

Protecting Workers from Effects of Heat

During emergency response activities or recovery operations, workers may be required to work in hot environments, and sometimes for extended periods. When the body is unable to cool itself by sweating, several heat-induced illnesses can occur, and can result in death. The following information will help workers understand what heat stress is, how it may affect their health and safety, and how it can be prevented.

Factors Leading to Heat Stress

- High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; some medicines; inadequate tolerance for hot workplaces; and insufficient water intake can all lead to heat stress.

What kind of heat disorders and health effects are possible and how should they be treated?

- **Heat Stroke** is the most serious heat related disorder and occurs when the body's temperature regulation fails and body temperature rises to critical levels. It is a medical emergency that may result in death. The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature. If a worker shows signs of possible heat stroke, professional medical treatment should be obtained immediately. Until professional medical treatment is available, the worker should be placed in a shady, cool area and the outer clothing should be removed. Douse the worker with cool water and circulate air to improve evaporative cooling. Provide the worker fluids (preferably water) as soon as possible.
- **Heat Exhaustion** is only partly due to exhaustion; it is a result of the combination of excessive heat and dehydration. Signs and symptoms are headache, nausea, dizziness, weakness, thirst, and giddiness. Fainting or heat collapse is often associated with heat exhaustion. Workers suffering from heat exhaustion should be removed from the hot environment and given fluid replacement. They should also be encouraged to get adequate rest, and when possible, ice packs should be applied.
- **Heat Cramps** are usually caused by performing hard physical labor in a hot environment. Heat cramps have been attributed to an electrolyte imbalance caused by sweating and are normally caused by the lack of water replenishment. It is imperative that workers in hot environments drink water every 15 to 20 minutes and also drink carbohydrate-electrolyte replacement liquids (e.g., sports drinks) to help minimize physiological disturbances during recovery.
- **Heat Rashes** are the most common problem in hot work environments where the skin is persistently wetted by unevaporated sweat. Heat rash looks like a red cluster of pimples or small blisters. It is more likely to occur on the neck and 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 environment. Keep the affected area dry. Dusting powder may be used to increase comfort, but avoid using ointments or creams—they keep the skin warm and moist and may make the condition worse.

Administrative or work practice controls to offset heat effects

- **Acclimatize workers** by exposing them to work in a hot environment for progressively longer periods.
- **Replace fluids** by providing cool water or any cool liquid (except alcoholic and caffeinated beverages) to workers and encourage them to

drink small amounts frequently, e.g., one cup every 20 minutes. Ample supplies of liquids should be placed close to the work area.

- **Reduce the physical demands** by reducing physical exertion such as excessive lifting, climbing, or digging with heavy objects. Use relief workers or assign extra workers, and minimize overexertion.
- **Provide recovery areas** such as air-conditioned enclosures and rooms and provide intermittent rest periods with water breaks.
- **Reschedule hot jobs** for the cooler part of the day, and routine maintenance and repair work in hot areas should be scheduled for the cooler seasons of the year.
- **Monitor workers** who are at risk of heat stress, such as those wearing semi-permeable or impermeable clothing when the temperature exceeds 70°F, while working at high energy levels. Personal monitoring can be done by checking the heart rate, recovery heart rate, and oral temperature.

What Personal Protective Equipment is effective in minimizing heat stress?

- **Reflective clothing**, worn as loosely as possible, can minimize heat stress hazards.
- **Wetted clothing**, such as terry cloth coveralls or two-piece, whole-body cotton suits are another simple and inexpensive personal cooling technique. It is effective when reflective or other impermeable protective clothing is worn.
- **Water-cooled garments** range from a hood, which cools only the head, to vests and "long johns," which offer partial or complete body cooling. Use of this equipment requires a battery-driven circulating pump, liquid-ice coolant, and a container.

Additional Information

- For more information on this, and other health-related issues affecting workers, visit OSHA's Web site at www.osha.gov.

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For more complete information:



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