

TECH SHEET

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Working in Hot Environments

Foundry workers, pastry bakers and agricultural workers are just a few of the workers who are exposed to hot or humid environments. While most workers prefer a climate-controlled environment, this is not possible in many locations. Although heat-related discomfort is a complaint of many workers, it is not the most serious problem associated with working in high temperature and humidity. Workers who are exposed to hot environments face additional hazards to their safety and health, such as heat stroke, heat exhaustion and fatigue. These hazards can be avoided by introducing engineering controls, implementing administrative controls and training workers about heat-related illness.

Health Problems Caused by Hot Environments

Heat Stroke is the most serious problem associated with working in hot environments. It occurs when the body's only effective means of removing excess heat is compromised and sweating becomes inadequate. When the body's temperature regulatory system fails, there is little warning for victims to realize they have reached a crisis stage.

According to the National Institute for Occupational Safety & Health (NIOSH), a heat stroke victim's skin is hot and usually dry, red or spotted. Body temperature is usually 105° F or higher, the victim is generally confused, delirious, and perhaps with convulsions or unconscious. Death can occur if the victim does not receive quick and appropriate treatment.

Any person with symptoms of heat stroke requires immediate hospitalization. The victim should be moved to a cool area, thoroughly soaked with cool water and vigorously fanned to increase cooling. Medical treatment should be directed toward continuing the cooling process and monitoring complications which often accompany heat stroke. Early recognition and treatment of heat stroke are the only means of preventing permanent brain damage or death.

Heat Exhaustion is caused by the loss of large amounts of fluid by sweating, sometimes with excessive loss of sodium. A worker suffering from heat exhaustion may exhibit some of the early symptoms of heat stroke, such as fatigue, nausea or headache.

In more serious cases, the victim may vomit or lose consciousness. The skin is clammy and moist, the complexion is pale or flushed and the body temperature is normal or only slightly elevated.

In most heat exhaustion cases, NIOSH recommends having the victim rest in a cool place and drink plenty of liquids. Victims with mild cases of heat exhaustion usually recover spontaneously with this treatment. Those with severe cases may require extended care for several days. Fortunately, there are no known long-term effects of heat exhaustion.

Heat Cramps are painful spasms of the muscles that occur among those who sweat profusely in heat and drink large quantities of water but do not adequately replace the body's electrolytes, particularly sodium. Drinking large quantities of water tends to dilute bodily fluids, while the body continues to lose sodium. The low sodium level in the muscles contributes to the onset of painful cramps. Cramps can occur in any muscle group, but are most likely to develop in the muscles used most extensively. Cramps can occur during or after work hours and may be relieved by consuming salted liquids.



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Preventing Heat-Related Illnesses

Many industries have attempted to reduce the hazards of heat stress by introducing engineering controls, implementing administrative controls and training workers to prevent heat stress. Engineering controls eliminate or reduce the hazard, while administrative controls and training only limit exposure to the hazard.

Engineering Controls—Many workplace improvements can be introduced to minimize exposure to heat. For example, improving insulation on a furnace wall can reduce its surface temperature and temperature of the area around it. In a laundry room, exhaust hoods installed over the sources releasing moisture into the room will lower the humidity in the work area. A simple and inexpensive method of reducing heat and humidity can be accomplished by using fans, opening windows in hot work areas and using other methods of creating airflow, such as exhaust ventilation or air blowers.

Administrative Controls—Workers should be permitted to distribute the workload evenly throughout the day and incorporate work-rest cycles wherever possible, to limit extended periods of exposure to heat during the course of the job. Postponing nonessential tasks to cooler periods of the day and providing additional workers in strenuous activities are also good ways to reduce the amount of time workers are exposed to the heat.

Providing cool rest areas for workers considerably reduces the stress of working in hot environments. Information from NIOSH suggests that rest areas cooled to 76° F are generally adequate and may even feel chilly to a hot, sweating worker. Individual work periods should not be lengthened in favor of longer rest periods. Instead, workers will obtain the greatest benefit from shorter, more frequent work-rest cycles.

A worker may lose two to three gallons of sweat during a workday in a hot environment. Since so many heat disorders involve excessive dehydration of the body, it is essential that water intake during the workday be about equal to the amount of sweat produced. NIOSH suggests drinking 5 to 7 ounces of water every 15 to 20 minutes. Drinking water should be cool, palatable and readily available to the worker. Individual drinking

cups should be provided—never use a common cup. Electrolyte replacement drinks, which are designed to replace the sodium lost during perspiration, can also be used in heat-stress situations.

Employee Training—The key to preventing excessive heat stress is educating the employer and workers on the hazards of working in the heat and the benefits of implementing proper controls and work practices. Employers should establish a program designed to acclimatize workers who must be exposed to hot environments and provide necessary work-rest cycles and water to minimize heat stress.

Employee training should occur each year—ideally, just before the start of the warm-weather season. An in-depth discussion should be held regarding symptoms, first aid and prevention of heat-related illnesses.

Prolonged Heat Spells

The number of heat-related illnesses usually increases during unusually hot weather conditions lasting longer than two days. This is due to progressive loss of body fluids, loss of appetite and buildup of heat in living and working areas. Therefore, it is particularly important during extended hot spells to adhere to the preventative techniques described above.

Double shifts and overtime should be avoided whenever possible during prolonged heat spells. Rest periods should be extended to alleviate the increase in the body heat load. The consumption of alcoholic beverages during these longer periods of heat can also cause additional dehydration and should be avoided.

For Additional Information

Centers for Disease Control and Prevention:

www.cdc.gov

- Emergency Preparedness and Response – Extreme Heat

National Institute for Occupational Safety and Health: www.cdc.gov/niosh

- Heat Stress

Occupational Safety & Health Administration:

www.osha.gov

- Quick Cards – Heat Stress