

Heat Stress

Goal

This program will increase employer and employee awareness of the risks of working in hot environments and will provide information on measures to reduce those risks.

Objective

The employer and employee will recognize safety and health hazards of working in high heat, factors that increase the risk of heat-related illness, signs and symptoms of illness, first aid and preventive measures that decrease the risk of heat-related illness.

Regulations

Although there is no specific Occupational Safety and Health Administration (OSHA) standard for heat stress, employees are protected under the General Duty Clause of the Occupational Safety and Health (OSH) Act because heat-related illnesses are a serious hazard. The General Duty Clause states that employers are required to "...provide a place of employment free from recognized hazards that are causing or are likely to cause death or serious physical harm to its employees."

Factors

For the human body to maintain a constant internal temperature, the body must rid itself of excess heat. This is achieved primarily through varying the rate and amount of blood circulation to the outer layers of the skin and releasing of fluid onto the skin by the sweat glands. The evaporation of sweat cools the skin, releasing large quantities of heat from the body. As area temperatures approach normal skin temperature, cooling of the body becomes more difficult. If air temperature is as warm or warmer than the skin, blood brought to the body surface cannot lose its heat, and sweating becomes the primary means of maintaining a constant body temperature. Sweating does not cool the body unless the moisture is removed from the skin by evaporation. Under conditions of high humidity, the evaporation of sweat from the skin is decreased and the body's efforts to maintain acceptable body temperature may be significantly impaired.

Humans are capable of adjusting to the heat. Employers can reduce the chance of employees experiencing heat-related illnesses by gradually exposing them to a hot environment for progressively longer periods of time. This process usually takes about 5-7 days. Gradual exposure to heat gives the body time to adjust to the higher temperatures. Heat-related illnesses will more likely occur among employees who have not been given time to adjust or employees who have been away from hot environments for a period of time.

Safety Hazards

The frequency of accidents in general appears to be higher in hot environments than in more moderate temperatures. Heat tends to promote accidents that occur because of sweaty palms, dizziness, or the fogging of safety glasses. Employees can get burned from accidental contact with hot materials such as steam or metal surfaces.

Mental confusion, tiredness, and irritability may occur when an employee becomes overheated. The effect of these conditions can result in poor judgement and unsafe practices.

Health Hazards

Excessive exposure to a hot environment can bring about a variety of heat-related health problems and illnesses.

Heat cramps may occur alone or simultaneously with other heat-related illnesses. Heat cramps are painful muscle spasms caused by sweating while performing hard physical labor in a hot environment. The cramps may be caused by either too much or too little salt. Tired muscles are very susceptible to heat cramps.

Fainting may occur when an employee who is not used to the heat stands in one position for an extended period of time. An employee who has fainted should recover after a brief period of sitting or lying down. Moving around, rather than standing still, will reduce the possibility of fainting.

Heat Rash (also known as prickly heat) often occurs in hot, humid environments where sweat does not easily evaporate from the skin. The sweat ducts become clogged, resulting in a rash. Heat rash can be very uncomfortable if the rash is extensive or complicated by infection. Taking frequent breaks in a cool place during the work day and bathing and drying the skin regularly can help prevent heat rash.

Heat Exhaustion is caused by the loss of large amounts of fluid by sweating, sometimes with excessive loss of salt. An employee suffering from heat exhaustion still sweats but may experience the signs and symptoms listed below:

- headache
- dizziness
- weakness
- mood changes (confused or irritable)
- feeling sick to stomach
- vomiting
- decreased and dark-colored urine
- light-headedness or fainting
- pale clammy skin

Treat victims of heat exhaustion by:

- moving person to a cool, shaded area;
- provide cool water to drink;
- cool the person by fanning them;
- cool the skin with a wet cloth;
- lay victim on his or her back and raise the victim's legs 6 to 8 inches if he or she is dizzy;
- lay victim on his or her side if nausea occurs;
- loosen and remove heavy clothing; and
- stay with the victim.

Call for emergency help if the victim does not feel better in a few minutes. If heat exhaustion is not treated, the illness may advance to heat stroke.

Heat stroke is the most serious heat-related illness. Heat stroke occurs when the body's temperature-regulating system fails and sweating becomes an inadequate way of removing excess heat. Signs that an employee may be suffering a heat stroke are:

- dry pale skin (no sweating);
- hot red skin;
- mood changes (irritable, confused);
- seizures/fits; and
- collapse/unconsciousness.

Prompt first aid for someone suffering the symptoms of heat stroke should include the same first aid for heat exhaustion, plus:

- call for emergency help;
- lay victim on his or her back unless he or she is unconscious;
- remove any objects close by if victim has a seizure;
- provide cool water to drink if conscious; and
- place ice packs under armpits and in the groin area.

Employees are at increased risk for heat-related illness when they:

- are dehydrated;
- are fatigued;
- use improper work methods;
- have infrequent exposure to hot temperatures and high humidity;
- are over the age of 40;
- are in poor physical condition or overweight;
- use certain medications (antihistamines, diuretics and some tranquilizers);
- have had prior heat-related illnesses;
- use drugs and or alcohol within the past 24 hours;
- have heat rash or sunburn; or
- wear restrictive clothing or too much clothing.

Prevention

Employers can protect their employees by following these recommendations:

- train all employees on the signs and symptoms of heat-related illnesses and how to respond;
- schedule the hardest work during the coolest part of the day;
- encourage the buddy system (employees working in hot environments in pairs);
- provide plenty of cool water and encourage employees to drink one cup every 15 to 20 minutes;
- encourage employees to wear light-colored, loose fitting, breathable (cotton) clothing;
- provide frequent short breaks in cool shaded areas;
- encourage employees to avoid eating large meals or consuming caffeine and alcoholic beverages before and during work in hot environments;
- reduce radiant heat by placing shields around hot machines or furnaces;
- increase the amount of insulation on furnace walls;
- open windows and doors;
- use exhaust ventilators or air blowers;
- use fans and/or air conditioning;

- lower humidity levels by installing exhaust hoods over areas that release moisture; and
- provide tools and equipment that reduce physical demands on employees.

Review Questions

1. Name the primary means by which a human body maintains a constant body temperature.
2. How does a hot humid environment inhibit the body's ability to maintain a constant internal temperature?
3. List 4 conditions that increase your risk of heat-related illness.
4. Describe first-aid treatment for victims of heat stroke.

Resources

The Texas Department of Insurance, Division of Workers' Compensation (DWC) Resource Center offers a workers' health and safety video tape library. Call (512) 804-4620 for more information or visit our web site at www.tdi.state.tx.us/wc/indexwc.html

For complete information on rules and regulations, please consult your 29 Code of Federal Regulations 1910.5(a)(1).

1. Sweating

2. Decreased sweat evaporation from skin.

3. (Any four of the following: dehydration, fatigue, improper work methods, lack of exposure to hot temperatures and high humidity, older, than 40, medications, prior heat-related illnesses, recent alcohol or drug use, heat rash or sunburn, or too much and/or too restrictive clothing.

4. Call for emergency help, lie victim on back unless unconscious, remove nearby objects, provide ice packs under armpits and in groin area.

Safety Violations Hot Line
1-800-452-9595
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