

IEC Heat Stress Guideline	Document Author: Vince Gagner	IEC-777-OCCHYGIENE
Effective Date: December 1, 2021	Revision # 3	Origin Date: July 30, 2013

Purpose: The IEC Occupational Hygiene Subcommittee, IEC 777 Committee, and IEC Board of Directors recommend that the following heat stress guidelines be considered when performing assessments and establishing controls for heat stress at the member worksites of the Bluewater Association for Safety, Environment and Sustainability (BASES).


HEAT STRESS

What is heat stress? Heat stress refers to a group of physical conditions that can happen from overexposure to, or overexertion in, excess environmental temperatures. These physical conditions, which can affect the body's ability to cool itself, can range from minor disorders to severe disorders, each with their own set of causes, symptoms and treatment, as outlined below.

	Causes	Symptoms	Treatment
Heat Rash	Humid environment; plugged sweat glands.	Red bumpy rash with severe itching.	<ul style="list-style-type: none"> • Change into clean dry clothes often • Rinse skin with cool water • If possible, avoid hot environments
Heat Cramps	Heavy sweating from strenuous physical activity drains the body of fluid and salt, which cannot be replaced just by drinking water. Heat cramps occur from the salt imbalance.	Painful cramps in the most worked muscles, like the arms, legs, or stomach, which can occur suddenly or later at home.	<ul style="list-style-type: none"> • Move to a cool area • Loosen clothing, and gently massage affected muscles • Drink cool salted water or commercial electrolyte replacement beverage • Seek medical aid if necessary
Heat Exhaustion	Fluid loss and inadequate salt and water intake causes the body's cooling system to start to break down.	Heavy sweating; cool moist skin; body temperature over 38°C; weak pulse; nausea and vomiting; very thirsty; panting or breathing rapidly.	<ul style="list-style-type: none"> • SEEK MEDICAL AID (condition can lead to heat stroke) • Move to a cool shaded area • Loosen / remove excess clothing • Drink cool water • Fan and spray with cool water
Heat Stroke	When the body has used up all its water and salt reserves, it will stop sweating. This can cause the body temperature to rise. Heat stroke may develop suddenly or may follow from heat exhaustion.	Body temperature over 41°C plus any one of the following: weak, confused or acting strangely; hot, dry, red skin; fast pulse; headache or dizziness. Possible fainting or convulsions in late stages.	<ul style="list-style-type: none"> • CALL AMBULANCE (condition can lead to death) • Remove excess clothing • Fan and spray with cool water • Offer sips of cool water if person is conscious

This table is adapted from the Ministry of Labour's Health and Safety Guideline for Heat Stress

In Ontario, heat stress is usually of greatest concern at the beginning of the summer season when people haven't yet adjusted to the heat. Anyone can suffer from heat stress. When higher temperatures and humidity are combined with other stresses, such as performing heavy physical work, wearing certain types of protective clothing and/or equipment, taking certain medications or having pre-existing medical conditions, it can lead to heat related illnesses.



The body will get used to working in a hot environment gradually over time. This process of the body becoming more efficient at cooling itself down is known as **"acclimatization"**

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According to the WSIB's "By the Numbers Report", from 2016-2017 there were 82 approved lost-time claims related to hot/cold temperature extremes.

Duties of Employers

Employers have a duty under clause 25(2)(h) of the *Occupational Health and Safety Act* to take every precaution reasonable in the circumstances for the protection of a worker. This includes developing policies and procedures to protect workers in environments that are hot because of hot processes and/or weather.

Design your workplace to reduce heat stress

- Use machines (for example, hoists and lift-tables) to reduce the physical demands of work
- Control the heat at its source by using insulating and reflective barriers (for example, insulate furnace walls)
- Exhaust hot air and steam produced by operations
- Use air conditioners to reduce the temperature and humidity
- Use fans if the temperature is below 35°C (if fans are used when the temperature is above 35°C they may recirculate the hot air, which can prevent cooling)
- Provide: cool, shaded work areas / air-conditioned rest areas

Plan ahead to reduce heat stress






- Assess the demands of the jobs and put a plan in place for hot days and workplaces
- Increase frequency and length of rest breaks
- Schedule strenuous jobs to cooler times of the day such as in the early morning, late afternoon or night
- Provide cool drinking water near workers
- Remind workers to drink a cup of water at least every 15 to 20 minutes to stay hydrated
- Caution workers to avoid direct sunlight
- Assign more workers or slowing down the pace of work
- Acclimatize workers (1-2 weeks) to increased intensities of work
- Train workers to recognize the signs and symptoms of heat stress
- Ask workers to monitor coworkers for heat stress symptoms
- Investigate any heat-related incidents reported by workers
- Ensure 1st Aid is available to respond to heat-related illnesses
- Advise workers who are pregnant or have a medical condition to consult their physician about working in the heat and accommodate

Create A Heat Stress Plan

- Process Heat
 - When workers are exposed to process heat, employers shall follow assessment and control requirements of the American Conference of Governmental Hygienists (ACGIH) Threshold Limit Values (TLVs).
 - Engage the Joint Health and Safety Committee in these assessments and methods used to ensure compliance.
- Hot Weather
 - Organizations associated with the Sarnia-Lambton Industrial Educational Cooperative have developed the following guideline that uses humidex readings to trigger action.
 - Humidex measures must be representative of general work area where the person is working

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Heat Stress Controls for Various Humidex Ranges & Working Conditions (for unacclimatized workers)

CONDITIONS	LIGHT	MODERATE	HEAVY
WORK	<ul style="list-style-type: none"> Sitting with light manual work with hands or hands and arms, and driving Standing with some light arm work and occasional walking 	<ul style="list-style-type: none"> Sustained moderate hand and arm work Moderate arm and leg work Moderate arm and trunk work Light pushing and pulling Normal walking 	<ul style="list-style-type: none"> Intense arm and trunk work Carrying and shoveling Manual sawing Pushing and pulling heavy loads Walking at a fast pace
CLOTHING	<ul style="list-style-type: none"> Less than moderate clothing 	<ul style="list-style-type: none"> Loose fitting outer layer (e.g. coveralls) plus cotton T-shirt and shorts 	<ul style="list-style-type: none"> Protective clothing over moderate clothing (e.g. disposable coveralls, chemical suits, full-face respirator)
RADIANT HEAT	<ul style="list-style-type: none"> Temperature controlled, cooled environment 	<ul style="list-style-type: none"> Partial sunlight 	<ul style="list-style-type: none"> Direct sunlight Near other radiant heat sources (e.g. furnace, boiler, hot equipment)
ACTION	<ul style="list-style-type: none"> For light conditions, consider decreasing one colour category 	<ul style="list-style-type: none"> For moderate conditions use the colour categories 	<ul style="list-style-type: none"> For heavy conditions, increase at least one colour category
CATEGORY	HUMIDEX RANGES	ACTIONS	LIQUIDS
GREEN 	33C to < 38C (91.4F to < 100.4F)	<ul style="list-style-type: none"> Issue recognition / alerts 	<ul style="list-style-type: none"> Drink water
	38C to < 40C (100.4F to < 104F)		
YELLOW 	40C to < 42C (104F to < 107.6F)	<ul style="list-style-type: none"> Reduce physical activity to 45 minutes per hour 	<ul style="list-style-type: none"> Drink 1 cup of water every 20 minutes
	42C to < 45C (107.6F to < 113F)		
ORANGE 	≥ 45C (113F to < 123F)	<ul style="list-style-type: none"> Reduce physical activity to 30 minutes per hour 	<ul style="list-style-type: none"> Drink 1 cup of water every 20 minutes
	≥ 42C to < 45C (107.6F to < 113F)		
RED 	≥ 45C (113F to < 123F)	<ul style="list-style-type: none"> Stop all non-essential work Essential work can proceed with controls (e.g., modified work hours, work rotation, fans, etc.) 	<ul style="list-style-type: none"> Drink 1 cup of water every 20 minutes
	≥ 42C to < 45C (107.6F to < 113F)		
BLACK 	≥ 45C (113F to < 123F)	<ul style="list-style-type: none"> Stop all non-essential work Essential work can proceed with specific controls as deemed acceptable 	<ul style="list-style-type: none"> Drink 1 cup of water every 20 minutes
	≥ 42C to < 45C (107.6F to < 113F)		

NOTE 1: Time away from physical activity is to be taken in shaded area, near work location.

NOTE 2: Humidex is to be measured in direct sunlight at worksite.

NOTE 3: For non-acclimatized workers conducting moderate work in FRC coveralls wearing only cotton undergarments.

NOTE 4: This is a guideline only. Work may be stopped prior to the Red Alert due to the impact of breaks on productivity.

Revision Log

Rev. Date	Rev. #	Rev. Description	Revision	Endorsement	Approval
Dec 1, 2021	3	Updates to 2017 guideline	Occ'l Hygiene Sub	777 Strategy Committee	IEC Board of Directors
April 20, 2017	2	Updates to 2013 guideline		777 Strategy Committee	
June 30, 2013	1	New guideline		777 Strategy Committee	