

# Office Thermal Comfort & Heat Stress Guideline

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## Table of Contents

Scope .....	2
What is Heat Stress ? .....	2
Hazards of Heat Stress .....	3
How we cope with Heat Stress .....	3
Legal Requirements & Legislation .....	3
How Heat Stress may arise at Carleton University .....	4
Triggers .....	5
Reporting .....	6
Resources .....	6

## Scope

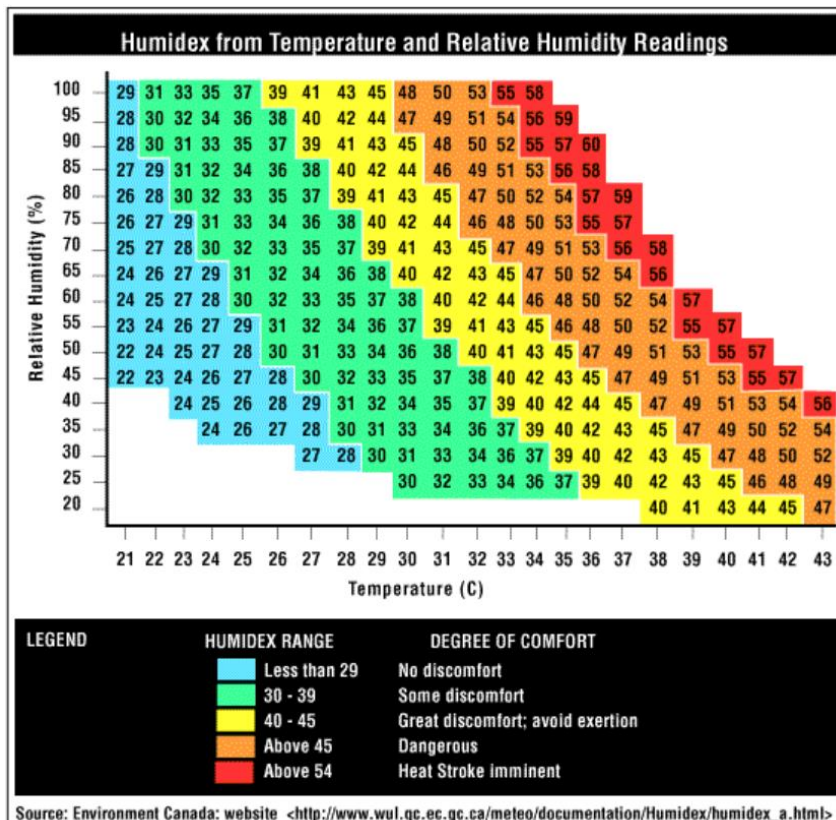
This guideline is intended for use by the University community who conduct the regular part of their job in an office environment. It is to be read in conjunction with the Carleton University Policy on Temperature extremes. It is designed as a guideline for “thermal comfort” to be referenced during periods of warm, summer weather during transition periods between cooling and heating, and any time an unexpected event occurs which impacts the normal operations. Temperature values for which this guideline comes into effect are based on actual workplace temperature values and not from local media weather reports. Please speak to your supervisor if you have concerns regarding workplace temperatures. Facilities Management and Planning (FMP) and the Office of Risk Management (ORM) are available to assist as a resource, if required.

## What is Heat Stress ?

Everyone at some time or another manages heat stress. Managing heat stress is a natural function of the human body. When the body is in a warm, hot environment, the temperature of the body rises. The body must lower this effect through relief of heat; this is done through the evaporation of sweat produced from the body. If the body is unable to cool itself through this method, the body’s core temperature increases. When this happens, typical everyday functions such as thinking, concentrating, conducting a task, can become difficult depending on the exposure time and environmental conditions. A rise in the core body temperature can lead to feelings of exhaustion, panting, light-headedness, nausea, among other symptoms. This may represent the start of more serious heat associated hazards. These hazards are briefly described below.

## Humidex

The humidex factor can make it feel like it is much warmer. This value takes into account the air temperature, combines it with the humidity in the air, and produces a value which is how warm it feels outside. The humidex is used as a measure of perceived heat that a person feels. Below is a table adapted from Environment Canada indicating air temperature on the x-axis and relative humidity on the y-axis. The point where the two values meet is the humidex factor.



## Hazards of Heat Stress

There are several types of hazards associated with exposure to significantly warmer (eg. prolonged heat exposure and high temperatures) than normal environments. These include, but are not limited to, the following:

- Heat rash – a red, bumpy, itchy rash on the skin
- Sunburn – red, sometimes painful, blistering of the skin
- Heat cramps – pain in arms and legs which occur suddenly; can be an indicator of a more serious issue
- Fainting – loss of consciousness, blacking out
- Heat exhaustion – heavy sweating, cool skin, core body temperature over 38°C, weak pulse, fatigue, nausea, vomiting, thirst, panting, rapid breathing, blurred vision
- Heat stroke – core body temperature over 41°C and any one of the following
  - Weakness
  - Confusion
  - Acting strange
  - Hot, dry, red skin
  - Rapid pulse
  - Dizziness
  - Headache

## How we cope with Heat Stress

As noted, humans cope with heat stress, primarily, by sweating. The sweat evaporates on the skin of the person leaving a cooling effect. Hydration is also very important; keeping the body hydrated with a cool, non-alcoholic, noncarbonated, low sugar, drink is important when working in warm climates. The best drink for the body, and for the hydrating effect, is water.

## Legal Requirements & Legislation

In Ontario, there is no pre-set maximum working temperature for office workers. The duty to protect the worker(s) falls under section 25(2)(h) of the Ontario Occupational Health & Safety Act – the employer shall take every precaution reasonable for the protection of the worker(s).

As a general practice, the Ministry of Labour, Immigration, Training and Skills Development (MLITSD or the Ministry) looks to the American Conference of Governmental Industrial Hygienists' (ACGIH) method (ACGIH method) of assessing a worker's risk of heat stress for the purposes of enforcing clause 25(2)(h). ACGIH recommends that an un-acclimatized worker's core body temperature shall not exceed 38°C. Body temperature is typically at 37°C for a healthy person – which means that your internal body temperature should not rise more than 1°C. As mentioned, this is controlled by your body through the production of sweat, and the intake of liquids.

In addition, the Canadian Standards Association has also released a standard dealing with optimal working temperatures – this is found in the Office Ergonomics – Z412-00 standard (section 6.6(b)). The standard indicates that the acceptable working temperature will depend on the activity level and clothing worn by the user. The ASHRAE standard (55-2004), which the Canadian standard was based upon, is intended to accommodate 80% of individuals. Some workers, by virtue of personal factors, may need additional measures to accommodate them. The optimum temperature ranges are as follows:

Summer: 23 – 26 °C at 50% relative humidity  
Winter: 20 – 23.5 °C at 50% relative humidity

(Note the overlap at 23 to 23.5 °C – people in summer dress would be slightly cool, while people in winter dress would be slightly warm).

The table below was adapted by the Canadian Centre for Occupational Health & Safety (CCOHS) from the ASHRAE 55-2004 and demonstrates what should represent a comfortable working environment based on the humidity level.

<b>Table 1 Temperature / Humidity Ranges for Comfort</b>		
<b>Conditions</b>	<b>Relative Humidity</b>	<b>Acceptable Operating Temperatures (°C)</b>
Summer (light clothing)	If 30%, then	24.5 – 28
	If 60%, then	23 – 25.5
Winter (warm clothing)	If 30%, then	20.5 – 25.5
	If 60%, then	20 - 24

Refer to the [CCOHS](#) guidelines for additional information.

Additionally, radiant temperature also affects the surrounding areas. For example, uncomfortable temperatures can be caused by large warm surfaces, such as poorly insulated windows, direct sunlight on surfaces (concrete), computer rooms, etc.

### **How Heat Stress may arise at Carleton University**

While most workers at Carleton University do not work in consistently warm environments, everyone at some point will be exposed to a warm environment through nature – eg. warm / hot, humid, summer weather. This will generally be the most common type of heat issue encountered at Carleton.

While most buildings have air conditioning, some parts of campus do not; meaning hot, summer temperatures are more likely to impact these locations.

Other considerations include:

- Construction / Renovations

Fresh air (and therefore subsequent cooling of the air) may need to be reduced or even closed within the building due to fumes / odours produced by specific activities.

- Repairs

Air conditioning, like other mechanical systems, will need preventative maintenance or overall repairs / replacement of parts to ensure that they are functioning properly.

- External conditions

In circumstances such as were experienced during wildfire season, fresh air (and therefore subsequent cooling of the air) may need to be reduced or even closed within the building due to smoke odours being experienced across the province/country.

Should ventilation need to be shut down or reduced for any period of time, FMP will notify building authorities and facility managers / occupants through regular communication channels . Where possible, maintenance is scheduled for off hours (eg. prior to and following University designated working hours;

and typically do not have an effect on building occupants. However, there are cases where work is not able to be postponed or rescheduled.

## Triggers

For the purposes of taking every reasonable precaution for the protection of the Carleton workers, trigger points where controls need to be implemented to protect workers are as follows:

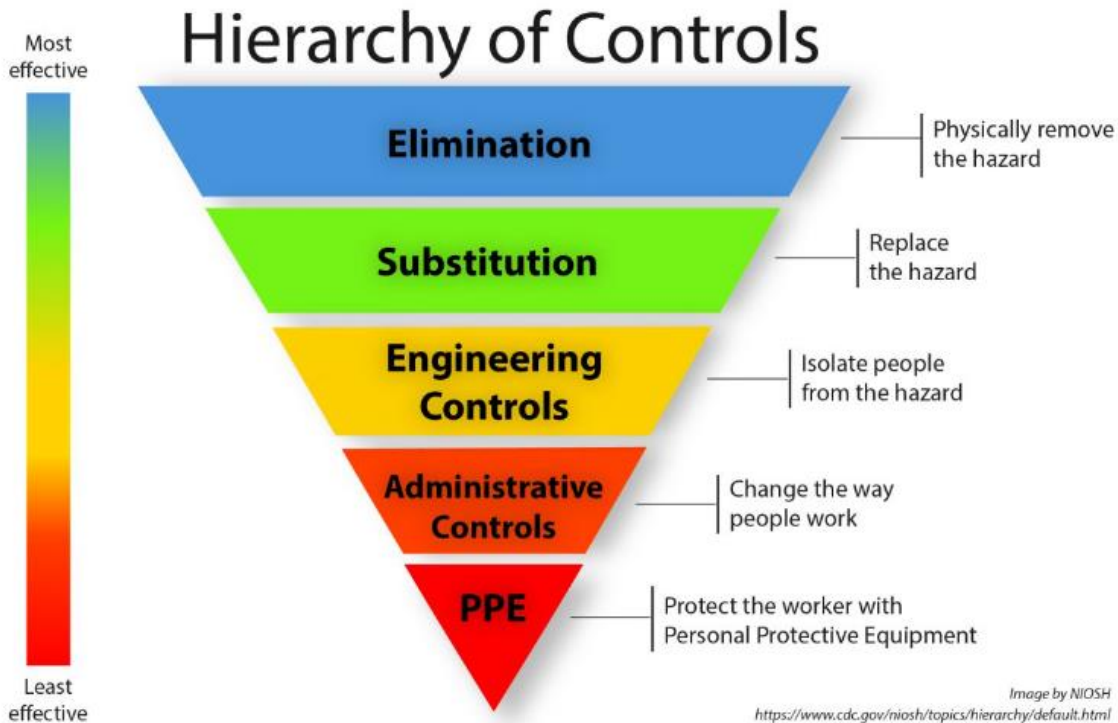
- Temperatures below 18 °C
- Temperature and / or humidex in an office setting reaching / exceeding 35 °C
- Environment Canada humidex advisory (air temperature reaching 30 °C and humidex exceeding 40 °C)

(adapted from Ministry of Labour Heat Stress Guidelines)

**For temperatures which do not reach the trigger point(s) for action described below, please speak with your supervisor to determine if alternate arrangements can be made for the individual worker(s).**

## Hazard Controls

As with all hazards in the workplace, the hierarchy of controls is to be applied



Below are ways to control heat stress – the best way to do so is to eliminate the elevated heat altogether; although this is sometimes not possible, it is the most desired method.

Examples are provided below:

**Engineering**

- Ventilation and air conditioning to the affected rooms;
- Reduce physical demands of the job / task;
- Increase movement of the air through the use of fans (FMP Service Centre x3668 request);
- Reflective barriers to sources of heat (eg. use of curtains / blinds to block sunlight).

**Administrative**

- Slightly increase length and frequency of breaks;
- Limit total time spent in the warm environment;
- Slow the pace of work;
- Re-schedule work to a cooler time of day (early morning / evening);
- Working from another location – preferably an on-campus office (where possible) or from home.

**Other measures to consider**

- Wear cool, light-weight, light coloured clothing;
- Drink lots of water to stay hydrated.

**Reporting**

If you have any concerns about the hazards of heat stress, please inform your supervisor. Should a situation arise where a warm environment affects a previously existing medical condition (i.e. asthma), please notify the Human Resources, Benefits at (613) 520-3634 to discuss required Accommodations. Should the heat issue remain unresolved, please contact FMP at ext. 3668 and / or the Office of Risk Management at ext. 3000 or [ehs@carleton.ca](mailto:ehs@carleton.ca)

**Resources**

There are several resource websites available for more information on heat stress and the hazards thereof; they are found below:

- [Canadian Centre for Occupational Health & Safety](#)
- [Ontario Ministry of Labour](#)
- [Health and Safety Ontario](#)
- [Occupational Health Clinics for Ontario Workers \(OHCOW\)](#)
- [Infrastructure Health and Safety Association](#)