

# Heat Stress

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## **How the Body Handles Heat**

To get rid of excess heat, our brains tell our bodies to change our blood circulation and produce sweat. Heat stress occurs when our bodies are unable to maintain a safe internal temperature.

### ***Blood Circulation***

The heart pumps more blood and the vessels close to our skin expand so that heat leaves the body at the skin's surface. Our muscles and organs may receive less blood while the body is cooling off. We feel weaker, more tired and less alert. Blood may pool in our lower extremities, causing us to faint. Move around to prevent fainting and lie down while recovering.

### ***Sweat***

When sweat evaporates, it sends heat away from our bodies. The moisture in humid air makes it harder for sweat to evaporate and move heat away from the body.

## **Conditions for Heat Stress**

Some conditions make it difficult for our body to cool itself, making heat stress more likely. High **humidity** means there is a lot of water in the air that makes it harder for sweat to evaporate off your skin.

**Radiant heat** is the heat that objects, such as fires, ovens and pavement, give off. Exposure to radiant heat makes it harder for the body to cool down.

**Direct sunlight** can cause heat stress because you don't have protection from the radiant heat of the sun. When the air is still, it is not moving heat away from you and it is harder for sweat to evaporate.

The **heat index** is a measure of the level of discomfort the average person can expect due to the temperature and humidity of the air.

**Exertion** is another factor that can increase the likelihood of heat stress. The greater the heat index and the more you exert yourself, the more water you need to drink to replace what you lose from sweating. Light exertion involves sitting or standing with minimal arm and leg movement. Moderate exertion involves actions that require continuous, modest intensity, such as light pushing/pulling or normal walking. Heavy exertion involves intense upper body work, such as carrying loads or sawing.

## **Health and Safety Concerns**

### ***Health Concerns***

Medical conditions, medications and supplements may make people more sensitive to sun damage and heat stress. Read the labels on everything you take and consult a doctor if you have questions or concerns.

Disorder	Description and Symptoms	Treatment
<b>Sunburn</b>	<ul style="list-style-type: none"> <li>• Skin is burned by UV rays (strongest in late morning and afternoon)</li> <li>• Can burn even on cloudy days</li> <li>• All skin colors can burn</li> <li>• Overexposure to sun can cause skin cancer</li> </ul>	<ul style="list-style-type: none"> <li>• Keep skin <b>cool and moisturized</b> as it heals</li> <li>• Wear sunscreen</li> <li>• Protect sunburned skin from further burning</li> <li>• Seek medical attention for severe sunburns, dehydration, high fever and extreme pain</li> </ul>
<b>Heat rash</b>	<ul style="list-style-type: none"> <li>• Also known as prickly heat</li> <li>• Likely in hot, humid environments</li> <li>• Sweat ducts become plugged</li> <li>• Uncomfortable <b>skin rash</b></li> <li>• Discomfort may reduce work performance</li> </ul>	<ul style="list-style-type: none"> <li>• Keep skin <b>cool and dry</b></li> <li>• Let skin air-dry after bathing</li> </ul>
<b>Heat cramps</b>	<ul style="list-style-type: none"> <li>• Painful spasms of the muscles due to body's water and salt loss</li> </ul>	<ul style="list-style-type: none"> <li>• Rest briefly and cool down</li> <li>• Drink liquids with salt or electrolytes, such as sports drinks</li> </ul>
<b>Heat exhaustion</b>	<ul style="list-style-type: none"> <li>• Sweat more (clammy, moist skin)</li> <li>• Develop a headache</li> <li>• Notice dark urine</li> <li>• Feel nauseated/dizzy</li> <li>• Faint</li> </ul>	<ul style="list-style-type: none"> <li>• Rest in a cool place and drink liquids</li> <li>• Prompt treatment is important because untreated heat exhaustion could lead to heat stroke</li> </ul>
<b>Heat stroke</b>	<ul style="list-style-type: none"> <li>• Red skin</li> <li>• Sweating that suddenly stops</li> <li>• Vomiting</li> <li>• Rapid heartbeat</li> <li>• Confusion/delirium</li> <li>• Convulsions</li> <li>• Loss of consciousness</li> <li>• <b><u>Death can occur</u></b></li> </ul>	<ul style="list-style-type: none"> <li>• Get medical help <b><u>immediately</u></b></li> <li>• While you wait for help: <ul style="list-style-type: none"> <li>○ Move victim to cool area</li> <li>○ Remove unnecessary clothing</li> <li>○ Soak person/clothing with water</li> <li>○ Fan their body</li> <li>○ If possible, give them fluids and help them to drink</li> </ul> </li> <li>• Do NOT give the victim aspirin or acetaminophen</li> </ul>

Long-term, prolonged exposure to heat can cause swelling and permanent damage to body's tissues and organs. People who have underlying medical conditions are at an increased risk for heat exhaustion, heat stroke and organ damage or failure. Talk to your physician about any heat stress you may experience on the job and work with your employer to make sure you can work safely.

### **Safety Concerns**

Sweat may cause slips. Heat lowers alertness. Irritability can distract and people may rush and overlook safety procedures to get out of the heat.

## Reducing the Likelihood of Heat Stress

Use the hierarchy of controls to avoid heat stress.

1. To **eliminate** sources of heat, your employer may seal steam/heat leaks or intrusions.
2. **Substitution** may involve using alternative processes that produce less heat such as cutting pipes manually rather than using torches. Substitution may also involve using equipment to perform manual tasks, such as lifting or material handling.
3. **Engineering controls** may include air conditioning, canopies, tents or umbrellas, fans/blowers (if heat can escape the area), misters and seat coolers, insulation, windows and ventilation.
4. As an **administrative control**, your employer should have a written program that explains how to prevent heat stress and respond to emergencies. Other administrative controls include letting people work in the shade, scheduling shifts to reduce heat exposure time, enforcing mandatory breaks, medical monitoring, and requiring people to work pairs or groups.
5. **Personal protective equipment (PPE)** may include insulated suits, heat-reflecting clothing, infrared-reflecting face shields, cooling neck wraps, cooling packs or inserts for liners or pockets, and cooling vests. Be aware that some types of PPE, such as respirators, impermeable clothing and head coverings, can increase the risk of heat-related illness.

Bring and use sunscreen, wide-brimmed hats, sunglasses, protective clothing and bottled water when working outside.

Heat disorders are more likely among people who are not used to or acclimated to heat. It takes 4 to 14 days to get used to heat. If possible, **increase heat exposure gradually** over this time. When temperatures jump 10 °F (5 °C) from the previous 5-day period, be prepared for heat stress.

**Make hot jobs easier, lessen job duration, take frequent short breaks, and postpone non-essential tasks.**

Lifestyle and tasks that are unrelated to work can affect your susceptibility to heat stress. Exhaustion reduces heat tolerance, so get plenty of **sleep**. Eat **small, frequent meals** rather than large meals and choose foods that have higher water content to help reduce internal heat.

**Look out for each other** and enlist **additional workers** to help perform tasks in the heat more efficiently. When temperatures go above 90 °F (32 °C), make sure people don't work alone or are supervised in case they need help.

### **Rest Areas**

Take advantage of shade, ventilation and heat shielding to **reduce the heat around you**. When work happens at or above 80 °F (26.6 °C), employers may provide rest areas under trees or in shelters. If you need to rest outside of regularly scheduled breaks, alert your supervisor. Do not return to work until you feel sufficiently cooled and confident that you can do so safely.