

## **10.0 Heat Stress**

**10.1** Prolonged exposure to heat can result in health effects ranging from transient heat fatigue to serious illness or death. Heat stress is caused by number of interaction factors, including environmental conditions, clothing, workload, and the individual characteristics of the worker. Because heat stress is probably one of the most common (and potentially serious) illnesses, regular monitoring and other preventative precautions are vital to ensure employee safety and health.

**10.1.1** Individuals vary in their susceptibility to heat stress. Factors that may predispose someone to heat stress include:

- x Lack of physical fitness
- x Lack of acclimatization
- x Age
- x Dehydration
- x Obesity
- x Alcohol and drug use
- x Infection
- x Sunburn
- x Diarrhea
- x Chronic disease

**10.1.2** Reduced work tolerance and the increased risk of excessive heat are directly influenced by the amount and type of PPE worn. PPE adds weight and bulk, severely reduces the body's access to normal heat exchange mechanisms (evaporation, convection, and radiation), and increases energy expenditure. Therefore, when selecting PPE, each item's benefit should be carefully evaluated in relation to its potential for increasing the risk of heat stress; Once PPE is selected, the safe duration of work/rest periods should be determined based on the (1) anticipated work rate, (2) ambient temperature and other environmental factors, (3) type of protective ensemble, (4) individual worker characteristics and fitness.

### **10.3** Prevention

**10.3.1** Proper training and prevention measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat injuries. To avoid heat stress, management should take the following steps:

#### **10.3.1.1** Adjust work schedules.

x Modify work/rest schedules according to monitoring requirements.

x Mandate work slowdowns as needed

x Rotate personnel, alternate job functions to minimize overstress

or overexertion at one task.

x Add additional personnel to work teams.

x Work during cooler hours of the day if possible or at night if adequate lighting can be provided.

**10.3.1.2** Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.

**10.3.1.3** Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluids intake must approximately equal the amount of water lost in sweat, i.e. 8 fluid ounces (0.23 liters) of water be ingested for approximately every 8 ounces (0.23 kg) of weight lost. The normal thirst mechanism is not sensitive to ensure that enough water will be drunk to replace lose sweat. When heavy sweating occurs, encourage the worker to drink more. Employees should always have access to an adequate amount of potable drinking water for the entire shift or duration of the assigned task. The following strategies may be useful:

**10.3.1.3.1** Maintain water temperature at 50 to 60 F (10 to 15.6 C).

**10.3.1.3.2** Provide small disposable cups that hold about 4 ounces (0.1 liter).

**10.3.1.3.3** Have workers drink 16 ounces (0.5 liters) of fluid (preferably water or dilute drinks) before beginning work.

**10.3.1.3.4** Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day is recommended, but more may be necessary to maintain body weight.

**10.3.1.3.5** Encourage workers to maintain an optimal level of physical fitness.

Encourage workers to maintain normal weight levels.

**10.3.1.3.6** Supervisors shall be trained annually in the prevention and detection of heat stress related illnesses and assure that Amsys Energy LLC Heat stress program is being followed by employees. Supervisors shall be trained in heat stress illnesses and be thoroughly familiar with Amsys Energy LLC Emergency respond procedures prior to supervising any employees. Amsys Energy LLC shall also train workers to recognize and treat heat stress. As part of training, identify the signs and symptoms of heat stress.

#### **10.4** Signs and Symptoms of Heat Stress

**10.4.1** Heat Rash may result from continuous exposure to heat or humid air.

**10.4.2** Heat Cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include muscle spasms and pain in the hands, feet, and abdomen. Treat heat cramps by removing the worker from the hot environment, loosening any tight clothing, and giving him/her water.

**10.4.3** Heat Exhaustion causes increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include:

x Pale, cool, moist skin

x Heavy Sweating

x Dizziness

x Nausea

x Fainting

**10.4.3.1** Treat cases of heat exhaustion the same as you would cases of

heat cramps. If symptoms do not clear, consciousness decreases, or temperature remain elevated, take the patient to a physician.

**10.4.4** Heat Stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels, immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained.

Signs and symptoms include:

- x Red, hot, usually dry skin
- x Lack of or reduced perspiration
- x Nausea
- x Dizziness and confusion
- x Strong, rapid pulse
- x Coma

**10.4.4.1** Proper initial treatment of individuals experiencing heat stroke is critical. Remove the person from the hot environment, attempt to cool the body with wet towels and cool dry air, and get emergency assistance immediately