

Heat illness is not only relevant to employees that work outdoors. Many workers spend part of their working day in a hot environment. Foundries, laundries, construction projects, and restaurant kitchens are just a few workplaces that may put workers at risk of heat illness. Discomfort is not the only problem with working in hot environments. The consequences of heat illness can be seen in decreased worker productivity, increased accident rates, illnesses, and fatalities.

OSHA does not have a specific standard that covers working in hot environments. Nonetheless, under the Occupational Safety and Health (OSH) Act, employers have a duty to protect workers from recognized serious hazards in the workplace, including heat-related hazards.

Heat disorders (symptoms, causes, and treatment/prevention) are described in the following table:

Physical Disorder	Symptoms	Causes	Treatment/Prevention
Heat Fatigue	<ul style="list-style-type: none"> <li>Decreased productivity, alertness, coordination, and vigilance</li> </ul>	<ul style="list-style-type: none"> <li>Not acclimated to the hot environment</li> </ul>	<ul style="list-style-type: none"> <li>Gradual adjustment to the hot environment</li> </ul>
Heat Rash	<ul style="list-style-type: none"> <li>Rash in area of heavy perspiration</li> <li>Discomfort</li> <li>Temporary disability</li> </ul>	<ul style="list-style-type: none"> <li>Hot and humid environments where perspiration is not easily removed from skin surface</li> <li>Plugged sweat glands</li> <li>Inflamed sweat glands</li> </ul>	<ul style="list-style-type: none"> <li>Periodically resting in a cool area</li> <li>Regular bathing</li> <li>Allowing skin to dry</li> </ul>
Fainting	<ul style="list-style-type: none"> <li>Blacking out</li> <li>Collapsing</li> </ul>	<ul style="list-style-type: none"> <li>Standing still in the heat</li> <li>Shortage of blood to the brain, reducing oxygen</li> </ul>	<ul style="list-style-type: none"> <li>Lying down</li> <li>Elevating feet slightly above the head</li> <li>Moving around</li> </ul>
Heat Cramps	<ul style="list-style-type: none"> <li>Painful spasm of heavily used skeletal muscles (extremities, back, or abdomen)</li> </ul>	<ul style="list-style-type: none"> <li>Loss of salt by sweating</li> <li>Large quantities of water consumed</li> <li>Excess water that seeps into active muscles and causes pain</li> </ul>	<ul style="list-style-type: none"> <li>Adequate salt with meals</li> <li>Liquids for relief (unless advised differently by a physician)</li> </ul>
Heat Exhaustion	<ul style="list-style-type: none"> <li>Extreme weakness or fatigue</li> <li>Giddiness</li> <li>Nausea</li> <li>Headache</li> <li>Pale or flushed complexion</li> <li>Slightly elevated body temperature</li> <li>Clammy/moist skin</li> <li>Vomiting</li> <li>Loss of consciousness (in extreme cases)</li> </ul>	<ul style="list-style-type: none"> <li>Blood volume reduced by loss of water or salt due to sweating</li> <li>Inadequate fluid and/or salt intake</li> </ul>	<ul style="list-style-type: none"> <li>Resting in a cool area</li> <li>Drinking plenty of liquids</li> </ul>
Heat Stroke	<ul style="list-style-type: none"> <li>Hot, dry, and (often) red or spotted skin</li> <li>Body temperature of 105°F or higher and rising</li> <li>Mental confusion</li> <li>Delirium</li> <li>Convulsions</li> <li>Loss of consciousness</li> </ul> <p><i>*Death or permanent brain damage may result unless heat stroke is treated immediately.</i></p>	<ul style="list-style-type: none"> <li>Breakdown of the body's cooling system under stress, which stops sweating and almost eliminates the body's ability to remove excess heat</li> </ul>	<ul style="list-style-type: none"> <li>Moving to a cool area</li> <li>Soaking clothing with cold water</li> <li>Vigorously fanning the body</li> <li>Calling for an ambulance immediately</li> </ul>



## Risk Factors for Heat Illness

- High temperature and humidity
- Direct sun exposure
- No breeze or wind
- Low liquid intake
- Heavy physical labor
- Waterproof clothing
- No recent exposure to hot workplaces

## What Employers Can Do to Prevent Heat Illness

- Establish a complete Heat Illness Prevention Program.
- Provide training about the hazards leading to heat stress and how to prevent them.
- Provide a supply of cool water to workers close to the work area. At least one pint of water per hour is needed.
- Modify work schedules and arrange frequent rest periods with water breaks in shaded or air-conditioned areas.
- Gradually increase workloads and allow more frequent breaks for workers new to the heat or those that have been away from work to adapt to working in the heat (acclimatization).
- Routinely check workers who are at risk of heat stress due to protective clothing and high temperature. Consider protective clothing that provides cooling.

## How You Can Protect Yourself and Others

- Know the signs and symptoms of heat illnesses, monitor yourself, and use a buddy system.
- Block out direct sun and other heat sources. Drink plenty of fluids.
- Drink often and before you are thirsty. Drink water at least every 15 minutes.
- Avoid beverages containing alcohol or caffeine.
- Wear lightweight, light colored, loose-fitting clothes.
- Have employees use and understand the heat index.

## What to Do When a Worker is Ill from the Heat

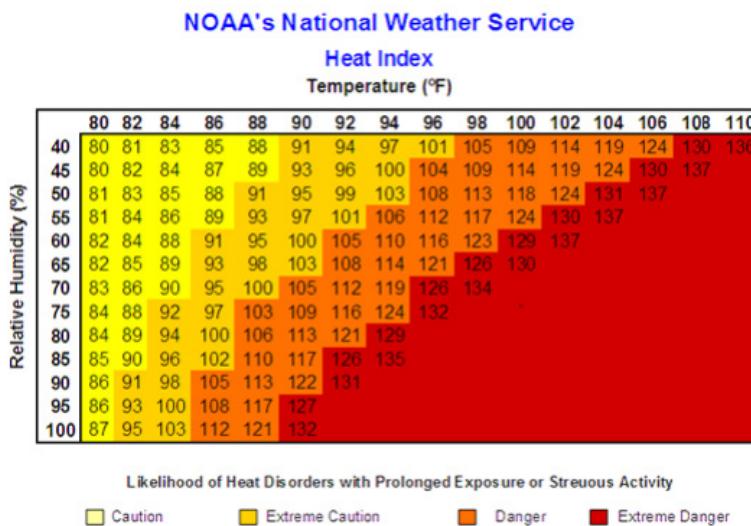
- Call a supervisor for help. If the supervisor is not available, call 911.
- Have someone stay with the worker until help arrives.
- Move the worker to a cooler/shaded area.
- Remove outer clothing.
- Fan and mist the worker with water; apply ice (ice bags or ice towels).
- Provide cool drinking water, if the worker is able to drink.



## NOAA Heat Index

The risk of heat-related illness becomes greater as the weather gets hotter and more humid. Both air temperature and humidity affect how hot people feel when they are working outdoors in the heat. The “**heat index**” is a single value that takes both temperature and humidity into account. The higher the heat index, the hotter the weather feels. The heat index is a better measure than air temperature alone for estimating the risk to workers from environmental heat sources.

**Why humidity matters:** Relative humidity is a measure of the amount of moisture in the air. Sweat does not evaporate as quickly when the air is moist as it does in a dry climate. Since evaporation of sweat from the skin is one of the ways the human body cools itself on a hot day, high humidity reduces our natural cooling potential and we feel hotter. Low humidity can also be a problem for outdoor workers in hot, desert-like climates. Sweat evaporates very rapidly in low humidity, which can lead to severe dehydration if a person does not drink enough water throughout the day.



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

## References

- [www.OSHA.gov](http://www.OSHA.gov)
- OSHA Heat Safety Tool App - [https://www.osha.gov/SLTC/heatillness/heat\\_index/heat\\_app.html](https://www.osha.gov/SLTC/heatillness/heat_index/heat_app.html)
- <http://www.nws.noaa.gov/os/heat/index.shtml#heatindex>

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