In continuing the focus on summertime, another important topic to discuss is heat stress. People will find themselves outside engaging in fun as well as work activities during the hottest months of the year, so being aware of the heat’s impact is very important in gauging when to go out and how long to stay outdoors during the day. For the information related to this topic, the Centers for Disease Control and Prevention’s website was used as the source. To read more, visit [http://www.cdc.gov/](http://www.cdc.gov/) or [http://www.cdc.gov/niosh/topics/heatstress/](http://www.cdc.gov/niosh/topics/heatstress/). Also, to read further about a topic highlighted in blue, right click your mouse and select Open Hyperlink.

**HEAT STRESS**

**Overview**

Workers who are exposed to extreme heat or work in hot environments may be at risk of heat stress. Exposure to extreme heat can result in occupational illnesses and injuries. Heat stress can result in heat stroke, heat exhaustion, heat cramps, or heat rashes. Heat can also increase the risk of injuries in workers as it may result in sweaty palms, fogged-up safety glasses, and dizziness. Burns may also occur as a result of accidental contact with hot surfaces or steam.

Workers at risk of heat stress include outdoor workers and workers in hot environments such as firefighters, bakery workers, farmers, construction workers, miners, boiler room workers, factory workers, and others. Workers at greater risk of heat stress include those who are 65 years of age or older, are overweight, have heart disease or high blood pressure, or take medications that may be affected by extreme heat.
Prevention of heat stress in workers is important. Employers should provide training to workers so they understand what heat stress is, how it affects their health and safety, and how it can be prevented.

Types of Heat Stress

Heat Stroke

Heat stroke is the most serious heat-related disorder. It occurs when the body becomes unable to control its temperature: the body’s temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. When heat stroke occurs, the body temperature can rise to 106 degrees Fahrenheit or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not given.

Symptoms

Symptoms of heat stroke include:

- Hot, dry skin or profuse sweating
- Hallucinations
- Chills
- Throbbing headache
- High body temperature
- Confusion/dizziness
- Slurred speech

First Aid

Take the following steps to treat a worker with heat stroke:

- Call 911 and notify their supervisor.
- Move the sick worker to a cool shaded area.
- Cool the worker using methods such as:
  - Soaking their clothes with water.
  - Spraying, sponging, or showering them with water.
  - Fanning their body.
Heat Exhaustion

Heat exhaustion is the body's response to an excessive loss of the water and salt, usually through excessive sweating. Workers most prone to heat exhaustion are those that are elderly, have high blood pressure, and those working in a hot environment.

Symptoms

Symptoms of heat exhaustion include:

- Heavy sweating
- Extreme weakness or fatigue
- Dizziness, confusion
- Nausea
- Clammy, moist skin
- Pale or flushed complexion
- Muscle cramps
- Slightly elevated body temperature
- Fast and shallow breathing

First Aid

Treat a worker suffering from heat exhaustion with the following:

- Have them rest in a cool, shaded or air-conditioned area.
- Have them drink plenty of water or other cool, nonalcoholic beverages.
- Have them take a cool shower, bath, or sponge bath.

Heat Syncope

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.

Symptoms

Symptoms of heat syncope include:

- Light-headedness
- Dizziness
- Fainting
First Aid

Workers with heat syncope should:

- Sit or lie down in a cool place when they begin to feel symptoms.
- Slowly drink water, clear juice, or a sports beverage.

Heat Cramps

Heat cramps usually affect workers who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture levels. Low salt levels in muscles causes painful cramps. Heat cramps may also be a symptom of heat exhaustion.

Symptoms

Muscle pain or spasms usually in the abdomen, arms, or legs.

First Aid

Workers with heat cramps should:

- Stop all activity, and sit in a cool place.
- Drink clear juice or a sports beverage.
- Do not return to strenuous work for a few hours after the cramps subside because further exertion may lead to heat exhaustion or heat stroke.
- Seek medical attention if any of the following apply:
  - The worker has heart problems.
  - The worker is on a low-sodium diet.
  - The cramps do not subside within one hour.

Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather.
**Symptoms**

Symptoms of heat rash include:

- Heat rash looks like a red cluster of pimples or small blisters.
- It is more likely to occur on the neck and upper chest, in the groin, under the breasts, and in elbow creases.

**First Aid**

Workers experiencing heat rash should:

- Try to work in a cooler, less humid environment when possible.
- Keep the affected area dry.
- Dusting powder may be used to increase comfort.

**Recommendations for Employers**

Employers should take the following steps to protect workers from heat stress:

- Schedule maintenance and repair jobs in hot areas for cooler months.
- Schedule hot jobs for the cooler part of the day.
- Acclimatize workers by exposing them for progressively longer periods to hot work environments.
- Reduce the physical demands of workers.
- Use relief workers or assign extra workers for physically demanding jobs.
- Provide cool water or liquids to workers.
  - Avoid alcohol, and drinks with large amounts of caffeine or sugar.
- Provide rest periods with water breaks.
- Provide cool areas for use during break periods.
- Monitor workers who are at risk of heat stress.
- Provide heat stress training that includes information about:
  - Worker risk
  - Prevention
  - Symptoms
  - The importance of monitoring yourself and coworkers for symptoms
  - Treatment
  - Personal protective equipment
Recommendations for Workers

Workers should avoid exposure to extreme heat, sun exposure, and high humidity when possible. When these exposures cannot be avoided, workers should take the following steps to prevent heat stress:

- Wear light-colored, loose-fitting, breathable clothing such as cotton.
  - Avoid non-breathing synthetic clothing.
- Gradually build up to heavy work.
- Schedule heavy work during the coolest parts of day.
- Take more breaks in extreme heat and humidity.
  - Take breaks in the shade or a cool area when possible.
- Drink water frequently. Drink enough water that you never become thirsty. Approximately 1 cup every 15-20 minutes.
- Avoid alcohol, and drinks with large amounts of caffeine or sugar.
- Be aware that protective clothing or personal protective equipment may increase the risk of heat stress.
- Monitor your physical condition and that of your coworkers.

CDC Resources

OSHA-NIOSH INFOSHEET: Protecting Workers from Heat Illness


NIOSH: Criteria for a Recommended Standard: Occupational Exposure to Hot Environments (Revised Criteria 1986)

This document presents the criteria, techniques, and procedures for the assessment, evaluation, and
control of occupational heat stress by engineering and preventive work practices. Included are ways of predicting health risks, procedures for control of heat stress, and techniques for prevention and treatment of heat-related illnesses.

NIOSH: Working in Hot Environments
Workers who are suddenly exposed to working in a hot environment face additional and generally avoidable hazards to their safety and health. This publication discusses the safety and health consequences of heat stress.

OSHA-NIOSH INFOSHEET: Protecting Workers from Heat Illness

Other Government Resources

Occupational Safety and Health Administration (OSHA) Safety and Health Topics: Heat Stress
Provides a guide to information regarding the recognition, evaluation, control, and compliance actions involving heat stress.

OSHA Technical Manual Section III: Chapter 4 - Heat Stress
Provides descriptions of heat disorders, investigative guidelines, sampling methods, control, and PPE.

OSHA Sawmills eTool: Heat Stresses
Provides information on the hazards of heat stress and possible solutions or controls.

OSHA Quick Card: Heat Stress [PDF - 2.37MB]
Provides heat stress factors, symptoms, prevention tips, and first aid recommendations.

OSHA Fact Sheet: Protecting Workers from Effects of Heat [PDF - 22 KB]
Provides information that will help workers understand what heat stress is, how it may affect their health and safety, and how it can be prevented.

OSHA Fact Sheet: Working Outdoors in Warm Climates [PDF - 25 KB]
Hot summer months pose special hazards for outdoor workers who must protect themselves against heat, sun exposure, and other hazards. Employers and employees should know the potential hazards in their workplaces and how to manage them.

National Oceanic & Atmospheric Administration's (NOAA) National Weather Service: Heat Index

NOAA: Heat Wave - A Major Summer Killer [PDF - 268 KB]
Provides general information regarding the recognition and control of heat stress.

Mine Safety & Health Administration (MSHA): Heat Stress - What to Do
Provides documents related to heat stress in the mining industry.

United States Department of Agriculture (USDA): Wildland Fire Safety - Heat Stress
This brochure focuses on the risks of heat stress, and what the firefighter should do to minimize those risks.

U.S. Army: Heat Index Calculator
Additional Resources

American Conference of Governmental Industrial Hygienists: Product Store - Threshold Limit Values and Biological Exposure Indices
Purchase this document

American National Standards Institute (ANSI) - Ergonomics of the Thermal Environment: Analytical Determination and Interpretation of Heat Stress Using Calculation of the Predicted Heat Strain
This document specifies a method for the analytical evaluation and interpretation of the thermal stress experienced by a subject in a hot environment. It describes a method for predicting the sweat rate and the internal core temperature that the human body will develop in response to the working conditions.
Purchase this document

ANSI - Ergonomics of the Thermal Environment: Medical Supervision of Individuals Exposed to Extreme Hot or Cold Environments
This International Standard provides advice to those concerned with the safety of human exposures to extreme hot or cold thermal environments.
Purchase this document

ANSI - Hot environments: Estimation of the Heat Stress on Working Man, Based on the WBGT-index (Wet Bulb Globe Temperature)
This document gives a method, which can easily be used in an industrial environment for evaluating the stresses on an individual. It applies to the evaluation of the mean effect of heat on man during a period representative of his activity but it does not apply to very short periods, nor to zones of comfort.
Purchase this document

According to the CDD’s website:
Page last reviewed: May 16, 2012
Page last updated: May 18, 2012
Content source: National Institute for Occupational Safety and Health Education and Information Division