

Thermal (Heat) Stress

This task may only be performed by trained and authorized personnel

Hazards Present:	Risks associated with the hazards:	Personal Protective Equipment (PPE) or Devices Required: <small>(CSA or ANSI Standards required as per regional legislation)</small>	Additional Training Requirements:
<ul style="list-style-type: none"> • Extreme temperature / weather 	<ul style="list-style-type: none"> • Heat exhaustion • Heat stroke • Heat Stress • Dehydration • Death 	<ul style="list-style-type: none"> • Head Protection • Protective Clothing • Multiple layers of dry clothing 	<ul style="list-style-type: none"> • First Aid • Heat Emergency Awareness Training

NOTE: Workers must be trained in a way that demonstrates they are competent. JUST READING a SWP is NOT training. Workers must demonstrate they can safely perform task and trainer/supervisor must follow up regularly to ensure workers are performing task in a safe manner. Document each occurrence in the employee's training record.

NOTE: All procedures obtained from mySafetyAssistant™, operator manuals or other samples must have the consultation of workers and be thoroughly reviewed to ensure they are accurate for your workplace and your jobs!

 DANGER: Failure to follow this Safe Work Practice may result in **SERIOUS INJURY or **DEATH**.**

HOT ENVIRONMENTS AND THE HUMAN BODY

The human body functions best within a narrow internal temperature range of 36 to 38 degrees Celsius. Below this range, the body's temperature control center in the brain goes to work, directing more blood to vital internal organs and causing shivering to help keep the body warm. In hot environments, more blood is directed toward the skin surface and perspiration increases to help cool the body. When heat loss or gain becomes more than the body can balance, internal systems will begin to fail and shut down, leading to illness and possibly death.

Dehydration is a common concern when working in a hot environment. It is caused by failure to replace the salt and water lost through perspiration. Although perspiring helps the body cool, it is necessary to replace lost fluid and salt.

Factors other than the environment and workload can influence the body's ability to acclimatize and cope with heat. To avoid heat related illness, such factors should be taken into consideration when assigning worker tasks and deciding on control measures

HEAT-RELATED ILLNESSES SYMPTOMS, PREVENTION AND TREATMENT

Heat illness is PROGRESSIVE. It is important to recognize the signs and symptoms BEFORE Heat Stroke occurs.

SIGNS & SYMPTOMS	CAUSES	PREVENTION	TREATMENT
HEAT FATIGUE Irritability, tiredness, loss of skill for fine or precision work. Lower ability to concentrate. No change in body temperature.	Lack of acclimatization. Other emotional or psychological stresses. Discomfort in heat.	Proper acclimatization. Rest breaks.	None necessary unless other heat illness present. Removal may be necessary if acclimatization ineffective.
HEAT RASH Prickling sensation during heat exposure. Itchy, tiny red spots on skin covered by clothing. A result of plugged sweat glands.	Skin continuously wet from sweat. Humid heat.	Shower to keep skin clean. Apply powder and mild drying lotions (e.g. calamine).	Keep skin dry. Rest in cool place. May take several days to subside.
HEAT SYNCOPE Giddiness and fainting while standing in hot environment.	Pooling of blood in legs causing drop in blood pressure. Lack of acclimatization. Loss of body fluid from sweating.	Moving from time to time. Proper acclimatization. Drink extra fluids.	Rest in cool area. Recovery usually fast. May need to see physician.
HEAT CRAMPS Sharp pains in muscles of arms, legs or abdominal muscles. May occur during or after work.	Heavy sweating causing loss of salt. Drinking large amounts of water without salt replacement.	Add salt to foods. Drink fluids naturally containing salt (e.g. fruit and vegetable juices).	Move to cool place. Give salted fluids. If severe, may need to see physician.
HEAT EXHAUSTION Headache, nausea, dizziness, weakness, intense thirst. Skin moist and clammy. Rapid, weak pulse.	Loss of water and salt from heavy sweating. Lowered volume of circulating blood. Lack of acclimatization. Sustained exertion in high temperatures.	Drink cool fluids often. Take extra salt in food. Drink fruit juices. Proper acclimatization.	Rest lying down in cool area. Replace body fluids and salt. If vomiting, refer to physician.
HEAT STROKE OR HEAT HYPER-PYREXIA Nausea, headache, dizziness. Hot dry skin (moist in hyperpyrexia). Body temperature 40 c or over. Rapid strong pulse. Convulsions, coma may occur.	Failure of central control of sweating. Prolonged work in hot environment. Unfit, unacclimatized workers. High humidity. Pre-existing medical conditions, use of medications, high alcohol intake.	Medical assessment prior to hot work. Acclimatization. Monitoring of workers during periods of work in heat. Work-rest regimes. Adequate fluid/salt replacement.	Immediate medical attention! Immediate first aid-remove clothing, spray with cool water, fanning, cool wet sheets.

PREVENTION AND CONTROL MEASURES

The risk of heat-related illnesses can be reduced by preventive and control measures, including:

- engineering controls to provide a cooler workplace
- administrative controls to reduce exposure and recognize symptoms heat-related illness
- personal protective equipment, when necessary, to further limit exposure

Engineering Controls

Engineering controls are the most effective means of reducing occupational heat exposure, including:

- shielding the radiant heat at the source through insulation and reflective barriers
- exhausting heat and water-vapour (steam) to the outside
- reducing temperature and humidity through ventilation or air-conditioning
- providing cooled observation booths or air-conditioned rest areas
- increasing general air movement if temperature is less than skin temperature (approximately 36 degrees C)
- reducing air movement if air temperature is greater than skin temperature
- use of cooling fans and air-conditioning units
- reducing physical exertion by changing processes or using machines designed to assist

Administrative Controls

Administrative controls like these are the easiest to put in place, for or by the worker:

- apply a work schedule to allow for heat acclimatization
- increase frequency and length of rest breaks
- use a buddy system whenever working in extreme weather conditions
- schedule hot jobs during cooler times of day
- provide cool drinking water near the work location and encourage workers to drink even if not feeling thirsty
- slow down work pace or assign additional workers to decrease workload
- allow for self-limitation of exposures and encourage co-workers to observe signs and symptoms of heat stress in each other
- provide information signs and posters at worksite if possible
- provide workers with accurate written and verbal instructions, frequent training programs and other information on heat stress and recognizing a heat emergency
- consider requiring that, as a condition of hiring, prospective employees provide medical evidence that they are not susceptible to systemic heat related illness

Personal Protective Equipment

Where engineering or administrative controls are not feasible or practical, occasional use of personal protective equipment may be necessary, including:

- monitor yourself and co-workers for signs and symptoms of heat illness.
- dress in layers so that clothing can be removed as the temperature rises.
- take rest breaks in shade and drink plenty of water prior to exposure.
- wear insulated or cooled clothing for short-term exposure such as maintenance jobs
- wear light colored clothing that allows free movement of airflow
- wear heat reflective clothing near heat sources such as a hot furnace
- wear light-filtering eye protection
- use sunscreen and sun block when working outdoors
- wear a hat and light clothing to protect skin when working in the sun
- wear additional suitable PPE as required by the job

Additional Prevention Tips:

1. Drink plenty of fluids throughout the workday. Water or sport drinks are best. Avoid caffeinated beverages such as coffee, energy drinks or cola.
2. Work in the shade if possible and away from other heat sources.
3. If possible rotate hot work duties with co-workers. Under extreme conditions, work must be stopped.

If you or a co-worker are experiencing symptoms of heat illness:

1. Move worker to a cool, shaded area.
2. Loosen or remove heavy clothing.
3. Provide drinking water, soak clothing with cool water.

Call 911 if you think someone is experiencing heat stroke and be prepared to perform CPR.

HUMIDEX- TABLE 1		
HUMIDEX 1	ACTION RECOMMENDED	HUMIDEX 2
30 -37	WARN FOR SYMPTOMS AND EXTRA WATER	36 - 42
38 - 39	WORK WITH 15 MINUTES/HOUR RELIEF	43 - 44
40 - 41	WORK WITH 30 MINUTES/HOUR RELIEF	45 - 46
42 - 44	WORK WITH 45MINUTES/HOUR RELIEF	47 – 49
45+	HAZARDOUS TO CONTINUE PHYSICAL ACTIVITY	50+

Humidex 1 or Humidex 2

- There are two humidex guidelines to determine the appropriate actions required:

Humidex 1 - refers to unacclimatized workers doing moderate work, and ranges indicate the need for general heat stress controls.

Humidex 2 - refers to acclimatized workers doing moderate work, and ranges indicate the need for specific controls.

Humidex 1 general controls - include providing annual heat stress training, encouraging adequate fluid replacement, permitting self-limitation of exposure, encouraging employees to watch for symptoms in co-workers, and adjusting expectations for workers coming back to work after an absence.

Humidex 2 specific controls - include (in addition to general controls) engineering controls to reduce physical job demands, shielding of radiant heat, increased air movement, reduction of heat and moisture emissions at the source, adjusting exposure times to allow sufficient recovery, and personal body-cooling equipment.

Source: Occupational Health and Safety Council of Ontario (OHSCO)

NOTICE: Report all hazardous situations to your supervisor without delay! If you or you witness anyone else demonstrate signs and symptoms of heat stroke, notify your supervisor and seek medical attention immediately. Heat stroke is a life threatening emergency.

Guidance Documents / Standards / Applicable Legislation / Other	This Safe Work Practice will be reviewed any time the task, equipment, or materials change and at a minimum every three years.
<p>Guidance Documents:</p> <ul style="list-style-type: none"> Guideline for Thermal Stress <p>MB Workplace Safety & Health Regulation, MR 217/2006:</p> <ul style="list-style-type: none"> Part 2.1 Eliminating or Control of Risks Part 4.12-4.13 Thermal Conditions Part 5 First Aid Part 6 Personal Protective Equipment 	<p>Completed / Approved by: _____</p> <p>Date Completed: _____</p> <p>Reviewed / Revised by: _____</p> <p>Date Reviewed: _____</p> <p><i>Disclaimer: Any references to legislation such as the Manitoba Workplace Safety and Health Act or Regulation or Standards, Codes of Procedures or Guidelines are for convenience sake only. The original text must be consulted for all intents and purposes of applying and interpreting the law.</i></p>

This Safe Work Practice has had the consultation of the following workers:

Name	Signature	Position	Date