

Why is heat a hazard to workers?

When a person works in a hot environment, the body must get rid of excess heat to maintain a stable internal temperature. It does this mainly through circulating blood to the skin and through sweating.

When the air temperature is close to or warmer than normal body temperature, cooling of the body becomes more difficult. Blood circulated to the skin cannot lose its heat. Sweating then becomes the main way the body cools off. But sweating is effective only if the humidity level is low enough to allow evaporation, and if the fluids and salts that are lost are adequately replaced.

If the body cannot get rid of excess heat, it will store it. When this happens, the body's core temperature rises and the heart rate increases. As the body continues to store heat, the person begins to lose concentration and has difficulty focusing on a task, may become irritable or sick, and often loses the desire to drink. The next stage is most often fainting and even death if the person is not cooled down.

Excessive exposure to heat can cause a range of heat-related illnesses, from heat rash and heat cramps to heat exhaustion and heat stroke. Heat stroke can result in death and requires immediate medical attention.

Exposure to heat can also increase the risk of injuries because of sweaty palms, fogged-up safety glasses, dizziness, and burns from hot surfaces or steam.

How do I know if it's too hot?

- The temperature rises
- Humidity increases
- The sun gets stronger
- There is no air movement
- No controls are in place to reduce the impacts of equipment that radiates heat
- Protective clothing or gear is worn
- Work is strenuous

The heat index, which takes both temperature and humidity into account, is a useful tool for outdoor workers and employers (see Heat Index chart right)

Heat Index	Risk Level	Protective Measures
Less than 91°F	Lower Caution	Basic heat safety and planning
91°F to 103°F	Moderate	Implement precautions and heighten awareness
103°F to 115°F	High	Additional precautions to protect workers
Greater than 115°F	Very High to Extreme	Triggers even more aggressive protective measures

Prevention

Most heat-related health problems can be prevented, or the risk of developing them can be reduced. For indoor environments, refer to the information below.

Engineering Controls

The best way to prevent heat-related illness is to make the work environment cooler. A variety of engineering controls can reduce workers' exposure to heat:

- Air conditioning (such as air-conditioned crane or construction equipment cabs, air conditioning in break rooms).
- Increased general ventilation.
- Cooling fans.
- Local exhaust ventilation at points of high heat production or moisture (such as exhaust hoods in laundry rooms).
- Reflective shields to redirect radiant heat.
- Insulation of hot surfaces (such as furnace walls).
- Elimination of steam leaks.

Work Practices

- Employers should have an emergency plan in place that specifies what to do if a worker has signs of heat-related illness, and ensures that medical services are available if needed.
- Employers should take steps that help workers become acclimatized (gradually build up exposure to heat), especially workers who are new to working in the heat or have been away from work for a week or more. Gradually increase workloads and allow more frequent breaks during the first week of work.
- Workers must have adequate potable (safe for drinking) water close to the work area, and should drink small amounts frequently.
- Rather than being exposed to heat for extended periods of time, workers should, wherever possible, be permitted to distribute the workload evenly over the day and incorporate work/rest cycles.

Work Practices

- If possible, physical demands should be reduced during hot weather, or heavier work scheduled for cooler times of the day.
- Rotating job functions among workers can help minimize overexertion and heat exposure.
- Workers should watch out for each other for symptoms of heat-related illness and administer appropriate first aid to anyone who is developing a heat-related illness.
- In some situations, employers may need to conduct physiological monitoring of workers - see Monitoring Workers at Risk of Heat-related Illness.

Personal Protective Equipment

Workers should be aware that use of certain personal protective equipment (e.g., certain types of respirators and impermeable clothing) can increase the risk of heat-related illness.

In some situations, special cooling devices can protect workers in hot environments:

- In some workplaces, insulated gloves, insulated suits, reflective clothing, or infrared reflecting face shields may be needed.
- Thermally conditioned clothing might be used for extremely hot conditions; for example:
 - A garment with a self-contained air conditioner in a backpack.
 - A garment with a compressed air source that feeds cool air through a vortex tube.
 - A plastic jacket whose pockets can be filled with dry ice or containers of ice.

Training

Workers and supervisors should be trained about the hazards of heat exposure and their prevention. Topics should include:

- Risk factors for heat-related illness.
- Different types of heat-related illness, including how to recognize common signs and symptoms.
- Heat-related illness prevention procedures.
- Importance of drinking small quantities of water often.
- Importance of acclimatization, how it is developed, and how your worksite procedures address it.
- Importance of immediately reporting signs or symptoms of heat-related illness to the supervisor.
- Procedures for responding to possible heat-related illness.
- Procedures to follow when contacting emergency medical services.
- Procedures to ensure that clear and precise directions to the work site will be provided to emergency medical services.

HEAT RELATED ILLNESS AND FIRST AID		
ILLNESS	SYMPTOMS	FIRST AID*
HEAT STROKE	<ul style="list-style-type: none"> • Confusion • Fainting • Seizures • Excessive sweating or red, hot, dry skin • Very high body temperature 	<ul style="list-style-type: none"> • Call 911 While waiting for help: <ul style="list-style-type: none"> • Place worker in shady, cool area • Loosen clothing, remove outer clothing • Fan air on worker, cold packs in armpits • Wet worker with cool water, apply ice packs, cool compresses, or ice if available • Provide fluids (preferably water) as soon as possible • Stay with worker until help arrives
HEAT EXHAUSTION	<ul style="list-style-type: none"> • Cool, moist skin • Heavy sweating • Headache • Nausea • Dizziness • Light Headedness • Weakness • Thirst • Irritability • Fast heart beat 	<ul style="list-style-type: none"> • Have worker sit or lie down in a cool, shady area • Give worker plenty of water or other beverages to drink • Cool worker with cold compresses/ice packs • Take worker to clinic or emergency room for medical evaluation or treatment if signs or symptoms worsen or do not improve within 60 minutes • Do not return to work that day
HEAT CRAMPS	<ul style="list-style-type: none"> • Muscle spasms • Pain • Usually in abdomen, arms, or legs 	<ul style="list-style-type: none"> • Have worker rest in shady, cool area • Worker should drink water or other cool beverages • Wait a few hours before allowing worker to return to strenuous work • Have worker seek medical attention if cramps don't go away
HEAT RASH	<ul style="list-style-type: none"> • Clusters of red bumps on skin • Often appears on neck, upper chest, folds of skin 	<ul style="list-style-type: none"> • Try to work in a cooler, less humid environment when possible • Keep the affected area dry
* Remember, if you are not a medical professional, use this information as a guide only to help workers in need.		