

HEAT ILLNESS PREVENTION

RESPONDING TO HEAT TRENDS

The Bureau of Labor Statistics revealed that there were **36 work-related deaths due to environmental heat exposure in 2021**. Although the number was a decrease from 56 deaths in 2020 and the lowest number since 2017, concerns about extreme temperatures across the country require a continued focus on preventing work-related heat illness.

The Occupational Safety and Health Administration (OSHA) estimates that 50% to 70% of outdoor fatalities occur in the first few days of working in warm or hot environments. This needless loss of life is often due to a lack of acclimatization to heat that would otherwise provide heat tolerance for work activities.

Although encouraging employees to drink fluids and take frequent rest breaks is important, employers can't overlook other methods to protect employees from heat exposure.



WHAT CONSTITUTES “EXCESSIVE HEAT”?

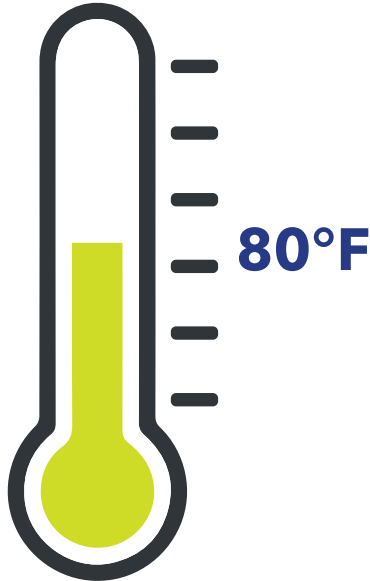
Heat illness can occur in both indoor and outdoor work settings when the heat index (HI) is as low as 80°F or less. Employers should refer to OSHA's Heat National Emphasis Program that highlights National Weather Service heat index classifications of environmental heat exposure used by agency inspectors. These are:

- **Caution** (80 - 90 degrees F heat index)
- **Extreme Caution** (91-103 degrees F heat index)
- **Danger** (103-124 degrees F heat index)
- **Extreme Danger** (126 degrees F or higher heat index)

The HI is a measure of how hot it actually feels to a worker when air temperature and humidity are both factored into the “heat” equation.

Certain environmental and personal factors, in addition to the temperature, can add to heat stress. These include:

ENVIRONMENTAL	PERSONAL
High air temperatures and humidity	Level of physical fitness/overall health
Exposure to radiant heat sources (ovens, furnaces, tar, etc.)	Ability to acclimate to temperature extremes
Direct sunlight	Age, weight, etc.
Heavy clothing	Dehydration
Limited airflow or air movement	Alcohol or drug use
Wearing personal protective equipment (PPE)	Infection, illness, or previous heat-related illness
Heavy workload or physical exertion	Certain medications
	Pregnancy
	Chronic disease



Heat illness can occur in work settings when the heat index (HI) is as low as **80°F** or less.

WHO'S MOST AFFECTED BY EXTREME HEAT?

Heat-related illness can affect workers in any industry when conditions are right. Any process or job site that is likely to raise the worker's deep core temperature (typically considered as higher than 100.4 degrees F) increases the risk of a heat illness. Whether indoors or outdoors, occupational risk factors like heavy physical activity, high humidity, excessive heat, lack of acclimatization, and wearing clothing that holds in body heat increase the chances of a heat-related illness.

All employers with workers that are potentially exposed to indoor or outdoor heat hazards must provide sufficient protection from harm. Industries that are especially susceptible to heat-related illness include:

- **Construction, general**
- **Roofing**
- **Agriculture**
- **Foundries/Refineries**
- **Traffic/Work Zones**
- **Emergency Response**
- **Manufacturing**
- **Bakeries/Commercial Kitchens**
- **Landscaping**
- **Tree Trimming**
- **Mining**
- **Chemical Industries**

Heat illness risk increases when a worker's deep core temperature is higher than 100.4°F.



HOW CAN YOU PROTECT EMPLOYEES?

Employers can best protect workers by developing, implementing, and enforcing safe work procedures that address extreme temperature hazards. These include acclimatization, engineering and administrative controls, personal protective equipment (PPE), training, and oversight.

One of the simplest, most economical ways to protect employees is through acclimatization. **Acclimatization** is a process by which the body adjusts to increased heat exposure. Employees are more likely to develop heat illness if they are not provided the opportunity to adapt to hotter work environments.

Acclimatization is fully achieved in most people within four to 14 days of regular work involving at least two hours per day in the heat.

During heat waves and with new employees not acclimated, employers must be especially vigilant. A supervisor or designee must closely observe employees and find ways to lessen the intensity of employees' work during temperature extremes and during two-week break-in periods of new employees.

Employers can also implement **engineering controls** like air conditioning, circulation fans, and ventilation systems. When engineering controls aren't feasible, **administrative controls** must be implemented. These include adjusting work practices like assigning shifts during cooler hours, providing additional rest breaks, implementing a "buddy system," and acclimatizing workers to extreme temperatures.

Often considered by OSHA as the last line of defense, **PPE** can actually increase the risk of work-related heat illness if not carefully considered during temperature fluxes. To ensure worker safety, some PPE can't just be removed to protect a worker from heat. Instead, employers should consider additional or alternative protections that maintain worker safety as well as functionality.

Cooling garments –

these include hoods, vests, or undergarments designed to provide partial or full body cooling. This equipment typically requires a battery-driven circulating pump, a coolant (liquid ice), and a container.

Reflective clothing –

this clothing includes suits, jackets, and aprons that enclose or otherwise protect workers from radiant heat. Because reflective clothing isn't the best for air exchange, it should be worn as loosely as possible and with complementary cooling systems.

Cooling ice vests –

these are vests filled with as many as 50 or more ice packets, which are usually filled with water or carbon dioxide (dry ice). This inexpensive and mobile option may only last for 2 to 4 hours during moderate heat, so frequent breaks may be necessary.

Personal cooling systems –

these complicated, but extremely effective systems circulate air for the worker especially when used with impermeable garments or double cotton overalls. Cooling systems are designed to force exhaust air from a supplied-air source around the neck and down inside an impermeable suit. The air then escapes through openings in the suit.

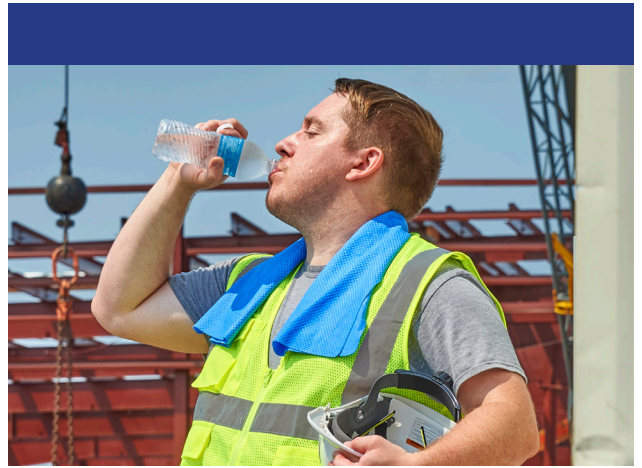
Wetted clothing –

these can range from neck wraps to terry cloth coveralls or whole-body cotton suits and are inexpensive and effective.

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All the efforts under the sun are worth very little without proper training. Employers must provide effective heat illness prevention training, so workers know how to recognize signs of heat stress in themselves and their coworkers, and what to do in a heat-related emergency. Workers should understand the differences between heat stroke, heat exhaustion, heat fatigue, and other heat-related illnesses and how best to prevent each.

Regardless of the protective safety method(s) used, employers should always provide adequate oversight and supervision to ensure workers are resting, hydrating, and slowing down so heat doesn't sneak up on workers. Continuous communication between supervisors, workers, and contractors is also key for effective oversight.



WHICH REGULATIONS APPLY TO HEAT ILLNESS PREVENTION?

Duties of employers and employees are found in [29 USC 654](#) (including Pub. L. 91-596 "OSH Act of 1970" 5(a)(1), the "General Duty Clause").

Currently, OSHA doesn't have a specific standard addressing heat-related hazards, but the agency has implemented [Directive CPL 03-00-024, National Emphasis Program – Outdoor and Indoor Heat-Related Hazards](#) to ensure that employees in high-hazard industries are protected from heat-related hazards that may lead to serious illnesses, injuries, or death.



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Ray Chishti joined J. J. Keller in 2017 as a Workplace Safety Editor. He has 15 years of EH&S experience in a variety of industries, including EPC projects, construction, railway, fossil fuel power plants, gas distribution and transmission, electrical transmission, and retail. His experience includes working knowledge in OSHA safety, environmental, HR, workers' compensation, and DOT topics. As a safety professional, his previous roles included auditing and leadership positions with new construction, existing facilities, and large EPC projects valued between one million and two billion dollars. His experience includes positions within law enforcement as a police officer and fraud specialist.

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