Heat Stress Safety Program

Purpose

This program outlines how to assess the level of heat stress an individual may experience when working outdoors and provides recommendations on types of controls that can be used to minimize the impact.

Scope

This program impacts all employees, students, volunteers and contractors (working under A-State supervision), who work in hot environments.

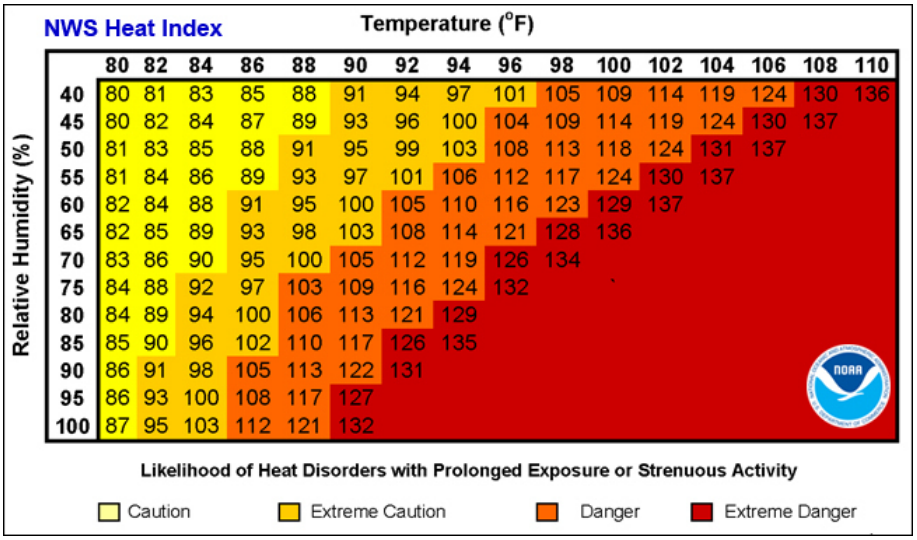
Definitions

Acclimatization - The process or result of becoming accustomed to a new climate or to new conditions.

Heat Cramps - Caused by the body's depleted salt and water levels from excessive sweating resulting in muscle cramps or spasms. They usually occur in the muscles used during work. The symptoms include spastic contractions and pain in voluntary muscles mainly in the arms, legs, or torso.[1]

Heat Exhaustion - Often a precursor to heat stroke. It is often accompanied by elevated core body temperatures around 38°C–39°C (100.4°F–102.2°F). Symptoms may include headache, nausea, dizziness, fatigue, weakness, thirst, heavy sweating, irritability, and a decreased urine output.[1]

Heat Index - The heat index, also known as the apparent temperature, is what the temperature feels like to the human body when relative humidity is combined with the air temperature. This has important considerations for the human body's comfort. When the body gets too hot, it begins to perspire or sweat to cool itself off. If the perspiration is not able to evaporate, the body cannot regulate its temperature. Evaporation is a cooling process. When perspiration is evaporated off the body, it effectively reduces the body's temperature. When the atmospheric moisture content (i.e. relative humidity) is high, the rate of evaporation from the body decreases. In other words, the human body feels warmer in humid conditions.[2]



Heat Strain - The body's physiological response to heat stress (e.g., sweating).[1]

Heat Stress – The net heat load to which a worker is exposed. Physical exertion, environmental factors, and clothing worn all contribute to heat stress.[1]

Heat Stroke - The most serious heat-related illness and should be treated as a medical emergency. Heat stroke occurs when the body becomes unable to adequately dissipate heat, losing the ability to regulate core body temperature. The core body temperature rises rapidly, the sweating mechanism may fail, and the body is unable to cool down. When heat stroke occurs, the body temperature can rise to 41oC (106°F) or higher within 10 to 15 minutes. Thinking clearly, perception, planning, and other mental processes become impaired, and the worker may be unable to recognize dangerous situations. Heat stroke can cause death or permanent disability if emergency medical treatment is not given. Symptoms include confusion, clumsiness, slurred speech, fainting/unconsciousness, hot dry skin, profuse sweating, seizures, and high body temperature.[1]

Heat Syncope - Usually occurs after prolonged standing or sudden rising from a sitting or supine position. Heat syncope symptoms include light-headedness, dizziness, and fainting. Dehydration and inadequate acclimatization often contribute to heat syncope.[1]

Relative Humidity - The amount of water vapor present in air expressed as a percentage of the amount needed for saturation at the same temperature.

Temperature - the degree or intensity of heat present in a substance or object, especially as expressed according to a comparative scale and shown by a thermometer or perceived by touch.

Responsibilities

Environmental, Health and Safety

- Assist departments in implementation of this program.

Department/Supervisor/Principal Investigator

- Identify conditions in which heat stress may be a concern.
- Implement controls to reduce risk when heat stress is a concern.
- Train workers on what controls will be implemented and how to implement them.
- Provide guidance on the use of any PPE that is required.
- Schedule more physically demanding tasks during cooler times of the day.

Employees

- Be familiar with this program and the procedures associated with it.
- Report any hazards, incidents or injuries to their direct supervisor and EH&S.
- Follow all procedures as written or required for the work they are performing.
- Attend any training sessions deemed necessary to complete their work in a competent manner.
- Understand the signs and symptoms of heat related illnesses and watch for these symptoms in co-workers.

Heat Stress Prevention

Heat stress can be induced by high temperatures, increased relative humidity, decreased air movement or lack of shading from direct heat heavy workloads, the type of clothing being worn, etc. The goal of a heat stress program is to keep the body temperature below 104° F. Consider the following control examples that may reduce heat stress:

- Use air conditioning
- Increase ventilation
- Provide cooling fans
- Provide shade for outdoor work sites
- Acclimatize workers starting the first day of work in the heat.
- Re-acclimatize workers after extended absences
- Use work/rest schedules
- Limit strenuous work
- Train supervisors on heat stress prevention and how to identify symptoms
- Wear sun hats
- Light colored clothing

Some employees are more likely to have heat disorders than others. Younger employees and those more physically fit are often less likely to have problems. Employees with heart, lung or kidney disease, diabetes and those on medications are more likely to experience heat stress problems. Diet pills, sedatives, tranquilizers, caffeinated drinks and excessive alcohol consumption can all exacerbate heat stress effects.

Acclimatization is meant to reduce the impact of heat stress on the body. Employers should use a structured program to help workers adapt to working in the heat. This means gradually introducing normal work activities over the span of 7 to 14 days.

Heat Stress Treatment

Heat stress includes a series of conditions where the body is under stress from overheating. Supervisors should be familiar with the signs and symptoms of these conditions which are provided below. They should also be prepared to implement the first aid measures identified in the table to treat employees.

Condition	Signs/Symptoms	First Aid
Heat Strain	Painful muscle spasms Pain usually in abdomen, arms or legs	**Rest in shady, cool area** **Increase water intake** **Wait a few hours to resume work**

Heat Syncope	Brief fainting Light Headed, dizziness Headache Nausea, vomiting Increased pulse	**Rest in shady, cool area** **Increase water intake** **Refrain from vigorous activity**
Dehydration	Fatigue Reduce movement	**Rest in shady, cool area** **Increase water intake**
Heat Exhaustion	Cool, moist skin Heavy Sweating Headache Nausea, vomiting Light headed, dizziness Weakness, fatigue Thirst Irritability Fast heartbeat	**Rest in shady, cool area** **Increase water intake** **Loosen clothing** **Cool with cold compresses/ ice packs** **Take to Clinic or Emergency Room if symptoms worsen or do not improve within 60 minute**
Heat Stroke	Confusion or erratic behavior Fatigue Seizures Excessive sweating or red, hot dry skin Very high body temperature	**Medical Emergency!** **Call 911 to summon ambulance** **Move to shady, cool area** **Loosen clothing** **Fan air on, cold pack armpits** **Wet with cool water** **Provide fluids, preferably water** **Stay with victim until help arrives**

Resources

[1] OSHA Technical Manual, Section III: Chapter 4 Heat Stress. OSHA Technical Manual (OTM) - Section III: Chapter 4 | Occupational Safety and Health Administration

[2]National Weather Service, National Oceanic and Atmospheric Administration. What is the heat index? What is the heat index? (weather.gov)