

Working in Hot Environments: *Health & Safety Guide*



CCOHS Canadian Centre for Occupational Health and Safety

Target Audience

The guide is intended to serve as a handy reference for health and safety committee members, health and safety representatives, employees, supervisors and managers.

For training sessions, the guide can serve as a practical handout for future reference.

Summary

Heat stress is the net heat load on the body from the combined effect of hot environmental conditions (air temperature, radiant heat, humidity and air movement), internal body heat due to physical activity, and clothing requirements. Workplaces and occupations associated with excessive heat exposure include: foundries, steel mills, bakeries, construction sites, kitchens, grounds maintenance, dishwashing and steaming.

Heat strain is the overall response of the body resulting from heat stress. It can cause a wide variety of health disorders. Heat stroke is the most serious health risk, which can be fatal if medical attention is not available promptly. People doing heavy physical work in hot and humid conditions are affected more than those doing light work.

Heat stress is largely preventable by engineering and administrative control methods. As a last resort or in extreme conditions, the use of personal protection is warranted. Engineering controls are designed to eliminate or minimize the level of heat exposure at the source of the hazard. Administrative controls reduce heat exposure at the worker. These measures include establishing procedures for acclimatization of new workers, training in safe work practices, reducing the duration of work in hot environments and providing plenty of drinking water. Workers and supervisors must receive adequate training and education to be able to recognize early symptoms of health disorders and seek timely medical help.

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3. Effect of Clothing

Clothing affects heat exchange between the body and the environment. Heavy clothing that fails to “breathe” does not allow the body to cool off by air circulation and sweat evaporation processes.



Cool Down by removing clothes

4. Other contributing factors

In addition to high temperature and humidity, the effect of heat stress on the body depends on several individual factors such as general health and lack of acclimatization. Certain medications such as antihistamines, cold remedies, diuretics, tranquilizers, etc. may cause heat intolerance by decreasing sweating or increasing urination. People taking such medications must consult their doctor about their ability to work in hot environments.

2. Environmental measures of heat exposure

Environmental measures are generally based on air temperature and relative humidity but do not take into account the effect of radiant heat and air movement in the workplace. Therefore, such measures cannot be used to determine occupational heat stress in the industry.

Two commonly used environmental measures are:

1. The Humidex; and,
2. The Heat Index.

The Humidex

Environment Canada's Weather Service uses the humidex as a measure of how hot people feel in outdoor environmental conditions. The humidex gives a combined effect of air temperature and relative humidity as a single number that is intended to reflect perceived heat (see Appendix B). Humidex levels can be obtained on the Environment Canada website:
http://www.weatheroffice.ec.gc.ca/canada_e.html.

Heat Index

The US National Weather Service has developed a Heat Index Chart to express perceived heat for different environmental conditions of temperature and humidity. A heat index chart is available from the National Weather Service (NWS), the US National Oceanic and Atmospheric Administration (NOAA).
Website:<http://www.srh.noaa.gov/lzk/images/hindex1.gif>.

Recommended Rest Break Schedules for Acclimatized Workers

Wet Bulb Globe Temperature (WBGT) Index

<i>Work Load</i>	<i>Work Rate</i>		
Continuous work	15 minutes rest per hour	30 minutes rest per hour	45 minutes rest per hour
Heavy up to 25.0°C	25.0°C to 26.0C	26.0°C to 28.0°C	28.0°C to 30.0°C
Moderate up to 27.0°C	27.0°C to 28.0C	28.0°C to 29.0°C	29.0°C to 31.0°C
Light up to 30.0°C	30.0°C to 30.6C	30.6°C to 31.4°C	31.4°C to 32.2°C

Sources: "<http://www.labour.gov.sk.ca/safety/thermal/hot/page%208%20.htm>" <http://www.labour.gov.sk.ca/safety/thermal/hot/page%208%20.htm>, and "http://www.worksafesask.ca/topics/specific_hazards/physical/heat.html" http://www.worksafesask.ca/topics/specific_hazards/physical/heat.html

Using fans to cool off

Fans don't cool the air — they just move air around. Fans keep you cool by increasing the rate of sweat evaporation. Following are some helpful tips for using fans.



USE your fan in or next to a window, box fans are the best.

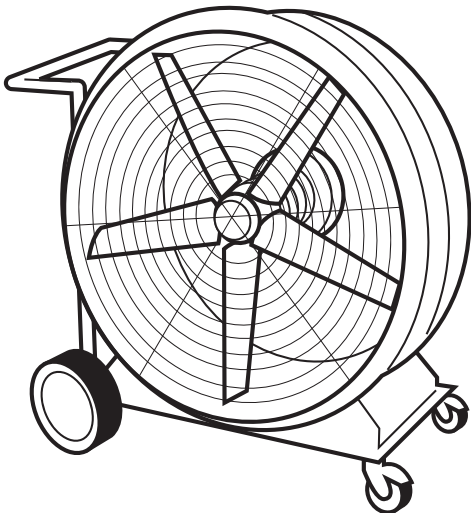
USE a fan to bring cool air in from outside.

USE your fan by plugging it directly into the wall outlet. If you need an extension cord, it should be CSA approved and should not present a trip hazard.



DO NOT use fans if the room is closed and filled with hot air. Blowing hot air on the body will increase the risk of adverse health effects.

DO NOT use a fan to blow extremely hot air on yourself. This can cause heat exhaustion to happen faster.



4. Sample safe work practices

The following are some examples of safe work practices for preventing heat stress.

(a) Working outdoors during prolonged heat spells

In the summer months, outdoor workers are simultaneously exposed to two main health hazards:

- i. Heat stress as air temperature and/or humidity increases; and,
- ii. UV rays from sunlight.

Preventing health effects of heat Stress



AVOID unnecessary or unusual stressful activity.

PERFORM stressful tasks during the cooler parts of the day (early morning or at night).

AVOID double shifts and overtime whenever possible. Employers must not permit double shift or overtime to workers in hot environments.

ADOPT a recommended work-rest regimen to recover from the heat stress.

DRINK plenty of water in frequent small portions. Employers are required to provide plenty of drinking water in hot workplaces.

AVOID alcohol consumption. The consumption of alcoholic drinks increases the risk of dehydration and other heat-related illnesses.

CONSULT your doctor about potential side effects if you are taking blood pressure control medication, diuretics or water pills.

TAKE sufficient sleep and good nutrition for maintaining a high level of heat tolerance.