

## HEAT STRESS

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(For assistance, please contact EHS at (402) 472-4925, or visit our web site at <http://ehs.unl.edu/>)

Although outdoor workers are more likely to think about possible heat stress, the condition is also of concern to workers in any area prone to heat build-up such as warehouses, storerooms, kitchens/baking areas, laundry areas, etc. This SOP provides guidance on risk factors, mitigation strategies, and recognizing signs and symptoms as an aid to avoid heat stress and illnesses.

Working in the heat stresses the body and can lead to illness or even death in severe cases. Exposure to heat can also increase the risk of other injuries because of sweaty palms, fogged-up safety glasses, dizziness, and burns from hot surfaces. Every year thousands of workers become sick from heat exposure and a number of workers die. Most heat-related health problems can be prevented, or the risk of developing them can be reduced.

### Risk Factors

- **Weather/Working Conditions.** The risk of heat stress is relative to temperature, humidity, sunlight, and wind speed. High temperature, high humidity, direct sunlight and low wind speed make the worst combination. Working indoors in areas where heat is generated and/or is not easily dissipated can be a risk factor. If possible, schedule heavy work for the cooler parts of the day. Indoors, try to provide ventilation/enhance air movement.
- **Personal Factors and Physical Demands.** The risk of heat stress increases with physical demands. For example, a worker who is walking is at higher risk than a worker who is riding in a vehicle. A worker who is lifting and carrying heavy items is at the greatest risk. Older workers, obese workers, and persons taking certain types of medication, such as antihistamines, are at a greater risk for heat illness.

### Signs and Symptoms

Heat-related illnesses can range from mild heat rash and heat cramps to life threatening heat stroke.

- **Heat rash** is a skin irritation marked by small clusters of pimples or blisters caused by excessive sweating during hot, humid weather. Talcum powder may help relieve discomfort.
- **Heat cramps** occur when excessive sweating results in loss of normal levels of

body moisture and salts. Heat cramps often occur in the abdomen, arms, or legs and may be an early symptom of a more serious heat illness- heat exhaustion or heat stroke. If you experience heat cramps, stop the strenuous activity, get to a cooler environment, drink lots of fluids (preferably an electrolyte sports drink), and do not resume the strenuous activity for several hours after the cramps subside. Seek medical attention if you have an underlying health condition.

- Heat fainting (heat syncope) is a fainting (syncope) episode or dizziness that usually occurs with prolonged standing or sudden rising from a sitting or lying position. Factors that may contribute to heat syncope include dehydration and lack of acclimatization. If you feel dizzy, seek a cool spot to rest and drink fluids. Slowly acclimate to the work and stop if the symptoms recur. Seek medical attention if you have an underlying health condition
- Heat exhaustion is often identified with several of the following symptoms: heavy sweating, extreme weakness, dizziness, confusion, nausea, clammy skin, muscle cramps, elevated body temperature, and/or fast and shallow breathing. Left untreated, heat exhaustion can quickly progress to heat stroke. Persons with symptoms of heat exhaustion should seek a cool place to rest and drink fluids. Often a cool shower or bath will help reduce the body temperature. Persons with underlying health conditions should seek medical attention.
- Heat stroke occurs when the body temperature rises about 104 degrees F. In the case of heat stroke the body's natural ability to cool itself is compromised and internal body organs may be damaged. Symptoms may include hot, dry skin or profuse sweating, rapid pulse, throbbing headache, dizziness, hallucinations, slurred speech, nausea, confusion, loss of consciousness, and seizures. If heat stroke is suspected, call 911 immediately and begin first aid by moving to a cool location, removing excess clothing, wetting the body with cool water, and fanning.

### **Mitigation Strategies**

It may not always be possible to work only in cooler parts of the day or in cool environments. The risk of heat-related illness can be reduced by:

- **Acclimation.** Tolerance to the heat can be increased through a process of acclimation that involves gradually increasing exposure time and work load. New employees and workers returning from an absence of a week or more should take care to re-acclimate to the conditions.
- **Appropriate Clothing.** Wear light, loose clothing and a hat. In some cases, personal cooling devices (such as water circulating cooling vests) may be advisable.
- **Hydration.** Pre-hydrate by drinking 8-16 ounces of water *before* working in the heat. Keep water or an electrolyte drink within easy reach and consume about 8

ounces every 15-20 minutes, not just during rest breaks. Avoid alcohol, coffee, tea, or soda, which act as diuretics and further dehydrate the body. Monitor your urine output. Large volumes of relatively clear or light-colored liquid indicate proper hydration. Small volumes and/or dark urine may be indicators of dehydration.

- **Adequate Rest Periods.** Avoid overexertion and work at a steady pace. Heed the body's signals. Take plenty of breaks in shaded or cooler areas.
- **Job Rotation.** When possible, rotate difficult work tasks in hot conditions between two or more employees.
- **Education.** Heat stress can manifest as a number of conditions, all to be taken seriously and some requiring medical assistance to avoid permanent aftereffects. Workers should recognize the signs and symptoms of heat stress and the proper actions to take, whether experienced personally or observed in co-workers.

The Occupational Safety and Health Administration (OSHA) developed a Heat Safety smartphone app in both English and Spanish. The app provides reminders about protective measures that should be taken at the indicated risk level to protect workers from heat-related illness, for example, reminders about drinking enough water, recognizing signs and symptoms of heat-related illness, planning for and knowing what to do in an emergency.

[http://www.osha.gov/SLTC/heatillness/heat\\_index/heat\\_app.html](http://www.osha.gov/SLTC/heatillness/heat_index/heat_app.html)).

SIGNS AND SYMPTOMS	TREATMENT*
<p><b>Early Heat Illness</b> Mild dizziness, fatigue, or irritability; decreased concentration; impaired judgment.</p>	<ul style="list-style-type: none"> <li>• Loosen or remove clothing.</li> <li>• Rest in shade 30 minutes or more.</li> <li>• Drink water.</li> </ul>
<p><b>Heat Rash</b> Tiny blister-like red spots on the skin; prickling sensations. Commonly found on clothed areas of the body.</p>	<ul style="list-style-type: none"> <li>• Clean the skin and allow it to dry.</li> <li>• Wear loose clothing.</li> <li>• Rest in a cool place.</li> </ul>
<p><b>Heat Syncope</b> Fainting of an un-acclimated worker when standing still in the heat.</p>	<ul style="list-style-type: none"> <li>• Lie down until recovered.</li> <li>• Moving around, instead of standing still, in the heat will reduce recurrence.</li> <li>• Acclimate to heat.</li> </ul>
<p><b>Heat Cramps</b> Painful spasms of the muscles; occurs when workers drink large amounts of water without replacing salts. May occur during or after work hours.</p>	<ul style="list-style-type: none"> <li>• Drink electrolyte liquids (i.e., sports drinks such as Gatorade, All Sport, etc.).</li> <li>• Rest.</li> <li>• Massage affected areas.</li> <li>• May require intravenous salt solutions if determined by a doctor.</li> </ul>
<p><b>Heat Exhaustion</b> Extreme weakness or fatigue, giddiness, nausea, or headache. Moist, clammy skin. Pale or flush complexion. Normal or slightly elevated body temperature.</p>	<ul style="list-style-type: none"> <li>• Rest lying down in a cool place.</li> <li>• Loosen or remove clothing.</li> <li>• Splash water on body.</li> <li>• Massage legs and arms.</li> <li>• If conscious, drink water or an electrolyte solution, but not salt or salt water.</li> <li>• If unconscious, treat for Heat Stroke (below) until proven otherwise.</li> <li>• Severe cases involving workers who vomit or lose consciousness may require longer treatment under medical supervision.</li> <li>• Medical personnel should evaluate workers who collapse.</li> </ul>
<p><b>Heat Stroke</b> Often occurs suddenly. Sweating stops. Mental confusion, very aggressive behavior, delirium, loss of consciousness, convulsions, or coma. Fast pulse. Rapid breathing. Body temperature of 106° F or higher. Hot, red skin that may be red, mottled, or bluish. Worker may resist treatment.</p>	<ul style="list-style-type: none"> <li>• Summon medical assistance.</li> <li>• While awaiting medical help, remove victim to cool area, soak clothing with cool water, fan vigorously to increase cooling, and elevate legs. Treat for shock, if required, after temperature drops.</li> <li>• If conscious, have victim drink as much water as possible.</li> <li>• Prompt first aid can prevent permanent injury to the brain and other vital organs.</li> </ul>

\* Sources: A Guide to Heat Stress in Agriculture (EPA); Heat-related Illness and First Aid (OSHA) 2011