1.0 PURPOSE

The purpose of this procedure is to develop guidelines for working in hot environments, reduce the potential for heat-related illnesses, and to ensure compliance with the Occupational Health & Safety Act of Ontario and its regulations.

2.0 SCOPE

This procedure applies to all workers working in hot environments at the University of Windsor.

3.0 DEFINITIONS

Acclimatization: the physiological changes that occur after prolonged exposure, allowing the body to adapt to a new temperature, climate, or environment.

Dehydration: the loss or deficiency of water in body tissues which may be caused by perspiration, vomiting, or diarrhea. Symptoms include excessive thirst, nausea and exhaustion.

ECC: Energy Conversion Centre

Hot Work Environment: conditions in the workplace (air temperature, radiant temperature, humidity, air velocity, clothing and physical activity) which provide a risk for hazardous body heat storage.

Humidex: an index that describes how hot or humid weather feels to the average person.

WSIB: Workplace Safety and Insurance Board

Worker:

4.0 RESPONSIBILITIES

Managers/Supervisors are responsible for;

- Ensuring all workers in their department who work in hot environments are instructed in this procedure.
- Scheduling strenuous work during cooler times of day where possible.
- Providing cool drinking water to employees and encouraging them to drink it often (a cup every 20-30 minutes).
- Providing mechanical aids for employees to avoid strenuous lifting / physical activity.

Workers are responsible for;

- Taking precautions as necessary to prevent heat-related illnesses.
- Participating in training as required.

Campus Safety is responsible for;

- Providing information on heat stress to departments as necessary.
- Tracking heat-related illnesses and complaints to measure the effectiveness of the Heat Stress Prevention Program.

5.0 REFERENCE DOCUMENTS

Ontario Occupational Health and Safety Act

Ministry of Labour guideline "Heat Stress Health & Safety Guideline"

Workplace Safety & Insurance Board guide "Heat Stress Awareness Guide"

Accident/Incident Investigation Report (OHS-5.2.2a)

6.0 PROCEDURE

The University of Windsor recognizes the potential problems caused by high temperatures in the workplace. A "hot" work environment at the University of Windsor is defined as a condition or situation in the workplace which provides a risk for hazardous body heat storage. Examples include air temperature, radiant temperature, humidity, air velocity, clothing and physical activity.

This procedure consists of 4 sections that describe the precautions to follow in "hot" work environments: Heat Monitoring Methods, Safe Work Practices & Control Measures, Heat Exposure Illnesses, and Training.

Managers / Supervisors shall ensure all workers in their department who work in hot environments are instructed in this procedure prior to the commencement of work.

A. HEAT MONITORING METHODS

Acclimatization

Employees who perform moderate work regularly in hot environments can develop a certain degree of tolerance for heat, which is called acclimatization. Examples of workers at the University that can become acclimatized include groundskeeping, ECC, and Production Kitchen staff, who are consistently working in a hot environment.

Self-Regulation

Employees will vary in their ability to work within a hot environment, depending on factors such as age and health, physical shape, the type of clothes worn to work, amount of fluid intake, and intensity of exertion. It is therefore very important for individuals to respond to any symptoms of heat stress immediately, regardless of weather or heat monitoring measurements.

Humidex Comfort Ranges – Hot Weather Plans

In the weather forecast, Humidex is used to inform the public about the measurement of heat outdoors. The Humidex combines the temperature and humidity into one number to reflect the perceived temperature by the average person. It is therefore a better measure of how stifling the air feels than either temperature or humidity alone.

The Humidex comfort ranges are as follows:

Humidex Range (degrees Celsius)	Degree of Comfort
20-29	Comfortable
30-39	Varying degree of discomfort
40-44	Great discomfort; avoid exertion
45 +	Dangerous: Most work must be restricted
55 +	Heat stroke imminent

Environment Canada defines an extremely high humidex reading as one that is over 40.

Hot Weather: Humidex Readings

Humidex readings can be found on Environment Canada's website at www.weatheroffice.gc.ca. The University of Windsor will accept Environment Canada's humidex measurement for Windsor, ON as the reading for outdoor

"moderate" work on campus (see definition below). This measurement will determine the appropriate action to take when the Humidex is high (see Humidex-Based Heat Response Plan described below).

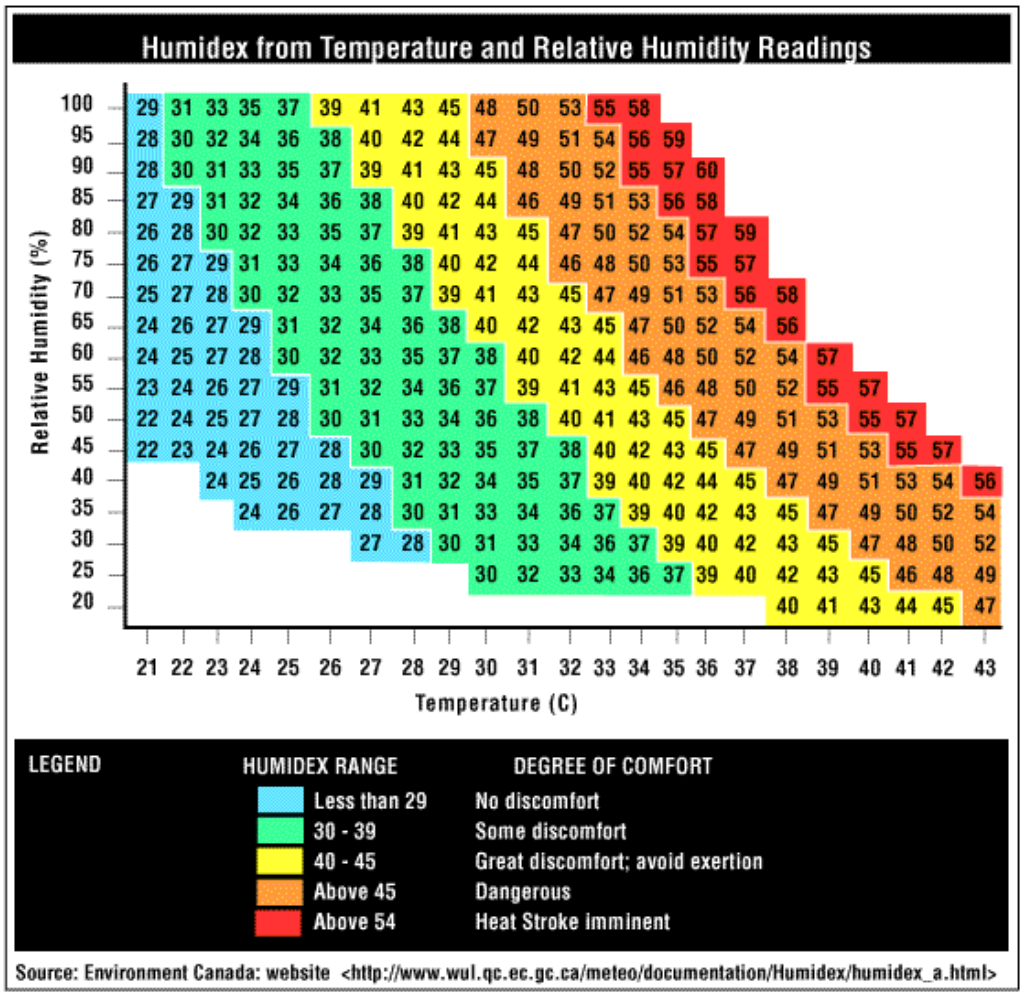
Indoor Readings / Hot Processes: Wet Bulb Globe Temperature

The Ministry of Labour uses Wet Bulb Globe Temperature (WBGT) to measure heat stress. This calculation is based on humidity and radiant heat. This measurement should be used in job tasks involving significant radiant-heat load from process-related heat.

Environment Canada has published a heat stress reference chart that translates WBGT values from heat stress Threshold Limit Values into Humidex units (Table 1). This can determine readings for indoor areas and process-related heat by taking a measurement of the temperature and relative humidity, and cross referencing it to this chart. An online version of the Humidex calculator is also available at griff1in

http://www.ohcow.on.ca/edit/files/general_handouts/heat-stress-calculator.html

Table 1. Humidex from Temperature and Relative Humidity Readings



LIMITATIONS: This table is based on the following assumptions:

- work is being performed under conditions with little or no radiant heat,
- workers are wearing regular summer clothing (light shirt and pants, socks & shoes)
- For outdoor work in direct sunlight between the hours of 10 am and 4 pm, add 1 – 2 degrees to your Humidex measurement.
- For indoor radiant heat exposures, Department Managers / Supervisors can determine whether the exposure involves more or less radiant heat than direct sunlight and adjust the 1 – 2 degree factor accordingly.

Humidex Based Heat Response Plan

Humidex-based heat response plans will begin when the Humidex reading is at 30 or more. The following table details the recommended action to be taken when Humidex measurements are high:

HUMIDEX 1	ACTION PLAN	HUMIDEX 2
30-37	Notify employees of Heat Stress warning and that they need to drink extra water and be aware of heat stress symptoms in themselves and coworkers	**36-42**
38-39	Work with 15 minutes relief per hour	**43-44**
40-41	Work with 30 minutes relief per hour	**45-46**
42-44	Work with 45 minutes relief per hour	**47-49**
45 or over	Hazardous to continue physical activity	**50 and over**

NOTE:
The **HUMIDEX 1** readings are to be used for unacclimatized workers who are doing "moderate" work in hot environments, and ranges indicate the need for general heat stress controls (detailed in Section B). Examples may include: Maintenance, Campus Community Police, Biology (greenhouse) staff

The **HUMIDEX 2** readings are to be used for acclimatized workers doing "moderate" work in hot environments, and ranges indicate the need for job-specific controls (detailed in Section B). Examples may include: ECC, Grounds, and Production Kitchen staff.

The WSIB Heat Stress Awareness Guide defines the three types of work as follows:

Light work: sitting/standing, doing light arm work

Moderate work: work with some pushing and lifting

Heavy work: work requiring intense physical exertion – for example shovelling dry sand

B. SAFE WORK PRACTICES & CONTROL MEASURES

General Controls for Working in Hot Environments (Humidex 1 Readings)

The following safe work practices are general guidelines that will assist with the prevention of heat stress hazards while working in a hot environment;

- Keep skin clean and dry.

- Work in the shade when possible.
- Learn to recognize the signs and symptoms of heat stress in yourself and coworkers. Take breaks when feeling tired, dizzy, or weak.
- Cover skin with lightweight, loose clothing where possible.
- Apply sunscreen in the morning and again at your lunch break if working outside.
- Reduce activity levels and/or heat exposure whenever possible.
- Drink fluids regularly, avoiding caffeine and alcohol.
- Use the buddy system where possible; check on your coworkers periodically to assist with the early recognition of heat illness symptoms.

Job-Specific Control Measures to Reduce Heat Stress (Humidex 2 Readings)

Some positions at the University of Windsor may require certain tasks to be done in the heat. Examples include, but are not limited to, groundskeepers, Maintenance, Production Kitchen, and Energy Conversion Centre staff. Managers / Supervisors shall schedule strenuous work to be done during cooler times of day where possible.

The following measures should be taken where possible to reduce heat stress:

- Drink at least one cup of water every 20-30 minutes, even if you don't feel thirsty. Water is provided by your department – fill up your bottle prior to the start of your day and during breaks and lunch.
- Use mechanical aids for manual lifting where possible (ie. dollies, carts, hoists, etc.)
- Use cooling fans where possible.
- Alter your work/rest schedule. Take breaks as needed and alter your pace of work. Rotate work with coworkers if possible. If you feel tired, weak, or dizzy, take a break. Breaks should be taken in air-conditioned buildings whenever possible.
- Heat stress increases when heavy work is done at temperatures above 30 degrees. Don't push yourself beyond your limits. It could be harmful to your health, and could put you at risk of having an accident.
- Wear sunscreen and cover your head if working outside as part of your personal protective equipment
- Notify your Supervisor or co-worker of any heat stress symptoms immediately.

Department Managers / Supervisors will provide cool drinking water to workers and shall encourage them to drink it often (a cup every 20-30 minutes).

Personal Control Measures to Reduce Heat Stress (All Workers)

It is important that employees "listen" to their bodies and respond to any symptoms of heat stress. The following measures can help to prevent heat-related illnesses;

- Hydrate yourself. Water is crucial to helping the body adjust to high temperatures. The rate of water intake must equal the increased rate of water loss by perspiration to keep your body temperature normal.
- Eat smaller but more frequent meals or snacks while working in hot environments.
- Avoid alcohol or beverages with caffeine – these make the body lose water and increase the risk of heat stress.
- Wear light clothing that permits the evaporation of sweat (ie. cotton clothing).
- Check with your doctor if your medication may affect your heat tolerance.

- Make healthy lifestyle choices (ie. body weight, fitness, diet, rest).

C. HEAT EXPOSURE ILLNESSES

Heat stress symptoms are a set of natural signals telling you that something needs to be done to balance your body's heating and cooling. As your body heats up, it tries to rid itself of excess heat through the evaporation of sweat. If it is unable to cool itself this way, your body temperature will increase. When body temperature gets above 38-39°C, the brain starts to overheat, leading to a shutdown of your body's cooling system (sweating stops). Your temperature now rises even faster, leading to heat stroke and possibly death.

The causes, symptoms, treatment, and prevention of various heat-related illnesses are listed here:

	HEAT RASH
CAUSES	Hot humid environment; plugged sweat glands
SYMPTOMS	Red bumpy rash with severe itching
TREATMENT	Change into dry clothes and avoid hot environments, rinse skin with cool water
PREVENTION	Wash regularly to keep skin clean and dry.

	SUNBURN
CAUSES	Too much exposure to the sun
SYMPTOMS	Red, painful, or blistering and peeling skin
TREATMENT	If the skin blisters, seek medical aid, use skin lotions (avoid topical anaesthetics) and work in the shade
PREVENTION	Work in the shade; cover skin with clothing; apply skin lotions with a sun protection factor of at least 15. People with fair skin should be especially cautious.

	HEAT CRAMPS
CAUSES	Heavy sweating drains a person's body of salt, which cannot be replaced just by drinking water.
SYMPTOMS	Painful cramps in arms, legs, or stomach that occur suddenly at work or later at home. Heat cramps are serious because they can be a warning of other more dangerous heat-induced illnesses.
TREATMENT	Move to a cool area; loosen clothing and drink an electrolyte replacement beverage, if the cramps are severe or don't go away, seek medical aid.
PREVENTION	Reduce activity levels and/or heat exposure. Drink fluids regularly. Workers should check on each other to help spot the symptoms that often precede heat stroke.

(continued on next page)

	FAINTING	HEAT EXHAUSTION	HEAT STROKE
CAUSES	Fluid loss and inadequate water intake	Fluid loss and inadequate salt and water intake causes the body's cooling system to start to break down	If a person's body has used up all its water and salt reserves, it will stop sweating, which can cause body temperature to rise; heat stroke may develop suddenly or may follow from heat exhaustion
SYMPTOMS	Sudden fainting after at least two hours of work; cool moist skin; weak pulse	Heavy sweating; cool, moist skin; body temperature above 38°C; weak pulse; normal or low blood pressure; tired and weak, nausea and vomiting; very thirsty; panting or breathing rapidly; blurred vision	High body temperature (above 41°C) and any of the following: the person is weak, confused, upset, or acting strangely; has hot, dry, red skin; a fast pulse; headache or dizziness; in later stages, a person may pass out and have convulsions . **THIS IS AN IMMEDIATE MEDICAL EMERGENCY. PROMPT ACTION MAY SAVE THE PERSON'S LIFE.**
TREATMENT	**GET MEDICAL ATTENTION** Assess need for CPR; move to a cool area; loosen clothing; make person lie down; and when the person is conscious, offer sips of cool water. Fainting may also be due to other illnesses.	**GET MEDICAL AID** This condition can lead to heat stroke, which can kill; move the person to a cool shaded area; loosen or remove excess clothing; provide cool water to drink; fan and spray with cool water	**CALL AN AMBULANCE** This condition can kill a person quickly; remove excess clothing; fan and spray the person with cool water; offer sips of cool water, if the person is conscious
PREVENTION	Reduce activity levels and/or heat exposure. Drink fluids regularly. Workers should check on each other to help spot the symptoms that often precede heat stroke.	Reduce activity levels and/or heat exposure. Drink fluids regularly. Workers should check on each other to help spot the symptoms that often precede heat stroke.	Reduce activity levels and/or heat exposure. Drink fluids regularly. Workers should check on each other to help spot the symptoms that often precede heat stroke.

All heat-related incidents or illnesses must be reported to your supervisor immediately. Supervisors will complete an Accident/Incident Investigation Report (OHS-5.2.2a) as necessary.

D. TRAINING

The prevention of heat stress and heat-related illness begins with educating supervisors and workers on the hazards of working in hot environments.

Managers / Supervisors shall ensure all employees in their department who may be exposed to hot environments are trained in this procedure prior to work.

Safety talks should also be conducted in applicable departments every season as a refresher session. Health and Safety has developed a bulletin for this purpose, "Safety Talk: Heat Stress", which is available at www.uwindsor.ca/campus-safety.

Campus Safety will track heat-related illnesses and complaints to measure the effectiveness of the Heat Stress Prevention Program. Additional control measures will be implemented as necessary.

7.0 REVISION HISTORY

Date (yyyy/mm/dd)	**Revision**
2019/02/08	Change VPAF to VPHR, change occupational health & safety to health & safety, change employee to worker, spelling & grammer.
2024/11/11	Change VPHR to VPFO, change health & safety to campus safety to reflect organizational changes