

Chapter 28 HEAT STRESS PREVENTION

TITLE 8, CHAPTER 4

DEFINITIONS:

Acclimatization - temporary adaptation of the body to work in the heat that occurs gradually when a person is exposed to it. Acclimatization peaks in most people within four to fourteen days of regular work for at least two hours per day in the heat.

Heat Illness - a serious medical condition resulting from the body's inability to cope with a particular heat load, and includes heat cramps, heat exhaustion, heat syncope and heat stroke

Environmental Risk Factors for Heat Illness - working conditions that create the possibility that heat illness could occur, including air temperature, relative humidity, radiant heat from the sun and other sources, conductive heat sources such as the ground, air movement, workload severity and duration, protective clothing and personal protective equipment worn by employees.

Personal Risk Factors for Heat Illness - factors such as an individual's age, degree of acclimatization, health, water consumption, alcohol consumption, caffeine consumption, and use of prescription medications that affect the body's water retention or other physiological responses to heat.

Shade - blockage of direct sunlight. One indicator that blockage is sufficient is when objects do not cast a shadow in the area of blocked sunlight. Shade is not adequate when heat in the area of shade defeats the purpose of shade, which is to allow the body to cool. For example, a car sitting in the sun does not provide acceptable shade to a person inside it, unless the car is running with air conditioning. Shade may be provided by any natural or artificial means that does not expose employees to unsafe or unhealthy conditions and that does not deter or discourage access or use.

Temperature - the dry bulb temperature in degrees Fahrenheit obtainable by using a thermometer to measure the outdoor temperature in an area where there is no shade. While the temperature measurement must be taken in an area with full sunlight, the bulb or sensor of the thermometer should be shielded while taking the measurement, e.g., with the hand or some other object, from direct contact by sunlight.

HEAT INDEX:

The Heat Index (HI) is the temperature the body feels when heat and humidity are combined. The chart below shows the HI that corresponds to the actual air temperature and relative humidity. (This chart is based upon shady, light wind conditions. Exposure to direct sunlight can increase the HI by up to 15°F.) (Due to the nature of the heat index calculation, the values in the tables below have an error +/- 1.3F.)

°F	90%	80%	70%	60%	50%	40%
80	85	84	82	81	80	79
85	101	96	92	90	86	84
90	121	113	105	99	94	90
95		133	122	113	105	98
100			142	129	118	109
105				148	133	121
110						135

HI	Possible Heat Disorder:
80°F - 90°F	Fatigue possible with prolonged exposure and physical activity.
90°F - 105°F	Sunstroke, heat cramps and heat exhaustion possible.
105°F - 130°F	Sunstroke, heat cramps, and heat exhaustion likely, and heat stroke possible.
130°F or greater	Heat stroke highly likely with continued exposure.

Preventing Heat-Related Illness:

Drink Water. Employees shall have access to potable drinking water that is fresh, pure, suitably cool, and provided to employees free of charge. The water shall be located as close as practicable to the areas where employees are working. Where drinking water is not plumbed or otherwise continuously supplied, it shall be provided in sufficient quantity at the beginning of the work shift to provide one quart per employee per hour for drinking for the entire shift.

Shade. Shade shall be present when the temperature exceeds 80 degrees Fahrenheit. When the outdoor temperature in the work area exceeds 80 degrees Fahrenheit, the employer shall have and maintain one or more areas with shade at all times while employees are present that are either open to the air or provided with ventilation or cooling. The amount of shade present shall be at least enough to accommodate the number of employees on recovery or rest periods, so that they can sit in a normal posture fully in the shade without having to be in physical contact with each other. The shade shall be located as close as practicable to the areas where employees are working. Subject to the same specifications, the amount of

shade present during meal periods shall be at least enough to accommodate the number of employees on the meal period who remain onsite.

Shade shall be available when the temperature does not exceed 80 degrees Fahrenheit. When the outdoor temperature in the work area does not exceed 80 degrees Fahrenheit Sign Designs shall either provide or provide timely access to shade upon an employee's request.

Employees shall be allowed and encouraged to take a preventative cool-down rest in the shade when they feel the need to do so to protect themselves from overheating. Such access to shade shall be permitted at all times. An individual employee who takes a preventative cool-down rest

- A. shall be monitored and asked if he or she is experiencing symptoms of heat illness;
- B. shall be encouraged to remain in the shade; and
- C. shall not be ordered back to work until any signs or symptoms of heat illness have abated, but in no event less than 5 minutes in addition to the time needed to access the shade.

If an employee exhibits signs or reports symptoms of heat illness while taking a preventative cool-down rest or during a preventative cool-down rest period, Sign Designs shall provide appropriate first aid or emergency.

Where Sign Designs can demonstrate that it is infeasible or unsafe to have a shade structure, or otherwise to have shade present on a continuous basis, Sign Designs may utilize alternative procedures for providing access to shade if the alternative procedures provide equivalent protection.

Cooling measures other than shade (e.g., use of misting machines) may be provided in lieu of shade if Sign Designs can demonstrate that these measures are at least as effective as shade in allowing employees to cool.

High Heat Procedures. Sign Designs shall implement high-heat procedures when the temperature equals or exceeds 95 degrees Fahrenheit. These procedures shall include the following to the extent practicable:

1. Ensuring that effective communication by voice, observation, or electronic means is maintained so that employees at the work site can contact a supervisor when necessary. An electronic device, such as a cell phone or text messaging device, may be used for this purpose only if reception in the area is reliable.
2. Observing employees for alertness and signs or symptoms of heat illness. Sign Designs shall ensure effective employee observation/monitoring by implementing one or more of the following:
 - A. Supervisor or designee observation of 20 or fewer employees, or
 - B. Mandatory buddy system, or
 - C. Regular communication with sole employee such as by radio or cellular phone, or
 - D. Other effective means of observation.
3. Designating one or more employees on each worksite as authorized to call for emergency medical services, and allowing other employees to call for emergency services when no designated employee is available.
4. Reminding employees throughout the work shift to drink plenty of water.
5. Pre-shift meetings before the commencement of work to review the high heat procedures, encourage employees to drink plenty of water, and remind employees of their right to take a cool-down rest when necessary.

Know The Symptoms of Heat Related Illness:

Heat cramps: Heat cramps are muscular pains and spasms due to heavy exertion. They usually involve the abdominal muscles or the legs. It is generally thought that the loss of water and salt from heavy sweating causes the cramps.

Heat Exhaustion: Heat exhaustion is less dangerous than heat stroke. It typically occurs when people exercise heavily or work in a warm, humid place where body fluids are lost through heavy sweating. Fluid loss causes blood flow to decrease in the vital organs, resulting in a form of shock. With heat exhaustion, sweat does not evaporate as it should, possibly because of high humidity or too many layers of clothing. As a result, the body is not cooled properly. Signals include cool, moist, pale, flushed or red skin; heavy sweating; headache; nausea or vomiting; dizziness; and exhaustion. Body temperature will be near normal.

Heat Stroke: Also known as sunstroke, heat stroke is life-threatening. The victim's temperature control system, which produces sweating to cool the body, stops working. The body temperature can rise so high that brain damage and death may result if the body is not cooled quickly. Signals include hot, red and dry skin; changes in consciousness; rapid, weak pulse; and rapid, shallow breathing. Body temperature can be very high--sometimes as high as 105°F

Stages of Heat-Related Illness

Heat-related illness usually comes in stages. The signal of the first stage is heat cramps in muscles. These cramps can be very painful. If you are caring for a person who has heat cramps, have him or her stop activity and rest. If the person is fully awake and alert, have him or her drink small amounts of cool water or a commercial sports drink. Gently stretch the cramped muscle and hold the stretch for about 20 seconds, then gently massage the muscle. Repeat these steps if necessary. If the victim has no other signals of heat-related illness, the person may resume activity after the cramps stop.

The signals of the next, more serious stage of a heat-related illness (often called **heat exhaustion**) include--

- Cool, moist, pale skin (the skin may be red right after physical activity).
- Headache.
- Dizziness and weakness or exhaustion.
- Nausea.
- The skin may or may not feel hot.

The signals of the late stage of a heat-related illness (often called **heat stroke**) include-

- Vomiting.
- Decreased alertness level or complete loss of consciousness.
- High body temperature (sometimes as high as 105°F).
- Skin may still be moist or the victim may stop sweating and the skin may be red, hot and dry.
- Rapid, weak pulse.
- Rapid, shallow breathing.

This late stage of a heat-related illness is life threatening. Call 9-1-1 or the local emergency number.

For heat cramps or heat exhaustion: Get the person to a cooler place and have him or her rest in a comfortable position. If the person is fully awake and alert, give a half glass of cool water every 15 minutes. Do not let him or her drink too quickly. Do not give liquids with alcohol or caffeine in them, as they can make conditions worse. Remove or loosen tight clothing and apply cool, wet cloths such as

towels or wet sheets. Call 9-1-1 or the local emergency number if the person refuses water, vomits or loses consciousness. Symptoms:

- The body temperature will be near normal
- High thirst level
- Weakness and fatigue
- Excessive sweating
- Headache and/or dizziness
- Nausea
- The skin is usually pale but it can be flushed right after physical activity.
- The skin may feel cool (clammy) or it may be slightly warm. But, if the skin is hot, the person is suffering from heat stroke not heat exhaustion.

For heat stroke: Heat stroke is a life-threatening situation! Help is needed fast. Call 9-1-1 or your local EMS number. Move the person to a cooler place. Quickly cool the body. Wrap wet sheets around the body and fan it. If you have ice packs or cold packs, wrap them in a cloth and place them on each of the victim's wrists and ankles, in the armpits and on the neck to cool the large blood vessels. (Do not use rubbing alcohol because it closes the skin's pores and prevents heat loss.) Watch for signals of breathing problems and make sure the airway is clear. Keep the person lying down.

Symptoms:

- The victim's face is often flushed red. In some cases it may appear ashen in color.
- Determine if the victim's skin feels hot. Place the back of your hand on the victim's forehead. If it feels like a fever treat the victim for heat stroke.
- The skin will probably be dry but it could be moist from earlier sweating.
- Severe headache is possible
- Rapid breathing, and a rapid, weak pulse.
- The victim may exhibit an altered mental state (reduced alertness, lethargy, confusion or delirium.)
- The victim may vomit.
- The victim may become unconscious, have convulsions or stop breathing.

For Prickly Heat (skin rash): treat by drying and cooling the skin.

Heat Cramps: (painful muscle spasms that occur during or after activity). Cramps can be very painful (usually occurring in the leg muscles).

- Gently stretch the cramped muscle and hold the stretch for about 20 seconds then gently massage the muscle. Repeat if necessary.
- If the victim has no other signs of heat-related illness, he/she may resume light activity after the cramps stop.

Heat Syncope: (fainting)

- In an effort to increase heat loss, the skin's blood vessels dilate to such an extent that blood flow to the brain is reduced resulting in symptoms of faintness, dizziness, headache, increased pulse rate, restlessness, nausea, vomiting, and possibly even a brief loss of consciousness.

- The victim should lie or sit down, preferably in the shade or in a cooler environment. Elevate the victim's feet and give fluids.
- Prevent fainting by acclimatization and avoiding long periods of immobility. Immobility causes blood to pool in the skin and the lower part of the body decreasing blood flow to the brain.

	Heat Cramps	Heat Syncope	Heat Exhaustion	Heat Stroke
Cause	Excessive sweating	Fluid and electrolyte losses via sweating. Shunting of blood to dilated peripheral vessels	Excessive fluid loss leading to hypovolemic shock	Inadequacy or failure of heat loss mechanism
Appearance, signs and symptoms	Cramping of muscles (severe pain/spasms of lower extremities); VS are usually normal; skin may be hot and dry or clammy and cool (depends on humidity)	Headache, lightheadedness, postural hypotension, and brief loss of consciousness may occur	Gradual weakness, nausea, anxiety, excess sweating and syncope; pale, clammy skin; weak, pulse rapid, low BP; faintness; below normal temperature	Headache, weakness, sudden loss of consciousness and/or mental disorientation; Hot, red, dry skin; little sweating; hard, rapid pulse; very high temperature
Management	Prevent by drinking fluids. If patient can't drink, give intravenous fluids	Rest in cool environment, elevate legs with head in a lower position, and if in warm environment, avoid prolonged standing (rest every so often)	Rest in cool environment. Oral hydration and/or IV fluids	Emergency cooling by wrapping or immersing in cold water or ice (ice packs to groin, neck, wrists and armpits); immediate hospital
Prognosis	Good unless sodium tablets are used as preventative and overdosing will cause edema (swelling)	Good unless prolonged exposure	Good unless prolonged exposure then circulatory failure will occur	Unless treated promptly, convulsions, death or permanent brain injury can occur

Emergency Response Procedures. Sign Designs shall implement effective emergency response procedures including:

1. Ensuring that effective communication by voice, observation, or electronic means is maintained so that employees at the work site can contact a supervisor or emergency medical services when necessary. An electronic device, such as a cell phone or text messaging device, may be used for this purpose only if reception in the area is reliable. If an electronic device will not furnish reliable communication in the work area, Sign Designs will ensure a means of summoning emergency medical services.
2. Responding to signs and symptoms of possible heat illness, including but not limited to first aid measures and how emergency medical services will be provided.
 - A. If a supervisor observes, or any employee reports, any signs or symptoms of heat illness in any employee, the supervisor shall take immediate action commensurate with the severity of the illness.
 - B. If the signs or symptoms are indicators of severe heat illness (such as, but not limited to, decreased level of consciousness, staggering, vomiting, disorientation, irrational behavior or convulsions), Sign Designs must implement emergency response procedures.
 - C. An employee exhibiting signs or symptoms of heat illness shall be monitored and shall not be left alone or sent home without being offered onsite first aid and/or being provided with emergency medical services in accordance with Sign Designs' procedures.
3. Contacting emergency medical services and, if necessary, transporting employees to a place where they can be reached by an emergency medical provider.
4. Ensuring that, in the event of an emergency, clear and precise directions to the work site can and will be provided as needed to emergency responders.

Acclimatization. All employees shall be closely observed by a supervisor or designee during a heat wave. For purposes of this section only, “heat wave” means any day in which the predicted high temperature for the day will be at least 80 degrees Fahrenheit and at least ten degrees Fahrenheit higher than the average high daily temperature in the preceding five days.

An employee who has been newly assigned to a high heat area shall be closely observed by a supervisor or designee for the first 14 days of the employee's employment.

Employee Training. Effective training in the following topics shall be provided to each supervisory and non-supervisory employee before the employee begins work that should reasonably be anticipated to result in exposure to the risk of heat illness:

1. Physical factors that contribute to heat related illness should be taken into consideration before performing a task. The most common physical factors that can contribute to heat related illness are type of work, level of physical activity and duration, and clothing color, weight and breathability, and personal protective equipment.
2. Sign Designs' procedures for complying with the requirements of this standard, including, but not limited to, Sign Designs' responsibility to provide water, shade, cool-down rests, and access to first aid as well as the employees' right to exercise their rights under this standard without retaliation.
3. The importance of frequent consumption of small quantities of water, up to 4 cups per hour, when the work environment is hot and employees are likely to be sweating more than usual in the performance of their duties.
4. The concept, importance, and methods of acclimatization pursuant to Sign Designs' procedures.
5. The different types of heat illness, the common signs and symptoms of heat illness, and appropriate first aid and/or emergency responses to the different types of heat illness, and in addition, that heat illness may progress quickly from mild symptoms and signs to serious and life threatening illness.
6. The importance to employees of immediately reporting to Sign Designs, directly or through the employee's supervisor, symptoms or signs of heat illness in themselves, or in co-workers.
7. Sign Designs' procedures for responding to signs or symptoms of possible heat illness, including how emergency medical services will be provided should they become necessary.
8. Sign Designs' procedures for contacting emergency medical services, and if necessary, for transporting employees to a point where they can be reached by an emergency medical service provider.
9. Sign Designs' procedures for ensuring that, in the event of an emergency, clear and precise directions to the work site can and will be provided as needed to emergency responders. These procedures shall include designating a person to be available to ensure that emergency procedures are invoked when appropriate.

Supervisor Training. Prior to supervising employees performing work that should reasonably be anticipated to result in exposure to the risk of heat illness effective training on the following topics shall be provided to the supervisor:

1. The information required above.
2. The procedures the supervisor is to follow to implement the applicable provisions in this section.
3. The procedures the supervisor is to follow when an employee exhibits signs or reports symptoms consistent with possible heat illness, including emergency response procedures.
4. How to monitor weather reports and how to respond to hot weather advisories.

Heat Illness Prevention Plan. Sign Designs shall establish, implement, and maintain, an effective heat illness prevention plan. The plan shall be in writing in both English and the language understood by the majority of the employees and shall be made available at the worksite to employees and to representatives of the Division upon request.

Preventing Heat-Related Illness:

Dress for the heat. Wear lightweight, light-colored clothing. Light colors will reflect away some of the sun's energy. It is also a good idea to wear hats or to use an umbrella.

Drink water. Carry water or juice with you and drink continuously even if you do not feel thirsty. Avoid alcohol and caffeine, which dehydrate the body. Drink a cup of water every 15 minutes, or about a quart an hour. Sports drinks are **only** effective if you drink a bottle of water for every sports drink that you consume. Sports drinks can be more effective if there is a lot of sweating. Sign Designs provides water containers of adequate size to provide one quart per hour per employee. It is the employee's responsibility to fill the container prior to beginning work for the day.

Eat small meals and eat more often. Avoid foods that are high in protein which increase metabolic heat.

Avoid using salt tablets unless directed to do so by a physician.

Slow down. Avoid strenuous activity. If you must do strenuous activity, do it during the coolest part of the day, which is usually in the morning between 4:00 a.m. and 7:00 a.m.

Stay indoors when possible.

Take regular breaks when engaged in physical activity on warm days. Take time out to find a cool place. If you recognize that you, or someone else, is showing the signals of a heat-related illness, stop activity and find a cool place. Remember to stay cool!

Acclimatization. Allow your body time to adapt to high temperatures by gradually increasing your exposure to heat. Especially watch and caution any new employee who may not be accustomed to the hot working conditions.

Engineering controls. Where practical, mechanize heavy jobs, isolate heat sources, increase air movement with fans, provide shaded areas, lower air temperature with coolers, automate jobs near high heat sources or provide personal cooling systems.

Teamwork. In a hot environment it's a good idea to work with others. A fellow worker may spot the early signs of heat stress such as irritability, confusion, or clumsiness and provide critical help.

Monitoring. Supervisors should frequently check environment conditions and the condition of workers. A worker may not realize that he/she has a problem until heat stress is well-advanced. In remote environments, recognition of the gravity of the situation is especially important.

High-heat procedures. Your supervisor will implement high-heat procedures when the temperature equals or exceeds 95 degrees Fahrenheit. These procedures shall include the following to the extent practicable:

- (1) Ensuring that effective communication by voice, observation, or electronic means is maintained so that employees at the work site can contact a supervisor when necessary. Sign Designs, Inc. provides Nextel radios as the primary means of communication. An electronic device, such as a cell phone or text messaging device, may be used for this purpose only if reception in the area is reliable.
- (2) Observing employees for alertness and signs or symptoms of heat illness.
- (3) Reminding employees throughout the work shift to drink plenty of water.
- (4) Close supervision of a new employee by a supervisor or designee for the first 14 days of the employee's employment by the employer, unless the employee indicates at the time of hire that he or she has been doing similar outdoor work for at least 10 of the past 30 days for 4 or more hours per day.

EMPLOYEE RESPONSIBILITY:

1. You are required to notify your immediate supervisor and the Personnel Department immediately or as soon as reasonably possible.
2. You are required to complete a form called "EMPLOYEE'S CLAIM FOR WORKERS' COMPENSATION BENEFITS".
3. You are required to cooperate with your immediate supervisor and / or Director of Safety to investigate and determine the cause of your loss and how it will be prevented from occurring again.

AUTHORITY AND RESPONSIBILITY FOR OUR PROGRAM:

- A. The Production Manager is responsible for implementing, managing and controlling our Injury and Illness Prevention Program. The enclosed information will be enhanced and explained where needed.
2. Management and all employees are responsible through every activity of this company to prevent any injury or illness to themselves, to other employees and to the public. It is expected that every employee will perform every operation in a safe manner so that they do not injure themselves, other employees or members of

the public.

3. At every job location away from the main location, involving more than one employee, one specific employee will be designated responsible for our Injury and Illness Prevention Program.
4. A copy of our Injury and Illness Prevention Program will be available at every job location.

REPORTING – A report must be made within 24 hours to the Production Manager and shall include: who contributed to the loss, what happened, where did it happen, why it happened, when, and how it will be prevented in the future.