

## OCCUPATIONAL HEALTH & SAFETY ISSUES

---

### HEAT STRESS

#### What is Heat Stress?

Many Unifor members spend some part of their working lives or days in a hot environment. Workers in Unifor workplaces such as foundries, casting, steel mills, assembly, components, laundries, kitchen and construction projects and bakeries - just to name a few industries - often face hot conditions. Especially in the summer months, these conditions pose special hazards to their safety and health.

Working where it is hot puts stress on our body's cooling system. High temperatures and humidity stress the body's ability to cool itself and heat illness becomes a special concern during hot weather. There are three major forms of heat illness: heat cramps, heat exhaustion and heat stroke, with heat stroke being a life threatening condition.

There are four environmental factors that affect the amount of stress a worker faces in a hot work environment: temperature, humidity, radiant heat (such as from the sun or a furnace) and air velocity. Important to the level of stress the individual faces are personal characteristics such as age, weight, fitness, medical condition and acclimatization to the heat.

#### How our bodies cope with heat

The body reacts to high external temperatures by circulating blood to the skin which increases skin temperature and allows the body to give off its excess heat through the skin. However, if the muscles are being used for physical labour, less blood is available to flow to the skin and release the heat.

Sweating is another means the body uses to maintain a stable internal body temperature in the face of heat. However, sweating is effective only if the humidity level is low enough to permit evaporation and if the fluids and salt lost are adequately replaced. Workers over 40 should be more careful because of a reduced ability to sweat. But if the body cannot dispose of excess heat, it will store it. When this happens, the body's core temperature rises and the heart rate increases. As the body continues to store heat, the individual begins to lose concentration and has difficulty focussing on a task, may become irritable or sick and often loses the desire to drink. The next stage is often fainting and ultimately death is possible if the person is not removed from the source of heat stress.

#### Heat Stress hazards and their signs and symptoms

**Heat Rash**, also known as prickly heat, may occur in a hot and humid environment when sweat is not easily removed from the surface of the skin by evaporation. When extensive or complicated by infection, heat rash can be so uncomfortable that it inhibits sleep and impedes a worker's performance or even results in temporary or total disability. It can be prevented by resting in a cool place and allowing skin to dry.

**Heat Cramps** are painful spasms of the muscles, are caused when a worker drinks large quantities of water but fail to replace their body's salt loss. Tired muscles - those used for performing the work - are usually the

ones susceptible to cramps. Cramps may occur during or after working hours and may be relieved by taking liquids by mouth or saline solutions intravenously for quicker relief, if medically determined to be required.

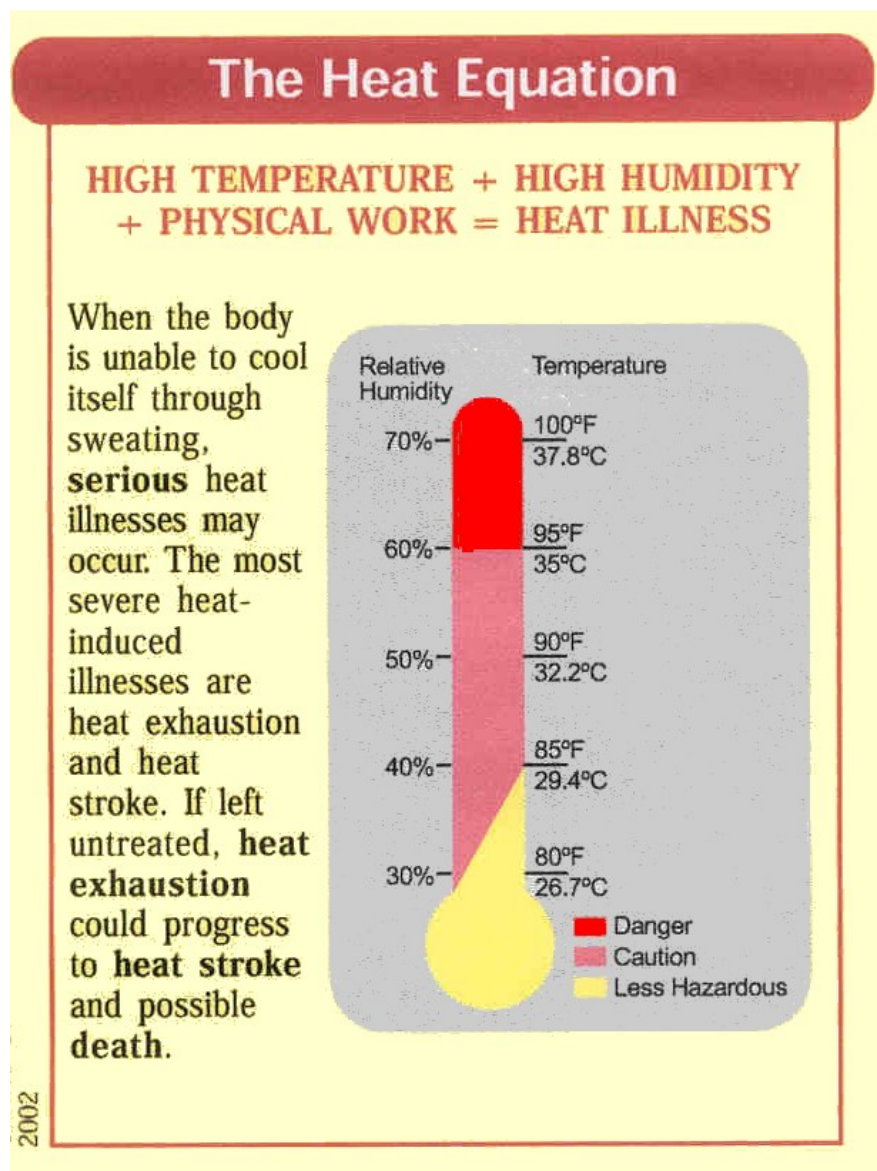
**Heat Exhaustion** results from the loss of fluid through sweating when a worker has not replaced enough fluids by drinking or taken in enough salt or both. The worker with heat exhaustion still sweats but experiences extreme weakness, fatigue, giddiness, nausea or headache. The skin is clammy and moist, the complexion may be pale or flushed and the body temperature is normal or slightly higher. Treatment is usually simple. The victim should rest in a cool place and drink an electrolyte solution (a beverage used by athletes to quickly restore potassium, calcium and magnesium salts). Severe cases involving victims who vomit or lose consciousness may require longer treatment under medical supervision.

**Heat Fatigue** resulting from prolonged heat exposure, causes a decline in coordination, alertness, and performance. With so much blood going to the periphery of the body, less is available for muscles. Strength drops and fatigue kicks in sooner than otherwise. Accidents are more likely to happen. For example, accident rates for heavy machine operators double when they work in hot environments.

**Fainting** or heat syncope may be a problem for the worker unacclimatized to a hot environment by standing still in heat. Victims usually recover quickly after a brief period of lying down. Moving around, rather than standing still, will usually reduce the possibility of fainting.

**Heat Stroke**, the most serious health problem for workers in hot environment, is caused by the failure of the body's internal mechanism to regulate its core temperature. Sweating stops and the body can no longer rid itself of excess heat. Signs and symptoms include:

- mental confusion, delirium, loss of consciousness, convulsions or coma.
- a body temperature of 41 degrees Celsius (106° F) or higher.
- hot dry skin which may be red, mottled or bluish. **Victims of heat stroke will die unless treated promptly.** While awaiting for medical help, the victim must be removed to a cool area and his or her clothing soaked with cool water. He or she should be fanned vigorously to increase cooling. Prompt first aid can prevent permanent injury to the brain and other vital organs.



## Susceptibility to other toxins

Heat stress can aggravate the effect of other toxins. Dehydration and loss of minerals through sweat decreases the body's ability to detoxify chemicals. Because the circulatory system is under strain other hazards increase. Carbon monoxide, which reduces oxygen supply to the tissues, is of particular concern. Because of this, standards for other substances should be adjusted downward for the workers in hot environment.

## Inspection of the workplace

An inspection of the workplace can help determine in advance if heat is likely to be a hazard. The union and the Joint Health and Safety Committee should recommend employers reduce heat stress in the following ways:

### Engineering Controls

- Control the heat at the source through the use of insulating and reflective barriers (insulate furnace walls).
- Exhaust hot air and steam produced by specific operations.
- Reduce the temperature and humidity through air cooling
- Provide air-conditioned rest areas.
- Increase air movement if temperatures is less than 35° C (fans).
- Reduce physical demands of work task through mechanical assistance (hoists, lift-tables, etc.).

### Administrative Controls

- Assess the demands of all jobs and ensure monitoring and control strategies are in place for hot days.
- Increase the frequency and length of rest breaks.
- Use the ACGIH TLVs for work-rest regimes, classifying all jobs as "heavy".
- Schedule hot jobs to cooler times of the day.
- Provide cool drinking water near workers and remind them to drink a cup every 20 minutes or so.
- Assign additional workers or slow down work pace.
- Train workers to recognize the signs and symptoms of heat stress and start a "Buddy System" since people are not likely to notice their own symptoms.
- Pregnant workers and workers with a medical condition should discuss working in the heat with their doctor.

### Personal Protective Equipment

- Light summer clothing should be worn to allow free air movement and sweat evaporation.
- In a high radiant heat situation reflective clothing may help.
- For very hot environments, air, water or ice-cooled insulated clothing should be considered.
- Vapour barrier clothing, such as acid suits, greatly increases the amount of heat stress on the body, and extra caution is necessary.

## Union strategies for beating the heat

- More work slowdowns, walkouts, and similar job actions occur over heat problems than any other workplace hazard. Many of these are effective in producing workplace change.
- As a union we should collectively negotiate more permanent solutions to heat stress. Unifor Locals should negotiate the ACGIH (American Conference of Government Industrial Hygienists) schedule on heat stress and ensure that all work be classified as “HEAVY”.
- We need revised work schedules during heat waves. Increasing breaks and reducing exposure should be the number one administrative control of heat hazards. Heavier work can be done during cooler times. Overtime should be reduced during heat waves and people should work at a slower work pace during hot weather.
- Cool down periods should be implemented in addition to workplace breaks.
- Ensure that all workers know that they have the right to refuse work which is likely to endanger them. If it is too hot to work safely, don’t work.
- “Cool Jackets” should be made available to those workers, at the expense of the employer, where engineering controls are not practicable (e.g. foundry, casting, smelting etc.).
- Cool rest areas are needed near the work area for breaks.
- Isolation or insulation of hot equipment is needed as is shielding between workers and heat sources.
- Cool drinking water should be supplied near the work area, up to 2 gallons per worker per day. Some workplaces offer popsicles as refreshment. While popsicles are refreshing and help to boost morale, they do almost nothing to replenish the water that the body has lost.

Heat stress level	Practical example of [Temperature ; Relative Humidity]	Exposure duration	Milk loss under heat stress [kg/h ; kg/cow/day]
Stress Threshold THI [68-71]	[22°C (72°F) ; 50%]	4 hrs/day	[-0.283kg/h ; -1.1kg/cow/day]
Mild-Moderate Stress THI [72-79]	[25°C (77°F) ; 50%]	9 hrs/day	[-0.303kg/h ; -2.7kg/cow/day]
Moderate-Severe Stress THI [80-89]	[30°C (86°F) ; 75%]	12 hrs/day	[-0.322kg/h ; -3.9kg/cow/day]
Severe Stress THI [90-99]	[34°C (93°F) ; 85%]		Not measured