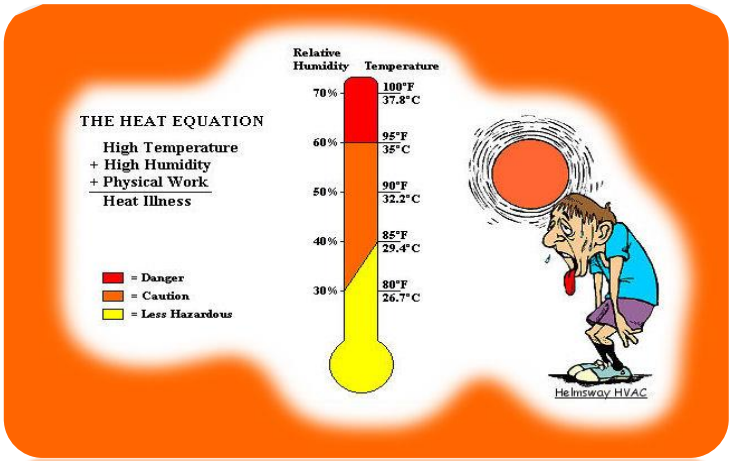
Hot weather and heat stress

At times, workers may be required to work in hot environments for long periods. When the human body is unable to maintain a normal temperature, heat- related illnesses can occur and may result in death.

Heat illness is a serious threat to every worker, and no one is immune! To combat heat illness understanding the cause is very essential. During the work in hot weather it is required to take all steps to avid it such as - recognize the symptoms - and be prepared to administer immediate treatment. When heat illness strikes, the brain activates several defense mechanisms. The flow of 'hot' internal blood is increased and diverted to the lung and skin area. In the lungs cooler air is inhaled, absorbs heat from the blood, then hot air is exhaled. On the skin surface, increased perspiration cools the skin and the blood beneath the surface, but, as severity increases, body controls begin to fail; at this point professional help is urgent.

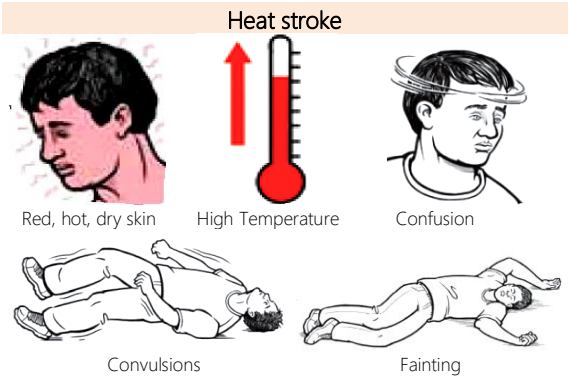


Factors That Increase Risk to Workers

- High temperature and humidity
- Low fluid consumption
- Direct sun exposure (with no shade) or extreme heat
- Limited air movement (no breeze or wind)
- Physical exertion
- Use of bulky protective clothing and equipment
- Poor physical condition or ongoing health problems
- Some medications
- Pregnancy
- Lack of previous exposure to hot workplaces
- Previous heat-related illness

Health Problems Caused by Hot Work Environments

Heat Stroke is the most serious heat-related health problem. Heat stroke occurs when the body's temperature regulating system fails and body temperature rises to critical levels (greater than 104°F).***This is a medical emergency that may result in death!*** The signs of heat stroke are :- *confusion, loss of consciousness and seizures*. Workers experiencing heat stroke have a very *high body temperature* and may *stop sweating*. If a worker shows signs of possible heat stroke, ***get medical help immediately***, and call emergency number. Until medical help arrives, move the worker to a shady, cool area and remove as much clothing as possible. Wet the worker with cool water and circulate the air to speed cooling. Place cold wet cloths, wet towels or ice all over the body or soak the worker's clothing with cold water.

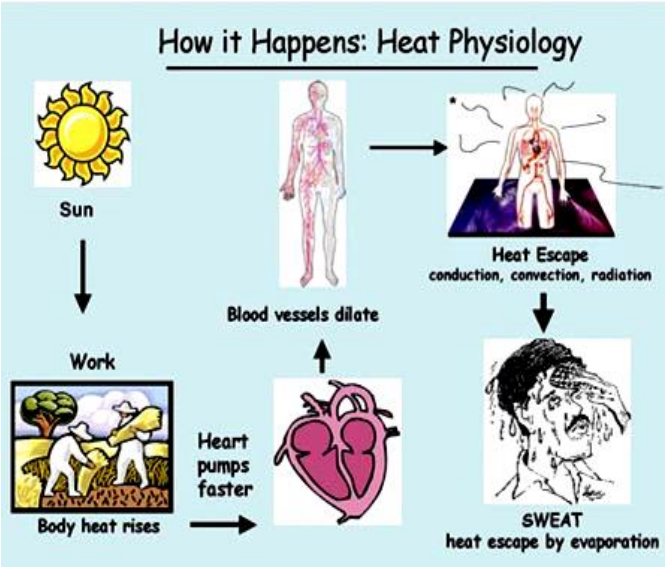


Heat Exhaustion is the next most serious heat-related health problem. The signs and symptoms of heat exhaustion are:- *headache, nausea, dizziness, weakness, irritability, confusion, thirst, heavy sweating and a body temperature greater than 100.4°F*. Workers with heat exhaustion should be removed from the hot area and given liquids to drink. Remove unnecessary clothing including shoes and socks. Cool the worker with cold compresses to the head, neck, and face or have the worker wash his or her head, face and neck with cold water. Encourage frequent sips of cool water. Workers with signs or symptoms of heat exhaustion should be taken to a clinic or emergency room for medical evaluation and treatment. Make sure that someone stays with the worker until help arrives. If symptoms worsen, call emergency number and get help immediately.

Heat Cramps are muscle pains usually caused by physical labour in a hot work environment. Heat cramps are caused by the loss of body salts and fluid during sweating. Workers with heat cramps should replace fluid loss by drinking water and/or carbohydrate-electrolyte replacement liquids (e.g., sports drinks) every 15 to 20 minutes.

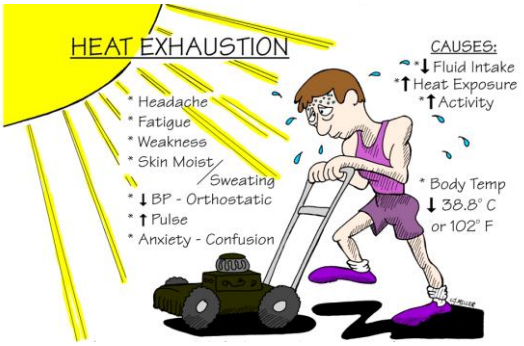
Heat Rash is the most common problem in hot work environments. Heat rash is caused by sweating and looks like a red cluster of pimples or small blisters. Heat rash usually appears on the neck, upper chest, in the groin, under the breasts and in elbow creases. The best treatment for heat rash is to provide a cooler, less humid work environment. The rash area should be kept dry. Powder may be applied to increase comfort. Ointments and creams should not be used on a heat rash. Anything that makes the skin warm or moist may make the rash worse.

Health Effects



The best way to prevent heat illness is to make the work environment cooler. In outdoor situations, this may be done by scheduling activities during the cooler times of the day. However, very early starting times may result in increased fatigue. Also, humidity tends to be higher in the early morning hours. Provide air conditioned or shaded areas close to the work area and allow frequent rest breaks. Indoor workplaces may be cooled by using air conditioning or increased ventilation, assuming that cooler air is available from the outside. Other methods to reduce indoor temperature include: providing reflective shields to redirect radiant heat, insulating hot surfaces, and decreasing water vapour pressure, e.g., by sealing steam leaks and keeping floors dry. The use of fans to increase the air speed over the worker will improve heat exchange between the skin surface and the air, unless the air temperature is higher than the skin temperature. However, increasing air speeds above 300 ft. per min. may actually have a warming effect. Industrial hygiene personnel can assess the degree of heat stress caused by the work environment and make recommendations for reducing heat exposure.

Work Practices to Prevent Heat-related Health Effects



- Train workers and supervisors about the hazards leading to heat stress and ways to prevent them.
- Allow workers to get used to hot environments by gradually increasing exposure over a 5-day work period. Begin with 50% of the normal workload and time spent in the hot environment and then gradually build up to 100% by the fifth day. New workers and those returning from an absence of two weeks or more should have a 5-day adjustment period.
- Provide workers with plenty of cool water in convenient, visible locations close to the work area. Water should have a palatable (pleasant and odour free) taste and water temperature should be 50- 60°F if possible.
- Remind workers to frequently drink small amounts of water before they become thirsty to maintain good hydration. Simply telling them to drink plenty of fluids is not sufficient. During moderate activity, in moderately hot conditions, at least one pint of water per hour is needed. Workers should drink about 6 ounces or a medium-sized glass-full every 15 minutes. Instruct workers that urine should be clear or lightly coloured.
- Be aware that it is harmful to drink extreme amounts of water. Workers should generally not drink more than a total of 12 quarts of fluid in 24 hours.
- Reduce the physical demands of the job, such as excessive lifting, climbing, or digging with heavy objects. Use mechanical devices or assign extra workers.
- Monitor weather reports daily and reschedule jobs with high heat exposure to cooler times of the day. When possible, routine maintenance and repair projects should be scheduled for the cooler seasons of the year.
- Schedule frequent rest periods with water breaks in shaded or air-conditioned recovery areas.
- Workers are at an increased risk of heat stress from personal protective equipment (PPE), especially from wearing semi-permeable (penetrable) or impermeable clothing (such as Tyvek or rubber), when the outside temperature exceeds 70°F, or while working at high energy levels. These types of clothing materials trap heat close to a worker's body.

General Heat Stress Index

Danger Category	Apparent Temperature (°F) (Humiture)	Heat Syndrome
IV. Extreme Danger	>130°	Heatstroke or sunstroke imminent
III. Danger	105° – 130°	Sunstroke, heat cramps, or heat exhaustion likely. Heatstroke possible with prolonged exposure and physical activity.
II. Extreme Caution	90° – 105°	Sunstroke, heat cramps, and heat exhaustion possible with prolonged exposure and physical activity.
I. Caution	80° - 90°	Fatigue possible with prolonged exposure and physical activity.

Note: Degree of heat stress may vary with age, health, and body characteristics.

TEMPERATURE °F	Relative Humidity 10%	20%	30%	40%	50%	60%	70%	80%	90%
104	98	104	110	120	>130	>130	>130	>130	>130
102	97	101	108	117	125	>130	>130	>130	>130
100	95	99	105	110	120	>130	>130	>130	>130
98	93	97	101	106	110	125	>130	>130	>130
96	91	95	98	104	108	120	128	>130	>130
94	89	93	95	100	105	111	122	128	>130
92	87	90	92	96	100	106	115	122	128
90	85	88	90	92	96	100	106	114	122
88	82	86	87	89	93	95	100	106	115
86	80	84	85	87	90	92	96	100	109
84	78	81	83	85	86	89	91	95	99
82	77	79	80	81	84	86	89	91	95
80	75	77	78	79	81	83	85	86	89
78	72	75	77	78	79	80	81	83	85
76	70	72	75	76	77	77	77	78	79
74	68	70	73	74	75	75	75	76	77

- Workers should be monitored by establishing a routine to periodically check them for signs and symptoms of overexposure.