. Don-Jo Mfg., Inc.

f. Hager Companies

g. Ives; an Allegion brand

h. McKinney Products; an ASSA ABLOY Group company

i. PBB, Inc.

j. Stanley Commercial Hardware; dormakaba USA, Inc.

k. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

2.5 CENTER-HUNG AND OFFSET PIVOTS

A. Center-Hung and Offset Pivots: BHMA A156.4.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

    a. Accurate Lock & Hardware Co.

    b. Allegion

    c. Architectural Builders Hardware Mfg, Inc.

    d. Bommer Industries, Inc.

    e. dormakaba USA, Inc.

    f. Hager Companies

    g. INOX by Unison Hardware, Inc.

    h. Rixson Specialty Door Controls; an ASSA ABLOY Group company

    i. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

2.6 CONTINUOUS HINGES

A. Continuous, Pin and Barrel Type Hinges: BHMA A156.26; minimum 0.120-inch-thick, hinge leaves with minimum overall width of 4 inches; fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

    a. Allegion

    b. Architectural Builders Hardware Mfg., Inc.

    c. Hager Companies

    d. Ives; an Allegion brand

    e. Lawrence Hardware, Inc.

    f. Marker Architectural Products, Inc.; an ASSA ABLOY company

    g. McKinney Products; an ASSA ABLOY Group company

    h. PBB, Inc.

    i. Select Products Limited

    j. STANLEY; dormakaba USA, Inc.

    k. Zero International; an Allegion brand

    l. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

B. Continuous, Gear-Type Hinges: ANSI/BHMA A156.26; minimum 0.120-inch-thick, extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-

lubricating thrust bearings. Minimum overall width of 4 inches; fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

    a. Allegion

    b. Architectural Builders Hardware Mfg., Inc.

    c. Bommer Industries, Inc.

    d. Cal-Royal Products, Inc.

    e. Hager Companies

    f. Ives; an Allegion brand

    g. Legacy Manufacturing

    h. McKinney Products; an ASSA ABLOY Group company

    i. PBB, Inc.

    j. Pemko Manufacturing Company; an ASSA ABLOY company

    k. Select Products Limited

    l. STANLEY; dormakaba USA, Inc.

    m. Zero International; an Allegion brand

    n. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

2.7 ELECTRIC POWER TRANSFER (EPT)

A. Manufacturers:

1. Acceptable Manufacturers:

    a. ABH

    b. Securitron

    c. Security Door Controls

    d. Von Duprin

    e. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

B. Requirements:

1. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.

2. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.8 CONCEALED HINGES

A. Concealed Hinges: Fully concealed within mortises in the door edge and frame and allowing door to swing open 180 degrees.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. McKinney Products; an ASSA ABLOY Group company

b. Simonswerk North America, Inc.

c. SOSS Door Hardware

d. Sugatsune America, Inc.

e. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

2.9 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: As indicated in door hardware schedule

B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Bored Locks: Minimum 1/2-inch latchbolt throw.

2. Mortise Locks: Minimum 3/4-inch latchbolt throw.

3. Deadbolts: Minimum 1-inch or 1.25-inch bolt throw.

C. Lock Backset: 2-3/8 inches or 2-3/4 inches unless otherwise indicated.

D. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

E. Bored Locks and Latches: BHMA A156.2; Series 4000

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Allegion

b. Arrow USA; an ASSA ABLOY Group company

c. Best Access Solutions, Inc.; dormakaba USA, Inc.

d. Better Home Products (BHP)

e. Cal-Royal Products, Inc.

f. Callan by Delaney Hardware

g. Corbin Russwin; an ASSA ABLOY Group company

h. Design Hardware; Mesker Openings Group; dormakaba

i. Dormakaba USA, Inc.

j. Falcon; an Allegion brand

k. Hager Companies

l. INOX by Unison Hardware, Inc.

m. Kwikset

n. PAMEX Inc.

o. PDQ Industries, Inc.

p. SARGENT Manufacturing Company, ASSA ABLOY

q. Schlage

r. STANLEY; dormakaba USA, Inc.

s. Taymor Industries

t. Weiser Lock Corp.

u. Yale Security Inc.; an ASSA ABLOY Group company

v. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

2. Locks and Latches, General:

a. Trim: Lever, style as scheduled

b. Finish: As selected by Owner

3. Locks and Latches, Grade Level: Provide the following minimum grade levels unless higher grade level is required based on fire rating of opening or hardware type.

a. Unit Interior: ANSI/BHMA Grade 3

b. Unit Exterior: ANSI/BHMA Grade 3

c. Unit Entry: ANSI/BHMA Grade 2

d. Building Common Spaces: ANSI/BHMA Grade 2

e. Clubhouse / Leasing Center: ANSI/BHMA Grade 2

f. Building Common Spaces: ANSI/BHMA Grade 2

F. Mortise Locks: BHMA A156.13; Grade 1 or Grade 2; stamped steel case with steel or brass parts; Series 1000.

G. Roller Latches: BHMA A156.16; Grade 1; rolling plunger that engages socket or catch, with adjustable roller projection.

2.10 AUXILIARY LOCKS

A. Bored Auxiliary Locks: ANSI/BHMA A156.36 with strike that suits frame

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Allegion

b. Arrow USA; an ASSA ABLOY Group company

c. BEST Access Solutions, Inc.; dormakaba USA, Inc.

d. Better Home Products (BHP)

e. Cal-Royal Products, Inc.

f. Corbin Russwin; an ASSA ABLOY Group company

g. Falcon; an Allegion brand

h. Hager Companies

i. INOX

j. Kwikset

k. PAMEX Inc.

l. PDQ Industries, Inc.

m. SARGENT Manufacturing Company; an ASSA ABLOY company

n. Schlage

o. STANLEY; dormakaba USA, Inc.

p. Taymor Industries

q. Yale; ASSA ABLOY

r. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

2.11 ELECTRIC STRIKES

A. Electric Strikes: BHMA A156.31; Grade 1 or Grade 2; with faceplate to suit lock and frame.

2.12 ELECTROMAGNETIC LOCKS

A. Electromagnetic Locks: BHMA A156.23; Grade 1; electrically powered; with electromagnet attached to frame and armature plate attached to door; full-exterior or full-interior type, as required by application indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

    a. Allegion

    b. ASSA ABLOY Electronic Security Hardware

    c. Door Controls International, Inc.

    d. dormakaba USA, Inc.

    e. Dortronics Systems, Inc.

    f. DynaLock Corp.

    g. Hager Companies

    h. Rutherford Controls Int'l (RCI); dormakaba Group

    i. Security Door Controls

    j. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

2.13 ELECTROMECHANICAL LOCKS

A. Electromechanical Locks: BHMA A156.25; Grade 1 or Grade 2; motor or solenoid driven; with strike that suits frame.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

    a. Allegion

    b. Best Access Systems, Inc.; dormakaba USA, Inc.

    c. DynaLock Corp.

    d. Lawrence Hardware Inc.

    e. Marks USA

    f. PDQ Manufacturing

    g. Rutherford Controls Int'l (RCI); dormakaba Group

    h. SARGENT Manufacturing Company; ASSA ABLOY

    i. Security Door Controls

    j. STANLEY; dormakaba USA, Inc.

    k. Weiser Lock Corp.

    l. Yale Security Inc.; an ASSA ABLOY Group company

    m. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

2.14 SELF-CONTAINED ELECTRONIC LOCKS

A. Self-Contained Electronic Locks: BHMA A156.25, bored or mortise; with internal, battery-powered, self-contained electronic locks; consisting of complete lockset, motor-driven lock mechanism, and actuating device; enclosed in zinc-dichromate-plated, wrought-steel case, and strike that suits frame. Provide key override, low-battery detection and warning, LED status indicators, and ability to program at the lock.

1. Basis of Design:

a. 20-minute rated openings: InSync D deadbolt by dormakaba

1) Grade: Minimum as required based on fire rated application, but not less than ANSI/BHMA Grade 2

b. 60-minute rated openings: InSync M mortise lock by dormakaba

1) Grade: Minimum as required based on fire rated application, but not less than ANSI/BHMA Grade 1

2. Characteristics:

a. Operation:

1) From Outside: Rotation of electronic RIFD key

2) From Inside: Thumb-turn

b. Egress: Shall permit free egress with rotation of thumb-turn

c. Style: As selected by Owner from manufacturer’s full range.

d. Finish: As selected by Owner from manufacturer’s full range.

3. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Allegion

b. Best Access Solutions; dormakaba USA, Inc.

c. Kaba Ilco Corp.

d. Marks USA

e. SARGENT Manufacturing Company; ASSA ABLOY

f. Yale Security Inc.; an ASSA ABLOY Group company

g. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

2.15 MANUAL FLUSH BOLTS

A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Adams Rite Manufacturing Co; an ASSA ABLOY Group company

b. Allegion

c. Burns Manufacturing Inc.

d. Don-Jo Mfg., Inc.

e. Door Controls International

f. INOX by Unison Hardware, Inc.

g. Ives, an Allegion Brand

h. Trimco

i. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.16 AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

A. Automatic Flush Bolts: BHMA A156.3, Type 25; minimum 3/4-inch throw; with dust-proof strikes; designed for mortising into door edge.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Allegion

b. Burns Manufacturing Inc.

c. Cal-Royal Products, Inc.

d. Don-Jo Mfg., Inc.

e. Door Controls International

f. Ives, an Allegion brand

g. Rutherford Controls Int'l (RCI); dormakaba Group

h. Trimco

i. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Self-Latching / Constant Latching Flush Bolts: BHMA A156.3, Type 27; minimum 3/4-inch throw; with dust-proof strikes; designed for mortising into door edge.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Allegion

b. Burns Manufacturing Inc.

c. Cal-Royal Products, Inc.

d. Don-Jo Mfg., Inc.

e. Door Controls International

f. Ives, an Allegion brand

g. Rutherford Controls Int'l (RCI); dormakaba Group

h. Trimco

i. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.17 EXIT DEVICES

A. Exit Devices: BHMA A156.3, Grade 1

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Adams Rite Manufacturing Co; an ASSA ABLOY Group company

b. Allegion

c. Arrow USA; an ASSA ABLOY Group company

d. C.R. Laurence Co., Inc.

e. Cal-Royal Products, Inc.

f. Corbin Russwin, Inc.; an ASSA ABLOY company

g. Design Hardware; Mesker Openings Group; dormakaba

h. Door Controls International

i. dormakaba USA, Inc.

j. Falcon; an Allegion brand

k. Hager Companies

l. INOX by Unison Hardware Inc.

m. PAMEX Inc.

n. Precision Hardware; dormakaba Group

o. Rutherford Controls Int'l (RCI); dormakaba Group

p. SARGENT Manuf. Co.; an ASSA ABLOY Group company

q. STANLEY; dormakaba USA, Inc.

r. Yale Security Inc.; an ASSA ABLOY Group company

s. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Requirements:

a. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware

b. Provide exit devices listed in accordance with UL 305 at non-fire resistance rated doors.

c. Provide exit devices listed in accordance with UL 305 and UL 10C at fire-resistance rated doors.

d. Provide exit devices with manufacturer's approved strikes

e. Provide cylinder or hex-key dogging as specified at non-fire-rated openings.

f. Removable Mullions: 2 inches x 3 inches steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.

g. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.

h. Provide electrified options as scheduled.

2.18 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

1. Manufacturers:

a. Allegion

b. Arrow USA; an ASSA ABLOY company

c. ASSA, Inc.

d. BEST Access Solutions, Inc; dormakaba USA, Inc.

e. Cal-Royal Products, Inc.

f. Corbin-Russwin, Inc.; and ASSA ABLOY company

g. Falcon, an Allegion brand

h. Hager Companies

i. Medeco Security Locks; an ASSA ABLOY company

j. PAMEX Inc.

k. PDQ Industries, Inc.

l. SARGENT Manufacturing Co.; ASSA ABLOY

m. STANLEY; dormakaba USA, Inc.

n. Yale Security; ASSA ABLOY

o. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Standard Lock Cylinders: ANSI/BHMA A156.5, permanent cores; face finished to match lockset

1. Core Type: Small format interchangeable core (SFIC)

C. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide ten (10) construction keys.

2.19 OPERATING TRIM

A. Operating Trim: BHMA A156.6; aluminum or stainless steel unless otherwise indicated.

2.20 ACCESSORIES FOR PAIRS OF DOORS

A. Coordinators: BHMA A156.3; Grade 1; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release; and with internal override.

B. Carry-Open Bars: BHMA A156.3; prevent the inactive leaf from opening before the active leaf; provide polished brass or bronze carry-open bars with strike plate for inactive leaves of pairs of doors unless automatic or self-latching bolts are used.

C. Astragals: BHMA A156.22.

2.21 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; Grade 1; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Allegion

b. Arrow USA; an ASSA ABLOY Group company

c. Cal-Royal Products, Inc.

d. Corbin Russwin Inc.; an ASSA ABLOY Group company

e. Design Hardware; Mesker Openings Group; dormakaba

f. dormakaba USA, Inc.

g. Falcon, an Allegion brand

h. Hager Companies

i. INOX by Unison Hardware Inc.

j. Norton Door Conrtols; ASSA ABLOY

k. PAMEX Inc.

l. Rixson Specialty Door Controls; an ASSA ABLOY Group company

m. SARGENT Manuf. Co.; an ASSA ABLOY Group company

n. STANLEY; dormakaba USA, Inc.

o. Yale Security Inc.; an ASSA ABLOY Group company

p. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.22 MECHANICAL STOPS AND HOLDERS

A. Wall- and Floor-Mounted Stops: BHMA A156.16.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Allegion

b. Architectural Builders Hardware Mfg., Inc.

c. ASI-American Specialties, Inc.

d. Baldwin Hardware Corp.

e. Burns Manufacturing, Inc.

f. Cal-Royal Products, Inc.

g. Don-Jo Mfg., Inc.

h. Door Controls International

i. Hager Companies

j. Ives, an Allegion brand

k. Rockwood Manufacturing Company; an ASSA ABLOY Group company

l. Trimco

m. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.23 ELECTROMAGNETIC HOLDERS

A. Electromagnetic Door Holders: BHMA A156.15, Grade 1; wall-mounted electromagnetic single unit with strike plate attached to swinging door; coordinated with fire detectors and interface with fire-alarm system for labeled fire-rated door assemblies.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Allegion

b. Architectural Builders Hardware Mfg., Inc.

c. dormakaba USA, Inc.

d. Hager Companies

e. INOX by Unison Hardware, Inc.

f. Lawrence Hardware, Inc.

g. SARGENT Manuf. Co.; an ASSA ABLOY Group company

h. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.24 DOOR GASKETING

A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Hager Companies

b. Legacy Manufacturing

c. M-D Building Products, Inc.

d. National Guard Products, Inc.

e. Pemko; an ASSA ABLOY Group company

f. Reese Enterprises, Inc.

g. Sealeze

h. Zero International; an Allegion brand

i. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Gasketing at Smoke and Draft Control Doors: ANSI/UL 1784 classified smoke and draft control gasketing.

C. Gasketing at Fire Rated Doors: ANSI/UL 10C classified.

2.25 THRESHOLDS

A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Hager Companies

b. Legacy Manufacturing

c. M-D Building Products, Inc.

d. National Guard Products, Inc.

e. Pemko; an ASSA ABLOY Group company

f. Reese Enterprises, Inc.

g. Rixson Specialty Door Controls; an ASSA ABLOY Group company

h. Sealeze

i. Zero International; an Allegion brand

j. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.26 SLIDING DOOR HARDWARE

A. Sliding Door Hardware: BHMA A156.14; consisting of complete sets including rails, hangers, supports, bumpers, floor guides, and accessories indicated.

2.27 FOLDING DOOR HARDWARE

A. General: BHMA A156.14; complete sets including overhead rails, hangers, supports, bumpers, floor guides, and accessories indicated.

2.28 METAL PROTECTIVE TRIM UNITS (aka PROTECTION PLATES)

A. Metal Protective Trim Units: ANSI/BHMA A156.6; fabricated from 0.056-inch-thick aluminum or stainless steel; with manufacturer’s standard machine or self-tapping screw fasteners, finished to match plates.

B. Size 2 inches less width of door on single doors, pairs of doors with a mullion, and doors with edge guards.

C. Size 1 inch less width of door on pairs without a mullion or edge guards.

D. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.29 DOOR POSITION SWITCHES

A. Acceptable Manufacturers:

1. Schlage

2. Securitron

3. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Requirements:

1. Provide recessed or surface mounted type door position switches as specified.

2. Coordinate door and frame preparations with door and frame suppliers.

3. Provide minimum of 4 inches between switch and magnetic locking devices.

2.30 AUXILIARY DOOR HARDWARE

A. Door Viewers: BHMA A156.16; adjustable, glass lens door viewer with 160-degree field of vision (min)

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Allegion

b. ASSA ABLOY Opening Solutions

c. Cal-Royal Products, Inc.

d. Don-Jo Mfg, Inc.

e. Hager Companies

f. Rockwood Manufacturing Co.; ASSA ABLOY

g. PAMEX Inc.

h. Trimco

i. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Fire Rating: Provide UL listed door viewer at fire-resistance rated doors, match fire rating indicated for door.

2.31 FABRICATION

A. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

B. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.

1. Fire-Rated Applications:

a. Wood or Machine Screws: For the following:

1) Hinges mortised to doors or frames

2) Strike plates to frames.

3) Closers to doors and frames.

b. Steel Through Bolts: For the following unless door blocking is provided:

1) Surface hinges to doors.

2) Closers to doors and frames.

3) Surface-mounted exit devices.

2. Spacers or Sex Bolts: For through bolting of hollow-metal doors.

3. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.32 FINISHES

A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames in accordance with ANSI/SDI A250.6.

B. Wood Doors: Comply with door and hardware manufacturers' written instructions.

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.

2. Custom Steel Doors and Frames: HMMA 831.

3. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.

2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

1. Doors up to 5 feet (60 inches) high: Two

2. Doors up to 7 feet 6 inches (90 inches) high: Three

3. Doors up to 10 feet (120 inches) high: Four

D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule, but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches of door height greater than 90 inches.

E. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room. Verify location with Architect.

F. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 07 92 00 "Joint Sealants."

G. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.

H. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

1. Do not notch perimeter gasketing to install other surface-applied hardware.

I. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

J. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

2. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 70 degrees and so that closing time complies with accessibility requirements of authorities having jurisdiction.

3. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.6 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal door hardware.

3.7 DOOR HARDWARE SCHEDULE

A. General: Hardware sets represent Architect's design intent. Discrepancies, omissions and conflicting hardware should be brought to the attention of the Architect. When omitted items have been excluded from a hardware set, additional hardware required for proper application and functionality shall be added.

B. Provide accessible lever trim at all passage doors.

C. Electronic Access Control (EAC) – Coordinate door hardware selections with Owner's EAC consultant. Discrepancies, omissions and conflicting hardware should be brought to the attention of the Architect.

D. Privacy locks shall include push button locks that do not require tight grasping, pinching, or twisting of the wrist to operate.

E. Hinges at fire rated doors shall be steel, and except for spring hinges, shall be of the ball bearing type.

F. Finishes: Satin Nickel BHMA 619/646 (US15) or nearest equivalent based on base material; except as noted below:

1. Hinges at Exterior Doors: Satin Stainless Steel BHMA 630 (US32D)
2. Aluminum Geared Continuous Hinges; BHMA 628 (US 28)
3. Push / Pull Plates: Satin Stainless Steel BHMA 630 (US32D)
4. Protection Plates: Satin Stainless Steel BHMA 630 (US32D)
5. Thresholds: Mill Finish Aluminum
6. Clubhouse: As selected by Owner's Interior Design consultant

G. **Hardware Schedule – Dwelling Unit Interior Doors**

Hardware Set: **001**

Description: Bedroom / Bathroom / Powder Room / Study

4 Hinge
1 Bored Lock / Lever Set, Privacy Function
1 Door Stop

Hardware Set: **002**

Description: Walk-in closet, Storage closet, Mechanical closet, Utility closet, Linen, Pantry

4 Hinge
1 Bored Lock / Lever Set, Passage Function
1 Door Stop

Hardware Set: **003**

Description: Utility closet, Storage closet - Pair

8 Hinge
2 Roller Latch
2 Dummy Lever Trim

2 Door Stop

Hardware Set: **004** (not used)

Hardware Set: **005**
Description: Study – Barn Door

1 Light Duty Enclosed Head Track
4 Wall Brackets
2 Rolling Door Hangers
2 Vertical U-Style Barn Door Handles
2 Door Stop

Hardware Set: **006 – 010**, RESERVED

H. **Hardware Schedule – Dwelling Unit Exterior Doors**

Hardware Set: **011**
Description: Entry, 20-Minute Fire Rated

2 Self-Closing Hinge
2 Hinge
1 Bored, Self-Contained Electronic Lockset w/ Thumb-Turn
1 Bored, One-sided Deadbolt
1 Bored, Lever Set, Passage Function
1 Viewer – Provide two viewers at Type A units
1 Door Stop
1 Gasketing (Smoke / Fire Seal)
1 Door Bottom / Sweep
1 Threshold
Notes: Smoke and draft control opening

Hardware Set: **012**
Description: Patio

4 Hinge
1 Bored, One-Sided Deadbolt
1 Bored, Lever Set, Passage Function
1 Weather Gasketing
1 Door Bottom / Sweep
1 Threshold

Hardware Set: **013**
Description: Balcony

4 Hinge

1 Bored, One-Sided Deadbolt
1 Bored, Lever Set, Passage Function
1 Weather Gasketing
1 Door Bottom / Sweep
1 Threshold

Hardware Set: **014**
Description: Storage Closet at Patio / Balcony

4 Hinge
1 Bored, Lock / Lever Set, Storeroom Function
1 Weather Gasketing
1 Door Bottom / Sweep
1 Threshold

Hardware Set: **015** (not used)

Hardware Set: **016**
Description: Ground Level Unit Entry / Exit

Grade 2 hardware
Pivots (qty. as required by door manufacturer)
1 Storeroom Entry Lever Deadbolt Mortise Lock
1 Single Cylinder Dead-bolt
1 Surface Closer
1 Weather Gasketing
1 Door Bottom / Sweep
1 Threshold

Hardware Set: **017 – 020**, RESERVED

I. **Hardware Schedule – Common Space Interior Doors**

Hardware Set: **021**
Description: Firewall at Building Corridor, Double Egress, **180**-Minute Fire Rated

8 Hinge
2 Fire Exit Device - Surface Vertical Rod, LBR, AFL, Lever Trim, Passage Function
2 Surface Closer
2 Electromagnetic Holder
1 Gasketing (Smoke / Fire Seal)
1 Astragal (Smoke / Fire Seal)
2 Protection / Kick Plate – Stainless Steel, 10” x 2” LDW, B-CS
1 Threshold

Notes: Doors normally held open with electromagnetic hold open devices which shall be tied into building fire alarm system. Hold opens shall release upon activation of fire alarm. Free egress at all times when doors are closed. Lever trim retracts latchbolt at all times.

Hardware Set: **022**

Description: Exit Access, Building Corridor to Stair, 120-Minute Fire Rated

4 Hinge

1 Fire Exit Device with Lever Trim, Passage Function

1 Surface Closer

1 Door stop

1 Gasketing (Smoke / Fire Seal)

1 Protection / Kick Plate – Stainless Steel, 10” x 2” LDW, B-CS

1 Sweep

1 Threshold

Notes: Smoke and draft control opening. Fire exit device provides free egress at all times. No dogging. Lever trim retract latchbolt at all times.

Hardware Set: **023**

Description: Tenant Storage Closet, **60**-Minute Fire Rated

4 Hinge

1 Bored, Lock / Lever Set, Storeroom Function

1 SFIC Core

1 Surface Closer

1 Gasketing (Smoke / Fire Seal)

1 Door Stop

1 Protection / Kick Plate – Stainless Steel, 10” x 2” LDW, B-CS

1 Door Bottom / Sweep

1 Threshold

Notes: Smoke and draft control opening

Hardware Set: **024**

Description: Mechanical Closet, [**60**]-Minute Fire Rated

4 Hinge

1 Bored, Lock / Lever Set, Storeroom Function

1 SFIC Core

1 Surface Closer

1 Door Stop

1 Gasketing (Smoke / Fire Seal)

1 Protection / Kick Plate – Stainless Steel, 10” x 2” LDW, B-CS

1 Door Bottom / Sweep

1 Threshold

Notes: Smoke and draft control opening

Hardware Set: **025**

Description: Electrical Meter Closet, [**60**]-Minute Fire Rated

4 Hinge
1 Bored, Lock / Lever Set, Storeroom Function
1 SFIC Core
1 Surface Closer
1 Door Stop
1 Gasketing (Smoke / Fire Seal)
1 Protection / Kick Plate – Stainless Steel, 10” x 2” LDW, B-CS
1 Door Bottom / Sweep
1 Threshold

Notes: Smoke and draft control opening

Hardware Set: **026**

Description: Electrical Meter Closet, [**60**]-Minute Fire Rated

4 Hinge
1 Fire Exit Device with Lever Trim, Storeroom Function
1 SFIC Core
1 Surface Closer
1 Gasketing (Smoke / Fire Seal)
1 Door Stop
1 Protection / Kick Plate – Stainless Steel, 10” x 2” LDW, B-CS
1 Door Bottom / Sweep
1 Threshold

Notes: Smoke and draft control opening. Fire exit device provides free egress at all times. No dogging.

Hardware Set: **027**

Description: Trash Chute Access / Trash Drop Room, [**60**]-Minute Fire Rated

4 Hinge
1 Bored, Lever Set, Passage Function
1 Surface Closer
1 Gasketing (Smoke / Fire Seal)
1 Door Stop
1 Protection / Kick Plate – Stainless Steel, 10” x 2” LDW, B-CS
1 Door Bottom / Sweep
1 Threshold

Notes: Smoke and draft control opening

Hardware Set: **028**

Description: IDF / MDF Closet, [**60**]-Minute Fire Rated

4 Hinge
1 Bored, Lock / Lever Set, Storeroom Function
1 SFIC Core
1 Surface Closer
1 Gasketing (Smoke / Fire Seal)
1 Door Stop
1 Door Bottom / Sweep
1 Threshold

Notes: Smoke and draft control opening

Hardware Set: **029** (not used)

Hardware Set: **030**

Description: Electrical Closet, [**60**]-Minute Fire Rated, Pair

8 Hinge
1 Automatic Flush Bolt, LBB
1 Bored, Lock / Lever Set, Storeroom Function
1 SFIC Core
2 Surface Closer with Coordinator
1 Gasketing (Smoke / Fire Seal)
1 Astragal (Smoke / Fire Seal)
2 Door Stop
2 Door Bottom / Sweep
1 Threshold

Notes: Smoke and draft control opening

Hardware Set: **030**

Description: Storage / Mechanical Closet, [**20**] -Minute Fire Rated, Pair

8 Hinge
1 Constant Latching Flush Bolt
1 Dust Proof Strike
1 Bored, Lock / Lever Set, Storeroom Function
1 SFIC Core
2 Surface Closer with Coordinator
1 Gasketing (Smoke / Fire Seal)
1 Astragal (Smoke / Fire Seal)
2 Door Stop
2 Door Bottom / Sweep
1 Threshold

Notes: Smoke and draft control opening

Hardware Set: **031** (not used)

Hardware Set: **032** (not used)

Hardware Set: **033**
Description: Men's / Women's Restroom, [60]-Minute Fire Rated

4 Hinge
1 Door Pull
1 Push Plate
1 Surface Closer
1 Door Stop
1 Gasketing (Smoke / Fire Seal)

Hardware Set: **034**
Description: Office

4 Hinge
1 Bored, Lock / Lever Set, Entry / Office Function
1 SFIC Core
1 Door Stop

Hardware Set: **035** (not used)

Hardware Set: **036**
Description: Water Closet Stall (Accessible)

2 Hinge
2 Self-Closing Hinge
1 Bored, Lock / Lever Set, Privacy Function
1 Door Stop
1 Gasketing (Smoke / Fire Seal)

Hardware Set: **037**
Description: Elevator Lobby to Corridor, [**60**] -Minute Fire Rated, Pair

8 Hinge
1 Constant Latching Flush Bolt
1 Dust Proof Strike
1 Fire Exit Device with Lever Trim, Passage Function
2 Surface Closer with Coordinator
1 Gasketing (Smoke / Fire Seal)
1 Astragal (Smoke / Fire Seal)
2 Door Stop

2 Door Bottom / Sweep
1 Threshold

Notes: Smoke and draft control opening

Hardware Set: **038 – 045**, RESERVED

J. **Hardware Schedule – Common Space Exterior Doors**

Hardware Set: **046**
Description: Storage / Mechanical Room
4 Hinge
1 Bored, Lock / Lever Set, Storeroom Function
1 SFIC Core
1 Surface Closer
1 Kick Plate - Stainless Steel, 10” x 2” LDW, B-CS
1 Door Stop
1 Weather Gasketing
1 Door Bottom / Sweep
1 Threshold

Hardware Set: **047**
Description: Storage / Mechanical Room - Pair
8 Hinge
1 Manual Flush Bolt
1 Bored, Lock / Lever Set, Storeroom Function
1 SFIC Core
1 Astragal
2 Kick Plate - Stainless Steel, 10” x 2” LDW, B-CS
2 Door Stop
1 Weather Gasketing
2 Door Bottom / Sweep
1 Threshold

Hardware Set: **048**
Description: Courtyard Access / Egress
4 Hinge
1 Exit Device with Passage Trim
1 Surface Closer
1 Door Stop
1 Weather Gasketing
1 Door Bottom / Sweep
1 Threshold

Hardware Set: **049** (not used)

Hardware Set: **050** (not used)

Hardware Set: **051**

Description: Water Closet Stall (Accessible)

4 Hinge
1 Surface Closer
1 Bored, Lock / Lever Set, Privacy Function
1 Door Stop
1 Weather Gasketing
1 Door Bottom / Sweep
1 Threshold

Hardware Set: **052**

Description: Water Closet Stall (Accessible)

4 Hinge
1 Surface Closer
1 Bored, Lock / Lever Set, Storeroom Function
1 Door Stop
1 Weather Gasketing
1 Door Bottom / Sweep
1 Threshold

Hardware Set: **053**

Description: Storage / Mechanical Room – Pair, [120]-Minute Fire Rated

8 Hinge
1 Manual Flush Bolt
1 Bored, Lock / Lever Set, Storeroom Function
1 SFIC Core
1 Astragal
2 Kick Plate - Stainless Steel, 10” x 2” LDW, B-CS
2 Door Stop
1 Weather Gasketing
2 Door Bottom / Sweep
1 Threshold

Hardware Set: **054**

Description: Security Gate

4 Hinge
1 Exit Device with Passage Trim
1 Surface Closer

Hardware Set: **055 – 060**, RESERVED

K. **Hardware Schedule – Electronic Access Controlled Common Space Interior Doors**

Hardware Set: **061**

Description: Amenity to Apartment Building Corridor, [**60**] -Minute Fire Rated

4 Hinge
1 Electric Power Transfer (EPT)
1 Fire Exit Device with Lever Trim, Passage Function
1 Surface Closer
1 Electromagnetic Lock
1 Door stop
1 Gasketing (Fire Seal)
1 Door Bottom / Sweep
1 Threshold
1 Access Control Reader
1 Door Contact
1 Power Supply

Notes: Doors normally closed and locked. Electronic access controlled with electromagnetic lock. Fire exit device to include internal request to exit (REX) switch to auto-disengage electromagnetic lock at egress side. Credential unlocks magnetic lock from non-egress side. Magnetic lock remains unlocked upon loss of power (Fail Safe). Exit device remains positively latched upon loss of power. Free egress provided at all times. Door contact integrated with electronic access control system.

Hardware Set: **062** (not used)

Hardware Set: **063**

Description: Elevator Lobby to Exit Passageway, 120-Minute Fire Rated

4 Hinge
1 Electric Power Transfer (EPT)
1 Electronic Fire Exit Device with Lever Trim
1 Mortise Cylinder
1 SFIC Core
1 Surface Closer
1 Door stop
1 Gasketing (Fire Seal)
1 Door Bottom / Sweep
1 Threshold
1 Access Control Reader
1 Door Contact
1 Power Supply

Notes: Doors normally closed and locked. Access by credentials at access control reader or by use of key. [Lever trim to be remain unlocked upon loss of power (Fail Safe).] [Lever trim to be remain locked upon loss of power (Fail Secure).] Free egress provided at all times. Door contacts integrated with electronic access control system.

Hardware Set: **064** (not used)

Hardware Set: **065**

Description: Business Center to Exit Passageway, 120-Minute Fire Rated

4 Hinge

1 Electric Power Transfer (EPT)

1 Fire Exit Device with Concealed Vertical Rod, LBR, AFL, Lever Trim, Passage Function

1 Surface Closer

1 Electromagnetic Lock

1 Door Stop

1 Astragal

1 Gasketing (Fire Seal)

1 Door Bottom / Sweep

1 Threshold

1 Access Control Reader

2 Door Contact

1 Power Supply

Notes: Doors normally closed and locked. Electronic access controlled with electromagnetic locks. Fire exit devices to include internal request to exit (REX) switches to auto-disengage electromagnetic locks. Credential unlocks mag-lock from non-egress side. Magnetic locks remain unlocked upon loss of power (Fail Safe). Exit devices remain positively latched upon loss of power. Free egress provided at all times. Door contacts integrated with electronic access control system.

Hardware Set: **066 – 080**, RESERVED

L. **Hardware Schedule – Electronic Access Controlled Common Space Exterior Doors**

Hardware Set: **081** (not used)

Hardware Set: **082**

Description: Clubhouse Entry / Exit - Pair

8 Hinge
2 Electric Power Transfer (EPT)
2 Electronic Exit Device, Concealed Vertical Rod, LBR
1 Dust Proof Strike
1 Mortise Cylinder
1 SFIC Core
2 Door Pull
2 Surface Closer
1 Astragal
1 Weather Gasketing
2 Door Bottom / Sweep
1 Threshold
1 Access Control Reader
2 Door Contact
1 Power Supply

Notes: Doors normally closed and locked. Access by credentials at access control reader or by use of key. Free egress provided at all times. Doors remain locked upon loss of power (Fail Secure). Door contacts integrated with electronic access control system. Push / Pull operation when exit device is dogged open.

Hardware Set: **083** (not used)

Hardware Set: **084** (not used)

Hardware Set: **085**

Description: Clubhouse Entry / Exit

4 Hinge
1 Electric Power Transfer (EPT)
1 Electronic Exit Device with Lever Trim
1 Mortise Cylinder
1 SFIC Core
1 Surface Closer
1 Weather Gasketing
1 Door Bottom / Sweep
1 Threshold
1 Access Control Reader
1 Door Contact

1 Power Supply

Notes: Door normally closed and locked. Access by credentials at access control reader or by use of key. Free egress provided at all times. Door remains locked upon loss of power (Fail Secure). Door contact integrated with electronic access control system.

Hardware Set: **086** (not used)

Hardware Set: **087**

Description: Stair, Building Corridor Discharge / Building Entry

4 Hinge

1 Electric Power Transfer (EPT)

1 Electronic Exit Device with Lever Trim, Passage Function

1 Mortise Cylinder

1 SFIC Core

1 Surface Closer

1 Weather Gasketing

1 Door Bottom / Sweep

1 Threshold

1 Access Control Reader

1 Door Contact

1 Power Supply

Notes: Doors normally closed and locked. Access by credentials at access control reader or by use of key. Free egress provided at all times. Door remains locked upon loss of power (Fail Secure). Door contact integrated with electronic access control system.

Hardware Set: **088**

Description: Pool Enclosure Gate (Coordinate with Landscape Architect and local pool code)

3 Self-Closing Hinge

1 Electric Power Transfer (EPT)

1 Electronic Exit Device with Lever Trim, Passage Function

1 Access Control Reader

1 Door Contact

1 Power Supply

END OF SECTION

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SECTION 08 76 50

ASSISTIVE WINDOW ACTUATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Assistive window actuators.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 COORDINATION AND SEQUENCING

1. Coordinate with Section 08 53 00 “Vinyl Windows”

2. Install widow actuator after completion of finishes surrounding window, and after adjustment of window unit is complete.

1.5 PERFORMACE REQUIREMENTS

A. Provide window actuation system with hand crank and other features which enable window system to operate within standards set forth within ADAAG, UFAS, and ICC A117.1.

B. Provide window actuation system capable of operating vertical hung windows and horizontal sliding windows.

1.6 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to remove, replace or repair defective window actuators within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain window actuators from single source from single manufacturer.

2.2 WINDOW ACTUATOR

A. Product Quality of Standard: Window Ease™ window actuator by Southwest Home Products LLC

1. Either jamb or sill mounted.

2. Manual hand operation.

B. Technical features:

1. Actuator shall maintain operating range of window.

2. All actuator control functions from one location.

3. Internal balance mechanism to ensure tight weather gasket closure.

4. Emergency escape and rescue opening requirement in eight crank revolutions or less.

5. Synchronous two-sided pull for jam resistant operation.

6. Clutching or power disengagement capability shall prevent damage to window or window actuator due to occasional excessive operational force.

7. "Freewheeling" emergency egress feature to ensure compliance with Life Safety Code 101.

8. Latching feature capable of infinite number of latched open window positions.

C. Materials:

1. All parts to be corrosion resistant.

2. Bearings: Self-lubricating ball bearings.

D. Accessories:

1. Standard covers are powder coated bronze or white. Standard cover corners and controls are black.

a. Special Cover finishes available: Powder coating, high solid paint or anodize.

2. Side cover closures for surface (wall) mounting, shallow jamb mounting or center ganged or mulled window trim.

3. Special mounting hardware for ganged or mulled window.

4. Alternative crank handles.

5. Custom (non-standard) sash or chassis brackets and adapters.

6. Crank or latch control extension(s) kits.

7. Oversize window kit.

8. Heavy duty drive for windows over 35lbs and up to 55lbs operating force.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Preparation: Examine installed windows and determine that installation is complete and that windows are operating smoothly and compatible with all actuator system requirements.

B. Install actuators according to manufacturer's recommended instructions and approved shop drawings.

3.2 FIELD QUALITY CONTROL

A. After installation, test all windows and operators. Cycle open and closed a minimum of ten times, and verify the following:

1. Proper sash alignment in window frame.

2. Full opening and closing.

3. Latching system operation.

4. "Excessive force" clutching system.

5. Emergency "freewheeling" function.

6. Complete and tight gasket closure for weather tight window unit seal.

B. Correct deficiencies and make required actuator adjustments.

END OF SECTION

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SECTION 08 80 00

GLASS AND GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Glass products.

2. Laminated glass.

3. Insulating glass.

4. Glazing sealants.

5. Glazing tapes.

6. Miscellaneous glazing materials.

1.2 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.

C. IBC: International Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.3 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances to achieve proper safety margins for glazing retention under each design load case, load case combination, and service condition.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.

C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified glazing contractor with a minimum of three years’ experience in the installation of glazing product for projects similar in size, scope, and nature.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F (4.4 deg C).

1.9 WARRANTY

A. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Manufacturer's Special Warranty for Heat-Soaked Tempered Glass: Manufacturer agrees to replace heat-soaked tempered glass units that spontaneously break due to nickel sulfide (NiS) inclusions at a rate exceeding 0.3 percent (3/1000) within specified warranty period. Coverage for any other cause is excluded.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Glass: Obtain tinted glass from single source from single manufacturer.

B. Source Limitations for Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined in accordance with the IBC and ASTM E1300:

1. Design Wind Pressures: As indicated on Drawings.

a. Wind Design Data: As indicated on Drawings.

b. Basic Wind Speed: 115 mph

c. Importance Factor: 1.0

d. Exposure Category: B

2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.

3. Thermal Loads: Design glazing to resist thermal stress breakage induced by differential temperature conditions and limited air circulation within individual glass lites and insulated glazing units.

C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. U-Factors: Center-of-glazing values, in accordance with NFRC 100 and based on most current non-beta version of LBL's WINDOW computer program.

2. SHGC and Visible Transmittance: Center-of-glazing values, in accordance with NFRC 200 and based on most current non-beta version of LBL's WINDOW computer program.

3. Visible Reflectance: Center-of-glazing values, in accordance with NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. NGA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."

2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than thickness indicated.

1. Minimum Glass Thickness for Exterior Lites: As indicated in ‘SCHEDULE’, but not less than 3mm.

C. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. AGC Glass Company North America, Inc.

2. Cardinal Glass Industries

3. Guardian Glass; SunGuard

4. Pilkington North America

5. Vitro Architectural Glass

6. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.

C. Tinted Annealed Float Glass: ASTM C1036, Type I, Class 2 (tinted), Quality-Q3.

D. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

E. Heat-Strengthened Float Glass: ASTM C1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

F. Reflective- and Low-E-Coated Vision Glass: ASTM C1376.

G. Ceramic-Coated Vision Glass: ASTM C1048, Condition C, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3; and complying with Specification No. 95-1-31 in NGA's "Engineering Standards Manual."

H. Reflective- and Low-E-Coated Spandrel Glass: ASTM C1376, Kind CS.

2.5 LAMINATED GLASS

A. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Construction: Laminate glass with polyvinyl butyral interlayer or ionoplast interlayer comply with interlayer manufacturer's written instructions.

2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.

3. Interlayer Color: Clear unless otherwise indicated.

B. Windborne-Debris-Impact-Resistant Laminated Glass: Comply with requirements specified above for laminated glass except laminate glass with one of the following to comply with interlayer manufacturer's written instructions:

1. Construction: Laminate glass with polyvinyl butyral interlayer reinforced with polyethylene terephthalate film or ionoplast interlayer to comply with interlayer manufacturer's written instructions.

2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.

3. Interlayer Color: Clear unless otherwise indicated.

2.6 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified in accordance with ASTM E2190.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.

2. Perimeter Spacer: Manufacturer's standard spacer material and construction.

3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.7 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range of industry colors.

B. Neutral-Curing Silicone Glazing Sealant: Complying with ASTM C920, Type S, Grade NS, Use NT.

C. Acid-Curing Silicone Glazing Sealant: Complying with ASTM C920, Type S, Grade NS, Use NT.

2.8 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.

2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as primary sealant.

2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.9 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Type recommended in writing by sealant or glass manufacturer.

D. Spacers: Type recommended in writing by sealant or glass manufacturer.

E. Edge Blocks: Type recommended in writing by sealant or glass manufacturer.

2.10 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.

2. Presence and functioning of weep systems.

3. Minimum required face and edge clearances.

4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches.

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

2. Provide 1/8-inch-minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended in writing by gasket manufacturer.

3.4 CLEANING AND PROTECTION

A. Immediately after installation, remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.5 INSULATING GLASS SCHEDULE

A. Clear Insulating Glass Type – Vinyl Window Assemblies:

1. Basis of Design: Type 366, LOW-E by Cardinal Glass Industries

2. Overall Thickness: 1 inch.

3. Outdoor Lite: Heat-strengthened float glass, 3mm thick.
    a. Provide fully tempered glass at indicated locations.
4. Interspace Fill: Argon
5. Indoor Lite: Heat-strengthened float glass, 3mm thick.
    a. Provide fully tempered glass at indicated locations.

B. Clear Insulating Glass Type – Storefront / Curtain Wall Assemblies:

1. Basis of Design: Type 366, Low-E by Cardinal Glass Industries
2. Overall Thickness: 1 inch.
3. Outdoor Lite: Heat-strengthened float glass, 6mm thick.
    a. Provide fully tempered glass at indicated locations.
4. Interspace Fill: Argon
5. Indoor Lite: Heat-strengthened float glass, 6mm thick.
    a. Provide fully tempered glass at indicated locations.

END OF SECTION

SECTION 08 83 00

MIRRORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silvered flat glass mirrors within dwelling unit bathrooms.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Mirrors: Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For mirrors to include in maintenance manuals.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect mirrors in accordance with mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

1. Warranty Period: Five years from date of manufacture.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.

B. Source Limitations for Mirror Accessories: Obtain mirror-glazing accessories from single source.

2.2 SILVERED FLAT GLASS MIRRORS

A. Mirrors, General: ASTM C1503

B. Annealed Monolithic Glass Mirrors: Mirror Glazing Quality, clear

1. ASTM C1036, Quality Q2

2. Nominal Thickness: 5.0 mm, minimum

2.3 MISCELLANEOUS MATERIALS

A. Mirror Frame: Where indicated, provide integral mirror frame, style and material as selected by Owner from manufacturer's full range.

B. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

C. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.

D. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.

2.4 MIRROR HARDWARE

A. Mirror Top and Bottom Clips: Stainless steel or chromium plated metal clips. Type and size as recommended by mirror manufacturer based on application.

B. Plated Steel Hardware: Formed-steel shapes with plated finish indicated.

1. Profile: As indicated.

C. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

D. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield, expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

2.5 FABRICATION

A. Shop fabricate mirrors to greatest extent possible.

B. Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts, so they fit closely around penetrations in mirrors.

C. Mirror Edge Treatment: As selected by Architect from manufacturer's standard selections.

1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.

2. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.

B. Verify compatibility with and suitability of substrates, including compatibility of existing finishes or primers with mirror mastic.

C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced National Glass Association (NGA) publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

1. NGA Publications: "Glazing Manual" and "Installation Techniques Designed to Prolong the Life of Flat Glass Mirrors."

B. Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.

1. Mirror Clips: Place a felt or plastic pad between mirror and each clip to prevent spalling of mirror edges. Locate clips so they are symmetrically placed and evenly spaced.

2. Install mastic as follows:

a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.

b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.

c. After mastic is applied, align mirrors and press into place while maintaining a minimum airspace of 1/8 inch between back of mirrors and mounting surface.

3.4 CLEANING AND PROTECTION

A. Protect mirrors from breakage and contaminating substances resulting from construction operations.

B. Do not permit edges of mirrors to be exposed to standing water.

C. Maintain environmental conditions that prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.

D. Clean exposed surface of mirrors before date scheduled for inspections that establish date of Substantial Completion. Clean mirrors as recommended in writing by mirror manufacturer and NGA's publication "Proper Procedures for Cleaning Flat Glass Mirrors."

END OF SECTION

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SECTION 08 88 13

FIRE-RESISTANT GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-protection-rated glazing.

2. Fire-resistance-rated glazing

1.2 DEFINITIONS

A. Fire-Protection-Rated Glazing: Glazing in rated doors and openings up to 45 minutes, limited in size, and not capable of blocking radiant heat.

B. Fire-Resistance-Rated Glazing: Glazing that prevents spread of fire and smoke and radiant heat; used in rated wall and door applications 60 minutes and above without size limitations.

C. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

D. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.

1.3 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of glass product, 12 inches square.

C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install fire-resistant glazing until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature conditions at occupancy levels during remainder of construction period.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organization below unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: Laminated Glazing Reference Manual and Glazing Manual.

B. Safety Glazing Labeling: Permanently mark glazing with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, glass thickness, and safety glazing standard with which glass complies.

2.2 MANUFACTURERS

A. Source Limitations for Glass: For each glass type, obtain from single source from single manufacturer.

B. Source Limitations for Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

C. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Pilkington North America

2. SAFTI FIRST Fire Rated Glazing Solutions

3. Schott North America, Inc.

4. Technical Glass Products

5. Vetrotech Saint-Gobain

2.3 GLASS PRODUCTS

A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

B. Ultraclear Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear), with visible light transmission not less than 91 percent.

C. Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class I (clear) unless otherwise indicated, Quality-Q3.

D. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

2.4 FIRE-PROTECTION-RATED GLAZING

A. Fire-Protection-Rated Glazing: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on positive-pressure testing according to NFPA 257 or UL 9, including the hose-stream test, and shall comply with NFPA 80.

1. If used in opening exceeding 100 sq. in., glazing must comply with 450 deg F temperature rise limitation

2. Fire-protection-rated glazing required to have a fire-protection rating of 20 minutes shall be exempt from the hose-stream test.

B. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name; test standard; whether glazing is permitted to be used in doors or openings; if permitted in openings, whether or not glazing has passed the hose-stream test; whether or not glazing meets 450 deg F (250 deg C) temperature-rise limitation; and the fire-resistance rating in minutes.

C. Fire-Protection-Rated Tempered Glass: 6-mm thickness, fire-protection-rated tempered glass; and complying with 16 CFR 1201, Category II.

1. Provide 20-minute fire-protection rating.

D. Film-Faced Ceramic Glazing: Clear, ceramic flat glass; 5-mm thickness; faced on one surface with a clear glazing film; and complying with 16 CFR 1201, Category II.

1. Provide 45, 60, 90- or 120-minute fire-protection rating as indicated.

E. Laminated Ceramic Glazing: Laminated glass made from two plies of clear, ceramic glass; 8-mm total thickness; and complying with 16 CFR 1201, Category II.

1. Provide 45, 60, 90- or 120-minute fire-protection rating as indicated.

F. Laminated Glass with Intumescent Interlayers: Laminated glass made from multiple plies of uncoated, ultraclear float glass; with intumescent interlayers; and complying with 16 CFR 1201, Category II.

1. Provide 45, 60, 90- or 120-minute fire-protection rating as indicated.

2. Comply with 450 deg F temperature rise limitation where required.

2.5 FIRE-RESISTANCE-RATED GLAZING

A. Fire-Resistance-Rated Glazing: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-resistance ratings indicated, based on testing according to ASTM E 119 or UL 263.

B. Fire-Resistance-Rated Glazing Labeling: Permanently mark fire-resistance-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, that the glazing is approved for use in walls, and the fire-resistance rating in minutes.

C. Laminated Glass with Intumescent Interlayers: Laminated glass made from multiple plies of uncoated, ultraclear float glass; with intumescent interlayers; and complying with 16 CFR 1201, Category II.

1. Provide 45, 60, 90- or 120-minute fire-protection rating as indicated.

2. Comply with 450 deg F temperature rise limitation where required.

D. Double Glazing Units with Gel Fill: Double glazing units made from two lites of uncoated, fully tempered, ultraclear float glass; with a perimeter metal spacer separating lites and dual-edge seal enclosing a cavity filled with clear, fully transparent, heat-absorbing gel; and complying with 16 CFR 1201, Category II.

1. Provide 45, 60, 90- or 120-minute fire-protection rating as indicated.

2. Comply with 450 deg F temperature rise limitation where required.

2.6 GLAZING ACCESSORIES

A. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.

B. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.

1. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with manufacturing and installation tolerances, including those for size, squareness, and offsets at corners, and for compliance with minimum required face and edge clearances.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate fire side and protected side. Label or mark units as needed so that fire side and protected side are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Use methods approved by testing agencies that listed and labeled fire-resistant glazing products.

B. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

3.4 CLEANING AND PROTECTION

A. Immediately after installation, remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Remove and replace glass that is damaged during construction period.

END OF SECTION

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SECTION 08 91 19

FIXED LOUVERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fixed extruded-aluminum and formed-metal louvers.

1.2 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Horizontal Louver: Louver with horizontal blades (i.e., the axis of the blades are horizontal).

C. Vertical Louver: Louver with vertical blades (i.e., the axis of the blades are vertical).

D. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

E. Wind-Driven-Rain-Resistant Louver: Louver that provides specified wind-driven-rain performance, as determined by testing according to AMCA 500-L.

F. Windborne-Debris-Impact-Resistant Louver: Louver that provides specified windborne-debris-impact resistance, as determined by testing according to AMCA 540.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show frame type and backer plates.

2. Show weep paths, gaskets, flashings, sealants, and other means of preventing water intrusion.

3. Show mullion profiles and locations.

1.4 INFORMATIONAL SUBMITTALS

A. Windborne-debris-impact-resistance test reports.

B. Sample Warranties: For manufacturer's special warranties.

1.5 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.6 WARRANTY

A. Special Finish Warranty: Manufacturer agrees to repair or replace components on which finishes fail in materials or workmanship within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D2244.

b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.

c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain fixed louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.

1. Wind Loads: Determine loads based on pressures as indicated on Structural Drawings.

B. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Design earthquake spectral response acceleration, short period (Sds) for Project is 0.225.

2. Component Importance Factor: 1.0.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120 deg F , ambient; 180 deg F, material surfaces.

D. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.3 MANUFACTURERS:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Airline Louvers; a division of MESTEK, Inc.

2. Airolite Company

3. All-Lite Architectural Products

4. American Warming and Ventilating (AWV); a Mestek Architectural Group Company

5. Architectural Louvers; Harray, LLC

6. Carnes Company

7. Cesco Products; a division of MESTEK, Inc.

8. Greenheck Fan Corp.

9. NCA Manufacturing, Inc.

10. Pottorff

11. Ruskin Company

12. Safe Air – Dowco Products

13. United Enertech

14. Vent Products Co., Inc.

15. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.4 FIXED EXTRUDED-ALUMINUM LOUVERS

A. Horizontal Nondrainable-Blade Louver:

1. Louver Depth: 4 inches

2. Blade Profile: Blade with center baffle.

3. Frame and Blade Nominal Thickness: Not less than 0.060 inch for blades and 0.080 inch for frames.

4. Mullion Type: Fully recessed.

5. Louver Performance Ratings:

a. Free Area: As indicated in Drawings.

b. Air Performance: As indicated in Drawings.

B. Horizontal Drainable-Blade Louver:

1. Louver Depth: 4 inches

2. Frame and Blade Nominal Thickness: Not less than 0.060 inch for blades and 0.080 inch for frames.

3. Mullion Type: Exposed.

4. Louver Performance Ratings:

a. Free Area: As indicated in Drawings.

b. Air Performance: As indicated in Drawings.

C. Horizontal, Wind-Driven-Rain-Resistant Louver:

1. Louver Depth: 4 inches

2. Frame and Blade Nominal Thickness: Not less than 0.060 inch for blades and 0.080 inch for frames.

3. Louver Performance Ratings:

a. Free Area: As indicated in Drawings.

b. Air Performance: As indicated in Drawings.

c. Wind-Driven Rain Performance: Not less than 95 percent effectiveness when subjected to a rainfall rate of 8 inches per hour and a wind speed of 50 mph**.**

D. Horizontal, Drainable-Blade, Windborne-Debris-Impact-Resistant Louver:

1. Louver Depth: 4 inches

2. Frame and Blade Nominal Thickness: Not less than 0.080 inch

3. Mullion Type: Exposed.

4. Louver Performance Ratings:

a. Free Area: As indicated in Drawings.

b. Point of Beginning Water Penetration: Not less than 1100 fpm.

c. Air Performance: As indicated in Drawings.

5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.5 FIXED FORMED-METAL LOUVERS

A. Horizontal Nondrainable-Blade Louver:

1. Louver Depth: 4 inches

2. Blade Profile: Blade with center baffle.

3. Frame and Blade Material and Nominal Thickness: Galvanized-steel sheet, not less than 0.052 inch for frames and 0.040 inch for blades.

4. Mullion Type: Fully recessed.

5. Louver Performance Ratings:

a. Free Area: As indicated in Drawings.

b. Air Performance: As indicated in Drawings.

B. Horizontal Drainable-Blade Louver:

1. Louver Depth: 4 inches

2. Frame and Blade Material and Nominal Thickness: Galvanized-steel sheet, not less than 0.052 inch for frames and 0.040 inch for blades.

3. Mullion Type: Exposed.

4. Louver Performance Ratings:

a. Free Area: As indicated in Drawings.

b. Air Performance: As indicated in Drawings.

2.6 LOUVER SCREENS

A. General: Provide screen at each exterior louver.

1. Screen Location for Fixed Louvers: Interior face.

2. Screening Type: Bird screening, except where insect screening is indicated.

B. Secure screen frames to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches from each corner and at 12 inches o.c.

C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.

1. Metal: Same type and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.

2. Finish: Same finish as louver frames to which louver screens are attached.

D. Louver Screening for Aluminum Louvers:

1. Bird Screening: Aluminum, 1/2-inch- square mesh, 0.063-inch wire.

2. Insect Screening: Aluminum, 18-by-16 mesh, 0.012-inch wire.

E. Louver Screening for Galvanized-Steel Louvers:

1. Bird Screening: Galvanized steel, 1/2-inch- square mesh, 0.041-inch wire.

2. Insect Screening: Galvanized steel, 18-by-14 mesh, 0.011-inch wire.

F. Louver Screening for Stainless-Steel Louvers:

1. Bird Screening: Stainless steel, 1/2-inch-square mesh, 0.047-inch wire.

2. Insect Screening: Stainless steel, 18-by-18 mesh, 0.009-inch wire.

2.7 MATERIALS

A. Aluminum Extrusions: ASTM B221, Alloy 6063-T5, T-52, or T6.

B. Aluminum Sheet: ASTM B209, Alloy 3003 or 5005, with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Galvanized-Steel Sheet: ASTM A653, G60 zinc coating, mill phosphatized.

D. Stainless-Steel Sheet: ASTM A240, Type 304

E. Fasteners: Use types and sizes to suit unit installation conditions.

1. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.

2. For fastening galvanized steel, use hot-dip-galvanized-steel or 300 series stainless-steel fasteners.

3. For fastening stainless steel, use 300 series stainless-steel fasteners.

4. For color-finished louvers, use fasteners with heads that match color of louvers.

F. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, fabricated from stainless-steel components, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing according to ASTM E488 conducted by a qualified testing agency.

G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187.

2.8 FABRICATION

A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.

1. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern unless horizontal mullions are indicated.

2. Horizontal Mullions: Provide horizontal mullions at joints unless continuous vertical assemblies are indicated.

C. Maintain equal louver blade spacing, to produce uniform appearance.

D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

1. Frame Type: Channel with backer plates, unless otherwise indicated.

E. Include supports, anchorages, and accessories required for complete assembly.

F. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer, or 72 inches o.c., whichever is less.

1. Fully Recessed Mullions: Where indicated, provide mullions fully recessed behind louver blades. Where length of louver exceeds fabrication and handling limitations, fabricate with close-fitting blade splices designed to permit expansion and contraction.

2. Semirecessed Mullions: Where indicated, provide mullions partly recessed behind louver blades, so louver blades appear continuous. Where length of louver exceeds fabrication and handling limitations, fabricate with interlocking split mullions and close-fitting blade splices designed to permit expansion and contraction.

3. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.

G. Provide subsills made of same material as louvers or extended sills for recessed louvers.

H. Join frame members to each other and to fixed louver blades with fillet welds concealed from view, threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.9 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

B. Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.

1. Color: As selected by Architect from manufacturer's full range.

C. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

D. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

2.10 GALVANIZED-STEEL SHEET FINISHES

A. Finish louvers after assembly.

B. Surface Preparation: Clean surfaces with nonpetroleum solvent, so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating compatible with the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas and repair according to ASTM A780.

C. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 2 mils (0.05 mm).

1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Protect unpainted galvanized- and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 079200 "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers damaged during installation and construction, so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION

SECTION 09 21 16

GYPSUM BOARD WALL ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Gypsum board shaft wall assemblies.

2. Gypsum board fire wall and fire barrier wall assemblies.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.3 ACTION SUBMITTALS

A. Product Data: For each component of gypsum board wall assembly.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and support them on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with gypsum-shaftliner-board manufacturer's written instructions.

B. Do not install finish panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, or mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.

2.2 GYPSUM BOARD SHAFT WALL, FIRE WALL AND FIRE BARRIER WALL ASSEMBLIES

A. Fire-Resistance Rating: As indicated on Drawings.

B. Gypsum Shaftliner Board:

1. Moisture- and Mold-Resistant Type X: ASTM C1396; manufacturer's proprietary fire-resistive liner panels with ASTM D3273 mold-resistance score of 10 as rated according to ASTM D3274, 1-inch thick, and with double beveled long edges.

    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

        1) American Gypsum

        2) CertainTeed Corp.

        3) CertainTeed Gypsum

        4) Continental Building Products, LLC

        5) Georgia-Pacific Gypsum LLC

        6) National Gypsum Company

        7) PABCO Gypsum

        8) USG Corporation

        9) Substitutions: Products meeting the indicated standards of this section, and requirements of indicated fire resistance rated assembly, shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Moisture- and Mold-Resistant, Fiberglass-Mat Faced: ASTM C1658; manufacturer's proprietary fire-resistive liner panels with ASTM D3273 mold-resistance score of 10 as rated according to ASTM D3274, 1 inch thick, and with double beveled long edges.

    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

        1) American Gypsum

        2) CertainTeed Gypsum

        3) Georgia-Pacific Gypsum LLC

        4) USG Corporation

        5) Substitutions: Products meeting the indicated standards of this section, and requirements of indicated fire resistance rated assembly, shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

C. Non-Load-Bearing Steel Framing, General: Complying with ASTM C645 requirements for metal unless otherwise indicated and complying with requirements for fire-resistance-rated assembly indicated.

    1. Protective Coating: ASTM A653, G40 (Z120), hot-dip galvanized unless otherwise indicated.

D. Studs: Manufacturer's standard profile for repetitive, corner, and end members as follows:

    1. Depth: As indicated in fire resistance rated assembly.

    2. Flange width: As indicated in fire resistance rated assembly.

    3. Shape: ‘H’, ‘C-H’, ‘C-T’, or ‘I’ as indicated.

4. Minimum Base-Metal Thickness: 0.018 inch (25-gauge)

    a. Provide minimum 0.030 inch (20-gauge) where required by wall system manufacturer based on wall height.

E. Runner Tracks: Manufacturer's standard J-profile track with manufacturer's standard long-leg length, but at least 2 inches long and matching studs in depth.

1. Minimum Base-Metal Thickness: Matching steel studs

F. Breakaway Clips: 2-inch wide, 0.036-inch-thick aluminum clip with 2-inch and 2-1/4-inch legs unless otherwise indicated in fire resistance rated assembly.

A. Mineral Wool Insulation: Unfaced: ASTM C665, Type I (blankets without membrane facing)

1. Non-combustible in accordance with ASTM E136

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.

3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.

4. Thickness: As indicated.

5. Density: 3.0 pcf, minimum

B. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

    a. CEMCO

    b. ClarkDietrich

    c. Fire Trak Corp.

    d. GCP Applied Technologies, Inc.

    e. Metal-Lite

    f. SCAFCO Steel Stud Company

    g. Substitutions: Products meeting the indicated standards of this section, and requirements of indicated fire resistance rated assembly, shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.3 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with shaft wall manufacturer's written instructions.

B. Trim Accessories: Cornerbead, edge trim, and control joints of material and shapes as specified in Section 09 29 00 "Gypsum Board" that comply with gypsum board shaft wall assembly manufacturer's written instructions for application indicated.

C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.

D. Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on shaft wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.

1. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E488 conducted by a qualified testing agency.

2. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E1190 conducted by a qualified testing agency.

E. Reinforcing: Galvanized-steel reinforcing strips with 0.033-inch minimum thickness of base metal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install gypsum board wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated and manufacturer's written installation instructions.

B. Do not bridge building expansion joints with wall assemblies; frame both sides of expansion joints with furring and other support.

C. Install supplementary framing in gypsum board wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, wall-mounted door stops, and similar items that cannot be supported directly by wall assembly framing.

D. Penetrations: At penetrations in wall, maintain fire-resistance rating of wall assembly.

E. Isolate perimeter of gypsum panels from building structure to prevent cracking of panels while maintaining continuity of fire-rated construction.

F. Firestop Tracks: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

G. Control Joints: Install control joints according to ASTM C840 and in specific locations approved by Architect while maintaining fire-resistance rating of gypsum board shaft wall assemblies.

H. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.3 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, or mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

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SECTION 09 22 16

NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior gypsum board assemblies.

2. Suspension systems for interior gypsum ceilings and soffits.

3. Grid suspension systems for gypsum board ceilings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: Provide materials and construction identical to those tested according to ASTM E 119.

B. STC-Rated Assemblies: Provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C645 requirements for steel unless otherwise indicated.

2. Protective Coating: ASTM A653, G40 (Z120) or manufacturer’s protective coating with equivalent corrosion resistance of ASTM A653, G40 (Z120), hot-dip galvanized unless otherwise indicated.

B. Steel Studs and Tracks: ASTM C 645.

1. Minimum Base-Metal Thickness: As required based on configuration but not less than 25 gauge (0.018 inch, 18 mils).

2. Depth: 3-5/8 inches, 6 inches, or 2-1/2 inches as indicated on Drawings.

C. Slip-Type Head Joints: Where indicated, provide one of the following in thickness not less than indicated for studs and in width to accommodate depth of studs:

1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing vertical movement.

2. Single Long-Leg Track System: ASTM C645 top track with 2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.

3. Double-Track System: ASTM C 645 top outer tracks, inside track with 2-inch deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction fit over inner track.

4. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

D. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

E. Flat Strap and Backing Plate: Galvanized steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base-Metal Thickness: 25 gauge (0.018 inch, 18 mils).

2. Finish: Hot dipped galvanized (ASTM A 653)

F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.

1. Depth: 1-1/2 inches

2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.

G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base-Metal Thickness: 25 gauge (0.018 inch, 18 mils)

2. Depth: 7/8 inch or 1-1/2 inches as indicated on Drawings.

3. Finish: Hot dipped galvanized, G-40 minimum (ASTM A 653)

H. Resilient Furring Channels: As indicated in Gypsum Board Section.

I. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.

1. Depth: 3/4 inch or as indicated on Drawings.

2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch.

3. Tie Wire: ASTM A 641, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.

J. Z-Shaped Furring: With slotted or non-slotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.018 inch, and depth required to fit insulation thickness indicated.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.

B. Hanger Attachments to Concrete:

1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, AC193, AC58, or AC308 as appropriate for the substrate.

a. Uses: Securing hangers to structure.

b. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.

c. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F593, and nuts, ASTM F594.

2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

C. Wire Hangers: ASTM A 641, Class 1 zinc coating, soft temper, 0.16 inch in diameter.

D. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.

E. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch and minimum 1/2-inch-wide flanges.

1. Depth: 2-1/2 inches, 2 inches, or 1-1/2 inches as required based on configuration.

F. Furring Channels (Furring Members):

1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.

2. Steel Studs and Tracks: ASTM C 645. Use either steel studs and runners or dimpled steel studs and runners of equivalent minimum base-metal thickness.

a. Minimum Base-Metal Thickness: As required based on configuration but not less than 25 gauge (0.018 inch, 18 mils)

b. Depth: As indicated on Drawings.

3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.

a. Minimum Base-Metal Thickness: 25 gauge (0.018 inch, 18 mils)

b. Finish: Hot dipped galvanized, G-40 minimum (ASTM A 653)

G. Grid Suspension System for Gypsum Board Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Basis of Design: Drywall Grid Systems by Armstrong Ceilings

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Chicago Metallic Corporation

b. United States Gypsum Company

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide foam gasket, adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8-inch-thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.3 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

   a. Install two studs at each jamb unless otherwise indicated.

   b. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

6. Curved Partitions:

    a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.

    b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches (150 mm) o.c.

E. Direct Furring:

1. Screw to wood framing.

2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

F. Z-Furring Members:

1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c.

2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.4 INSTALLING CEILING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

    a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

3. Do not attach hangers to steel roof deck.

4. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.

5. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.

6. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION

SECTION 09 24 00

CEMENT PLASTERING (3-COAT)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior vertical plasterwork (stucco).

2. Exterior horizontal and nonvertical plasterwork (stucco).

3. Weather-resistive barriers

4. Metal Lath

5. Accessories

1.2 DEFINITIONS

A. Three-Coat Cement Plastering (Three-Coat Stucco): Plasterwork applied with two base coats and one finish coat totaling ¾” to 7/8” total thickness.

1. First base coat is the scratch coat, which forms the bond with the lath or substrate.

2. Second base coat is the brown coat, which provides rough texture ready to receive the finish coat.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each type of factory-prepared finish coat and for each color and texture specified.

1.5 QUALITY ASSURANCE

A. Store materials inside under cover, and keep them dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockups for each substrate and finish texture indicated for cement plastering, including accessories.

2. Build mockup of typical wall area as shown on Drawings.

3. When no mock-up is shown in Drawings, build mockup of typical wall area:

a. Size: 48 inches long by 60 inches high

b. Include outside corner on one end of mockup and inside corner on other end.

4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.6 FIELD CONDITIONS

A. Comply with ASTM C926 requirements.

B. Exterior Plasterwork:

1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.

2. Apply plaster when ambient temperature is greater than 40 deg F.

3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.

C. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: Where indicated, provide cement plaster assemblies identical to those of assemblies tested for fire resistance according to ASTM E119 by a qualified testing agency.

2.2 CEMENT PLASTER MATERIALS

A. Portland Cement: ASTM C150, Type I or Type II.

B. Masonry Cement: ASTM C91, Type N.

C. Lime: ASTM C206, Type S; or ASTM C207, Type S.

D. Sand Aggregate: ASTM C897.

E. Ready-Mixed Finish-Coat Plaster: Mill-mixed portland cement, aggregates, coloring agents, and proprietary ingredients.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. California Stucco Products Corp.

b. El Rey Stucco Solutions; a Parex USA, Inc. brand

c. Florida Stucco

d. LaHabra Stucco Solutions; Parex USA

e. Omega Products International, Inc.

f. QUIKRETE

g. Shamrock Stucco LLC

h. SonoWall, BASF Corp.

i. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Architect approval. Comply with Section 01 25 13

2. Color: As selected by Architect from manufacturer's full range.

F. Acrylic-Based Finish Coatings: Factory-mixed acrylic-emulsion coating systems formulated with colorfast mineral pigments and fine aggregates; for use over cement plaster base coats. Include manufacturer's recommended primers and sealing topcoats for acrylic-based finishes.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. California Stucco Products Corp.

b. Dryvit Systems, Inc.

c. El Rey Stucco Solutions; a Parex USA, Inc. brand

d. Finestone; BASF Corp.

e. Masterwall, Inc.

f. Omega Products International, Inc.

g. Senergy; Master Builders Solutions

h. Shamrock Stucco LLC

i. SonoWall, BASF Corp.

j. Sto Corp.

k. Stuc-O-Flex International, Inc.

l. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Architect approval. Comply with Section 01 25 13

2. Color: As selected by Architect from manufacturer's full range.

2.3 WEATHER RESISTIVE BARRIERS

A. Base Layer: As indicated at Section 07 27 08 “Mechanically Attached Water Resistive Barriers”

B. Second Layer: Rainscreen Drainage Mat

2.4 METAL LATH

A. Expanded-Metal Lath: ASTM C847, cold-rolled carbon-steel sheet with ASTM A653, G60 (Z180), hot-dip galvanized-zinc coating.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Alabama Metal Industries Company (AMICO)

b. CEMCO

c. Clark Dietrich

d. MarinoWARE

e. Phillips Manufacturing Company

f. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Architect approval. Comply with Section 01 25 13

2. Diamond-Mesh Lath: Self-furring, 3.4 lb/sq. yd.

3. Flat-Rib Lath: Rib depth of not more than 1/8 inch, 3.4 lb/sq. yd.

4. 3/8-Inch Rib Lath: 3.4 lb/sq. yd.

B. Wire-Fabric Lath:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Clark Dietrich

b. Davis Wire

c. K-Lath

d. Structa Wire Corp.

e. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Architect approval. Comply with Section 01 25 13

2. Welded-Wire Lath: ASTM C933; self-furring, 1.4 lb/sq. yd.

3. Woven-Wire Lath: ASTM C1032; self-furring, with stiffener wire backing, 1.4 lb/sq. yd.

2.5 ACCESSORIES

A. General: Comply with ASTM C1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.

B. Metal Accessories:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Alabama Metal Industries Company (AMICO)

b. Brand X Metals

c. CEMCO

d. Clark Dietrich

e. MarinoWARE

f. Phillips Manufacturing Company

g. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Architect approval. Comply with Section 01 25 13

2. Foundation Weep Screed: Fabricated from zinc (ASTM B69).

a. Basis of Design: Foundation Weep Screed No. 7 by AMICO

3. Cornerite: Fabricated from metal lath with ASTM A653, G60, hot-dip galvanized-zinc coating.

4. External- (Outside-) Corner Reinforcement: Fabricated from metal lath with ASTM A653, G60, hot-dip galvanized-zinc coating.

5. Cornerbeads: Fabricated from zinc, ASTM B69

a. Smallnose cornerbead with expanded flanges; use unless otherwise indicated.

b. Smallnose cornerbead with perforated flanges; use on curved corners.

c. Smallnose cornerbead with expanded flanges reinforced by perforated stiffening rib; use on columns and for finishing unit masonry corners.

6. Casing Beads: Fabricated from zinc (ASTM B69); square-edged style; with expanded flanges. Provide weep holes at indicated locations.

a. Basis of Design: X-66 Casing Bead by AMICO

7. Control Joints: Fabricated from zinc (ASTM B69); one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.

a. Basis of Design: No. 15 Control Joint by AMICO

8. Two-Piece Expansion Joints: Fabricated from zinc (ASTM B69); formed to produce slip-joint and square-edged reveal that is adjustable from 1/4 to 5/8 inch wide; with perforated flanges.

a. Basis of Design: No. 40, 2-Piece Expansion Joint by AMICO

9. Soffit Drip Edge: Fabricated from galvanized sheet steel; ASTM A653, G90 coating

a. Basis of Design: No. 12 Soffit Drip Edge by CEMCO

2.6 MISCELLANEOUS MATERIALS

A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.

B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch long, free of contaminants, manufactured for use in cement plaster.

C. Bonding Compound: ASTM C932.

D. Fasteners for Attaching Metal Lath to Substrates: ASTM C1063.

E. Wire: ASTM A641, Class 1 zinc coating, soft temper, not less than 0.0475-inch diameter unless otherwise indicated.

F. EPS Foam Trim

1. Material: Expanded Polystyrene (EPS) Foam, Type II (ASTM C578)

2. Density: 1.35 lb / cu. ft. min.

3. Flame Spread / Smoke Developed Index: < 25 / <450 (ASTM E84)

2.7 PLASTER MIXES

A. General: Comply with ASTM C926 for applications indicated.

1. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. yd. of cementitious materials.

B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:

1. Portland Cement Mixes:

a. Scratch Coat: For cementitious material, mix 1-part portland cement and 3/4 to 1-1/2 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.

b. Brown Coat: For cementitious material, mix 1-part portland cement and 3/4 to 1-1/2 parts lime. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.

2. Masonry Cement Mixes:

a. Scratch Coat: Mix 1 part masonry cement and 2-1/2 to 4 parts aggregate.

b. Brown Coat: Mix 1 part masonry cement and 3 to 5 parts aggregate, but not less than volume of aggregate used in scratch coat.

3. Portland and Masonry Cement Mixes:

a. Scratch Coat: For cementitious material, mix 1-part portland cement and 1 part masonry cement. Use 2-1/2 to 4 parts aggregate per part of cementitious material.

b. Brown Coat: For cementitious material, mix 1-part portland cement and 1 part masonry cement. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.

C. Base-Coat Mixes for Use over Low-Absorption Unit Masonry and Concrete: Single base (scratch) coat for two-coat plasterwork on low-absorption plaster bases as follows:

1. Portland Cement Mix: For cementitious material, mix 1-part portland cement and 0-to-3/4-part lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.

2. Portland and Masonry Cement Mix: For cementitious material, mix 1-part portland cement and 1 part masonry cement. Use 2-1/2 to 4 parts aggregate per part of cementitious material.

D. Base-Coat Mixes for Use over High-Absorption Unit Masonry and Concrete: Single base (scratch) coat for two-coat plasterwork on high-absorption plaster bases as follows:

1. Portland Cement Mix: For cementitious material, mix 1-part portland cement and 3/4 to 1-1/2 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.

2. Masonry Cement Mix: Use 1 part masonry cement and 2-1/2 to 4 parts aggregate.

3. Portland and Masonry Cement Mix: For cementitious material, mix 1-part portland cement and 1 part masonry cement. Use 2-1/2 to 4 parts aggregate per part of cementitious material.

E. Job-Mixed Finish-Coat Mixes:

1. Portland Cement Mix: For cementitious materials, mix 1-part portland cement and 1-1/2 to 2 parts lime. Use 1-1/2 to 3 parts aggregate per part of cementitious material.

2. Masonry Cement Mix: Use 1 part masonry cement and 1-1/2 to 3 parts aggregate.

3. Portland and Masonry Cement Mix: For cementitious materials, mix 1-part portland cement and 1 part masonry cement. Use 1-1/2 to 3 parts aggregate per part of cementitious material.

F. Factory-Prepared Finish-Coat Mixes: For ready-mixed finish-coat plasters or acrylic-based finish coatings, comply with manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Ensure that exterior sheathing / substrate joints are gapped as required by cement plaster manufacturer’s requirements and as indicated at Section 06 10 00 “Rough Carpentry.”

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

B. Prepare smooth, solid substrates for plaster according to ASTM C926.

3.3 INSTALLATION, GENERAL

A. Fire-Resistance-Rated Assemblies: Install components according to requirements for design designations from listing organization and publication indicated on Drawings.

3.4 INSTALLING METAL LATH

A. Metal Lath: Install according to ASTM C1063.

3.5 INSTALLING ACCESSORIES

A. Install according to ASTM C1063, the Northwest Wall and Ceiling Bureau’s “Stucco Resource Guide,” and at locations indicated on Drawings.

B. Reinforcement for External (Outside) Corners:

1. Install cornerbead at exterior locations.

C. Control Joints: Locate as indicated on Drawings and as follows:

1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:

a. Vertical Surfaces: 144 sq. ft.

b. Horizontal and Other Nonvertical Surfaces: 100 sq. ft.

2. At distances between control joints of not greater than 18 feet o.c.

3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.

4. Where control joints occur in surface of construction directly behind plaster.

5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.

3.6 PLASTER APPLICATION

A. General: Comply with ASTM C926.

1. Do not deviate more than plus or minus 1/4 inch in 10 feet from a true plane in finished plaster surfaces when measured by a 10-foot straightedge placed on surface.

2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.

B. Bonding Compound: Apply on unit masonry and concrete substrates for direct application of plaster.

C. Plaster Finish Coats: Apply to provide finish to match Architect's sample.

D. Acrylic-Based Finish Coatings: Apply coating system, including primers, finish coats, and sealing topcoats, according to manufacturer's written instructions.

E. Concealed Exterior Plasterwork: Where plaster application is used as a base for adhered finishes, omit finish coat.

3.7 EPS FOAM SHAPES AND TRIM APPLICATION

A. EPS Foam Shapes: Install EPS foam board shapes over base coat with manufacturer’s recommended adhesive. Fully cover foam board shape with basecoat / adhesive and embed reinforcing mesh to wet coating.

3.8 PLASTER REPAIRS

A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.9 CLEANING AND PROTECTION

A. Remove temporary protection and enclosure of other work after plastering is complete. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION

SECTION 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.

2. Exterior gypsum board for ceilings and soffits.

3. Tile backing panels.

4. Texture finishes.

1.2 DEFINITIONS

1. Pre-Rock: Drywall installation when the building has not yet been dried-in.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Attendees: Contactors, installer, and representatives of manufacturers and fabricators involved in or affected by the work.

2. Agenda: Review progress of other construction activities, preparation and requirements for installation, specific details mock-ups, sequencing, and scheduling of the work.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Gypsum wallboard.

2. Gypsum board, Type X

3. Gypsum board, Type C.

4. Impact-resistant gypsum board.

5. Mold-resistant gypsum board.

6. Glass-mat interior gypsum board.

7. Acoustically enhanced gypsum board.

8. Exterior gypsum soffit board.

9. Glass-mat, water-resistant backing board.

10. Cementitious backer units.

11. Water-resistant gypsum backing board.

12. Interior trim.

13. Exterior trim.

14. Aluminum trim.

15. Joint treatment materials.

16. Laminating adhesive.

17. Sound-attenuation blankets.

18. Textured finishes.

B. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.

2. Textured Finishes: 12-inch square for each textured finish indicated and on same backing indicated for Work.

C. Schedule: Provide schedule identifying location where product will be utilized.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated in Drawings according to ASTM E119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. American Gypsum
2. CertainTeed
3. Continental Building Products, LLC
4. Georgia-Pacific Gypsum, LLC
5. National Gypsum Company
6. PABCO Gypsum
7. Panel Rey SA
8. USG Corporation
9. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.
    a. Substitutions must meet the fire resistance rating requirements specified in fire resistance rated assemblies referenced in drawings.

C. Gypsum Wallboard: ASTM C1396

1. Thickness: 1/2 inch or 5/8 inch as indicated in Drawings.
2. Long Edges: Tapered

D. Gypsum Board, Type X: ASTM C1396. Manufactured to have increased fire-resistive capability.

1. Thickness: 5/8 inch
2. Long Edges: Tapered

E. Gypsum Board, Type C: ASTM C1396. Manufactured to have increased fire-resistive capability.

1. Thickness: 5/8 inch
2. Long Edges: Tapered.

2.3 SPECIALTY GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. American Gypsum
2. CertainTeed
3. Continental Building Products, LLC
4. Georgia-Pacific Gypsum, LLC
5. National Gypsum Company

6. PABCO Gypsum

7. Panel Rey SA

8. USG Corporation

9. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

    a. Substitutions must meet the fire resistance rating requirements specified in fire resistance rated assemblies referenced in drawings.

B. Glass-Mat Interior Gypsum ('Pre-Rock') Board: ASTM C1658. With fiberglass mat laminated to both sides. Specifically designed for interior use in pre-rock applications.

1. Thickness: 1/2-inch or 5/8-inch as indicated in Drawings.

2. Core: As indicated on Drawings.

    a. Provide fire resistive core if required by assembly indicated in Drawings.

3. Long Edges: Tapered.

4. Mold Resistance: Score of 10 tested in accordance with ASTM D3273, and rated according to ASTM D3274.

C. Impact-Resistant Gypsum Board: ASTM C1396 gypsum board, tested according to ASTM C1629.

1. Thickness: 5/8-inch

2. Core: Type X.

3. Soft-Body Impact: ASTM C1629, meets or exceeds Level 1 requirements.

4. Hard-Body Impact: ASTM C1629, meets or exceeds Level 1 requirements according to test in Annex A1.

5. Long Edges: Tapered.

6. Mold Resistance: Score of 10 tested in accordance with ASTM D3273, and rated according to ASTM D3274.

D. Moisture / Mold-Resistant Gypsum Board: ASTM C1396. With moisture- and mold-resistant core and paper surfaces.

1. Thickness: 5/8-inch

2. Core: Type X.

3. Long Edges: Tapered.

4. Mold Resistance: Score of 10 tested in accordance with ASTM D3273, and rated according to ASTM D3274.

E. Acoustically Enhanced Gypsum Board: ASTM C1396 and ASTM C1766. Multilayer products constructed of two layers of gypsum boards sandwiching a viscoelastic sound-absorbing polymer core.

1. Thickness: 1/2-inch or 5/8-inch as indicated in Drawings.

2. Core: As indicated on Drawings.

a. Provide fire resistive core if required by assembly indicated in Drawings.

3. Long Edges: Tapered.

4. Mold Resistance: Score of 10 tested in accordance with ASTM D3273, and rated according to ASTM D3274.

2.4 EXTERIOR GYPSUM BOARD FOR CEILINGS AND SOFFITS

A. Exterior Gypsum Soffit Board: ASTM C1396, with manufacturer's standard edges.

1. Thickness: As indicated on Drawings.

2. Core: As indicated on Drawings.

a. Provide fire resistive core if required by assembly indicated in Drawings.

2.5 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board: ASTM C1178, with manufacturer's standard edges.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. CertainTeed Corporation

b. Georgia-Pacific Gypsum LLC

c. National Gypsum Company

d. USG Corporation

e. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Thickness: As indicated on Drawings.

3. Core: As indicated on Drawings.

a. Provide fire resistive core if required by assembly indicated in Drawings.

4. Mold Resistance: Score of 10 tested in accordance with ASTM D3273, and rated according to ASTM D3274.

B. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. CertainTeed Corporation

b. James Hardie Building Products, Inc.

c. National Gypsum Company

d. USG Corporation

e. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Thickness: As indicated on Drawings.

3. Mold Resistance: Score of 10 tested in accordance with ASTM D3273, and rated according to ASTM D3274.

C. Water-Resistant Gypsum Backing Board: ASTM C1396, with manufacturer's standard edges.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. American Gypsum

b. Continental Building Products, LLC

c. Georgia-Pacific Gypsum LLC

d. National Gypsum Company

e. Panel Rey SA

f. USG Corporation

g. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Thickness: As indicated on Drawings.

3. Core: As indicated on Drawings.

a. Provide fire resistive core if required by assembly indicated in Drawings.

4. Mold Resistance: Score of 10 tested in accordance with ASTM D3273, and rated according to ASTM D3274.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet

2. Shapes:

a. Cornerbead.

b. Bullnose bead.

c. LC-Bead: J-shaped; exposed long flange receives joint compound.

d. L-Bead: L-shaped; exposed long flange receives joint compound.

e. U-Bead: J-shaped; exposed short flange does not receive joint compound.

f. Expansion (control) joint.

g. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Exterior Trim: ASTM C1047.

1. Material: Hot-dip galvanized-steel sheet, plastic, or rolled zinc.

2. Shapes:

a. Cornerbead.

b. LC-Bead: J-shaped; exposed long flange receives joint compound.

c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

C. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. ClarkDietrich

b. Flannery, Inc.

c. Fry Reglet Corp.

d. Gordon, Inc.

e. Pittcon Industries

f. Tamlyn

g. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221, Alloy 6063-T5.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475.

B. Joint Tape:

1. Interior Gypsum Board: Paper.

2. Exterior Gypsum Soffit Board: Paper.

3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.

4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

D. Joint Compound for Exterior Applications:

1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.

2. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

E. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

2. Cementitious Backer Units: As recommended by backer unit manufacturer.

3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.8 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.

1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Resilient Channels:

1. Basis of Design: RC Deluxe by ClarkDietrich

a. Material: ASTM C645, Galvanized sheet steel, G40 coating thickness (min)

b. Gauge: 25-gauge (18 mils) minimum

c. Depth: 1/2-inch

E. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

F. Thermal Insulation: As specified in Section 07 21 00 "Building Insulation."

2.9 TEXTURE FINISHES

A. Primer: As recommended by textured finish manufacturer.

B. Texture: As indicated in Finish level / texture finish schedule.

C. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. CertainTeed Corporation

2. Georgia-Pacific Gypsum LLC

3. National Gypsum Company

4. USG Corporation

D. Polystyrene Aggregate Ceiling Finish: Water-based, job-mixed, polystyrene aggregate finish with flame-spread and smoke-developed indexes of not more than 25 when tested according to ASTM E84.

E. Aggregate Finish: Water-based, job-mixed, aggregated, drying-type texture finish for spray application.

F. Non-Aggregate Finish: Premixed, vinyl texture finish for spray application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

A. Comply with ASTM C840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.

2. Fit gypsum panels around ducts, pipes, and conduits.

3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

J. Fire-Rated Assemblies: Install gypsum panels and accessories in accordance with manufacturer's instructions and in accordance with requirements of tested assembly indicated in Drawings

K. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

L. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

A. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.

2. On partitions/walls, apply gypsum panels oriented according to manufacturer's recommendation unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

   a. Stagger abutting end joints not less than one framing member in alternate courses of panels.

   b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.

4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

B. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.

2. On partitions/walls, apply gypsum board indicated for base layers and face layers oriented according to manufacturer's recommendation, with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.

4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

C. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

D. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch-long straight sections at ends of curves and tangent to them.

2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

3.4 INSTALLATION OF EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS

A. Apply panels perpendicular to supports, with end joints staggered and located over supports.

1. Perimeter Relief:

a. Install with 1/4-inch open space where panels abut other construction or structural penetrations and seal open space with sealant and backer rod; or

b. Install perimeter trim accessory as indicated in Drawings.

2. Fasten with corrosion-resistant screws.

3.5 INSTALLATION OF TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at showers, tubs, and other indicated locations to receive tile. Install with 1/4-inch gap where panels abut other construction or penetrations.

B. Cementitious Backer Units: ANSI A108.11, at showers, tubs, and other indicated locations to receive tile.

C. Water-Resistant Backing Board: Install where indicated with 1/4-inch gap where panels abut other construction or penetrations.

D. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.6 INSTALLATION OF GLASS-MAT INTERIOR ‘PRE-ROCK’ GYPSUM PANELS

A. General: Comply with manufacturer’s written instructions.

B. Installation of horizontal ‘pre-rock’ assemblies is not allowed.

C. Fasten with corrosion-resistant screws.

3.7 INSTALLATION OF TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings and according to ASTM C840.

1. Walls and Ceilings: Provide control joints spaced not more than 30 feet apart.

2. Fire Rated Construction: Provide gypsum board blocking or intumescent-type control joint accessory in order to maintain integrity of fire rated assembly.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.

2. LC-Bead: Use at exposed panel edges and other indicated locations.

3. L-Bead: Use where indicated.

4. Curved-Edge Cornerbead: Use at curved openings.

D. Exterior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.

2. LC-Bead: Use at exposed panel edges and other indicated locations.

E. Aluminum Trim: Install in locations indicated on Drawings.

3.8 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.

E. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

F. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.9 INSTALLATION OF TEXTURE FINISHES

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.

C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written instructions.

3.10 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

3.11 TEXTURE AND FINISH SCHEDULE – WALLS AND CEILINGS

A. Dwelling Units

1. Finish Level: Level 3

2. Texture: Orange peel

B. Building Corridors / Building Common Spaces

1. Finish Level: Level 3

2. Texture: Orange peel

C. Clubhouse / Leasing Center

1. Finish Level: Level 4

2. Texture: Spatter knock-down

3. Verify clubhouse / leasing center finish level and texture with Owner’s Interior Design consultant.

D. Tenant Storage Closets

1. Finish Level: Level 3

2. Texture: Orange peel

E. Mechanical Closets

1. Finish Level: Level 3

2. Texture: Orange peel

F. Concealed Spaces

1. Finish Level: Level 2

a. Provide higher finish level when required at fire resistance rated assemblies

2. Texture: None

END OF SECTION

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SECTION 09 30 13

CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Quarry tile.
2. Pressed floor tile.
3. Porcelain tile.
4. Glazed wall tile.
5. Tile backing panels.
6. Waterproof membranes.
7. Crack isolation membranes.

1.2 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. Face Size: Actual tile size, excluding spacer lugs.

C. Module Size: Actual tile size plus joint width indicated.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated

1.6 QUALITY ASSURANCE

A. Conform with applicable provisions within TCA Handbook for Ceramic Tile Installation.

B. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

C. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

D. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

E. Store liquid materials in unopened containers and protected from freezing.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Tile: Obtain tile of each type from single source or producer.

1. Obtain tile of each type from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.

1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.

2. Obtain waterproof membrane and crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:

1. Waterproof membrane.

2. Crack isolation membrane.

3. Cementitious backer units.

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

1. Where tile is indicated for installation on exteriors or in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

2.3 TILE PRODUCTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. American Marazzi Tile, Inc.
2. American Olean; a division of Dal-Tile Corp.
3. Crossville, Inc.
4. Daltile
5. Endicott Tile LLC
6. Florida Brick & Clay Company, Inc.
7. Florida Tile, Inc.
8. Grupo Porcelanite
9. Interceramic
10. Jeffrey Court Inc.
11. Metropolitan Ceramics
12. Portobello America, Inc.
13. Quarry Tile Co.
14. Seneca Tiles, Inc.
15. Sonoma Tilemakers
16. Unites States Ceramic Tile Company
17. Vitromex USA
18. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Square-Edged Quarry Tile:

1. Face Size: As selected by Interior Design consultant from manufacturer's full range.
2. Slip Resistance: Provide slip resistant tile when tile is used on surfaces that may be regularly walked on when wet.
    a. Dynamic Coefficient of Friction: Not less than 0.42
3. Tile Color and Pattern: As selected by Interior Design consultant from manufacturer's full range.
4. Grout Color: As selected by Interior Design consultant from manufacturer's full range.
5. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as needed based on application, selected from manufacturer's standard shapes.

C. Pressed Floor Tile:

1. Composition: Natural clay or porcelain.

    a. Impervious or vitreous tiles as indicated in Interior Design Drawings.

2. Face Size: As selected by Interior Design consultant from manufacturer's full range.

3. Face Size Variation: Calibrated or rectified where designated by Interior Design.

4. Face and Edges: As indicated in Interior Design Drawings.

5. Slip Resistance: Provide slip resistant tile when tile is used on surfaces that may be regularly walked on when wet.

    a. Dynamic Coefficient of Friction: Not less than 0.42

6. Tile Color and Pattern: As selected by Interior Design consultant from manufacturer's full range.

7. Grout Color: As selected by Interior Design consultant from manufacturer's full range.

8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as needed based on application, selected from manufacturer's standard shapes.

D. Porcelain Tile:

1. Certification: Tile certified by the Porcelain Tile Certification Agency.

2. Face Size: As selected by Interior Design consultant from manufacturer's full range.

3. Face Size Variation: Rectified where designated by Interior Design.

4. Face and Edges: As indicated in Interior Design Drawings.

5. Slip Resistance: Provide slip resistant tile when tile is used on surfaces that may be regularly walked on when wet.

    a. Dynamic Coefficient of Friction: Not less than 0.42

6. Tile Color, Glaze, and Pattern: As selected by Interior Design consultant from manufacturer's full range.

7. Grout Color: As selected by Interior Design consultant from manufacturer's full range.

8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as needed based on application, selected from manufacturer's standard shapes.

E. Glazed Wall Tile Type:

1. Module Size: As selected by Interior Design consultant from manufacturer's full range.

2. Face Size Variation: Rectified where designated by Interior Design.

3. Face and Edges: As indicated in Interior Design Drawings.

4. Tile Color and Pattern: As selected by Interior Design consultant from manufacturer's full range.

5. Grout Color: As selected by Interior Design consultant from manufacturer's full range.

6. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as needed based on application, selected from manufacturer's standard shapes.

2.4 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 or ASTM C1325, Type A, in maximum lengths available to minimize end-to-end butt joints.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. C-Cure

b. Custom Building Products

c. FinPan, Inc.

d. Georgia-Pacific Gypsum, LLC

e. USG Corporation

f. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Fiber-Cement Backer Board: ASTM C1288, in maximum lengths available to minimize end-to-end butt joints.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. CertainTeed Corp.

b. Custom Building Products

c. James Hardie Building Products, Inc.

d. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.5 WATERPROOF MEMBRANES

A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Waterproof Membrane, PVC Sheet: PVC heat-fused on both sides to facings of nonwoven polyester.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Compotite Corporation

b. Noble Company

c. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Nominal Thickness: 0.025 inch (min)

C. Waterproof Membrane, Polyethylene Sheet: Polyethylene faced on both sides with fleece webbing; 0.008-inch nominal thickness.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Schluter Systems, LP

b. Schonox; HPS North America, Inc.

c. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

D. Waterproof Membrane, Fabric-Reinforced, Modified-Bituminous Sheet: Self-adhering, SBS-modified-bituminous sheet with fabric reinforcement facing; 0.040-inch nominal thickness.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Boiardi Products Corp.; a QEP company

b. HB Fuller Construction Products Inc. / TEC

c. National Applied Construction Products, Inc.

d. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

E. Waterproof Membrane, Fabric-Reinforced, Fluid-Applied: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Boiardi Products Corp.; a QEP company

b. Bostik, Inc.

c. Custom Building Products

d. HB Fuller Construction Products Inc. / TEC

e. Laticrete International, Inc.

f. MAPEI Corp.

g. Merkrete; a Parex USA, Inc. brand

h. Sakrete

i. Schonox; HPS North America, Inc.

j. Southern Grouts & Mortars, Inc.

k. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

F. Waterproof Membrane, Fluid-Applied: Liquid-latex rubber or elastomeric polymer.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. ARDEX Americas

b. Boiardi Products Corp.; a QEP company

c. Bostik, Inc.

d. C-Cure

e. Custom Building Products

f. HB Fuller Construction Products Inc. / TEC

g. Laticrete International, Inc.

h. MAPEI Corp.

i. Merkrete; a Parex USA, Inc. brand

j. National Applied Construction Products, Inc.

k. Sakrete

l. Siena Products; Omega

m. Southern Grouts & Mortars, Inc.

n. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

G. Latex-Portland Cement Waterproof Mortar: Flexible, waterproof mortar consisting of cement-based mix and latex additive.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. ARDEX Americas

b. Boiardi Products Corp.; a QEP company

c. C-Cure

d. HB Fuller Construction Products Inc. / TEC

e. Laticrete International, Inc.

f. MAPEI Corp.

g. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.6 CRACK ISOLATION MEMBRANES

A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for standard performance is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Crack Isolation Membrane, PVC Sheet: PVC heat-fused on both sides to facings of nonwoven polyester; 0.040-inch nominal thickness.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Compotite Corp.

b. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

C. Crack Isolation Membrane, Polyethylene Sheet: Polyethylene faced on both sides with fleece webbing; 0.008-inch nominal thickness.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Schluter Systems, LP

b. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

D. Corrugated Polyethylene: Corrugated polyethylene with dovetail-shaped corrugations and with anchoring webbing on the underside; 3/16-inch nominal thickness.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. ARDEX Americas

b. Custom Building Products

c. Schluter Systems, LP

d. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

E. Crack Isolation Membrane, Fabric-Reinforced, Modified-Bituminous Sheet: Self-adhering, modified-bituminous sheet with fabric reinforcement facing; 0.040-inch nominal thickness.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Boiardi Products Corp.; a QEP company

b. Custom Building Products

c. MAPEI Corp.

d. National Applied Construction Products, Inc.

e. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

F. Crack Isolation Membrane, Fabric-Reinforced, Fluid-Applied: System consisting of liquid-latex rubber or elastomeric polymer and fabric reinforcement.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Boiardi Products Corp.; a QEP company

b. Bostik, Inc.

c. Custom Building Products

d. HB Fuller Construction Products Inc. / TEC

e. Laticrete International, Inc.

f. MAPEI Corp.

g. Merkrete; a Parex USA, Inc. brand

h. Sakrete

i. Southern Grouts & Mortars, Inc.

j. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

G. Crack Isolation Membrane, Fluid-Applied: Liquid-latex rubber or elastomeric polymer.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Bostik, Inc.

b. C-Cure

c. Custom Building Products

d. HB Fuller Construction Products Inc. / TEC

e. Laticrete International, Inc.

f. MAPEI Corp.

g. Merkrete; a Parex USA, Inc. brand

h. Siena Products; Omega

i. Southern Grouts & Mortars, Inc.

j. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

H. Latex-Portland Cement Crack-Resistant Mortar: Flexible mortar consisting of cement-based mix and latex additive.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

    a. ARDEX Americas

    b. Boiardi Products Corp.; a QEP company

    c. C-Cure

    d. HB Fuller Construction Products Inc. / TEC

    e. MAPEI Corp.

    f. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.7 SETTING MATERIALS

A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.

1. Cleavage Membrane: Asphalt felt, ASTM D226, Type I (No. 15); or polyethylene sheeting, ASTM D4397, 4.0 mils thick.

2. Reinforcing Wire Fabric: Galvanized, welded-wire fabric, 2 by 2 inches by 0.062-inch diameter; comply with ASTM A185 and ASTM A82, except for minimum wire size.

3. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.

B. Standard Dry-Set Mortar (Thinset): ANSI A118.1.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

    a. Boiardi Products Corp.; a QEP company

    b. Bostik, Inc.

    c. C-Cure

    d. Custom Building Products

    e. HB Fuller Construction Products Inc. / TEC

    f. Laticrete International, Inc.

    g. MAPEI Corp.

    h. Sakrete

    i. Siena Products; Omega

    j. Southern Grouts & Mortars, Inc.

    k. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.1.

C. Modified Dry-Set Mortar (Thinset): ANSI A118.4.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. ARDEX Americas

b. Boiardi Products Corp.; a QEP company

c. Bostik, Inc.

d. C-Cure

e. Custom Building Products

f. HB Fuller Construction Products Inc. / TEC

g. Laticrete International, Inc.

h. MAPEI Corp.

i. Merkrete; a Parex USA, Inc. brand

j. Sakrete

k. Siena Products; Omega

l. Southern Grouts & Mortars, Inc.

m. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

2.8 GROUT MATERIALS

A. Standard Cement Grout: ANSI A118.6.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. ARDEX Americas

b. Boiardi Products Corp.; a QEP company

c. Bostik, Inc.

d. C-Cure

e. Custom Building Products

f. HB Fuller Construction Products Inc. / TEC

g. Laticrete International, Inc.

h. MAPEI Corp.

i. Sakrete

j. Siena Products; Omega

k. Southern Grouts & Mortars, Inc.

l. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. High-Performance Tile Grout: ANSI A118.7.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. ARDEX Americas

b. Boiardi Products Corp.; a QEP company

c. Bostik, Inc.

d. C-Cure

e. Custom Building Products

f. HB Fuller Construction Products Inc. / TEC

g. Laticrete International, Inc.

h. MAPEI Corp.

i. Sakrete

j. Southern Grouts & Mortars, Inc.

k. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.9 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Vapor-Retarder Membrane: Polyethylene sheeting, ASTM D4397, 4.0 mils thick.

C. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base; white zinc alloy, nickel silver, stainless steel, ASTM A276 or ASTM A666, 300 Series exposed-edge material.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Blanke Corporation

b. Ceramic Tool Company, Inc.

c. Schluter Systems, LP

d. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

E. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

2.10 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.

2. Verify that concrete substrates for tile floors installed with adhesives, bonded mortar bed, or thin set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.

b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.

4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives or thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproof membrane by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION OF CERAMIC TILE

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.

E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.

3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

F. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

G. Metal Edge Strips: Install at locations indicated and where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

3.4 INSTALLATION OF TILE BACKING PANELS

A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use modified dry-set mortar for bonding material unless otherwise directed in manufacturer's written instructions.

3.5 INSTALLATION OF WATERPROOF MEMBRANES

A. Install waterproof membrane to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

B. Allow waterproof membrane to cure and verify by testing that it is watertight before installing tile or setting materials over it.

3.6 INSTALLATION OF CRACK ISOLATION MEMBRANES

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

3.7 ADJUSTING AND CLEANING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.

2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.8 PROTECTION

A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

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SECTION 09 51 13

ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Acoustical panels for interior ceilings at food preparation spaces.

2. Fully concealed, direct-hung, suspension systems.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Ceiling suspension-system members.

2. Structural members to which suspension systems will be attached.

3. Method of attaching hangers to building structure.

4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.

5. Size and location of initial access modules for acoustical panel.

6. Items penetrating finished ceiling and ceiling-mounted items including the following:

a. Lighting fixtures.

b. Diffusers.

c. Grilles.

d. Sprinklers.

e. Access panels.

f. Perimeter moldings.

7. Minimum Drawing Scale: 1/8 inch = 1 foot

B. Qualification Data: For testing agency.

C. Product Test Reports: For each acoustical panel ceiling, for tests performed by a qualified testing agency.

D. Evaluation Reports: For each acoustical panel ceiling suspension system, from ICC-ES.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.

2. Suspension-System Components: Quantity of each concealed grid and exposed component equal to 2 percent of quantity installed.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations:

1. Suspended Acoustical Panel Ceilings: Obtain each type of acoustical ceiling panel and its suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less, Class A according to ASTM E84.

2. Smoke-Developed Index: 50 or less, Class A according to ASTM E84.

C. Fire-Resistance Ratings: When products are part of a fire-resistance rated assembly, comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL or from the listings of another qualified testing agency.

D. Meet Food Safety and Inspection Service (FISS) / USDA requirements for food processing areas.

2.3 ACOUSTICAL PANELS

A. Basis of Design: Kitchen Zone by Armstrong Ceilings

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Armstrong Ceilings; Armstrong World Industries, Inc.

2. CertainTeed Corporation

3. United States Gypsum Company

4. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

C. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E1264 classifications as designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

D. Composition: Mineral fiber base with scrubbable finish, resistant to heat, moisture, and corrosive fumes.

1. Type and Form: Type IX, Form 2

2. Pattern: G (smooth)

E. Color: White

F. Light Reflectance (LR): Not less than 0.80.

G. Ceiling Attenuation Class (CAC): Not less than 30.

H. Edge/Joint Detail: Square; butt joint.

I. Thickness: 5/8-inch

J. Modular Size: 24 by 48 inches

K. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.

2.4 METAL SUSPENSION SYSTEM

A. Basis of Design: Prelude XL by Armstrong Ceilings

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Armstrong Ceilings; Armstrong World Industries, Inc.

2. CertainTeed Corporation

3. United States Gypsum Company

4. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

C. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, fully concealed, metal suspension system and accessories of type, structural classification, and finish indicated that complies with applicable requirements in ASTM C635.

D. Direct-Hung, Double-Web, Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, hot-dip galvanized, G30 (Z90) coating designation. Aluminum capped.

1. Structural Classification: Intermediate duty system.

2. Color: White

3. Access: Upward and end pivoted or side pivoted, with initial access openings of size indicated below and located throughout ceiling within each module formed by main and cross runners, with additional access available by progressively removing remaining acoustical panels.

a. Initial Access Opening: In each module, 24 by 24 inches (min)

2.5 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five (5) times that imposed by ceiling construction, as determined by testing according to ASTM E488 or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency.

a. Type: Cast-in-place, postinstalled expansion or postinstalled bonded anchors.

b. Corrosion Protection: Carbon-steel components zinc plated according to ASTM B633, Class SC 1 (mild) service condition.

c. Corrosion Protection: Stainless-steel components complying with ASTM F593 and ASTM F594, Group 1 Alloy 304 or 316.

2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to ten (10) times that imposed by ceiling construction, as determined by testing according to ASTM E1190, conducted by a qualified testing and inspecting agency.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A641, Class 1 zinc coating, soft temper.

2. Stainless-Steel Wire: ASTM A580, Type 304, nonmagnetic.

3. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635, Table 1, "Direct Hung"), but not less than 0.106-inch-diameter wire.

C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

E. When required based on Project conditions, provide the following seismic accessories:

1. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.

2. Seismic Struts: Manufacturer's standard compression struts designed to accommodate lateral forces.

3. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical panels in-place during a seismic event.

2.6 METAL EDGE MOLDINGS AND TRIM

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Armstrong Ceilings; Armstrong World Industries, Inc.

2. CertainTeed Corporation

3. Fry Reglet Corporation

4. Gordon, Inc.

5. United States Gypsum Company

6. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations complying with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for of suspension-system runners.

1. For circular penetrations of ceiling, unless otherwise required based on seismic design requirements, provide edge moldings fabricated to diameter required to fit penetration exactly.

2. Finish: Painted to match color of acoustical unit.

C. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements.

1. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils (0.04 mm). Comply with ASTM C635 and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

2.7 ACOUSTICAL SEALANT

A. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834.

1. Colors for Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer’s full range of colors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing and substrates to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION OF SUSPENDED ACOUSTICAL PANEL CEILINGS

A. Install suspended acoustical panel ceilings according to ASTM C636, seismic design requirements, and manufacturer's written instructions.

1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.

2. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.

4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.

7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.

8. Do not attach hangers to steel deck tabs.

9. Do not attach hangers to steel roof deck. Attach hangers to structural members.

10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.

11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.

3. Avoid exposed fasteners, including pop rivets, on moldings and trim.

D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Install acoustical panels in coordination with suspension system and exposed moldings and trim. Place splines or suspension-system flanges into kerfed edges of panels so panel-to-panel joints are interlocked.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/4 inch in 10 feet, non-cumulative.

B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system.

3.5 ADJUSTING

A. Clean exposed surfaces of acoustical panel ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace panels and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

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SECTION 09 56 13

EXTERIOR GYPSUM PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Gypsum based acoustical panels for sheltered, exterior ceilings not directly exposed to weather.

2. Fully concealed, direct-hung, suspension systems.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Ceiling suspension-system members.

2. Structural members to which suspension systems will be attached.

3. Method of attaching hangers to building structure.

4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.

5. Size and location of initial access modules for exterior gypsum panel.

6. Items penetrating finished ceiling and ceiling-mounted items including the following:

a. Lighting fixtures.

b. Diffusers.

c. Grilles.

d. Sprinklers.

e. Access panels.

f. Perimeter moldings.

7. Minimum Drawing Scale: 1/8 inch = 1 foot

B. Qualification Data: For testing agency.

C. Product Test Reports: For each exterior gypsum panel ceiling, tests performed by a qualified testing agency.

D. Evaluation Reports: For each exterior gypsum panel ceiling suspension system, from ICC-ES.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Gypsum Panel Ceiling Units: Full-size panels equal to 2 percent of quantity installed.

2. Suspension-System Components: Quantity of each concealed grid and exposed component equal to 2 percent of quantity installed.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver exterior gypsum panels, suspension-system components, and accessories to Project site and store them in a space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install exterior gypsum panel ceilings until wet-work in spaces is complete and dry, work above ceilings is complete, and conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations:

1. Suspended Exterior Gypsum Panel Ceilings: Obtain each type of gypsum ceiling panel and its suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less, Class A according to ASTM E84.

2. Smoke-Developed Index: 50 or less, Class A according to ASTM E84.

C. Fire-Resistance Ratings: When products are part of a fire-resistance rated assembly, comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL or from the listings of another qualified testing agency.

2.3 EXTERIOR GYPSUM PANELS

A. Basis of Design: Vinylrock by CertainTeed

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Armstrong Ceilings; Armstrong World Industries, Inc.

2. CertainTeed Corporation

3. United States Gypsum Company

4. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

C. Exterior Gypsum Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E1264 classifications as designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

D. Composition: Vinyl-faced with gypsum core, scrubbable, resistant to heat, moisture, and corrosive fumes.

1. Type and Form: Type XX

2. Pattern: G (smooth)

E. Color: White

F. Light Reflectance (LR): Not less than 0.80.

G. Edge/Joint Detail: Square; butt joint.

H. Thickness: 5/8-inch

I. Modular Size: As indicated on Drawings

J. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.

2.4 METAL SUSPENSION SYSTEM

A. Basis of Design: EZ Stab Classic, Environmental System by CertainTeed

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Armstrong Ceilings; Armstrong World Industries, Inc.

2. CertainTeed Corporation

3. United States Gypsum Company

4. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

C. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, fully concealed, metal suspension system and accessories of type, structural classification, and finish indicated that complies with applicable requirements in ASTM C635.

D. Direct-Hung, Double-Web Suspension System: Main and cross runners roll formed cold-rolled steel sheet, hot-dip galvanized, G60 coating designation, aluminum capped.

1. Structural Classification: Heavy-duty system.

2. Color: White

3. Access: Upward and end pivoted or side pivoted, with initial access openings of size indicated below and located throughout ceiling within each module formed by main and cross runners, with additional access available by progressively removing remaining gypsum panels.

a. Initial Access Opening: In each module, 24 by 24 inches (min)

2.5 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five (5) times that imposed by ceiling construction, as determined by testing according to ASTM E488 or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency.

a. Type: Cast-in-place, postinstalled expansion or postinstalled bonded anchors.

b. Corrosion Protection: Carbon-steel components zinc plated according to ASTM B633, Class SC 1 (mild) service condition.

c. Corrosion Protection: Stainless-steel components complying with ASTM F593 and ASTM F594, Group 1 Alloy 304 or 316.

2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to ten (10) times that imposed by ceiling construction, as determined by testing according to ASTM E1190, conducted by a qualified testing and inspecting agency.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A641, Class 1 zinc coating, soft temper.

2. Stainless-Steel Wire: ASTM A580, Type 304, nonmagnetic.

3. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635, Table 1, "Direct Hung"), but not less than 0.081-inch-diameter wire (12-gauge).

C. Compression Posts:

1. 3/4-inch, zinc-coated electric metal tube (EMT) conduit with manufacturer’s recommended compression post adapter.

2. 1-5/8-inch or 2-1/2-inch, 20-gauge metal stud or track.

D. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

E. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

F. Hold-Down Clip: Manufacturer’s standard, adjustable hold-down clip, zinc coated or protected with rust-inhibitive paint.

G. When required based on Project conditions, provide the following seismic accessories:

1. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.

2. Seismic Struts: Manufacturer's standard compression struts designed to accommodate lateral forces.

3. Seismic Clips: Manufacturer's standard seismic clips designed to secure gypsum panels in-place during a seismic event.

2.6 METAL EDGE MOLDINGS AND TRIM

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Armstrong Ceilings; Armstrong World Industries, Inc.

2. CertainTeed Corporation

3. Fry Reglet Corporation

4. Gordon, Inc.

5. United States Gypsum Company

6. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations complying with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for of suspension-system runners.

1. For circular penetrations of ceiling, unless otherwise required based on seismic design requirements, provide edge moldings fabricated to diameter required to fit penetration exactly.

2. Finish: Painted to match color of gypsum panel.

C. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements.

1. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils (0.04 mm). Comply with ASTM C635 and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing and substrates to which exterior gypsum panel ceilings attach or abut, with Installer present, for compliance with requirements specified

in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject exterior gypsum panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of gypsum panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION OF SUSPENDED EXTERIOR GYPSUM PANEL CEILINGS

A. Install suspended exterior gypsum panel ceilings according to ASTM C636, ASTM E580, seismic design requirements, and manufacturer's written instructions.

1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.

B. Install suspended exterior gypsum panel ceilings to resist wind pressures indicated in structural Drawings.

C. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers and compression posts plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.

2. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.

4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

6. Space hangers and compression posts to resist indicated wind pressures, but not more than 24 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.

7. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

D. Install edge moldings and trim of type indicated at perimeter of exterior gypsum panel ceiling area and where necessary to conceal edges of exterior gypsum panels.

1. Apply sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.

3. Avoid exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install exterior gypsum panels in coordination with suspension system and exposed moldings and trim.

1. Install hold-down and seismic clips in areas indicated; space according to panel manufacturer’s written instructions unless otherwise indicated.

a. Hold-Down Clips: Space 24-inches o.c. on all cross runners.

2. Install hold-down nails to resist indicated wind pressures, according to manufacturer’s instructions.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/4 inch in 10 feet, non-cumulative.

B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system.

3.5 ADJUSTING

A. Clean exposed surfaces of exterior gypsum panel ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace panels and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

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SECTION 09 64 13

ENGINEERED HARDWOOD FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Factory-finished, engineered wood flooring.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For each type of floor assembly and accessory. Include plans, sections, and attachment details. Include expansion provisions and trim details.

C. Samples: For each exposed product and for each color and texture specified, approximately 12 inches long and of same thickness and material indicated for the Work and showing the full range of normal color and texture variations expected.

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Wood Flooring: Equal to **1** percent of amount installed for each type, color, and finish of wood flooring indicated.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver wood flooring materials in unopened cartons or bundles.

B. Protect wood flooring from exposure to moisture. Do not deliver wood flooring until after concrete, masonry, plaster, ceramic tile, and similar wet-work is complete and dry.

C. Store wood flooring materials in a dry, warm, ventilated, weathertight location.

1.5 FIELD CONDITIONS

A. Conditioning period begins not less than seven days before wood flooring installation, is continuous through installation, and continues not less than seven days after wood flooring installation.

1. Environmental Conditioning: Maintain ambient temperature between 65 and 75 deg F and relative humidity planned for building occupants in spaces to receive wood flooring during the conditioning period.

2. Wood Flooring Conditioning: Move wood flooring into spaces where it will be installed, no later than the beginning of the conditioning period.

a. Do not install flooring until it adjusts to relative humidity of, and is at same temperature as, space where it is to be installed.

B. After conditioning period, maintain relative humidity and ambient temperature planned for building occupants.

C. Install factory-finished wood flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 FACTORY-FINISHED WOOD FLOORING

A. Basis of Design: Refer to Interior Designer’s drawings.

B. Engineered-Wood Flooring: HPVA EF, complying with requirements for composite wood products.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Andersen Hardwood Floors

b. Armstrong World Industries, Inc.

c. Bellawood

d. Boen Hardwood Flooring, Inc.

e. Bruce Hardwood; Armstrong

f. Carlisle Wide Plank Floors

g. EcoTimber

h. Johnsonite; a Tarkett company

i. Mannington Mills, Inc.

j. Mohawk

k. Nydree Flooring

l. Oregon Lumber Company

m. Shaw Floors

n. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Species: As selected by Owner’s Interior Design consultant from manufacturer’s full range.

3. Thickness: 1/2 inch

4. Construction: Five ply.

5. Face Width: Refer to Interior Designer’s drawings.

6. Length: Manufacturer's standard.

7. Edge Style: Square or beveled (eased); as selected by Owner’s Interior Design consultant.

8. Finish: UV urethane or Acrylic impregnated.

a. Color: As selected by Owner’s Interior Design consultant from manufacturer's full range.

2.2 ACCESSORY MATERIALS

A. Wood Flooring Adhesive: Mastic recommended by flooring and adhesive manufacturers for application indicated.

B. Trowelable Leveling and Patching Compound: Latex-modified, hydraulic-cement-based formulation approved by wood flooring manufacturer.

C. Fasteners: As recommended by manufacturer.

D. Thresholds and Saddles: To match wood flooring. Tapered on each side.

E. Reducer Strips: To match wood flooring. 2 inches wide, tapered, and in thickness required to match height of flooring.

F. Cork Expansion Strip: Composition cork strip.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of wood flooring.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Concrete Slabs: Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.

1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas. Utilize one or both of the tests outlined below:

a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.

b. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

c. Perform additional moisture tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

3.2 PREPARATION

A. Concrete Slabs:

1. Grind high spots and fill low spots to produce a maximum 1/8-inch deviation in any direction when checked with a 10-foot straight edge.

2. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.

3. For adhesively applied flooring, remove coatings, including curing compounds, and other substances on substrates that are incompatible with installation adhesives and that contain soap,

wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

B. Broom or vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Comply with flooring manufacturer's written installation instructions.

B. Provide expansion space at walls and other obstructions and terminations of flooring as indicated in manufacturer's written installation instructions.

C. Vapor Retarder: When required by flooring manufacturer, install vapor retarder over substrate in accordance with written installation instructions.

3.4 PROTECTION

A. Protect installed wood flooring during remainder of construction period with covering of heavy kraft paper or other suitable material. Do not use plastic sheet or film that might cause condensation.

1. Do not move heavy and sharp objects directly over kraft-paper-covered wood flooring. Protect flooring with plywood or hardboard panels to prevent damage from storing or moving objects over flooring.

END OF SECTION

SECTION 09 65 00

RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid vinyl floor tile and vinyl composition floor tile.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include exhibits identifying locations where tile is being provided.

C. Samples: Full-size units of each color, texture, and pattern of floor tile required.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials**,** that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.7 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following periods:

1. 48 hours before installation.

2. During installation.

3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Altro Group
2. Armstrong
3. Builders Granite and Tile
4. Johnsonite; a Tarkett Company
5. Kolay Flooring
6. Parterre Flooring Systems
7. Shaw Contract Group
8. VPI Corp.
9. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.2 SOLID VINYL FLOOR TILE

A. Tile Standard: ASTM F1700.

B. Thickness: 0.125 inch (3.2 mm)

C. Size: As selected by Interior Design from manufacturer’s standard sizes.

D. Colors and Patterns: As selected by Interior Design from manufacturer’s standard selections.

E. Installation Method: Adhesive application.

2.3 VINYL COMPOSITION FLOOR TILE

A. Tile Standard: ASTM F1066

B. Wearing Surface: Smooth or embossed, not less than 8 mil.

C. Thickness: 0.125 inch (3.2 mm)

D. Size: As selected by Interior Design from manufacturer’s standard sizes.

E. Colors and Patterns: As selected by Interior Design from manufacturer’s standard selections.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.

3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing.

4. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than one test in each installation area, and with test areas evenly spaced in installation areas. Utilize one or both of the tests outlined below:

a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.

b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Adhere floor tiles to substrates to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:

1. Remove adhesive and other blemishes from surfaces.

2. Sweep and vacuum surfaces thoroughly.

3. Damp-mop surfaces to remove marks and soil.

C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.

E. Cover floor tile until Substantial Completion.

END OF SECTION

SECTION 09 68 00

CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sheet carpeting and cushion.

2. Modular carpet tile.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to carpet installation including, but not limited to, the following:

a. Review delivery, storage, and handling procedures.

b. Review ambient conditions and ventilation procedures.

c. Review subfloor preparation procedures.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics and durability.

2. Include manufacturer's written installation recommendations for each type of substrate.

B. Shop Drawings: For carpet installation, showing the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.

2. Seam locations, types, and methods.

3. Type of subfloor.

4. Type of installation.

5. Pattern type, repeat size, location, direction, and starting point.

6. Pile direction.

7. Types, colors, and locations of insets and borders.

8. Types, colors, and locations of edge, transition, and other accessory strips.

9. Transition details to other flooring materials.

10. Type of carpet cushion.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet: 12-inch-square Sample.

2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.

3. Carpet Cushion: 6-inch-square Sample.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For carpet and carpet cushion, for tests performed by a qualified testing agency.

B. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.

2. Precautions for cleaning materials and methods that could be detrimental to carpet and carpet cushion.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

1.7 PERFORMANCE CHARACTERISTICS:

A. Critical Radiant Flux Classification: Exit enclosures, exit passageways, and corridors:

1. Buildings protected with an automatic sprinkler system, provide carpet in compliance with DOC FF-1 “pill test” (CPSC 16 CFR, Part 1630)

2. Buildings not protected with an automatic sprinkler system, provide carpet with CRF not less than 0.22 W/sq. cm according to NFPA 253.

B. Accessibility: Along accessible routes and in accessible rooms and spaces, provide floor surfaces that are stable, firm, and slip resistant. Securely attach carpet and carpet tiles with firm cushion or backing, or no cushion. Provide carpet with maximum pile thickness of ½-inch and a face construction of level loop, textured loop, level cut, or level/uncut pile.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Comply with the Carpet and Rug Institute's CRI 104.

B. Deliver carpet in original mill protective covering with mill register numbers and tags attached.

1.10 FIELD CONDITIONS

A. Comply with the Carpet and Rug Institute's CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet and carpet cushion until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.

C. Do not install carpet and carpet cushion over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet before installing these items.

PART 2 - PRODUCTS

2.1 SHEET CARPETING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Interface, LLC

2. Mohawk Group; Mohawk Carpet, LLC

3. Shaw Contract Group

4. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Type: Tufted

C. Color: As selected by Interior Design from manufacturer's full range.

D. Pattern: As selected by Interior Design from manufacturer's full range.

E. Face Weight: 25 oz./sq. yd. (minimum)

F. Carpet Cushion

1. Polyurethane-Foam Cushion: Bonded

a. Thickness: 3/8 inch

b. Density: 6 lb/cu. ft. minimum

2. Performance Characteristics:

a. Critical Radiant Flux Classification: Match carpet CRF classification.

2.2 MODULAR CARPET TILE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Atlas Carpet Mills, Inc.

2. Beaulieu Group, LLC

3. Interface, LLC

4. J&J Invision

5. Milliken & Company

6. Mohawk Group; Mohawk Carpet, LLC

7. Shaw Contract Group

8. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Type: Tufted or fusion bonded.

C. Color: As selected by Interior Design from manufacturer's full range.

D. Pattern: As selected by Interior Design from manufacturer's full range.

2.3 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet or carpet cushion manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet and carpet cushion manufacturers.

C. Tackless Carpet Stripping: Water-resistant plywood, in strips as required to match cushion thickness and that comply with the Carpet and Rug Institute's CRI 104.

D. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

E. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance.

B. Examine carpet for type, color, pattern, and potential defects.

C. Concrete Slabs: Verify that finishes comply with requirements and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.

D. Moisture Testing for Adhesively-Applying to Concrete Slabs:

1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.

b. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

c. Perform additional moisture tests recommended in writing by adhesive, carpet cushion, and carpet manufacturers. Proceed with installation only after substrates pass testing.

E. Wood Subfloors: Verify the following:

1. Underlayment over subfloor complies with requirements specified in Section 06 10 00 “Rough Carpentry.”

2. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet manufacturer's written installation instructions for preparing substrates.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.

C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive, carpet, and carpet cushion manufacturers.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

3.3 INSTALLATION

A. Sheet Carpeting: Comply with the Carpet and Rug Institute's CRI 104 and carpet and carpet cushion manufacturers' written installation instructions for the following:

B. Modular Carpet Tile: Comply with the Carpet and Rug Institute's CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.

C. Comply with carpet manufacturer's written instructions and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.

1. Stretch-in Carpet Installation: Install carpet cushion seams at 90-degree angle with carpet seams.

D. Install pattern parallel to walls and borders unless indicated otherwise on Drawings.

E. Install borders with mitered corner seams.

F. Do not bridge building expansion joints with carpet.

G. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.

H. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

I. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet as marked on subfloor. Use nonpermanent, nonstaining marking device.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet:

1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.

2. Remove yarns that protrude from carpet surface.

3. Vacuum carpet using commercial machine with face-beater element.

B. Protect installed carpet to comply with the Carpet and Rug Institute's CRI 104.

C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods recommended in writing by carpet manufacturer and carpet cushion and adhesive manufacturers.

END OF SECTION

SECTION 09 91 13

EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Primers.

2. Finish coatings.

3. Floor sealers and paints.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include preparation requirements and application instructions.

2. Indicate VOC content.

B. Samples: For each type of topcoat product.

C. Product Schedule:

1. Include primer and finish coat product names, color designations, gloss and sheen level, and number of finish coats.

2. When provided in Drawings, use same designations indicated in the Exterior Painting Schedule to cross-reference paint systems specified in this Section. If Schedule is not provided in Drawings, provide schedule listing all major exterior components, including but not limited to the following:

a. Wood siding and trim

b. Fiber-cement siding and trim

c. Exterior gypsum soffit board

d. Balcony and stair rails

e. Miscellaneous metal

f. Patio and balcony doors

g. Concrete masonry units

h. Concrete

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint Products: 5 percent, but not less than 1 gal**.** of each material and color applied.

1.4 QUALITY ASSURANCE

A. Mockups: Apply paint systems indicated and each color and finish selected to mock-up as indicated in Drawings, in order to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. If no mock-up is included in Drawings, Architect will select one surface to represent surfaces and conditions for application of each paint system.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.

b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.

2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent, or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Behr Paint Company

2. Benjamin Moore & Co.

3. California Paint

4. Conoco Paints

5. Coronado Paint; Benjamin Moore & Co.

6. Diamond Vogel Paints

7. Dunn-Edwards Corporation

8. Kelly-Moore Paint Company, Inc.

9. McCormick Paints

10. PPG Paints

11. Pittsburgh Paints

12. Pratt & Lambert

13. Rodda Paint Co.

14. Rust-Oleum

15. Sherwin Williams Company

16. Valspar Corporation

17. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Source Limitations: Obtain each paint product from single source from single manufacturer.

2.2 PAINT PRODUCTS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer based on testing and field experience.

2. For each coat in a paint system, provide products recommended in writing by topcoat manufacturer for use in paint system and on substrate indicated.

B. Colors: As selected by Architect from manufacturer's full range.

2.3 PRIMERS

A. Exterior, Alkali-Resistant, Water-Based Primer: Pigmented, water-based primer formulated for use on alkaline surfaces, such as exterior plaster, vertical concrete, and masonry.

B. Exterior Wood Preservative: Solvent-based, zinc or copper napthenate, penetrating antifungal treatment for exterior wood.

C. Exterior, Latex Wood Primer: White, waterborne-emulsion primer formulated for resistance to extractive bleeding, mold, and microbials; for hiding stains; and for use on exterior wood subject to extractive bleeding.

D. Exterior, Alkyd/Oil Wood Primer: Alkyd/oil-based primer that is resistant to extractive bleeding when applied to wood substrates with less than 15 percent moisture content; formulated for sag, mold, and microbial resistance; for hiding stains; and for use on exterior wood subject to extractive bleeding.

E. Exterior, Latex Block Filler: Water-based, pigmented, high-solids, emulsion coating formulated to bridge and fill porous surfaces of exterior concrete masonry units in preparation for specified subsequent coatings.

1. Minimum Solids Content: Manufacturer's standard percentage solids by volume.

F. Water-Based Bonding Primer: Pigmented, water-based-emulsion primer formulated for exterior use and to promote adhesion of subsequent specified coatings.

G. Solvent-Based Bonding Primer: Pigmented, solvent-based primer formulated for exterior use and to seal substrates and promote adhesion of specified subsequent coatings.

H. Water-Based, Rust-Inhibitive Primer: Corrosion-resistant, water-based-emulsion primer formulated for resistance to flash rusting when applied to cleaned, exterior ferrous metals subject to mildly corrosive environments.

I. Surface-Tolerant Metal Primer: Corrosion-resistant, solvent-based metal primer formulated for use on structural steel and metal fabrications that have been minimally prepared.

J. Quick-Drying, Alkyd Metal Primer: Corrosion-resistant, solvent-based, modified-alkyd primer; lead and chromate free; formulated for quick-drying capabilities and for use on cleaned, exterior steel surfaces.

K. Water-Based, Galvanized-Metal Primer: Corrosion-resistant, pigmented, acrylic primer; formulated for use on cleaned/etched, exterior, galvanized metal to prepare it for subsequent water-based coatings.

L. Epoxy Metal Primer: Corrosion-resistant, solvent-based, two-component epoxy primer formulated for use on prepared, exterior ferrous- and galvanized-metal surfaces.

M. Vinyl Wash Primer: Two-component, vinyl butyral/phosphoric acid, wash primer formulated for use over cleaned metal surfaces and zinc-rich primers as a tie coat for subsequent corrosion-resistant primers or finish coatings.

N. Quick-Drying Aluminum Primer: Corrosion-resistant, solvent-based, alkyd or modified-alkyd primer formulated for quick-drying capabilities and for use on prepared exterior aluminum.

2.4 FINISH COATINGS

A. Exterior Latex Paint, Flat: Water-based, pigmented coating; formulated for alkali, mold, microbial, and water resistance and for use on exterior surfaces, such as portland cement plaster, concrete, and primed wood.

1. Gloss and Sheen: MPI Gloss Level 1, or manufacturer's standard flat finish.

B. Exterior Latex Paint, Low Sheen: Water-based, pigmented coating; formulated for alkali, mold, microbial, and water resistance and for use on exterior surfaces, such as portland cement plaster, concrete, and primed wood.

1. Gloss and Sheen Level: MPI Gloss Level 3 or 4, or manufacturer's standard low-sheen finish.

C. Exterior Latex Paint, Semigloss: Water-based, pigmented emulsion coating formulated for alkali, mold, microbial, and water resistance and for use on exterior surfaces, such as masonry, portland cement plaster, and primed wood and metal.

1. Gloss Level: MPI Gloss Level 5, or manufacturer's standard semigloss finish.

D. Exterior Latex Paint, Gloss: Water-based, pigmented, acrylic-copolymer-emulsion coating formulated for alkali, mold, microbial, scrub, blocking (sticking of two painted surfaces), and water resistance and for use on exterior, primed, wood and metal trim, sashes, frames, and doors.

1. Gloss Level: MPI Gloss Level 6, or manufacturer's standard gloss finish.

E. Exterior, High-Build Latex Paint: Water-based, high-build, pigmented, emulsion coating; high-solids content improves filling, uniformity, and film build on concrete masonry surfaces. Formulated for

abrasion, mold, microbial, and wind-driven rain resistance and for use on exterior masonry, concrete masonry unit, and concrete surfaces.

1. Gloss and Sheen Level: MPI Gloss Level 1, 2, or 3, or manufacturer's standard flat or low-gloss finish.

2. Minimum Solids Content: Manufacturer's standard percentage.

F. Textured Latex Coating: Water-based, pigmented coating that contains sand or other hard aggregate and is formulated for use on exterior masonry, concrete masonry unit, and concrete surfaces.

1. Textured Latex Coating, Flat:

a. Gloss and Sheen Level: MPI Gloss Level 1 or manufacturer's standard flat finish.

b. Aggregate Size: Manufacturer's standard.

2. Textured Latex Coating, Low Sheen:

a. Gloss and Sheen Level: MPI Gloss Level 2 or 3, or manufacturer's standard low-sheen finish.

b. Aggregate Size: Manufacturer's standard.

G. Exterior Alkyd Enamel: Solvent-based, pigmented, alkyd enamel formulated for mold, microbial, and water resistance and for use on exterior, primed, wood and metal surfaces.

1. Exterior Alkyd Enamel, Flat:

a. Gloss and Sheen Level: MPI Gloss Level 1 or manufacturer's standard flat finish.

2. Exterior Alkyd Enamel, Semigloss:

a. Gloss Level: MPI Gloss Level 5 or manufacturer's standard semigloss finish.

3. Exterior Alkyd Enamel, Gloss:

a. Gloss Level: MPI Gloss Level 6 or manufacturer's standard gloss finish.

b. Fineness of Grind: [Manufacturer's standard] [Maximum fineness of pigment dispersion of 6 units when tested in accordance with ASTM D1210] <Insert requirements>.

H. Quick-Drying Alkyd Enamel: Solvent-based, alkyd or modified-alkyd enamel formulated for quick-drying capabilities and for use on exterior, primed, metal and dimensionally stable wood surfaces.

1. Quick-Drying Alkyd Enamel, Semigloss:

a. Gloss Level: MPI Gloss Level 5 or manufacturer's standard semigloss finish.

2. Quick-Drying Alkyd Enamel, Gloss:

a. Gloss Level: MPI Gloss Level 7 or manufacturer's standard gloss finish.

I. Aluminum Paint: Aliphatic, solvent-based coating consisting of varnish or alkyd binder combined with aluminum pigment that is formulated for use as a stain-blocking coating and sealer on exterior wood, metal, bituminous-coated, and prepared masonry surfaces and to be able to be recoated with conventional alkyd and latex paints.

J. High-Build Epoxy Paint, Low Gloss: High-solids, two-component epoxy; formulated for use on exterior concrete, masonry, and primed-metal surfaces.

1. Gloss and Sheen Level: MPI Gloss Level 1, 2, or 3, or manufacturer's standard low-gloss finish.

K. Exterior, Water-Based, Light Industrial Coating: Corrosion-resistant, water-based, pigmented, emulsion coating formulated for resistance to blocking (sticking of two painted surfaces), water, alkalis, moderate abrasion, and mild chemical exposure and for use on exterior, primed, wood and metal surfaces.

1. Exterior, Water-Based, Light Industrial Coating, Low Sheen:

a. Gloss and Sheen Level: MPI Gloss Level 3 or manufacturer's standard low-sheen finish.

2. Exterior, Water-Based, Light Industrial Coating, Semigloss:

a. Gloss Level: MPI Gloss Level 5 or manufacturer's standard semigloss finish.

3. Exterior, Water-Based, Light Industrial Coating, Gloss:

a. Gloss Level: MPI Gloss Level 6 or manufacturer's standard gloss finish.

2.5 FLOOR SEALERS AND PAINTS

A. Latex Floor Paint, Low Gloss: Water-based, pigmented coating formulated to hide stains, for alkali and incidental water resistance, and for use on exterior, concrete and primed-wood surfaces subject to low to medium foot traffic.

1. Gloss and Sheen Level: MPI Gloss Level 1, 2, or 3 or manufacturer's standard low-gloss finish.

2. Slip-Resistant Aggregate: Manufacturer's standard additive.

B. Latex Deck Coating: Water-based, high-solids, acrylic-emulsion coating; formulated for use on exterior, concrete and wood-board traffic surfaces.

1. Gloss Level: Manufacturer's standard.

2. Minimum Solids Content: Manufacturer's standard percentage.

3. Surface Texture: Slip resistant.

C. Alkyd Floor Enamel, Gloss: Solvent-based, alkyd enamel; self-priming where applied to bare wood; formulated to hide stains, for durability, for microbial and abrasion resistance, and for use on exterior, wood-board, traffic surfaces.

1. Gloss Level: MPI Gloss Level 6 or manufacturer's standard gloss finish.

2. Slip-Resistant Aggregate: Manufacturer's standard additive.

D. Water-Based, Concrete-Floor Sealer: Clear, water-based, acrylic-copolymer-emulsion sealer formulated for oil, gasoline, alkali, and water resistance and for use on exterior, concrete traffic surfaces.

E. Solvent-Based, Concrete-Floor Sealer: Clear, acrylic, solvent-based sealer formulated for oil, gasoline, alkali, and water resistance and for use on exterior, concrete traffic surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.

2. Fiber-Cement Board: 12 percent.

3. Masonry (Clay and Concrete Masonry Units): 12 percent.

4. Wood: 15 percent.

5. Portland Cement Plaster: 12 percent.

6. Gypsum Board: 12 percent.

C. Portland Cement Plaster Substrates: Verify that plaster is fully cured.

D. Exterior Gypsum Board Substrates: Verify that finishing compound is dry and sanded smooth.

E. Verify suitability of substrates, including surface conditions and compatibility, with finishes and primers.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems specified in this Section.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Aluminum Substrates: Remove loose surface oxidation.

J. Wood Substrates:

1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.

2. Sand surfaces that will be exposed to view, and remove sanding dust.

3. Prime edges, ends, faces, undersides, and backsides of wood.

4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

K. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 INSTALLATION

A. Apply paints in accordance with manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.

2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.

3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.

4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

5. Primers specified in the Exterior Painting Schedule may be omitted on items that are factory primed or factory finished if compatible with intermediate and topcoat coatings and acceptable to intermediate and topcoat paint manufacturers.

B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

C. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed to view:

a. Equipment, including panelboards and switch gear.

b. Uninsulated metal piping.

c. Uninsulated plastic piping.

d. Pipe hangers and supports.

e. Metal conduit.

f. Plastic conduit.

g. Tanks that do not have factory-applied final finishes.

h. Other items as directed by Architect.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.

2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.

3. Allow empty paint cans to dry before disposal.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Nontraffic Surfaces:

1. Latex System:

a. Prime Coat: Exterior, alkali-resistant, water-based primer.

b. Topcoat: Exterior latex paint.

2. Water-Based, Light Industrial Coating System:

a. Prime Coat: Exterior, alkali-resistant, water-based primer.

b. Topcoat: Exterior, water-based, light industrial coating.

B. Concrete Substrates, Traffic Surfaces: Parking stripes, miscellaneous traffic markings, and parking stall designations:

1. Latex Traffic Paint System:

a. Prime Coat: Matching topcoat.

b. Topcoat: Latex floor paint, low gloss.

C. Concrete Masonry Unit Substrates:

1. Latex System:

a. Prime Coat: Exterior, latex block filler.

b. Topcoat: Exterior latex paint.

2. Water-Based, Light Industrial Coating System:

a. Prime Coat: Exterior, latex block filler.

b. Topcoat: Exterior, water-based, light industrial coating.

D. Steel and Iron Substrates: Exposed metal works, including but not limited to steel lintels, steel stairs, guardrails, and handrails:

1. Alkyd System:

a. Prime Coat: Alkyd metal primer.

b. Topcoat: Exterior alkyd enamel.

E. Galvanized-Metal Substrates:

1. Latex System:

a. Prime Coat: Water-based, galvanized-metal primer.

b. Topcoat: Exterior latex paint.

2. Water-Based, Light Industrial Coating System:

a. Prime Coat: Water-based, galvanized-metal primer.

b. Topcoat: Exterior, water-based, light industrial coating.

F. Aluminum Substrates:

1. Alkyd System:

a. Pretreatment Coat: Vinyl wash primer.

b. Prime Coat: Quick-drying aluminum primer.

c. Topcoat: Exterior alkyd enamel

G. Exposed Wood-Framing Substrates:

1. Latex System:

a. Prime Coat: Exterior, latex wood primer.

b. Topcoat: Exterior latex paint.

H. Wood-Based Panel Substrates:

1. Latex System:

a. Prime Coat: Exterior, latex wood primer.

b. Topcoat: Exterior latex paint.

I. Cementitious Composition Board (Fiber-Cement) Substrates: Siding, Trim, and Panels:

1. Latex System:

a. Prime Coat: Matching topcoat.

b. Topcoat: Exterior latex paint.

J. Metal-Clad and Hollow-Metal Exterior Doors:

1. Latex System:

a. Prime Coat: Solvent-based bonding primer or alkyd metal primer.

b. Topcoat: Exterior latex paint.

K. Fiberglass Substrates:

1. Latex System:

a. Prime Coat: Solvent-based bonding primer.

b. Topcoat: Exterior latex paint.

L. Portland Cement Plaster Substrates:

1. Latex System:

a. Prime Coat: Exterior, alkali-resistant, water-based primer.

b. Topcoat: Exterior latex paint.

M. Exterior Gypsum Soffit Board Substrates:

1. Latex System:

a. Prime Coat: Exterior, latex wood primer, reduced in accordance with manufacturer's written instructions for substrate and topcoat.

b. Topcoat: Exterior latex paint.

END OF SECTION

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SECTION 09 91 23

INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Primers.

2. Water-based finish coatings.

3. Solvent-based finish coatings.

4. Floor sealers and paints.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include preparation requirements and application instructions.

2. Indicate VOC content.

B. Samples: For each type of topcoat product.

C. Product Schedule:

1. Include primer and finish coat product names, color designations, gloss and sheen level, and number of finish coats.

2. When provided in the Interior Design Drawings, use same designations indicated in the Interior Painting Schedule to cross-reference paint systems specified in this Section. If Schedule is not provided in Drawings, provide schedule listing all major exterior components, including but not limited to the following:

a. Interior gypsum board walls and ceilings

b. Interior doors

c. Trim and built-in shelving

d. Concrete masonry units

e. Interior stairs and rails

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint Products: 5 percent, but not less than 1 gal. of each material and color applied.

1.4 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Owner or Owner's Interior Design consultant will select one surface to represent surfaces and conditions for application of each paint system.

    a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.

2. Final approval of color selections will be based on mockups.

    a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Owner or Owner's Interior Design consultant at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner or Owner's Interior Design consultant specifically approves such deviations in writing.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.

2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent, or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Behr Paint Company

2. Benjamin Moore & Co.

3. California Paint

4. Conoco Paints

5. Coronado Paint; Benjamin Moore & Co.

6. Diamond Vogel Paints

7. H&C Decorative Concrete Products; a brand of Sherwin Williams

8. Kelly-Moore Paint Company, Inc.

9. McCormick Paints

10. PPG Paints

11. Pittsburgh Paints

12. Pratt & Lambert

13. Rodda Paint Co.

14. Rust-Oleum

15. Sherwin Williams Company

16. Valspar Corporation

17. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Source Limitations: Obtain each paint product from single source from single manufacturer.

2.2 PAINT PRODUCTS, GENERAL

A. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. Colors: As selected by Owner or Owner’s Interior Design consultant from manufacturer's full range.

2.3 PRIMERS

A. Interior/Exterior Latex Block Filler: Water-based, high-solids, emulsion coating formulated to bridge and fill porous surfaces of exterior concrete masonry units in preparation for specified subsequent coatings.

B. Alkali-Resistant, Water-Based Primer: Water-based primer formulated for use on alkaline surfaces, such as plaster, vertical concrete, and masonry.

C. Interior Latex Primer Sealer: Water-based latex sealer used on new interior plaster, concrete, and gypsum wallboard surfaces.

D. Interior, Institutional Low-Odor/VOC Primer Sealer: Water-based primer sealer with low-odor characteristics and a VOC of less than 10 grams per liter for use on new interior plaster, concrete, and gypsum wallboard surfaces that are subsequently to be painted with latex finish coats.

E. Interior Latex Primer for Wood: Waterborne-emulsion primer formulated for resistance to extractive bleeding, mold, and microbials; for hiding stains; and for use on interior wood subject to extractive bleeding.

F. Interior Alkyd Primer Sealer: Solvent-based, alkyd-type, primer/sealer for new interior wood, plaster, and porous surfaces.

G. Water-Based Rust-Inhibitive Primer: Corrosion-resistant, water-based-emulsion primer formulated for resistance to flash rusting when applied to cleaned, interior ferrous metals subject to mildly corrosive environments.

H. Alkyd Quick-Dry Primer for Metal: Corrosion-resistant, solvent-based, modified-alkyd primer; lead and chromate free; formulated for quick-drying capabilities and for use on cleaned, interior steel surfaces.

I. Anti-Corrosive Epoxy Primer: Corrosion-resistant, solvent-based, two-component epoxy primer formulated for use on prepared, interior ferrous- and galvanized-metal surfaces.

J. Surface-Tolerant Metal Primer: Corrosion-resistant, solvent-based metal primer formulated for use on structural steel and metal fabrications that have been minimally prepared.

K. Cementitious Galvanized Primer: Solvent-based primer composed of linseed oil/alkyd resin and portland cement for cleaned galvanized metal prior to finish coating.

L. Water-Based Galvanized-Metal Primer: Corrosion-resistant, acrylic primer; formulated for use on cleaned/etched, exterior, galvanized metal to prepare it for subsequent water-based coatings.

M. Quick-Drying Aluminum Primer: Corrosion-resistant, solvent-based, alkyd or modified-alkyd primer formulated for quick-drying capabilities and for use on prepared exterior aluminum.

N. Vinyl Wash Primer: Two-component, vinyl butyral/phosphoric acid, wash primer formulated for use over cleaned metal surfaces and zinc-rich primers as a tie coat for subsequent corrosion-resistant primers or finish coatings.

O. Water-Based Bonding Primer: Water-based-emulsion primer formulated to promote adhesion of subsequent specified coatings.

P. Solvent-Based Bonding Primer: Solvent-based primer formulated to seal substrates and promote adhesion of specified subsequent coatings.

2.4 WATER-BASED FINISH COATS

A. Interior Latex: Pigmented, water-based paint for use on primed/sealed interior plaster and gypsum board, and on primed wood and metals.

1. Interior, Latex, Flat:

a. Gloss and Sheen Level: MPI Gloss Level 1, or Manufacturer's standard flat finish.

2. Interior, Latex, Low Sheen:

a. Gloss and Sheen Level: MPI Gloss Level 2, or Manufacturer's standard low-sheen finish.

3. Interior, Latex, Eggshell:

a. Gloss and Sheen Level: MPI Gloss Level 3, or Manufacturer's standard eggshell finish.

4. Interior, Latex, Satin:

a. Gloss and Sheen Level: MPI Gloss Level 4, or Manufacturer's standard satin finish.

5. Interior, Latex, Semigloss:

a. Gloss Level: MPI Gloss Level 5, or Manufacturer's standard semigloss finish.

6. Interior, Latex, Gloss:

a. Gloss Level: MPI Gloss Level 6, or Manufacturer's standard gloss finish.

B. Interior, Latex, Institutional Low Odor/VOC, White or colored latex paint with low-odor characteristics and a VOC of less than 10 grams per liter, for use in areas where the odor and VOC levels of conventional latex products would preclude their use.

1. Interior, Latex, Institutional Low Odor/VOC, Flat:
    a. Gloss and Sheen Level: MPI Gloss Level 1, or Manufacturer's standard flat finish.
2. Interior, Latex, Institutional Low Odor/VOC, Low Sheen:
    a. Gloss and Sheen Level: MPI Gloss Level 2, or Manufacturer's standard low-sheen finish.
3. Interior, Latex, Institutional Low Odor/VOC, Eggshell:
    a. Gloss and Sheen Level: MPI Gloss Level 3, or Manufacturer's standard eggshell finish.
4. Interior, Latex, Institutional Low Odor/VOC, Satin:
    a. Gloss and Sheen Level: MPI Gloss Level 4, or Manufacturer's standard satin finish.
5. Interior, Latex, Institutional Low Odor/VOC, Semigloss:
    a. Gloss Level: MPI Gloss Level 5, or Manufacturer's standard semigloss finish.
6. Interior, Latex, Institutional Low-Odor/VOC, Gloss:
    a. Gloss Level: MPI Gloss Level 6, or Manufacturer's standard gloss finish.

2.5 SOLVENT-BASED FINISH COATS

A. Interior, Alkyd: Pigmented, solvent-based alkyd paint for use on primed/sealed interior plaster, gypsum, wood, and metal walls primarily in residential and moderate traffic commercial environments.
    1. Interior, Alkyd, Flat:
        a. Gloss and Sheen Level: MPI Gloss Level 1, or Manufacturer's standard flat finish.
    2. Interior, Alkyd, Eggshell:
        a. Gloss and Sheen Level: MPI Gloss Level 3, or Manufacturer's standard eggshell finish.
    3. Interior, Alkyd, Semigloss:
        a. Gloss Level: MPI Gloss Level 5, or Manufacturer's standard semigloss finish.
    4. Interior, Alkyd, Gloss:
        a. Gloss Level: MPI Gloss Level 6, or Manufacturer's standard gloss finish.

B. Aluminum Paint: Aliphatic, solvent-based coating consisting of varnish or alkyd binder combined with aluminum pigment that is formulated for use as a stain-blocking coating and sealer on wood, metal, bituminous-coated, and prepared masonry surfaces and to be able to be recoated with conventional alkyd and latex paints.

2.6 FLOOR SEALERS AND PAINTS

A. Interior Concrete Stain: Penetrating semitransparent stain specifically manufactured for interior and exterior concrete horizontal and vertical surfaces.

B. Latex Floor Paint, Low Gloss: Water-based, pigmented coating formulated to hide stains, for alkali and incidental water resistance, and for use on concrete and primed-wood surfaces subject to low to medium foot traffic.

1. Gloss and Sheen Level: MPI Gloss Level 1, 2, or 3 or manufacturer's standard low-gloss finish.

2. Slip-Resistant Aggregate: Manufacturer's standard additive.

C. Alkyd Floor Enamel, Gloss: Solvent-based, alkyd enamel; self-priming where applied to bare wood; formulated to hide stains, for durability, for microbial and abrasion resistance, and for use on wood-board, traffic surfaces.

1. Gloss Level: MPI Gloss Level 6, or manufacturer's standard gloss finish.

2. Slip-Resistant Aggregate: Manufacturer's standard additive.

D. Water-Based Concrete Floor Sealer: Clear, water-based, acrylic-copolymer-emulsion sealer formulated for oil, gasoline, alkali, and water resistance and for use on concrete traffic surfaces.

E. Solvent-Based Concrete Floor Sealer: Clear, acrylic, solvent-based sealer formulated for oil, gasoline, alkali, and water resistance and for use on concrete traffic surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as indicated within “MPI Architectural Painting Specification Manual,” and as follows:

1. Concrete: 12 percent.

2. Fiber-Cement Board: 12 percent.

3. Masonry (Clay and CMUs): 12 percent.

4. Wood: 15 percent.

5. Gypsum Board: 12 percent.

6. Plaster: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Plaster Substrates: Verify that plaster is fully cured.

E. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.

F. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

G. Proceed with coating application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Aluminum Substrates: Remove loose surface oxidation.

J. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.

2. Sand surfaces that will be exposed to view, and dust off.

3. Prime edges, ends, faces, undersides, and backsides of wood.

4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

K. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 INSTALLATION

A. Apply paints according to manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.

2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

D. Painting Fire-Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in occupied spaces:

a. Equipment, including panelboards.

b. Uninsulated metal piping.

c. Uninsulated plastic piping.

d. Pipe hangers and supports.

e. Metal conduit.

f. Plastic conduit.

g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.

h. Other items as directed by Architect.

2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.

2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.

3. Allow empty paint cans to dry before disposal.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 INTERIOR PAINTING SCHEDULE

A. General:

1. Gloss and Sheen Level: Gloss and sheen levels indicated in schedules below should be verified with Owner's Interior Design Consultant. If there is a conflict between the requirements of this Section and those included within the Interior Design Consultant's Drawings, the requirements within the Drawings prevail.

2. System Type: Utilize primer coat type and topcoat type best suited to application, including wear performance, traffic level, stain resistance and scrub or burnish resistance.

3. Refer to Owner's Interior Design Consultant for requirements within tenant amenity spaces such as Clubhouse, Fitness, Mail Room, Leasing Center, Offices, and similar spaces.

B. Gypsum Board Substrates:

1. Latex System:

a. Prime Coat: Interior latex primer sealer.

b. Topcoat: Interior, latex, flat

C. Gypsum Board Substrates (Unit kitchens, utility rooms and baths):

1. Latex System:

a. Prime Coat: Interior latex primer sealer.

b. Topcoat: Interior, latex, semi-gloss.

D. Concrete Substrates, Nontraffic Surfaces:

1. Latex System:

a. Prime Coat: Alkali-resistant, water-based primer.

b. Topcoat: Interior latex paint, flat unless otherwise indicated.

E. Concrete Substrates, Traffic Surfaces:

1. Latex Floor Enamel System:

a. Prime Coat: Matching topcoat

b. Topcoat: Latex floor paint, low gloss.

2. Alkyd Floor Enamel System:

a. Prime Coat: Matching topcoat.

b. Topcoat: Alkyd floor enamel, gloss.

F. CMU Substrates:

1. Latex System:

a. Block Filler: Interior/exterior latex block filler.

b. Topcoat: Interior, latex, flat or low sheen

G. Steel Substrates:

1. Latex System, Alkyd Primer:

a. Prime Coat: Alkyd quick-dry primer for metal.

b. Topcoat: Interior, latex, flat unless otherwise indicated.

2. Alkyd System:

a. Prime Coat: Alkyd quick-dry primer for metal.

b. Topcoat: Interior, alkyd, flat unless otherwise indicated.

H. Galvanized-Metal Substrates:

1. Latex System:

a. Prime Coat: Cementitious galvanized primer or water-based galvanized primer.

b. Topcoat: Interior, latex, flat unless otherwise indicated.

2. Alkyd over Cementitious Primer System:

a. Prime Coat: Cementitious galvanized primer.

b. Topcoat: Interior, alkyd, flat unless otherwise indicated.

I. Aluminum (Not Anodized or Otherwise Coated) Substrates:

1. Latex System:

a. Prime Coat: Quick-dry primer for aluminum.

b. Topcoat: Interior, latex, flat unless otherwise indicated.

2. Alkyd System:

a. Prime Coat: Primer, Quick-dry primer for aluminum.

b. Topcoat: Interior, alkyd, flat unless otherwise indicated.

J. Finish Carpentry: Wood trim, MDF trim, doors, casework, and wood board paneling.

1. Latex over Latex Primer System:

a. Prime Coat: Interior latex primer for wood.

b. Topcoat: Interior, latex, semigloss.

K. Fiberglass Substrates:

1. Latex System:

    a. Prime Coat: Water-based or solvent-based bonding primer.

    b. Topcoat: Interior, latex, flat unless otherwise indicated.

L. Plastic Substrates:

1. Latex System:

    a. Prime Coat: Solvent-based bonding primer.

    b. Topcoat: Interior, latex, flat unless otherwise indicated.

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SECTION 10 01 00

MISCELLANEOUS SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Exterior dryer exhaust vent hoods

2. Dryer vent boxes

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports for dryer vent boxes.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Source Limitations:

1. Obtain each exterior dryer exhaust vent hood from single manufacturer.

2. Obtain each dryer vent box from single manufacturer.

B. Fire-Test-Response Characteristics:

1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.

2. Penetration firestopping systems shall bear classification marking of a qualified testing agency.

a. UL in its "Fire Resistance Directory."

b. Intertek Group in its "Directory of Listed Building Products."

c. QAI Laboratories

2.2 EXTERIOR DRYER EXHAUST VENT HOODS

A. Vent Hood Type: Flush-mount, paintable dryer vent hood with tail pipe and back-draft damper

1. Basis of Design: V-SBLV4 by M&M Manufacturing

2. Materials:

a. Steel: 26-gauge, paint grip galvanized steel

b. Aluminum: 0.027 inch thick

c. Stainless Steel: 26-gauge, 316 grade stainless steel

d. Finish: Paint to match adjacent surface, color as selected by Architect.

3. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

    a. Copperlab, LLC

    b. Deflecto, LLC

    c. Imperial Manufacturing Group

    d. Lambro Industries, Inc.

    e. M&M Manufacturing

    f. Substitutions: Products by manufacturers meeting indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Louvered Vent Hood Type: Flush-mount, plastic, louvered dryer vent hood with aluminum tail pipe and back-draft damper

1. Materials:

    a. Material: UV resistant polypropylene

    b. Finish: Paint to match adjacent surface, color as selected by Architect.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

    a. Deflecto, LLC

    b. Imperial Manufacturing Group

    c. Lambro Industries, Inc.

    d. NDA Distributors, LLC

    e. Substitutions: Products by manufacturers meeting indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.3 DRYER VENT BOXES

1. Basis of Design: Model 425 and Model 4D by In-O-Vate Technologies, Inc.

    a. Material: 22-gauge, aluminized steel

    b. Fire Rating: Must be tested and approved for use within fire-resistance rated wall assembly.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

    a. Construction Solutions, LLC

    b. Substitutions: Products by manufacturers meeting indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting performance of exterior dryer exhaust vent hoods and dryer vent boxes.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install exterior dryer exhaust vent hoods and dryer vent boxes in accordance with manufacturer's installation instructions.

B. Exterior Dryer Exhaust Vent Hood –

1. Integrate installation of dryer exhaust vent hoods with installation of weather-resistive barrier and provide self-adhered flexible flashings and urethane sealant as indicated in Drawings.

2. Align with adjacent exhaust vent hoods.

END OF SECTION

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SECTION 10 14 00

IDENTIFYING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes room-identification signs that are directly attached to the building.

B. Related Requirements:

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For room-identification signs.

1. Include fabrication and installation details and attachments to other work.

2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.

3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.

C. Samples: For each type of sign assembly, exposed component, and exposed finish.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.4 FIELD CONDITIONS

A. Field Measurements: Verify locations of anchorage devices and electrical service embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.

b. Deterioration of embedded graphic image.

c. Separation or delamination of sheet materials and components.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" the Fair Housing Act and ICC A117.1.

2.2 ROOM-IDENTIFICATION SIGNS

A. Room-Identification Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

1. Mounting: Manufacturer's standard method for substrates indicated.

2. Text and Typeface: Accessible raised characters and Braille; typeface as selected by Owner from manufacturer's full range.

2.3 SIGN MATERIALS

A. Aluminum Sheet and Plate: ASTM B209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

B. Aluminum Extrusions: ASTM B221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

C. Acrylic Sheet: ASTM D4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

D. Vinyl Film: UV-resistant vinyl film with pressure-sensitive, permanent adhesive; die cut to form characters or images as indicated on Drawings.

E. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.4 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.

2. For exterior exposure, furnish stainless-steel or hot-dip galvanized devices unless otherwise indicated.

3. Exposed Metal-Fastener Components, General:

a. Fabricated from same basic metal and finish of fastened sign unless otherwise indicated.

4. Sign Mounting Fasteners:

a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material or screwed into back of sign assembly unless otherwise indicated.

b. Through Fasteners: Exposed metal fasteners matching sign finish, with type of head indicated, and installed in predrilled holes.

B. Adhesive: As recommended by sign manufacturer.

C. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.

D. Hook-and-Loop Tape: Manufacturer's standard two-part tape consisting of hooked part on sign back and looped side on mounting surface.

E. Magnetic Tape: Manufacturer's standard magnetic tape with adhesive on one side.

2.5 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.

2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.

3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.

4. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

B. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.

C. Subsurface-Etched Graphics: Reverse etch back face of clear face-sheet material. Fill resulting copy with manufacturer's standard enamel. Apply opaque manufacturer's standard background color coating over enamel-filled copy.

2.6 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker.

B. Color Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker.

C. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.

2. Install signs so they do not protrude or obstruct according to the accessibility standard.

3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

B. Accessibility: Install signs in locations on walls as indicated on Drawings and according to the applicable accessibility standards.

C. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.

   a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.

   b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.

2. Through Fasteners: Drill holes in substrate using predrilled holes in sign as template. Countersink holes in sign if required. Place sign in position and flush to surface. Install through fasteners and tighten.

3. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.

4. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

5. Hook-and-Loop Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply sign component of two-part tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage; push to engage tape adhesive. Keep tape strips 0.250 inch away from edges to prevent visibility at sign edges when sign is initially installed or reinstalled. Apply substrate component of tape to substrate in locations aligning with tape on back of sign; push and rub well to fully engage tape adhesive to substrate.

6. Magnetic Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges.

3.2 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION

SECTION 10 18 50

SHOWER AND BATH ENCLOSURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Semi-Frameless shower doors and enclosures.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for shower doors and enclosures.

B. Shop Drawings: For tub and shower doors and enclosures.

1. Include plans, elevations, sections, and attachment details.

1.3 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For tub and shower doors and enclosures to include in maintenance manuals.

1.5 FIELD CONDITIONS

A. Verify dimensions by field measurements before fabrication and indicate on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Alumax Bath Enclosures

2. American Shower Door

3. Artistcraft Shower Doors

4. Cardinal Shower Enclosures

5. Century Bathworks

6. Coastal Shower Enclosure Systems

7. Dreamline

8. Fleurco Shower Doors

9. Hartung Glass Industries

10. Holcam Bath & Shower Enclosures

11. Southeastern Aluminum Products, Inc.

12. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.2 FRAMED ENCLOSURES

A. Glass panels with full perimeter frames of extruded aluminum with screw-fastened corners. Minimum 3/8-inch penetration of glass into frame. Framing members of thickness required to support imposed loads.

B. Frames, Hardware, and Trim: Manufacturer's standard units as indicated and as required for a complete installation.

1. Materials: Aluminum; ASTM B221.

2. Finish: Clear anodic, color anodic or baked enamel or powder coat.

3. Color: As selected by Owner’s Interior Design consultant from manufacturer’s full range.

C. Swinging Doors: Full-height piano hinge or top-and-bottom pivot hinges. Manufacturer's standard pulls and latch.

D. Glazing: Clear, fully tempered safety glazing materials complying with 16 CFR 1201, Category II, with permanently etched identification acceptable to authorities having jurisdiction.

1. Glass Nominal Thickness: As determined by enclosure manufacturer based on panel size, but not less than 6 mm.

2. Clear Glass: ASTM C1048, Type I, Quality-Q3, Class I (clear), Kind FT.

E. Fasteners: Manufacturer's standard stainless steel or other noncorrosive fasteners.

F. Sealant: Mildew-resistant, single-component, nonsag, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, for Use NT.

2.3 FRAMELESS ENCLOSURES

A. Frameless glass panels with mounting and operating hardware of types and sizes required to support imposed loads.

B. Hardware and Trim: Manufacturer's standard units as indicated and as required for complete installation.

1. Materials:

a. Aluminum:

1) Finish: Clear anodic, color anodic, or baked enamel or powder coat.

2) Color: As selected by Owner’s Interior Design consultant from manufacturer’s full range.

b. Stainless Steel Sheet and Plate:

1) Finish: As selected by Owner’s Interior Design consultant from manufacturer’s full range.

c. Stainless Steel Tubing:

1) Finish: As selected by Owner’s Interior Design consultant from manufacturer’s full range.

2. Door Pulls: Manufacturer’s standard pulls and patch.

C. Swinging Doors: Hinged for 90 degrees outwards swing. Soft bulb seal or wipes; affixed to door to direct water back into enclosure and provide a tight water seal.

1. Hinges: Full-height piano or top-and-bottom pivots.

2. Door Pulls: Single-sided C-pull.

D. Fixed Panels: Match hinges in material and finish.

E. Glazing: Safety glazing materials complying with 16 CFR 1201, Category II, with permanently etched identification acceptable to authorities having jurisdiction.

1. Glass Nominal Thickness: As determined by manufacturer based on panel size, but not less than 8 mm.

2. Clear Glass: ASTM C1048, Type I, Quality-Q3, Class I (clear), Kind FT.

F. Fasteners: Manufacturer's standard stainless steel or other noncorrosive fasteners.

G. Sealant: Mildew-resistant, single-component, nonsag, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, for Use NT.

H. Materials:

1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

a. Sheet and Plate: ASTM B209.

b. Extrusions: ASTM B221.

2. Stainless Steel Sheet: ASTM A240 or ASTM A666, Type 302 or 304.

3. Stainless Steel Bars and Shapes: ASTM A276, Type 302 or 304.

4. Copper-Alloy Sheet and Shapes: ASTM B3.

5. Copper-Alloy Extrusions: ASTM B455, alloy UNS No. C38500 (architectural brass).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Prepare and install per manufacturer's written instructions unless more stringent requirements are contained in GANA's "Glazing Manual."

B. Clean substrates, removing projections, filling voids, and sealing joints.

C. Set units level, plumb, and true to line, without warp or rack of frames and panels, and anchor securely in place.

D. Fasten components securely in place, with provisions for thermal movement. Install with concealed fasteners unless otherwise indicated.

E. Install components to drain and return water to tub or shower.

F. Install doors to produce smooth operation and tight fit at contact points.

G. Repair, refinish, or replace components damaged during installation.

3.2 ADJUSTING AND CLEANING

A. Adjust operating parts and hardware for smooth, quiet operation and watertight closure. Lubricate hardware and moving parts.

B. Remove nonpermanent labels, and clean surfaces immediately after installation.

END OF SECTION

SECTION 10 28 00

TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.

2. Private-use dwelling unit bathroom accessories.

1.2 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility: Toilet and bath accessories shall be designed and installed to comply with the applicable provisions within the following regulations:

1. At public and common-use spaces: ICC A117.1 – Accessible and Usable Buildings and Facilities, Fair Housing Act, and the 2010 ADA Standards for Accessible Design.

2. At apartment units: Fair Housing Act and ICC A117.1 – Accessible and Usable Buildings and Facilities.

B. Structural Performance: Design accessories and fasteners to comply with the following requirements:

1. Grab Bars: Installed units are able to resist 250 lbf concentrated load applied in any direction and at any point.

2. Shower Seats: Installed units are able to resist 250 lbf applied in any direction and at any point.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

A. Manufacturers:

1. Source Limitations: Obtain each type of private-use bathroom accessory from single source from single manufacturer.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. AJW Architectural Products

b. American Specialties Inc.

c. Bobrick Washroom Equipment, Inc.

d. Bradley Corporation

e. Brey-Krause Manufacturing Co.

f. GAMCO Specialty Accessories; a division of Bobrick

g. Seachrome Corporation

h. Tubular Specialties Manufacturing, Inc.

i. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Toilet Tissue (Roll) Dispenser:

1. Description: Double-roll dispenser.

2. Mounting: Partition mounted, serving two adjacent toilet compartments, or surface mounted at walled compartments.

3. Operation: Noncontrol delivery.

4. Material and Finish: As selected by Owner or Owner’s interior design consultant from manufacturer’s full range.

C. Waste Receptacle:

1. Mounting: Open top, recessed.

2. Material and Finish: As selected by Owner or Owner’s interior design consultant from manufacturer’s full range.

3. Lockset: Tumbler type for waste receptacle.

D. Combination Towel (Folded) Dispenser/Waste Receptacle:

1. Description: Combination unit for dispensing C-fold or multifold towels, with removable waste receptacle.

2. Mounting: Recessed.

a. Designed for nominal 4-inch wall depth.

3. Material and Finish: As selected by Owner or Owner's interior design consultant from manufacturer's full range.

4. Lockset: Tumbler type for towel-dispenser compartment and waste receptacle.

E. Manual Soap Dispenser:

1. Description: Designed for manual operation and dispensing soap in liquid or lather form.

2. Mounting: Deck mounted on counter top.

3. Materials: As selected by Owner or Owner's interior design consultant from manufacturer's full range.

F. Grab Bar:

1. Mounting: Flanges with concealed fasteners.

2. Material: Stainless steel, 0.05 inch thick.

a. Finish: Smooth, ASTM A480 No. 4 finish (satin).

3. Outside Diameter: 1-1/2 inches.

4. Configuration and Length: Straight, length as indicated on Drawings.

2.3 PRIVATE-USE BATHROOM ACCESSORIES

A. Manufacturers:

1. Source Limitations: Obtain each type of private-use bathroom accessory from single source from single manufacturer.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Better Home Products (BHP)

b. Creative Specialties; a division of Moen

c. Delta Faucet Company

d. Hallmark

e. Pamex

f. Peerless Faucet Company

g. Taymore Industries USA, Inc.

h. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Private-Use Toilet Tissue Dispenser:

1. Description: Single-roll dispenser.

2. Mounting: Surface mounted.

3. Material and Finish: As selected by Owner or Owner’s interior design consultant from manufacturer’s full range.

C. Private-Use Shower Curtain Rod:

1. Description: 1-inch-(minimum) outside diameter, curved rod.

2. Mounting Flanges: Designed for exposed fastening, in in material and finish matching rod.

3. Rod Material and Finish: As selected by Owner or Owner’s interior design consultant from manufacturer’s full range.

D. Private-Use Robe Hook:

1. Description: Single-prong unit.

2. Material and Finish: As selected by Owner or Owner’s interior design consultant from manufacturer’s full range.

E. Private-Use Towel Bar:

1. Description: 3/4-inch-square tube with rectangular end brackets or 3/4-inch-round tube with circular end brackets, as selected by Owner or Owner’s interior design consultant.

2. Mounting: Flanges with concealed fasteners.

3. Length: 18 inches and 24 inches as indicated.

4. Material and Finish: As selected by Owner or Owner’s interior design consultant from manufacturer’s full range.

F. Private-Use Towel Ring:

1. Description: Pin projecting approximately 2-1/2 inches from wall. Ring shape as selected by Owner or Owner’s interior design consultant from manufacturer’s full range.

2. Pin Material and Finish: As selected by Owner or Owner’s interior design consultant from manufacturer’s full range.

3. Ring Material and Finish: Matching pin.

2.4 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

1. Remove temporary labels and protective coatings.

B. Grab Bars: Install to comply with specified structural-performance requirements.

C. Shower Seats: Install to comply with specified structural-performance requirements.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION

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SECTION 10 44 13

FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for the following:

a. Portable fire extinguisher.

b. Fire-hose valve.

1.2 PREINSTALLATION CONFERENCE

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to fire-protection cabinets, including, but not limited to, the following:

a. Schedules and coordination requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semi-recessed-, or surface-mounting method and relationships of box and trim to surrounding construction.

2. Show location of knockouts for hose valves.

B. Shop Drawings: For fire-protection cabinets.

1. Include plans, elevations, sections, details, and attachments to other work.

C. Product Schedule: For fire-protection cabinets. Indicate whether recessed, semi-recessed, or surface mounted. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.5 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers and hose valves indicated are accommodated.

B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of fire-protection cabinet and accessory from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

2.3 FIRE-PROTECTION AND FIRE HOSE VALVE CABINETS - INTERIOR

A. Cabinet Type: Suitable for fire extinguisher or hose valve.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following Manufacturers:

a. Babcock-Davis

b. Guardian Fire Equipment, Inc.

c. JL Industries

d. Larsens Manufacturing Company

e. Nystrom, Inc.

f. Potter Roemer LLC

g. Strike First Corporation of America

h. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Basis of Design, Fire Extinguisher Cabinet: Ambassador Steel FX2, Semi-Recessed by JL Industries

3. Basis of Design: Hose Valve Cabinet: FRC1810 Series by Potter-Roemer

B. Cabinet Construction, Surface-Mounted: Non-rated.

C. Cabinet Construction, Recessed and Semi-Recessed: One-hour fire rated or two-hour fire rated, match fire rating of wall.

1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.043-inch-thick cold-rolled steel sheet lined with minimum 5/8-inch-thick fire-barrier material. Provide factory-drilled mounting holes.

D. Cabinet Material: Cold-rolled steel sheet

1. Shelf: Same metal and finish as cabinet.

E. Recessed Cabinet:

1. Trimless with Concealed Flange: Surface of surrounding wall finishes flush with exterior finished surface of cabinet frame and door, without overlapping trim attached to cabinet. Provide recessed flange, of same material as box, attached to box, to act as drywall bead.

2. Trimless with Hidden Flange: Flange of same metal and finish as box overlaps surrounding wall finish and is concealed from view by an overlapping door.

3. Exposed Flat Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).

F. Semi-recessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).

G. Surface-Mounted Cabinet: Cabinet box fully exposed and mounted directly on wall with no trim.

H. Door Style: Fully glazed panel or vertical duo with frame

I. Door Glazing:

1. Acrylic Sheet: Clear transparent acrylic sheet.

2. Tempered Glass: Clear tempered float glass.

J. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide manufacturer’s standard door pull or handle and latch.

2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.

K. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.

2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.

a. Identify fire-extinguisher cabinet with the words "**FIRE EXTINGUISHER**”

b. Identify fire-valve cabinet with the words "**FIRE DEPARTMENT VALVE**”

1) Location: Applied to location indicated on Drawings.

2) Application Process: Manufacturer’s standard.

3) Lettering Color: Red

4) Orientation: As indicated on Drawings.

L. Materials:

1. Cold-Rolled Steel: ASTM A1008, Commercial Steel (CS), Type B.

a. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.

b. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

c. Color: As selected by Architect from manufacturer's full range.

2. Transparent Acrylic Sheet: ASTM D4802, Category A-1 (cell-cast sheet)

3. Tempered Float Glass: ASTM C1036, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear)

2.4 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.

2. Miter corners and grind smooth.

3. Provide factory-drilled mounting holes.

4. Prepare doors and frames to receive locks.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.

1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.

2. Miter and weld perimeter door frames and grind smooth.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.5 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire-protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for hose valves and cabinets to verify actual locations of piping connections before cabinet installation.

B. Examine walls and partitions for suitable framing depth and blocking where recessed and semi-recessed cabinets will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for recessed and semi-recessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at height indicated below:

1. Fire-Protection Cabinet Mounting Height: 42 inches above finished floor to top of fire extinguisher.

B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semi-recessed fire-protection cabinets.

2. Provide inside latch and lock for break-glass panels.

3. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

4. Fire-Rated Hose Valve Cabinets:

a. Install cabinet with not more than 1/16-inch tolerance between pipe OD and knockout OD. Center pipe within knockout.

b. Seal through penetrations with firestopping sealant.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

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SECTION 10 44 16

FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to fire extinguishers including, but not limited to, the following:

a. Schedules and coordination requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.5 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each as indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Amerex Corporation

b. Ansul Incorporated; Tyco International

c. Babcock-Davis

d. Badger Fire Protection

e. Buckeye Fire Equipment Company

f. Guardian Fire Equipment, Inc.

g. JL Industries

h. Kidde Residential and Commercial Division

i. Larsens Manufacturing Company

j. Nystrom, Inc.

k. Potter Roemer LLC

l. Pyro-Chem; Tyco Suppression & Building Products

m. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Source Limitations: Obtain fire extinguishers and accessories, from single manufacturer.

3. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.

B. Multipurpose Dry-Chemical Type: UL-rated, with monoammonium phosphate-based dry chemical in enameled-steel container.

1. Schedule:

a. Dwelling Units: 1-A:10-B:C, 2.5-lb nominal capacity

1) Provide manufacturer’s recommended mounting bracket.

b. Clubhouse: 2-A:10-B:C, 5-lb nominal capacity

c. Building Corridors: 2-A:10-B:C, 5-lb nominal capacity

d. Building Common Spaces: 2-A:10-B:C, 5-lb nominal capacity

2.3 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Amerex Corporation

b. Ansul Incorporated; Tyco International

c. Babcock-Davis

d. Badger Fire Protection

e. Buckeye Fire Equipment Company

f. Guardian Fire Equipment, Inc.

g. JL Industries

h. Kidde Residential and Commercial Division

i. Larsens Manufacturing Company

j. Nystrom, Inc.

k. Potter Roemer LLC

l. Pyro-Chem; Tyco Suppression & Building Products

m. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Source Limitations: Obtain mounting brackets and fire extinguishers from single manufacturer.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

a. Orientation: Vertical.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

1. Mounting Brackets: Except when installed in base cabinets, install mounting brackets such that top of fire extinguisher to be at 42 inches above finished floor.

B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION

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SECTION 10 55 00

POSTAL SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mail receptacles

2. Parcel lockers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of postal specialty.

B. Shop Drawings: For postal specialties.

1. Include identification sequence for compartments.

2. Include layout of identification text.

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of postal specialty required to comply with USPS regulations, signed by product manufacturer.

B. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For postal specialties and finishes to include in maintenance manuals.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Furnish lock keys according to USPS requirements; with temporary identification for their respective locks, bagged, and securely taped inside the collection compartment for shipping.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of postal specialties that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures.

b. Faulty operation of hardware.

c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MAIL RECEPTACLES

A. Front-Loading Mail Receptacles: Consisting of multiple compartments with fixed, solid compartment backs, enclosed within a recessed wall box. Provide access to compartments for distributing incoming mail from front of unit by unlocking master lock and swinging side-hinged master door to provide accessibility to entire group of compartments. Provide access to each compartment for removing mail by swinging compartment door. Comply with USPS-STD-4C.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

   a. 2B Global

   b. Florence Corporation; a Gibralter Industries company

   c. Salsbury Industries

   d. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Source Limitations: Obtain mail receptacles from single manufacturer.

3. Basis of Design: Versatile 4C Suite by Florence Corporation

4. Front-Loading Master Door: Fabricated from extruded aluminum and braced and framed to hold compartment doors; prepared to receive master-door lock.

   a. Master-Door Lock: Door prepared to receive lock provided by local postmaster.

5. Compartments and Configurations: As indicated on Drawings.

6. Compartment Doors: Fabricated from extruded aluminum. Equip each with lock and tenant identification as required by USPS-STD-4C.

   a. Compartment-Door Locks: Comply with USPS-L-1172C for locks and keys, or equivalent as approved by the USPS; with three keys for each compartment door. Key each compartment differently.

   b. Parcel-Locker-Compartment-Door Locks: Two-key security system in which control key provides access to parcel-locker-compartment key, which opens compartment and is retained once opened.

7. Frames: Fabricated from extruded aluminum or aluminum sheet; ganged and nested units, with cardholder and blank cards for tenant's identification within each compartment.

8. Concealed Components and Mounting Frames: Aluminum or steel sheet with manufacturer's standard finish.

9. Compartment Identification: Black, sequential numbers engraved into recess in face of compartment door.

10. Exposed Aluminum Finish: Finish surfaces exposed to view as follows:

    a. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range.

2.2 PARCEL LOCKERS

A. Front-Loading Parcel Lockers, Recessed: Consisting of single or multiple compartments enclosed within a larger enclosure of type indicated below. Provide access to compartments for distributing incoming parcels from front of unit. Provide access to each compartment for removing parcels by swinging compartment door. Comply with USPS-STD-4C.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. 2B Global

b. Florence Corporation; a Gibralter Industries company

c. Salsbury Industries

d. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2. Source Limitations: Obtain parcel lockers from the same manufacturers as mail receptacle manufacturer.

3. Basis of Design: Versatile 4C Suite by Florence Corporation

4. Enclosure Type: Recessed.

5. Compartments and Configurations: As indicated on Drawings.

6. Front-Loading Master Door: Fabricated to hold compartment doors; prepared to receive master-door lock provided by local postmaster.

7. Compartment Doors and Frames: Fabricated from same material and finish as adjacent mail receptacles. Equip each compartment door with lock; identification; and concealed, full-length, spring-loaded, flush hinge on right side.

a. Compartment Identification: Black, sequential numbers engraved into recess in face of compartment door.

b. Compartment-Door Locks: Dual-lock security system in which master lock provides access to customer lock (USPS-L-1172C) and parcel-locker key opens compartment and is retained once opened.

8. Aluminum Finish: Finish surfaces exposed to view as follows:

a. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range.

2.3 FABRICATION

A. Form postal specialties to required shapes and sizes, with true lines and angles, square, rigid, and without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges and corners free of sharp edges and burrs and safe to touch. Fabricate doors of postal specialties to preclude binding, warping, or misalignment.

B. Preassemble postal specialties in shop to greatest extent possible to minimize field assembly.

C. Mill joints to a tight, hairline fit. Cope or miter corner joints. Form joints exposed to weather to exclude water penetration.

D. Drill or punch holes required for fasteners and remove burrs. Use security fasteners where fasteners are exposed. If used, seal external rivets before finishing.

E. Weld in concealed locations to greatest extent possible without distorting or discoloring exposed surfaces. Remove weld spatter and welding oxides from exposed surfaces.

F. Fabricate tubular and channel frame assemblies with manufacturer's standard welded or mechanical joints. Provide subframes and reinforcement as required for a complete system to support loads.

G. Where dissimilar metals contact each other, protect against galvanic action by painting contact surfaces with bituminous coating or by applying other permanent separation as recommended by manufacturers of dissimilar metals.

2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, for compliance with requirements for roughing-in openings, clearances, and other conditions affecting performance of the Work.

B. Examine walls and other adjacent construction for suitable conditions before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install postal specialties level and plumb, according to manufacturer's written instructions.

1. Where dissimilar metals contact each other, protect against galvanic action by painting contact surfaces with bituminous coating or by applying other permanent separation as recommended by manufacturer.

2. Where aluminum contacts grout, concrete, masonry, or wood, protect against corrosion by painting contact surfaces with bituminous coating.

3. Final acceptance of postal specialties served by the USPS depends on compliance with USPS requirements.

B. Mail Receptacles: Install mail receptacles with center of tenant-door lock cylinders and bottom of compartments at the maximum and minimum heights above finished floor established by the USPS, applicable accessibility standards, and manufacturer's written instructions.

1. Install removable-core and keyed-in door lock cylinders as required for each type of cylinder lock.

3.3 FIELD QUALITY CONTROL

A. Arrange for USPS personnel to examine and test postal specialties served by the USPS after they have been installed according to USPS regulations.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as postal specialties are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust doors, hardware, and moving parts to function smoothly, and lubricate as recommended by manufacturer. Verify that integral locking devices operate properly.

C. Touch up marred finishes or replace postal specialties that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by postal-specialty manufacturer.

D. Replace postal specialties that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

E. On completion of postal-specialty installation, clean interior and exterior surfaces as recommended by manufacturer.

END OF SECTION

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SECTION 10 57 23.13

WIRE CLOSET SHELVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fixed, vinyl-coated, ventilated wire closet shelving.

1.2 COORDINATION

A. Coordinate sizes and locations of blocking and backing required for installation of vinyl-coated wire closet shelving attached to wall assemblies.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For of vinyl-coated wire closet shelving.

1. Include plans, elevations, sections, and attachment details.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. ClosetMaid Corp.

2. Schulte

3. Rubbermaid

4. Organized Living

5. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Source Limitations: Obtain vinyl-coated wire closet shelving and accessories from single manufacturer.

2.2 VINYL-COATED WIRE CLOSET SHELVING

A. Wire Storage Shelving: Vinyl-coated wire closet shelving with integral hanging rod.

B. Shelves: 12-inch deep with 1-inch deck wire spacing.

C. Hanging Rods: Continuous slide type.

2.3 VINYL-COATED WIRE PANTRY AND LINEN CLOSET SHELVING

A. Wire Storage Shelving: Vinyl-coated wire closet shelving.

B. Shelves: 9, 12, 16, or 20-inch deep with 0.63-inch deck wire spacing.

2.4 MATERIALS

A. Steel Wire: Grade C-1006 cold-drawn steel wire.

B. Coating: Manufacturer’s standard polyvinyl chloride (PVC) coating, 9 mils (min)

1. Color: White

2.5 ANCHORS

A. Wall Anchors: Manufacturer's standard steel anchors designed to secure vinyl-coated wire closet shelving to wall.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install in accordance with manufacturer’s printed installation instructions.

B. Install vinyl-coated wire closet shelving level, plumb, square, rigid, true, and with shelves flat and free of dents or distortion. Make connections to form a rigid structure, free of buckling and warping.

1. Install braces, straps, plates, brackets, and other reinforcements as needed to support shelf loading and as required for stability.

2. Install shelves at spacing indicated on Drawings.

3.2 ADJUSTING

A. Adjust metal storage shelving so that connectors and other components engage accurately and securely.

B. Touch up marred finishes or replace vinyl-coated wire closet shelving that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by vinyl-coated wire storage shelving manufacturer.

C. Replace metal storage shelving components that have been damaged beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 10 73 16

PRE-FABRICATED ALUMINUM CANOPIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Building supported, pre-fabricated, fixed aluminum canopies.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include styles, material descriptions, construction details, fabrication details, dimensions of individual components and profiles, hardware, fittings, mounting accessories, features, and finishes for canopies.

B. Shop Drawings:

1. Include plans, elevations, sections, mounting heights, and attachment details.

2. Show locations for blocking, reinforcement, and supplementary structural support.

3. Shop drawings shall be sealed by professional structural engineer licensed to practice in the state where project is located.

1.3 WARRANTY

A. Special Warranty: Manufacturer and fabricator agree to repair or replace components of canopies that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including framework.

b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 MANUFACTURERS

A. Basis of Design: Super Lumideck by Mapes Architectural Canopies

1. Mounting Style: Hanger rod supported

2. Fascia Profile: As indicated on Drawings.

3. Decking / Soffit: Extruded aluminum flat soffit decking

4. Drainage: Concealed troughs directing water to rear drainage to downspout.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Aluminum Technologies, Inc.
2. Avadeck Walkway Covers and Canopies
3. Canopy Corporation
4. Douglass Colony Group
5. East Texas Canopy, Inc.
6. Mapes Architectural Canopies
7. MASA Architectural Canopies
8. Mitchell Metals
9. Perfection Architectural Systems; an Avadeck company
10. TFC Canopy
11. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

2.3 CANOPY FRAME AND ACCESSORY MATERIALS

A. Aluminum: Alloy and temper recommended by canopy manufacturer for type of use and finish indicated and with not less than the strength and durability properties of alloy and temper required by structural loads.

1. Aluminum Plate and Sheet: ASTM B209.
2. Aluminum Extrusions: ASTM B221.
3. Extruded Structural Pipe and Round Tubing: ASTM B429, standard weight (Schedule 40).
4. Drawn Seamless Tubing: ASTM B210.

B. Anchors, Fasteners, Fittings, Hardware, and Installation Accessories:

1. Material: Stainless steel or manufacturer’s standard corrosion-resistant, compatible, non-staining material.
2. Complying with performance requirements indicated and suitable for exposure conditions, supporting structure, anchoring substrates, and installation methods indicated.
3. Provide as required for canopy assembly, mounting, and secure attachment. Number as needed to comply with performance requirements and to maintain uniform appearance; evenly spaced.
4. Where exposed to view, provide finish and color as selected by Architect from manufacturer's full range.

C. Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in steel, complying with SSPC-Paint 20.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187.

2.4 FIXED CANOPY FABRICATION

A. Fabrication:

1. Frame Fabrication: Fabricate canopy frames from aluminum. Preassemble in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

2. Form exposed work true to line and level with accurate angles and surfaces and straight edges.

3. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Fabricate slip-fit connections exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

4. Weld corners and connections continuously. Obtain fusion without undercut or overlap. Remove welding flux immediately. At exposed corners and connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

5. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure canopies in place and to properly transfer loads.

B. Aluminum Finishes:

1. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

    a. Color and Gloss: As selected by Architect from manufacturer's full range

2. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

    a. Color and Gloss: As selected by Architect from manufacturer's full range

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for supporting members, blocking, inserts, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install canopies at locations and in position indicated, securely connected to supports, free of rack, and in proper relation to adjacent construction. Use mounting methods of types described and in compliance with Shop Drawings and fabricator's written instructions.

B. Install canopies after other finishing operations, including joint sealing and painting, have been completed.

C. Anchoring to In-Place Construction: Use anchors, fasteners, fittings, hardware, and installation accessories where necessary for securing canopies to structural support and for properly transferring load to in-place construction.

D. Corrosion Protection: Coat concealed surfaces of aluminum that come in contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

E. Coordinate canopy installation with flashing and joint-sealant installation so these materials are installed in sequence and in a manner that prevents exterior moisture from passing through completed exterior wall and roof assemblies.

3.3 CLEANING AND PROTECTION

A. Touch up factory-applied finishes to restore damaged or soiled areas.

B. Galvanized Surfaces: Clean field welds, connections, and abraded areas and repair galvanizing to comply with ASTM A780.

END OF SECTION

SECTION 11 24 23

BUILDING MAINTENANCE EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: This Section specifies design, supply and installation of building maintenance equipment for accessing the building facade.

1.2 REFERENCE STANDARDS

A. American Institute of Steel Construction (AISC)

1. AISC S342L, Load and Resistance Factor Design Specification for Structural Steel Buildings (including Supplement No.1).

B. Aluminum Association (AA).

1. AA DAF 45, Designation System for Aluminum Finishes.

2. AA ADM-1, Aluminum Design Manual.

C. American Society of Mechanical Engineers (AMSE).

1. ASME A120.1, Safety Requirements for Powered Platforms and Traveling Ladders and Gantries for Building Maintenance.

D. American National Standards Institute / International Window Cleaning Association (ANSI/IWCA).

1. ANSI/IWCA I-14.1, Window Cleaning Safety Standard.

E. American Welding Society (AWS).

1. AWS D1.2/D1.2M, Structural Welding Code - Aluminum.

2. AWS D1.1/D1.1M, Structural Welding Code—Steel.

F. ASTM International (ASTM).

1. ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

2. ASTM A167, Specification for Stainless and Heat Resisting Chromium Nickel Steel Plate, Sheet and Strip.

3. ASTM A276, Standard Specification for Stainless Steel Bars and Shapes.

4. ASTM A492 Standard Specification for Stainless Steel Rope.

5. ASTM B221, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

G. International Code Council (ICC).

1. International Building Code.

H. Occupational Safety and Health Administration (OSHA).

1. OSHA 1910, Subpart D, Walking and Work Surfaces.

2. OSHA 1910, Subpart F, Appendix C, Personal Fall Arrest Systems.

3. OSHA Ruling on Window Cleaning by Bosun's Chair.

4. OSHA 1910.66 Subpart F, Powered Platforms.

I. National Roofing Contractor's Association (NRCA)

1. The NRCA Roofing and Waterproofing Manual

1.3 ACTION SUBMITTALS

A. General: Submit listed action submittals in accordance with Contract Conditions and Section 01 33 00

B. Shop Drawings: Indicate information on shop drawings as follows:

1. Submit dimensioned shop drawings showing complete layout and configuration of window cleaning and suspended maintenance system, including components and accessories.

2. Load Requirements: Indicate loads imposed on the building structure and building façade where applicable.

3. Indicate design and fabrication details, window "drops", hardware, and installation details.

4. Include installation and rigging instructions

5. Shop Drawings shall be stamped and signed by an Engineer licensed in State where the project is located.

1.4 INFORMATION SUBMITTALS

A. Quality Assurance:

1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

3. Manufacturer's installation instructions.

1.5 CLOSEOUT SUBMITTALS

A. Submit 1-year standard manufacturer warranty documents specified.

B. Operation and Maintenance Data: Submit Operation and Maintenance data for installed products.

1. Three (3) bound sets of Operation and Maintenance manuals including:

a. Manufacturer's instructions covering maintenance requirements

b. Parts catalog giving complete list of repair and replacement parts with cuts and identifying numbers.

c. Sample inspection log for Owner's use in recording inspections

2. Two (2) copies of reduced, as-built shop drawings showing equipment locations and details. Ensure drawings are posted adjacent to roof access points.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.

2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction and approving application method.

B. Regulatory Requirements.

1. Comply with International Building Code (IBC) and the adopted Building Code Amendments where the project is located.

2. Comply with OSHA regulations as follows:

a. 1910, Subpart D, Walking and Working Surfaces.

b. Appendix C to 1910 Subpart F, Personal Fall Arrest Systems.

c. OSHA Ruling on Window Cleaning by Bosun's Chair.

d. 1910.66, Subpart F, Powered Platforms.

C. Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer’s installation instructions and manufacturer’s warranty requirements.

1.7 DELIVERY, STORAGE AND HANDLING

A. General: Comply with 01 66 00

B. Delivery: Deliver materials in manufacturer’s original packaging with identification labels intact

C. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

1.8 PROJECT AMBIENT CONDITIONS

A. Assemble and erect components only when temperatures are above 40 degrees F.

1.9 SEQUENCING

A. Sequence with other Work and Comply with building maintenance equipment manufacturer’s written recommendations for sequencing construction operations.

1.10 WARRANTY

A. Manufacturer’s Warranty: Submit, for Owner’s acceptance, manufacturer’s standard warranty document executed by authorized company official. Manufacturer’s warranty is in addition to, and does not limit, other rights Owner may have under Contract Documents.

B. Special Warranty: Manufacturer and fabricator agree to repair or replace components of building maintenance equipment that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Permanent Roof Anchor by Probel Group

B. Acceptable Manufacturers:

1. Probel Group

2. Summit Anchor Co.

3. Tractel, Ltd.

4. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.2 DESIGN PERFORMANCE REQUIREMENTS

A. Design window cleaning and suspended maintenance system to suit project requirements to AISC S342L and as indicated.

B. Locate anchorages to suit suspension equipment specified.

C. Design anchor components for cleaning and suspended maintenance equipment to ASME A120.1.

1. Ensure compatibility with industry standard equipment.

2. Anchorage and anchor components: Designed by Engineer qualified in design of window cleaning and suspended maintenance equipment and licensed in State where project is located.

D. Design system fall arrest safety anchors and equipment supports to AISC S342L (including supplement No.1) and ANSI/IWCA I-14.1, and as follows:

1. Comply with OSHA 1910, Subpart F, Appendix C.

2. Fall Arrest Safety Anchors:

a. Safety factor against fracture or detachment: 4 to 1.

b. Ultimate Load: 5,000 lbs (5,400 lbs in California) minimum in any direction at the attachment point

2.3 SYSTEM COMPONENTS

A. Safety Tieback Anchors

2.4 SAFETY TIEBACK ANCHORS

A. Safety U-bars: Mild steel, Type 300W with 44 Ksi minimum yield strength, hot-dip galvanized to ASTM A123/A123M.

1. U-bar: 0.75 inches minimum diameter material with 1.5 inches eye opening.

B. Hollow Steel Section (HSS) Piers: Mild steel, Type 300W with 50 Ksi minimum yield strength, hot dipped galvanized to ASTM A123/A123M

1. Wall thickness to suit application

C. Plate and other sections: Mild steel, Type 300W with 44 Ksi minimum yield strength, hot dipped galvanized to ASTM A123/A123M

1. Wall thickness to suit application

D. Miscellaneous Bolts, Nuts and Washers: Stainless steel to ASTM A276, Type 304 with 35 Ksi minimum yield strength.

2.5 SOURCE QUALITY CONTROL

A. Ensure building maintenance equipment components and materials are from single manufacturer.

PART 3 - EXECUTION

3.1 INSTALLERS

A. Provide experienced and qualified technicians to carry out erection, assembly and installation of building maintenance and suspended maintenance equipment system.

B. Complete steel welding to AWS D1.2/D1.2M.

C. Complete aluminum welding to AWS D1.1/D1.1M.

3.2 MANUFACTURERS INSTRUCTIONS

A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions and technical data sheets.

3.3 EXAMINATION

A. Site Verification of Conditions:

1. Verify that substrate conditions which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of building maintenance equipment.

2. Inform General Contractor of unacceptable conditions immediately upon discovery.

3. Proceed with installation only after unacceptable conditions have been remedied.

3.4 PREPARATION

A. Ensure structure or substrate is adequate to support complete building maintenance equipment system.

3.5 INSTALLATION

A. Coordinate building maintenance equipment work with work of other trades, for proper time and sequence to avoid construction delays.

B. Install building maintenance equipment plumb and level in accordance with manufacturer's written instructions.

C. Mechanically fasten anchors in accordance with manufacturer's recommendations, or install anchors in concrete in accordance with manufacturer's recommendations.

D. Accurately fit and align, securely fasten and install free from distortion or defects.

E. Deform threads of tail end of anchor studs after nuts have been tightened to prevent accidental

removal and vandalism.

F. Track Works: Install tracks straight, true and level, with 0.125 inches maximum step deviation and in accordance with manufacturer's written instructions.

3.6 FINAL CLEANING

A. Do cleanup in accordance with Section 01 74 00 - Cleaning and Waste Management.

B. Upon completion, remove surplus and excess materials, rubbish, tools and equipment.

3.7 PROTECTION

A. Protect installed product from damage during construction.

B. Make good damage to adjacent materials caused by building maintenance equipment installation.

END OF SECTION

SECTION 11 31 00

RESIDENTIAL APPLIANCES

1.1 SUMMARY

A. Section Includes: Residential appliances within apartment dwelling units:

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include installation details, material descriptions, dimensions of individual components, and finishes for each appliance.

2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

B. Product Schedule: For appliances.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each residential appliance to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of residential appliance from single manufacturer.

B. Basis of Design: Whirlpool Corporation

2.2 PERFORMANCE REQUIREMENTS

A. Electrical Appliances: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Gas-Fueled Appliances: Certified by a qualified testing agency for each type of gas-fueled appliance according to ANSI Z21 Series standards.

C. Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply with applicable provisions in the DOJ's 2010 ADA Standards for Accessible Design and ICC A117.1.

2.3 RANGES

A. Electric Range (**RG-1**): Freestanding, rear control range with one oven, complying with AHAM ER-1.

1. Width: 30 inches

2. Electric Burner Elements: Four

a. Controls: Digital panel or manual-dial controls, located on splash panel at rear of rangetop.

3. Oven Features:

a. Operation: Baking and self-cleaning.

b. Broiler: Located in top of oven.

c. Oven Door: Counterbalanced, removable, with observation window and full-width handle.

d. Controls: Digital panel or manual-dial controls, located on splash panel at rear of rangetop.

4. Anti-Tip Device: Manufacturer's standard.

5. Electric Power Supply: As indicated on Drawings.

6. Color / Finish: As selected by Owner from manufacturer’s full range.

B. Electric Range (**RG-2**): Slide-in range, front control range with one oven, complying with AHAM ER-1.

1. Width: 30 inches

2. Electric Burner Elements: Four

a. Controls: Digital panel or manual-dial controls, located on front of rangetop.

3. Oven Features:

a. Operation: Baking and self-cleaning.

b. Broiler: Located in top of oven.

c. Oven Door: Counterbalanced, removable, with observation window and full-width handle.

d. Controls: Digital panel or manual-dial controls, located on front of rangetop.

4. Anti-Tip Device: Manufacturer's standard.

5. Electric Power Supply: As indicated on Drawings.

6. Color / Finish: As selected by Owner from manufacturer’s full range.

2.4 MICROWAVE OVENS

A. Microwave Oven / Rang Hood Combination (**MO-1**):

1. Mounting: Wall cabinet

2. Type: Conventional

3. Width: 30 inches

4. Capacity: 1.5 cu. ft. (min)

5. Oven Door: Door with observation window and pull handle or pushbutton latch release.

6. Exhaust Fan: Two-speed fan with manufacturer’s standard capacity, but not less than 300-cfm.

a. Venting: Nonvented, recirculating type with charcoal filter

7. Microwave Power Rating: Manufacturer's standard.

8. Electric Power Supply: As indicated on Drawings.

9. Controls: Digital panel controls and timer display.

10. Color / Finish: As selected by Owner from manufacturer’s full range.

B. Microwave Oven (**MO-2**):

1. Mounting: Counter top
2. Type: Conventional
3. Capacity: 1.5 cu. ft. (min)
4. Oven Door: Door with observation window and pull handle or pushbutton latch release.
5. Microwave Power Rating: Manufacturer's standard.
6. Electric Power Supply: As indicated on Drawings.
7. Controls: Digital panel controls and timer display.
8. Color / Finish: As selected by Owner from manufacturer’s full range.

2.5 KITCHEN EXHAUST VENTILATION

A. Overhead Exhaust Hood (**EX-1**):

1. Type: Wall-mounted exhaust-hood system.
2. Width: 30 inches
3. Exhaust Fan: Two-speed fan built into hood and with manufacturer's standard capacity.
   a. Venting: Vented to outside through wall with weatherproof wall cap, backdraft damper, and rodent-proof screening
   b. Fan Control: Hood-mounted fan switch, with separate hood-light control switch.
4. Color / Finish: As selected by Owner from manufacturer’s full range.
5. Features:
   a. Permanent, washable filter.
   b. Built-in incandescent lighting.

2.6 REFRIGERATOR/FREEZERS

A. Refrigerator/Freezer (**RF-1)**: Two-door refrigerator/freezer with freezer on bottom and complying with AHAM HRF-1.

1. Type: Freestanding
2. Width: 33 inches (nom)
3. Storage Capacity (nominal): 18 cu. ft.
4. General Features:
   a. Separate temperature controls for each compartment.

5. Refrigerator Features:

   a. Interior light in refrigeration compartment.

6. Freezer Features:

   a. Interior light in freezer compartment.

   b. Automatic icemaker and storage bin.

7. Color / Finish: As selected by Owner from manufacturer's full range.

8. ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product-labeling program.

9. Accessibility: ADA compliant with not less than 50 percent of refrigerator and freezer shelves shall be a maximum of 54-inches above finished floor when shelves are installed at maximum height.

B. Refrigerator/Freezer (**RF-2)**: Two-door refrigerator/freezer with freezer on bottom and complying with AHAM HRF-1.

1. Type: Freestanding

2. Width: 36 inches (nom)

3. Storage Capacity (nominal): 18 cu. ft.

4. General Features:

   a. Separate temperature controls for each compartment.

5. Refrigerator Features:

   a. Interior light in refrigeration compartment.

6. Freezer Features:

   a. Interior light in freezer compartment.

   b. Automatic icemaker and storage bin.

7. Color / Finish: As selected by Owner from manufacturer's full range.

8. ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product-labeling program.

   Accessibility: ADA compliant with not less than 50 percent of refrigerator and freezer shelves shall be a maximum of 54-inches above finished floor when shelves are installed at maximum height.

2.7 DISHWASHERS

A. Dishwasher (**DW-1**): Complying with AHAM DW-1.

1. Type: Undercounter.

2. Dimensions:

a. Width: 24 inches (nom)

b. Height: 34-1/2 inches (nom)

3. Tub and Door Liner: Manufacturer's standard with sealed detergent and automatic rinsing-aid dispensers.

4. Color / Finish: As selected by Owner from manufacturer’s full range.

5. ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product-labeling program.

B. Dishwasher (**DW-2**): Complying with AHAM DW-1.

1. Type: Undercounter.

2. Dimensions:

a. Width: 24 inches (nom)

b. Height: 32-1/2 inches (nom)

3. Tub and Door Liner: Manufacturer's standard with sealed detergent and automatic rinsing-aid dispensers.

4. Color / Finish: As selected by Owner from manufacturer’s full range.

5. ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product-labeling program.

6. Accessibility: ADA compliant.

2.8 CLOTHES WASHERS

A. Clothes Washer (**CW-1)**: Complying with AHAM HLW-1.

1. Type: Stacking, front-loading unit.

2. Drum: Manufacturer's standard.

3. Control Location: Front.

4. Electrical Power: As indicated on Drawings.

5. Motor: Manufacturer's standard with built-in overload protector.

6. Color / Finish: White

7. Accessibility: ADA complaint with loading door 15-inches minimum and 34-inches maximum above finished floor.

8. ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product-labeling program.

2.9 CLOTHES DRYERS

A. Clothes Dryer (**CD-1)**: Complying with AHAM HLD-1.

1. Type: Freestanding, frontloading, electric unit.
2. Drum: Manufacturer's standard.
3. Control Location: Front.
4. Electric-Dryer Power: As indicated on Drawings.
5. Color / Finish: White
6. Accessibility: ADA complaint with loading door 15-inches minimum and 34-inches maximum above finished floor.

2.10 IN-SINK DISPOSERS

A. Disposal (**D-1**):

1. Type: Continuous-feed in sink disposer.
2. Motor Rating: 1/3-horsepower
3. Electrical Power: As indicated on Drawings.

2.11 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, power connections, and other conditions affecting installation and performance of residential appliances.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install appliances according to manufacturer's written instructions.

B. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and that rough openings are completely concealed.

C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

D. Range Anti-Tip Device: Install at each range according to manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

A. Perform the following tests and inspections.

1. Perform visual, mechanical, and electrical inspection and testing for each appliance according to manufacturers' written recommendations. Certify compliance with each manufacturer's appliance-performance parameters.

2. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.

3. Operational Test: After installation, start units to confirm proper operation.

4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.

B. An appliance will be considered defective if it does not pass tests and inspections.

3.4 APPLIANCE SCHEDULES

A. Typical One-bed Units

1.	Range:	RG-1
2.	Microwave Oven:	MO-1
3.	Kitchen Exhaust Ventilation:	MO-1
4.	Refrigerator / Freezer:	RF-1
5.	Dishwasher:	DW-1
6.	Clothes Washer:	CW-1
7.	Clothes Dryer:	CD-1
8.	In-Sink Disposer:	D-1

B. Typical Two-bed and Three-bed Units

9.	Range:	RG-1
10.	Microwave Oven:	MO-1
11.	Kitchen Exhaust Ventilation:	MO-1
12.	Refrigerator / Freezer:	RF-2
13.	Dishwasher:	DW-1
14.	Clothes Washer:	CW-1
15.	Clothes Dryer:	CD-1
16.	In-Sink Disposer:	D-1

C. ICC A117.1, Type A ‘HC’ Units

1.	Range	RG-2
2.	Microwave Oven	MO-2

3.	Kitchen Exhaust Ventilation	EX-2
4.	Refrigerator / Freezer	RF-1 (one-bed), RF-2 (others)
5.	Dishwasher:	DW-2
6.	Clothes Washer:	CW-1
7.	Clothes Dryer:	CD-1
8.	In-Sink Disposer:	D-1

END OF SECTION

SECTION 11 82 26

WASTE COMPACTORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes waste compactors.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1. Include rated capacities, operating characteristics, furnished specialties, accessories, and finishes.

B. Shop Drawings: For each waste compactor and for special components not dimensioned or detailed in manufacturer's product data. Include plans, elevations, sections, details, and attachments to other work.

1. Dimensions locating chutes that interface with waste compactors.

2. Location and installation details of automatic sprinkler in hopper of each chute-fed compactor.

3. Equipment access points and required space for equipment service and operation.

1.4 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation and maintenance of units required for this Project.

B. Waste-Compactor Standards: ANSI Z245.21and NFPA 82.

C. Waste-Container Standards: ANSI Z245.30 and ANSI Z245.60.

PART 2 - PRODUCTS

2.1 STATIONARY-HORIZONTAL WASTE COMPACTORS

A. Waste Compactor: Manufacturer's standard stationary-horizontal compactor, complying with requirements and with components, options, and accessories needed to provide a complete, functional system.

1. Manufacturers:

a. Chutes International

b. Marathon Equipment Company; a Dover Company

c. Wastequip

d. Wilkinson High-Rise

e. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13

2. Basis of Design: Mini-MAC by Marathon Equipment Company

a. Compactor Capacity / Rated Size (Volume): 0.30 cubic yards

b. Clear Top Opening (Length by Width): Minimum 27 inches by 24 inches

c. Cycle Time: 14 seconds.

d. Motor Size: 5 hp.

e. Finish: Manufacturer's standard

1) Color: As selected by Architect from manufacturer's full range

f. Number of Extra Storage Containers: As indicated on Drawings, but not less than two.

2.2 FABRICATION

A. Fabricate waste compactors with smooth, eased, exposed edges to prevent injury to persons in vicinity of equipment.

B. Fabricate containers, hoppers, compaction chambers, unit bodies, and similar components of steel with welded joints. Reinforce with steel members sized and spaced to withstand impacts and pressures of normal operations and to prevent deformation.

C. Fabricate equipment with replaceable parts at points of normal wear.

D. Fabricate liquid tight compactor baffles to stop liquid from leaking out.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions for compliance with requirements for installation tolerances, clearances, service rough-ins, and other conditions affecting performance of the Work.

B. Examine walls, floors, and chutes for suitable conditions where each waste compactor will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install each waste compactor according to manufacturer's written instructions, ANSI Z245.2, and ANSI Z245.21.

B. Install automatic sprinkler in hopper of each chute-fed compactor according to NFPA 82.

C. Set waste compactors level, plumb, properly aligned, and securely in place. Anchor as required for secure operation.

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Perform installation and startup checks according to manufacturer's written instructions.

2. Test and adjust controls, alarms, and safeties. Replace damaged and malfunctioning controls and equipment.

C. A waste compactor will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain waste compactors according to manufacturer's requirements and ANSI Z245.2.

END OF SECTION

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SECTION 12 21 13

HORIZONTAL LOUVER BLINDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manually operated, cordless, horizontal louver blinds with polymer slats within dwelling units.

2. Refer to Interior Design consultant for window treatments within Clubhouse, Leasing Center, and other building common spaces.

1.2 ACTION SUBMITTALS

A. Product Data: For horizontal louver blinds with polymer slats.

1. Include material descriptions, dimensions of individual components and profiles, finishes, operating characteristics, and furnished accessories.

B. Shop Drawings: For horizontal louver blinds with polymer slats.

1. Fabrication and installation details.

C. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type and color of horizontal louver blind.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For horizontal louver blinds.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Material: Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Horizontal Louver Blinds: Full-size units equal to 5 percent of quantity installed for each size, color, texture, pattern, and gloss indicated, but no fewer than two units.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver horizontal louver blinds in factory packages, marked with manufacturer, product name, and location of installation, using same designations indicated on Drawings.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not install horizontal louver blinds until construction and wet-work and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where horizontal louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain horizontal louver blinds from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Window Covering Safety Standard: Provide horizontal louver blinds that comply with WCMA A100.1.

B. Flame-Resistance Rating: Comply with NFPA 701; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.3 HORIZONTAL LOUVER BLINDS, POLYMER SLATS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. CACO Inc. Window Fashions

2. Comfortex Window Fashions

3. Hunter Douglas Contract

4. Levolor Inc.

5. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Slats: Polymers that are lead-free, UV stabilized, integrally colored, opaque, and will not crack or yellow; antistatic, dust-repellent treated.

1. Formulation: Manufacturer's standard

2. Width: 2 inches (51 mm)

3. Thickness: Not less than 0.125 inch

4. Spacing: Manufacturer's standard

5. Profile: Manufacturer's standard

6. Features:

a. Privacy Slats: Manufacturer's standard privacy slats with no inner lift-cord route holes or with minimum size inner lift-cord route holes located near back (outside) edge of slat to maximize slat overlap and minimize light gaps between slats.

C. Ladders: Evenly spaced across headrail at spacing that prevents long-term slat sag.

1. Type: Braided cord or cloth tape in manufacturer's standard width.

D. Headrail: Formed steel or extruded aluminum; long edges returned or rolled. Headrails fully enclose control mechanisms on three sides and ends.

1. Capacity: One blind per headrail unless otherwise indicated.

E. Manual Cordless Operation:

1. Lift Mechanism: Manufacturer's standard lift- or tension-control mechanism that allows blinds to be raised or lowered into position by manually pushing the bottom rail up or pulling it down.

2. Lift Operator: Lift-and-lock button on bottom rail for manually raising/lowering blinds when pressed and held, and locking blinds into position when released, or manufacturer’s standard bottom rail lift.

3. Tilt Mechanism: Enclosed worm-gear mechanism and linkage rod that adjusts ladders.

4. Tilt Position:

a. Full.

5. Tilt Operator: Clear-plastic wand or corrosion-resistant steel rod.

6. Tilt Over-Rotation Protection: Manufacturer's detachable operator or slip clutch to prevent over-rotation of gear.

7. Tilt-Operator Location: Manufacturer's standard

F. Bottom Rail: Secures and protects ends of ladders and inner lift cords.

1. Type: Manufacturer's standard

G. Valance: Manufacturer's standard

H. Mounting Brackets: With spacers and shims required for blind placement and alignment indicated.

1. Intermediate Support: Provide intermediate support brackets to produce support spacing recommended by horizontal louver blind manufacturer for weight and size of blind.

I. Hold-Down Brackets and Hooks or Pins: For use at door mounted blinds, utilize manufacturer's standard.

J. Colors, Textures, Patterns, and Gloss:

1. Slats: As selected by Architect from manufacturer's full range.

2. Components: Provide rails, cords, ladders, and materials exposed to view matching or coordinating with slat color unless otherwise indicated.

2.4 FABRICATION OF HORIZONTAL LOUVER BLINDS

A. Product Safety Standard: Fabricate horizontal louver blinds to comply with WCMA A 100.1 including requirements for lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows:

1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which blind is installed less 1/4 inch per side or 1/2 inch total, plus or minus 1/8 inch. Length equal to head-to-sill dimension of opening in which blind is installed less 1/4 inch, plus or minus 1/8 inch.

C. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.

1. Lift-and-Tilt Mechanisms: With permanently lubricated moving parts.

D. Mounting Brackets: Designed for removal and reinstallation of blind without damaging blind and adjacent surfaces, for supporting blind components, and for bracket positions and blind mounting method indicated.

E. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to brackets and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.

F. Color-Coated Finish:

1. Metal: For components exposed to view, unless anodized or plated finish is indicated, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF HORIZONTAL LOUVER BLINDS

A. Install horizontal louver blinds level and plumb, aligned and centered on openings, and aligned with adjacent units in accordance with manufacturer's written instructions.

1. Comply with requirements in GANA’s “Glazing Manual” for required clearance between exterior slat edges and face of glass and face of glazing frames.

2. Provide adequate clearance between exterior slat edges and window glazing and glazing frames to permit smooth operation of operable windows.

3. Install mounting brackets to prevent deflection of headrails.

4. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.

3.3 ADJUSTING

A. Adjust horizontal louver blinds to operate free of binding or malfunction through full operating ranges.

3.4 CLEANING AND PROTECTION

A. Clean horizontal louver blind surfaces after installation in accordance with manufacturer's written instructions.

B. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensures that horizontal louver blinds are without damage or deterioration at time of Substantial Completion.

C. Replace damaged horizontal louver blinds that cannot be repaired in a manner approved by Architect before time of Substantial Completion.

END OF SECTION

SECTION 14 21 00

ELECTRIC TRACTION ELEVATORS

1.1 SUMMARY

A. Section includes machine room-less (MRL) electric traction passenger elevators.

1.2 ACTION SUBMITTALS

A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information.

B. Shop Drawings:

1. Include plans, elevations, sections, and large-scale details indicating service at each landing, coordination with building structure, relationships with other construction, and locations of equipment.

2. Indicate maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.

C. Samples: For exposed finishes.

1.3 INFORMATIONAL SUBMITTALS

A. Seismic Qualification Certificates: For elevator equipment, accessories, and components, from manufacturer.

B. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and [**machine room**] [**control closet**] layout and dimensions, as shown on Drawings, and electrical service [**including standby power generator**], as shown and specified, are adequate for elevator system being provided.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For elevators to include in emergency, operation, and maintenance manuals.

B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.

C. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner, in the form of a standard maintenance agreement, starting on date initial maintenance service is concluded. Duration to be per Owner’s approval.

1.5 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair, restore, or replace elevator work that fails in materials or workmanship within specified warranty period.

1. Warranty Period: Five year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Schindler

2. Otis Elevator Company

3. Thyssen Krupp

4. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

2.2 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with ASME A17.1/CSA B44.

B. Accessibility Requirements: Comply with Section 407 in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and with ICC A117.1.

C. Seismic Performance: Elevator system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and shall comply with elevator safety requirements for seismic risk Zone 2 or greater in ASME A17.1/CSA B44.

1. Affected peak velocity acceleration (Av) for Project's location is greater than or equal to 0.10, but less than 0.20 (seismic risk Zone 2).

2. Provide earthquake equipment required by ASME A17.1/CSA B44.

3. Provide seismic switch required by ASCE/SEI 7.

4. Design earthquake spectral response acceleration short period (Sds) for Project is 0.225.

5. Project Seismic Design Category: B.

6. Elevator Component Importance Factor: 1.0.

2.3 ELEVATORS

A. Elevator System, General: Manufacturer's standard elevator systems. Unless otherwise indicated, manufacturer's standard components shall be used, as included in standard elevator systems and as required for complete system.

B. Basis of Design - Passenger: 3300 by Schindler

C. Elevator Description:

1. Elevator Number: 1.

2. Machine Location: Hoistway; no machine room is provided.

3. Machine Type: Gearless traction.

4. Rated Load: 3500 lb (1589 kg)

5. Freight Loading Class for Service Elevator(s): Class A.

6. Rated Speed: 150 fpm (0.5 m/s)

7. Operation System: Selective-collective automatic operation.

8. Auxiliary Operations:

a. Standby power operation.

b. Battery-powered lowering.

c. Automatic dispatching of loaded car.

d. Nuisance call cancel.

e. Emergency hospital service at all floors.

f. Independent service for all cars in group.

g. Loaded-car bypass.

h. Distributed parking.

9. Security Feature: Card-reader operation.

10. Car Enclosures:

a. Inside Width: 6’-9” from side wall to side wall.

b. Inside Depth: 5’-7” from back wall to front wall (return panels).

c. Inside Height: 7’-5” to underside of ceiling.

d. Front Walls (Return Panels): Satin stainless steel, No. 4 finish.

e. Car Fixtures: Satin stainless steel, No. 4 finish.

f. Side and Rear Wall Panels: Satin stainless steel, No. 4 finish.

g. Door Faces (Interior): Satin stainless steel, No. 4 finish.

h. Ceiling: Luminous ceiling.

i. Handrails: 1/2 by 2 inches rectangular, satin stainless steel, No. 4 finish at rear of car.

j. Floor prepared to resilient flooring.

11. Hoistway Entrances:

a. Width: 42 inches (3’-6”)

b. Height: 84 inches (7’-0”)

c. Type: Two-speed side sliding.

d. Frames: Satin stainless steel, No. 4 finish.

e. Doors: Satin stainless steel, No. 4 finish.

12. Hall Fixtures: Satin stainless steel, No. 4 finish.

13. Additional Requirements:

a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless steel, No. 4 finish.

b. Provide hooks for protective pads in all cars and one complete set of full-height protective pads.

D. Basis of Design - Service: 3300XL by Schindler

E. Elevator Description:

1. Elevator Number: 2.
2. Machine Location: Hoistway; no machine room is provided.
3. Machine Type: Gearless traction.
4. Rated Load: 4500 lb (1589 kg)
5. Freight Loading Class for Service Elevator(s): Class A.
6. Rated Speed: 150 fpm (0.5 m/s)
7. Operation System: Selective-collective automatic operation.
8. Auxiliary Operations:
    a. Standby power operation.
    b. Battery-powered lowering.
    c. Automatic dispatching of loaded car.
    d. Nuisance call cancel.
    e. Emergency hospital service at all floors.
    f. Independent service for all cars in group.
    g. Loaded-car bypass.
    h. Distributed parking.
9. Security Feature: Card-reader operation.
10. Car Enclosures:
    a. Inside Width: 5’-4” from side wall to side wall.
    b. Inside Depth: 8’-2” from back wall to front wall (return panels).
    c. Inside Height: 7’-5” to underside of ceiling.
    d. Front Walls (Return Panels): Satin stainless steel, No. 4 finish.
    e. Car Fixtures: Satin stainless steel, No. 4 finish.
    f. Side and Rear Wall Panels: Satin stainless steel, No. 4 finish.
    g. Door Faces (Interior): Satin stainless steel, No. 4 finish.
    h. Ceiling: Luminous ceiling.
    i. Handrails: 1/2 by 2 inches rectangular, satin stainless steel, No. 4 finish at rear of car.
    j. Floor prepared to resilient flooring.

11. Hoistway Entrances:

    a. Width: 48 inches (4’-0”)

    b. Height: 84 inches (7’-0”)

    c. Type: Two-speed side sliding.

    d. Frames: Satin stainless steel, No. 4 finish.

    e. Doors: Satin stainless steel, No. 4 finish.

12. Hall Fixtures: Satin stainless steel, No. 4 finish.

13. Additional Requirements:

    a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless steel, No. 4 finish.

    b. Provide hooks for protective pads in all cars and one complete set of full-height protective pads.

2.4 TRACTION SYSTEMS

A. Elevator Machines: Variable-voltage, variable-frequency, ac-type hoisting machines or variable-voltage dc-type hoisting machines and solid-state power converters.

1. Limit total harmonic distortion of regenerated power to 5 percent per IEEE 519.

B. Fluid for Hydraulic Buffers: If using hydraulic buffers, use only fire-resistant fluid.

C. Machine Beams: Provide framing to support elevator hoisting machine and deflector sheaves from the building structure. Comply with Section 05 50 00 "Metal Fabrications" for materials and fabrication.

D. Guides: Roller guides or polymer-coated, non-lubricated sliding guides. Provide guides at top and bottom of car and counterweight frames.

2.5 OPERATION SYSTEMS

A. General: Provide manufacturer's standard microprocessor operation systems as required to provide type of operation indicated.

B. Auxiliary Operations: In addition to primary operation system features, provide the following operational features for elevators where indicated:

1. Single-Car Standby Power Operation: On activation of standby power, car is returned to a designated floor and parked with doors open. Car can be manually put in service on standby power, either for return operation or for regular operation, by switches in control panel located at main lobby.

2. Single-Car Battery-Powered Lowering: If power fails and car is at a floor, it remains at that floor, opens its doors, and shuts down. If car is between floors, it is lowered to the next floor below, opens its doors, and shuts down. System includes rechargeable battery and automatic recharging system.

3. Group Standby Power Operation: On activation of standby power, cars are returned, one at a time, to a designated floor and parked with doors open. If a car cannot be returned, it is removed from

the system. When all cars have been returned or removed from the system, one car can be put in service on standby power by a selector switch in control panel located at main lobby.

4. Group Battery-Powered Lowering: If power fails, cars that are at a floor remain at that floor, open their doors, and shut down. Cars that are between floors are lowered one at a time to the next floor below, open their doors, and shut down. System includes rechargeable battery and automatic recharging system.

C. Security Feature: Security feature shall not affect emergency firefighters' service.

1. Card-Reader Operation: System uses card readers at car-control stations to authorize calls. Security system determines which landings and at what times calls require authorization by card reader. Allow space as indicated for card reader in car.

a. Coordinate with Owner’s access control consultant for type of security access system equipment.

2.6 DOOR REOPENING DEVICES

A. Infrared Array: Provide door reopening device with uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more light beams shall cause doors to stop and reopen.

2.7 CAR ENCLOSURES

A. Materials and Finishes: Manufacturer's standards, but not less than the following:

1. Enameled-Steel Wall Panels: Flush, hollow-metal construction; fabricated from cold-rolled steel sheet. Provide with factory-applied enamel finish; colors as selected by Architect from manufacturer's full range.

2. Stainless-Steel Wall Panels: Flush, hollow-metal construction; fabricated from stainless-steel sheet.

3. Plastic-Laminate Wall Panels: Plastic laminate adhesively applied to manufacturer's standard honeycomb core with manufacturer's standard protective edge trim. Panels have a flame-spread index of 25 or less, when tested according to ASTM E 84. Plastic-laminate color, texture, and pattern as selected by Architect from elevator manufacturer's full range.

4. Enameled-Steel Doors: Flush, hollow-metal construction; fabricated from cold-rolled steel sheet. Provide with factory-applied enamel finish; colors as selected by Architect from manufacturer's full range.

5. Stainless-Steel Doors: Flush, hollow-metal construction; fabricated from stainless-steel sheet.

6. Plastic-Laminate Doors: Flush, hollow-metal construction; fabricated by laminating plastic laminate to exposed faces of enameled cold-rolled steel doors and covering edges with protective edge trim matching return panels. Plastic-laminate color, texture, and pattern as selected by Architect from elevator manufacturer's full range.

7. Sight Guards: Provide sight guards on car doors.

8. Sills: Extruded aluminum, with grooved surface, 1/4 inch (6.4 mm) thick.

9. Luminous Ceiling: Fluorescent light fixtures and ceiling panels of translucent acrylic or other permanent rigid plastic.

10. Handrails: Manufacturer's standard handrails, of shape, metal, and finish indicated.

2.8 HOISTWAY ENTRANCES

A. Hoistway Entrance Assemblies: Manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Frame size and profile shall accommodate hoistway wall construction.

1. Where gypsum board wall construction is indicated, frames shall be self-supporting with reinforced head sections.

B. Fire-Rated Hoistway Entrance Assemblies: Door and frame assemblies shall comply with NFPA 80 and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing at as close-to-neutral pressure as possible according to NFPA 252 or UL 10B.

1. Fire-Protection Rating: 1-1/2 hours

C. Materials and Fabrication: Manufacturer's standards, but not less than the following:

1. Enameled-Steel Frames: Formed from cold- or hot-rolled steel sheet. Provide with factory-applied enamel finish; colors as selected by Architect from manufacturer's full range.

2. Stainless-Steel Frames: Formed from stainless-steel sheet.

3. Star of Life Symbol: Identify emergency elevators with star of life symbol, not less than 3 inches (76 mm) high, on both inside surfaces of hoistway door frames.

4. Enameled-Steel Doors: Flush, hollow-metal construction; fabricated from cold-rolled steel sheet. Provide with factory-applied enamel finish; colors as selected by Architect from manufacturer's full range.

5. Stainless-Steel Doors: Flush, hollow-metal construction; fabricated from stainless-steel sheet.

6. Plastic-Laminate Doors: Flush, hollow-metal construction; fabricated by laminating plastic laminate to exposed faces of enameled cold-rolled steel doors and covering edges with protective edge trim matching door frames. Plastic-laminate color, texture, and pattern as selected by Architect from elevator manufacturer's full range.

7. Sight Guards: Provide sight guards on doors matching door edges.

8. Sills: Extruded aluminum, with grooved surface, 1/4 inch (6.4 mm) thick.

9. Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M.

2.9 SIGNAL EQUIPMENT

A. General: Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate lighted elements with long-life lamps and acrylic or other permanent, non-yellowing translucent plastic diffusers.

B. Car-Control Stations: Provide manufacturer's standard recessed or semi-recessed car-control stations. Mount in return panel adjacent to car door unless otherwise indicated.

1. Provide "No Smoking" sign matching car-control station, with text and graphics as required by authorities having jurisdiction.

C. Emergency Communication System: Two-way voice communication system, with visible signal, which dials preprogrammed number of monitoring station and does not require handset use. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.

D. Firefighters' Two-Way Telephone Communication Service: Provide flush-mounted cabinet in each car and required conductors in traveling cable for firefighters' two-way telephone communication service.

E. Hall Push-Button Stations: Provide hall push-button stations at each landing as indicated.

F. Hall Lanterns: Units with illuminated arrows; but provide single arrow at terminal landings. Provide one of the following:

1. Manufacturer's standard wall-mounted units, for mounting above entrance frames.

2. Units mounted in both jambs of entrance frame for each elevator.

G. Hall Annunciator: With each hall lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.

H. Standby Power Elevator Selector Switches: Provide switches, as required by ASME A17.1/CSA B44, where indicated. Adjacent to switches, provide illuminated signal that indicates when normal power supply has failed. For each elevator, provide illuminated signals that indicate when they are operational and when they are at the designated emergency return level with doors open.

I. Fire-Command-Center Annunciator Panel: Provide panel containing illuminated position indicators for each elevator, clearly labeled with elevator designation; include illuminated signal that indicates when elevator is operational and when it is at the designated emergency return level with doors open. Provide standby power elevator selector switch(es), as required by ASME A17.1/CSA B44, adjacent to position indicators. Provide illuminated signal that indicates when normal power supply has failed.

J. Emergency Pictorial Signs: Fabricate from materials matching hall push-button stations, with text and graphics as required by authorities having jurisdiction. Provide one sign at each hall push-button station unless otherwise indicated.

2.10 FINISH MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, commercial steel, Type B, exposed, matte finish.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, commercial steel, Type B, pickled.

C. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.

D. Stainless-Steel Bars: ASTM A 276, Type 304.

E. Stainless-Steel Tubing: ASTM A 554, Grade MT 304.

F. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063.

G. Plastic Laminate: High-pressure type complying with NEMA LD 3, Type HGS or Type HGL.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts to minimize vibration transmission to structure and structure-borne noise due to elevator system.

B. Lubricate operating parts of systems, including ropes, as recommended by manufacturers.

C. Leveling Tolerance: 1/8 inch (3 mm), up or down, regardless of load and travel direction.

D. Set sills flush with finished floor surface at landing. Fill space under sill solidly with non-shrink, nonmetallic grout.

E. Locate hall signal equipment for elevators as follows unless otherwise indicated:

1. For groups of elevators, locate hall push-button stations between two elevators at center of group or at location most convenient for approaching passengers.

2. Place hall lanterns either above or beside each hoistway entrance.

3. Mount hall lanterns at a minimum of 72 inches (1829 mm) above finished floor.

3.2 FIELD QUALITY CONTROL

A. Acceptance Testing: On completion of elevator installation and before permitting elevator use (either temporary or permanent), perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by governing regulations and agencies.

3.3 PROTECTION

A. Temporary Use: Limit temporary use for construction purposes to one elevator. Comply with the following requirements for elevator used for construction purposes:

1. Provide car with temporary enclosure, either within finished car or in place of finished car, to protect finishes from damage.

2. Provide other protective coverings, barriers, devices, signs, and procedures as needed to protect elevator and elevator equipment.

3. Engage elevator Installer to provide full maintenance service.

4. Engage elevator Installer to restore damaged work, if any, so no evidence remains of correction. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate, adjust, and maintain elevator(s).

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SECTION 14 91 82

TRASH CHUTES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Waste chutes.

2. Waste doors.

1.2 DEFINITIONS

A. Access Door: Door other than an intake or discharge door that penetrates the chase wall for service access to devices in the chase.

B. Chase: The shaft that encloses a chute.

C. Discharge Door: Door or hatch at the bottom of a chute, through which materials exit the chute.

D. Intake Door: Door or hatch that penetrates the chase wall and chute, and through which materials are fed into the chute.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chutes.

B. Shop Drawings:

1. Include plans, elevations, sections, and mounting and attachment details.

2. Include dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

3. Include each type and location of intake, discharge, and access door.

4. Include diagrams for power, signal and control wiring.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fire-rated door inspector.

1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, section 5.2.3.1.

B. Coordination Drawings: Plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other:

1. Chute-discharge locations coordinated with compactor-intake or container locations.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For chutes to include in operation and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. American Chute Systems, Inc.

2. Century Chute, LLC

3. Chutes International

4. Midland Chutes

5. Valiant Products, Inc.

6. Western Chutes

7. Wilkinson Hi-Rise, LLC

8. Substitutions: Products meeting the indicated standards of this section shall be acceptable subject to Owner and Architect approval. Comply with Section 01 25 13.

B. Source Limitations: Obtain from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing and inspecting agency, for fire-protection ratings indicated.

1. Test Pressure: Test at atmospheric (neutral) pressure according to NFPA 252 or UL 10B.

2. Intake Doors: Labeled, 1-1/2-hour fire-resistance rated with 30-minute temperature rise of 250 deg F

3. Access Doors: Labeled, 1-1/2-hour fire-resistance rated with 30-minute temperature rise of 250 deg F

C. Discharge-Door Assemblies: Fire-resistive door construction according to NFPA 252 or UL 10B requirements for fire-rated door assemblies.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Standard: Provide chutes complying with NFPA 82.

2.3 WASTE CHUTES

A. Chute Metal: Aluminum-coated, cold-rolled, commercial steel sheet (aluminized steel); ASTM A463, Type 1, with not less than T1-40 (T1M-120) coating

1. Thickness: 0.0625 inch (16 gauge), minimum

B. Chute Size: As indicated on Drawings.

2.4 WASTE DOORS

A. Intake-Door Assemblies: ASTM A240, Type 304, stainless steel self-closing units with positive latch and latch handle, with stainless steel trim; constructed as required for performance requirements indicated; and with frame suitable for the enclosing chase construction.

1. Door Type: Hopper

2. Size: Manufacturer's standard size for door type, chute type, and diameter indicated.

3. Finish: Manufacturer's standard satin or ASTM A480 No. 3 directional polish.

4. Latchset: Lever-handle type that unlatches door.

5. Accessible Automatic Door Operating System: When indicated on Drawings, provide manufacturer's standard system complying with applicable provisions of the cited accessibility standard.

6. Baffles: Rubber backdraft baffles at each intake.

B. Discharge-Door Assemblies: Aluminum-coated steel; direct vertical-discharge type, inclined, and horizontally closing and latching; constructed as required for performance requirements indicated; and equipped with 165 deg F (74 deg C) fusible links that cause doors to close in the event of fire.

C. Access-Door Assemblies: Manufacturer's standard ASTM A240, Type 302/304, stainless steel doors with trim; constructed as required for performance requirements indicated; with frame suitable for the enclosing chase construction; in satin or ASTM A480 No. 3 directional polish finish; equipped with cylinder locks that release latch with keys that are removable only when cylinder is locked.

1. Lock Cylinder: Cylinders standard with manufacturer.

2.5 ACCESSORIES

A. Chute Fire Sprinklers: NFPA 13; manufacturer's standard, recessed, automatic, NPS 1/2 (DN 13) sprinklers; ready for piping connections.

B. Flushing Spray Unit: NPS 3/4 (DN 19) spray-head unit located in chute above highest intake door, ready for hot-water piping connection, and with access door for spray-head and piping maintenance.

C. Sanitizing Unit: NPS 3/4 (DN 19) disinfecting and sanitizing spray-head unit located in chute above highest intake door, including 1-gal. tank and adjustable proportioning valve with bypass for manual control of sanitizing and flushing operation, ready for hot-water piping connection, and with access door for spray-head and piping maintenance.

D. Intake-Door Baffles: Rubber baffles, 1/8 inch thick.

E. Sound Dampening: Manufacturer's standard sound-deadening coating on exterior of chute and sound and vibration isolator pads at supporting frame at each floor penetration.

2.6 FABRICATION

A. Factory-assemble chutes to greatest extent practicable with nonleaking, continuously welded or lock-seamed joints without bolts, rivets, or clips projecting into chute interior. Include intake-door assemblies, metal supporting framing at each floor, and chute expansion joints between each support point.

B. Offsets: Construct offsets where indicated on Drawings. Fabricate so that installed chute is without obstructions that might prevent materials from free falling within chute.

1. Offsets below Intake Doors: Unless otherwise indicated, do not exceed a 15-degree maximum offset angle at any point, or place offset closer than 48 inches to nearest door above offset.

2. Offset above Top Intake Door: Do not exceed a 45-degree maximum offset angle between the highest intake door and the upper termination of chute.

3. Offsets at Floors: Complete offset between floors by returning chute to plumb before penetrating floors.

4. External Reinforcing: Externally reinforce impact area of offsets located below top intake door. Install vibration isolators where braced to structure.

C. Roof Vent: Fabricate vent unit as full-size extension of chute, open to the atmosphere. Extend vent to height above roofing surface as indicated on Drawings, but not less than 48-inches. Equip vent with full insect screening and metal explosion-release cap. Fabricate with roof-deck flange, counterflashing, and clamping ring of nonferrous metal compatible with chute metal.

D. Chute Fire Sprinklers: Install internally within chute, recessed out of the chute area through which material travels, and according to NFPA 13. Locate fire sprinklers at or above the top intake door of chutes, within the chute at alternate floor levels in buildings more than two stories tall, and at the lowest service level.

E. Equipment Access: Fabricate chutes with access for maintaining equipment located within the chute, such as flushing and sanitizing units, fire sprinklers, and plumbing and electrical connections.

PART 3 - EXECUTION

3.1 INSTALLATION OF WASTE CHUTES

A. Install and test chutes before installing enclosing chase construction.

B. Install chutes according to NFPA 82 and manufacturer's written instructions. Assemble components with tight, nonleaking joints. Anchor chutes securely to supporting structure to withstand impacts and stresses. Install chute and components to maintain fire-resistive performance of chute and the enclosing chase construction.

C. Install chutes plumb, without obstructions that might prevent materials from free falling within chutes.

D. Anchor flanges of chute vents to roof curbs before installing roofing and flashing. Install chute-vent counterflashing after roofing and roof-penetration flashing are installed.

3.2 INSTALLATION OF WASTE DOORS

A. Intake and Discharge Doors: Interface door units with throat sections of chutes for safe, snag-resistant, sanitary depositing of materials in chutes.

3.3 FIELD QUALITY CONTROL

A. Test chute components after installation.

1. Operate doors and locks to demonstrate that hardware operates properly and smoothly.

2. Complete test operations before installing chase enclosures.

B. Inspections:

1. Fire-rated door inspections: Inspect each fire-rated door according to NFPA 80, section 5.2

2. Repair or remove and replace door installations where inspections indicate that they do not comply with specified requirements.

3. Reinspect repaired or replaced doors to determine if replaced or repaired door installations comply with specified requirements.

4. Prepare and submit separate inspection report for each fire-rated door indicating compliance with each item listed in NFPA 80.

C. Plumbing Access Doors: After construction of chase enclosure, verify that access doors have been correctly located and properly installed for their purpose.

3.4 ADJUSTING

A. Adjust doors for smooth and balanced movement.

B. Operate sanitizing unit through one complete cycle of chute use and cleanup, and replenish chemicals or cleaning fluids in unit containers.

3.5 CLEANING

A. After completing chase enclosure, clean exposed surfaces of chute system's components. Do not remove labels of testing and inspecting agencies.

3.6 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain each chute and related equipment.

B. Demonstrate replenishment of sanitizing-unit chemicals or cleaning fluids.

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SECTION 31 31 16

TERMITE CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Soil treatment.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components, and profiles for termite control products.

2. Include the EPA-Registered Label or EPA Registration number for termiticide products.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Certificates: For each type of termite control product.

C. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and include the following:

1. Date and time of application.

2. Moisture content of soil before application.

3. Termiticide brand name and manufacturer.

4. Quantity of undiluted termiticide used.

5. Dilutions, methods, volumes used, and rates of application.

6. Areas of application.

7. Water source for application.

D. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located.

1.6 FIELD CONDITIONS

A. Soil Treatment:

1. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.

2. Related Work: Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

1.7 WARRANTY

A. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work consisting of applied soil termiticide treatment will prevent infestation of subterranean termites, including Formosan termites (Coptotermes formosanus). If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain termite control products from single manufacturer.

2.2 SOIL TREATMENT

A. Termiticide: EPA-Registered termiticide acceptable to authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation.

1. Products: Subject to compliance with requirements, provide one of the following.

a. BASF Corporation, Pest Control Solutions:

1) Phantom or Termidor

b. Bayer Environmental Science

1) Premise 1, Premise 75, Premise Pre-Construction or Premise Pro

c. Ensystex

1) Maxxthor SC, Prothor SC2 or Prothor WSP

d. Syngenta

1) Demon Max

2. Service Life of Treatment: Soil treatment termiticide that is effective for not less than five years against infestation of subterranean termites.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil per termiticide label**,** interfaces with earthwork, slab and foundation work, landscaping, utility installation, and other conditions affecting performance of termite control.

B. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Prepare work areas according to the requirements of authorities having jurisdiction and according to manufacturer's written instructions before beginning application and installation of termite control treatment(s). Remove extraneous sources of wood cellulose and other edible materials, such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.

B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.

1. Fit filling hose connected to water source at the site with a backflow preventer, according to requirements of authorities having jurisdiction.

3.3 APPLYING SOIL TREATMENT

A. Application: Mix soil treatment termiticide solution to a uniform consistency. Distribute treatment uniformly. Apply treatment at the product's EPA-Registered Label volume and rate for maximum specified concentration of termiticide to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction.

1. Slabs-on-Grade and Basement Slabs: Underground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.

2. Foundations: Soil adjacent to and along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing.

3. Crawlspaces: Soil under and adjacent to foundations. Treat adjacent areas, including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.

4. Masonry: Treat voids.

5. Penetrations: At expansion joints, control joints, and areas where slabs and below-grade walls will be penetrated.

B. Post warning signs in areas of application.

C. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

3.4 PROTECTION

A. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.

B. Protect termiticide solution dispersed in treated soils and fills from being diluted by exposure to water spillage or weather until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

END OF SECTION

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