



Eye on Safety

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Heat stress and outdoor work

Staying safe at work has its challenges, especially for workers who are exposed to hot temperatures. Heat stress is caused by a number of interacting factors, including environmental conditions, clothing, and workload. Whether it's the result of seasonal fluctuations or the type of work performed, extreme temperatures can affect the body's natural ability to handle heat, which can lead to heat-related illnesses.

Additionally, some workers might be at greater risk than others if they have not built up a tolerance to hot conditions.

Heat index

Over the past several years, summertime forecasts have included references to a heat index. So, what exactly is a heat index, and what does it mean?

The heat index combines both air temperature and relative humidity into a single value that indicates the apparent temperature. A higher heat index poses an increased risk of heat-related illness to anyone who is outdoors.

Risk factors

A worker's sensitivity to heat can be affected by physical factors such as age, weight, degree of physical fitness, medical conditions, and metabolism. Environmental factors also play a large role, including air temperature, humidity, radiant heat, clothing, and personal protective equipment.

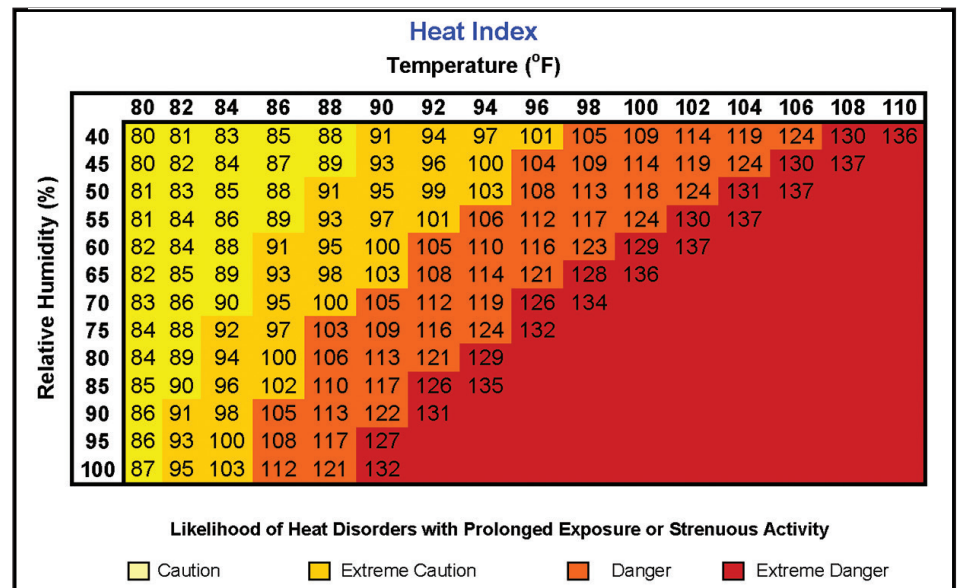
Heat-related illnesses

The body normally cools itself by sweating. When working in a hot

**National Institutes of Health
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Providing a safe and healthy environment for employees, patients and visitors.

“Safe science and good science go hand-in-hand.”

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Heat stress and outdoor work *(continued from page 1)*

environment, especially with high humidity, sweating isn't enough. Body temperature can rise to dangerous levels if precautions are not taken. Heat illnesses range from heat rash to heat stroke. Heat stroke requires immediate medical attention and can result in death.

Workers should be able to recognize the symptoms and remedies for heat illness.



Heat rash is caused by sweat that does not evaporate from the skin. It often appears as clusters of red bumps on the neck, chest, and in folds of the skin.

Heat cramps are painful muscle spasms caused by salt imbalances due to sweating. Symptoms of heat cramps include muscle pain or spasms usually in the abdomen, arms, or legs.

Heat exhaustion is caused by the body's loss of water and salt through sweating. Symptoms include extreme weakness, dizziness, heavy sweating, and impaired motor skills.

Drinking water or a carbohydrate-electrolyte beverage (sports drink), resting in a cool area, and applying cool water to the body can aid in recovery from heat cramps or heat exhaustion.

Heat stroke is the most serious heat-related disorder. It occurs when the body's temperature regulating system fails and the body's temperature rises to critical levels.

Symptoms of heat stroke include:

- Hot, dry skin, or profuse sweating
- Hallucinations
- Chills and a throbbing headache
- High body temperature
- Confusion/dizziness/slurred speech

Heat stroke is a medical emergency that requires an immediate call to 911 for help. The victim should be moved to a cool, shaded area, with outer clothing removed and cool water applied to the body until emergency personnel arrive.

Prevention

Avoiding heavy exertion, extreme heat, sun exposure, and high humidity are basic steps to prevent heat-related illnesses.

In reality, in this 24/7 world we live in, extreme weather conditions cannot always be avoided. When out in these conditions:

- Reduce air temperature. One way to reduce excessive heat exposure is to increase the rate the body loses heat. Modifying air temperature and air movement across the skin can reduce the risk of a heat illness. Consider bringing outside air or air conditioning into the work area and wear one layer of work clothing when possible.
- Wear light-colored, loose-fitting, breathable clothing, such as cotton (no synthetics).
- Apply sunscreen and wear sunglasses that block 99 to 100 percent of UV radiation.
- Try to schedule heavy work in the coolest part of the day.
- Rest breaks provide time for cooling and the opportunity to drink water. Ideally, the breaks should be in cooler or air conditioned areas. Outdoor workers should move to a shaded area when possible.
- Drink water frequently. Drink enough water so that you never become thirsty; five to seven ounces of fluids every 15 to 20 minutes.

Workers need to become acclimated to the working conditions, especially if they are new to working in a hot environment or have been away from work for a week or more. Workloads should be gradually increased to allow more frequent breaks during the first week of work.

OSHA recommends that employees get used to hot environments by gradually increasing exposure over a five-day work period beginning with 50 percent of the normal workload and time spent in the hot environment, and then gradually building up to 100 percent by the fifth day. New workers and those returning from an absence of two weeks or more should have a five-day adjustment period.

Become familiar with the symptoms of heat illness and watch for any signs in yourself and others during hot weather. Plan for an emergency and know what to do — acting quickly can save lives!



Safety focus: Using compressed air for cleaning

It is a common site in many workplaces to see employees using compressed air to clean parts, equipment, and, even clothing. What many workers and some employers do not realize is that compressed air can be deadly. That is why OSHA has a regulation concerning the use of compressed air for cleaning:

“Compressed air shall not be used for cleaning purposes except where reduced to less than 30 p.s.i. and then only with effective chip guarding and personal protective equipment (PPE).”

What is “chip guarding”?

“Effective chip guarding” means any method or equipment which will prevent a chip or particle (of whatever size) from being blown into the eyes or unbroken skin of the operator or other workers.

Effective chip guarding may be separate from the air nozzle as in the case where screens or barriers are used. The use of protective cone air nozzles are acceptable in general for protection of the operator but barriers, baffles, or screens may be required to protect other workers if they are exposed to flying chips or particles.



What about the psi requirement?

The regulation requires the psi at the nozzle to be less than 30 when using compressed air for cleaning. However, OSHA has said in interpretive guidance that the use of compressed air for cleaning purposes at pressures at or greater than 30 psi is permissible if the outlet or source is fitted with a relief device or air ports that drop the pressure to less than 30 psi if the flow is dead-ended.

What about cleaning clothing/bodies?

While the regulations do not specifically address the issue, in a letter of interpretation, OSHA says that employers should not allow employees to use compressed air for cleaning themselves or their clothing in general industry situations. The eyes and other body parts, such as the respiratory system, may be damaged as the result of inadequate PPE, lack of chip guards, and/or uncontrolled release of compressed air.

The dangers

There are numerous dangers of improperly using compressed air:

- **An embolism** — If compressed air enters the bloodstream through a body opening or skin break, it can create an embolism (air bubble) that can be life threatening.

- **Eye damage** — Particles that are being blown can “blow back” and strike the eyes. The air itself can also damage the eyes if it is pointed toward them.
- **Hearing loss** — Some compressed air equipment can be loud enough to damage hearing. Always wear proper PPE.
- **Combustible dust** — If compressed air is used to blow certain dusts, it can create a suspension in the air that could ignite if there is an ignition source.
- **Respiratory issues** — Particles or air can enter the respiratory system, posing deadly hazards.
- **Whips from hoses** — If not properly secured, hoses can whip and cause severe injury.

Workers must be trained that even extremely low pressures, such as 5 or 10 psi, can still cause severe damage if pointed toward the body, particularly the mouth, eyes, ears, or open areas in the skin.

Employers should train employees on the dangers of compressed air, and ensure the equipment is properly equipped with needed safety features and maintained. Supervisors should

watch for improper use, particularly horseplay, and initiate corrective action. In addition, for many applications, a broom or shop vacuum may be just as effective and much safer.

Compressed air may seem harmless, but if strict safeguards and practices are not utilized it can be deadly.

What about compressed air piping?

OSHA expects that the piping and fittings be designed to handle the pressures placed upon them. This means that PVC piping is not appropriate for compressed air systems. In fact, OSHA has used the General Duty Clause to cite employers for using PVC piping to transport compressed air. OSHA says that two feasible and acceptable methods to correct this hazard are:

1. Replace all existing PVC pipes and fittings with cast iron materials, or another type of metal piping, which are rated to transport compressed air safely in exposed above ground locations.
2. Replace all existing PVC piping and fittings with shatter resistant Acrylonitrile-Butadiene-Styrene (ABS) pipe and fittings, which are manufactured for above ground use of compressed air.

It is advised to check with the piping manufacturers and conduct a design review based on the intended usage and pressures to ensure the proper materials are utilized.

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Avoiding mosquito-borne illnesses

"The greatest mistake you can make in life is continually fearing that you'll make one."

Elbert Hubbard



Mosquitos can carry a number of dangerous diseases.

When you're heading to an area that's home to mosquitoes and the diseases they carry, it's worth taking time to protect yourself.

Mosquitoes not only have an annoying bite, they can also transmit diseases such as the West Nile and Zika viruses. Because mosquitoes find humans by using receptors which can detect carbon dioxide and skin odor, it's virtually impossible to hide from them without taking preventive measures. To reduce your risk of being bitten:

- Wear long-sleeved shirts, long pants, and shoes that cover your feet.
- Use an insect repellent on uncovered skin. Remember to spray the repellent on the outside of your clothing, as mosquitoes can bite through some clothing. Reapply the repellent as directed.
- Avoid areas with standing water, such as marshes.

The Centers for Disease Control and Prevention (CDC) recommend using an Environmental Protection Agency (EPA)-registered insect repellent with one of the following active ingredients.

- DEET
- Picaridin (known as KBR 3023 and icaridin outside the US)
- IR3535
- 2-undecanone

- Oil of lemon eucalyptus (OLE) or para-menthane-diol (PMD) (do not use on children under 3 years of age)

When used as directed, EPA-registered insect repellents are proven safe and effective, even for pregnant and breastfeeding women.

If you have a baby or child

- Always follow instructions when applying insect repellent to children. Do not spray insect repellent onto a child's hands or face. Instead, spray insect repellent onto your hands and then apply to a child's face.
- Do not use insect repellent on babies younger than 2 months of age.
- Dress your child in clothing that covers arms and legs, or use mosquito netting on strollers and carriers.

Mosquito-proof your home

- Use screens on windows and doors and repair holes in screens as needed.
- Use air conditioning when available.
- Keep mosquitoes from laying eggs in and near standing water.
- Once a week, empty and scrub, turn over, cover, or throw out items that hold water, such as tires, buckets, planters, pools, birdbaths, flowerpots, or trash containers. Check inside and outside your home.