OSHA·NIOSH INFOSHEET

Protecting Workers from Heat Illness

At times, workers may be required to work in hot environments for long periods. When the human body is unable to maintain a normal temperature, heat-related illnesses can occur and may result in death. This fact sheet provides information to employers on measures they should take to prevent heat-related illnesses and death.

Factors That Increase Risk to Workers

- High temperature and humidity
- Direct sun exposure (with no shade)
- Indoor exposure to other sources of radiant heat (ovens, furnaces)
- Limited air movement (no breeze)
- Low fluid consumption
- Physical exertion
- Heavy personal protective clothing and equipment
- Poor physical condition or health problems
- Some medications, for example, different kinds of blood pressure pills or antihistamines
- Pregnancy
- Lack of recent exposure to hot working conditions
- Previous heat-related illness
- Advanced age (65+)

Health Problems Caused by Hot Environments

Heat Stroke is the most serious heat-related health problem. Heat stroke occurs when the body's temperature regulating system fails and body temperature rises to critical levels. **Heat stroke is a medical emergency that may rapidly result in death!**

Symptoms of heat stroke include:

- Confusion
- Loss of consciousness
- Seizures
- Very high body temperature
- Hot, dry skin or profuse sweating

If a worker shows signs of possible heat stroke:

- **Heat stroke is a life-threatening emergency! While first aid measures are being implemented, call 911 and get emergency medical help.**
- **Make sure that someone stays with the worker until help arrives.**
- Move the worker to a shaded, cool area and remove outer clothing.
- Wet the worker with cool water and circulate the air to speed cooling.
- Place cold wet cloths or ice all over the body or soak the worker's clothing with cold water.

Heat Exhaustion is the next most serious heat-related health problem.

Symptoms of heat exhaustion:

- Headache
- Nausea
- Dizziness
- Weakness
- Irritability
- Thirst
- Heavy sweating
- Elevated body temperature
- Decreased urine output

If a worker shows signs of possible heat exhaustion:

- Workers with signs or symptoms of heat exhaustion should be taken to a clinic or emergency room for medical evaluation and treatment.
- If medical care is not available, **call 911 immediately.**
- Make sure that someone stays with the worker until help arrives.
- Workers should be removed from the hot area and given liquids to drink.
- Remove unnecessary clothing including shoes and socks.
- Cool the worker with cold compresses to the head, neck, and face or have the worker wash his or her head, face and neck with cold water.

- Encourage frequent sips of cool water. If the worker is unable to drink, get emergency medical help immediately.

Heat Cramps are muscle pains usually caused by physical labor in a hot work environment. Heat cramps are caused by the loss of body salts and fluid during sweating.

If a worker shows signs of possible heat cramps:

- Workers should replace fluid loss by drinking water and having a snack, and/or carbohydrate-electrolyte replacement liquids (e.g., sports drinks) every 15 to 20 minutes.
- Workers should avoid salt tablets.
- Get medical help if the worker has heart problems, is on a low sodium diet, or if cramps do not subside within one hour.

Heat Rash is the most common problem in hot work environments. Heat rash is caused by sweating and looks like a red cluster of pimples or small blisters. Heat rash usually appears on the neck, upper chest, in the groin, under the breasts and in elbow creases.

If a worker shows signs of possible heat rash:

- The best treatment for heat rash is to provide a cooler, less humid work environment.
- The rash area should be kept dry.
- Powder may be applied to increase comfort.
- Ointments and creams should not be used on a heat rash. Anything that makes the skin warm or moist may make the rash worse.

Preventing Heat Illness

The best way to prevent heat illness is to make the work environment cooler.

Recommendations for All Work Environments (Indoors and Outdoors):

- Train workers and supervisors about the hazards leading to heat illness and ways to prevent them.
- Train workers to recognize symptoms in themselves and others.
- Train and encourage workers to immediately report symptoms in themselves and others.
- If you have someone who is new to the job or who has been away for more than a week, gradually increase the workload or allow more frequent breaks the first week.
- Provide workers with plenty of cool water in convenient, visible locations close to the work area. Water should have a palatable (pleasant and odor-free) taste and water temperature should be 50-60°F if possible.
- Remind workers to frequently drink small amounts of water before they become thirsty to maintain good hydration. Simply telling them to drink plenty of fluids is not sufficient. During moderate activity, in moderately hot conditions, workers should drink about 1 cup every 15 to 20 minutes. Instruct workers that urine should be clear or lightly colored.
- Workers should eat regular meals and snacks as they provide enough salt and electrolytes to replace those lost through sweating as long as enough water is consumed. Electrolyte drinks (e.g. Gatorade®) are usually not necessary.
- Set up a buddy system if possible; if not, check routinely (several times an hour) to make sure workers are making use of water and shade and not experiencing heat-related symptoms.
- Make workers aware that it is harmful to drink extreme amounts of water. Workers should generally not drink more than 12 quarts (48 cups) in a 24 hour period. If higher amounts of fluid replacement are needed due to prolonged work in high heat conditions, a more comprehensive heat illness prevention program may be warranted.
- Reduce the physical demands of the job. If heavy job tasks cannot be avoided, change work/rest cycles to increase the amount of rest time.
- Schedule frequent rest periods with water breaks in shaded or air-conditioned recovery areas. Note that air conditioning will NOT result in loss of heat tolerance and is recommended for rest breaks.

Additional Recommendations for Outdoor Work Environments

- Monitor weather reports daily and reschedule jobs with high heat exposure to cooler times of the day. Be extra vigilant during heat waves when air temperatures rise above normal. When possible, routine maintenance and repair projects should be scheduled for the cooler seasons of the year.

Additional Recommendations for Indoor Work Environments

- Indoor workplaces may be cooled by using air conditioning or increased ventilation, if cooler air is available from the outside.
- Other methods to reduce indoor temperature include providing reflective shields to redirect radiant heat, insulating hot surfaces, and decreasing water vapor pressure, e.g., by sealing steam leaks and keeping floors dry.
- The use of fans to increase the air speed over the worker will improve heat exchange between the

skin surface and the air, unless the air temperature is higher than the skin temperature.

- Reflective clothing, such as safety vests, worn as loosely as possible, can minimize heat illness. Water-dampened cotton whole-body suits are an inexpensive and effective personal cooling technique. Cooling vests with pockets that hold cold packs are comfortable and effective.
- More complex and expensive water-cooled suits are also available; however, these may require a battery-driven circulating pump and liquid coolant.
- In worksites where high ambient temperatures typically occur (e.g., foundries, steel mills), professional consultation should be sought to evaluate the extent of the heat exposure and to make recommendations on how to prevent heat-related illnesses.

Resources

For more information about protecting workers from heat-related illnesses visit:

- OSHA online at:
  www.osha.gov/SLTC/heatstress/index.html
  and www.osha.gov/dts/osta/otm/otm_iii/otm_iii_4.html
- NIOSH online at:
  http://www.cdc.gov/niosh/topics/heatstress/
- Cal/OSHA's Heat Safety program at:
  www.99calor.org/english.html

OSHA Publications

OSHA has an extensive publications program. For a listing of free items, visit OSHA's web site at www.osha.gov/publications or contact the OSHA Publications Office, U.S. Department of Labor, 200 Constitution Avenue, N.W., N-3101, Washington, DC 20210. Telephone (202) 693-1888 or fax to (202) 693-2498.

Contacting OSHA

To report an emergency, file a complaint or seek OSHA advice, assistance or products, call (800) 321-OSHA (6742) or contact your nearest OSHA regional, area, or State Plan office; TTY: 1-877-889-5627.

Contacting NIOSH

To receive documents or more information about occupational safety and health topics, please contact NIOSH: 1-800-CDC-INFO (1-800-232-4636); TYY: 1-888-232-6348; e-mail: cdcinfo@cdc.gov or visit the NIOSH web site at www.cdc.gov/niosh.

This InfoSheet is advisory in nature and informational in content. It is not a standard or regulation, and it neither creates new legal obligations nor alters existing obligations created by OSHA standards or the Occupational Safety and Health Act. Pursuant to the OSH Act, employers must comply with safety and health standards and regulations issued and enforced either by OSHA or by an OSHA-approved State Plan. In addition, the Act's General Duty Clause, Section 5(a)(1), requires employers to provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm. The mention of any nongovernmental organization or link to its web site in this guidance does not constitute an endorsement by NIOSH or OSHA of that organization or its products, services, web site.

For more complete information:

U.S. Department of Labor
Hilda L. Solis, Secretary of Labor

Occupational Safety and Health Administration
www.osha.gov
(800) 321-OSHA

www.cdc.gov/niosh
(800) 232-4636

DHHS (NIOSH) 2011-174
OSHA 3438-5-11