Protecting Workers From Heat Stress: What Are an Employer’s Legal Obligations?
INTRODUCTION

Employers across Canada have a duty to protect workers from the dangers posed by exposure to high temperatures—whether from equipment, such as ovens and furnaces, or from weather conditions. Failure to meet this obligation exposes workers to heat-related illnesses, such as heat exhaustion and heat stroke, and even death (we’ll refer to all these hazards with the general term “heat stress” throughout this Special Report). It also exposes your company to stop-work orders, prosecutions and fines. As the company’s safety coordinator, it’s up to you to ensure that your company fulfills its heat stress duties.

But trying to figure out “the law of heat stress” can be tricky, especially if you’re based in a jurisdiction in which the OHS laws don’t specifically mention the topic. However, even in those jurisdictions, employers still have a duty to protect workers from heat stress. So how are you supposed to figure out what exactly the law requires the company to do as to heat stress let alone comply with those requirements?

This Special Report will help you overcome this problem by:

➢ Explaining how the different jurisdictions regulate the hazard of heat stress;

➢ Outlining what the OHS laws require companies to do to protect workers from heat stress; and

➢ Spelling out the components of a heat stress plan that will fulfill those legal obligations.

To help you zero in on your company’s specific obligations, there’s a chart on page 4 setting out each of the jurisdictions’ heat stress requirements. There’s also a Model Heat Stress Plan on page 10 that you can adapt and use in your workplace. And there’s a list of resources on heat stress on page 11.
UNDERSTANDING THE LAW OF HEAT STRESS

Exposure to extreme heat is perhaps the oldest form of workplace hazard. But recognition of the potentially dangerous and lethal effects of heat-related illnesses has been relatively slow in coming. So has regulation of these hazards. However, it’s now understood that all Canadian jurisdictions regulate heat stress; they just don’t do it the same way.

The 10 Direct Regulation Jurisdictions

Ten jurisdictions—Fed, BC, MB, NB, NL, NS, PE, QC, SK and YT—have specific heat stress provisions in their OHS regulations. Employers in these jurisdictions who don’t follow the requirements set out in the regulations run the risk of liability.

Example: Section 23(1) of New Brunswick’s OHS Regulations requires employers to ensure that a “competent person instructs” workers exposed to excessive heat “in the significance of symptoms of heat stress, such as heat exhaustion, dehydration, heat cramps, prickly heat and heat stroke” and precautions to avoid injury. A boilermaker collapsed while performing repairs inside an overheated paper mill during a heat wave. He died the next day of heat stroke. The boilermaker had been on the job three days. The night before, he actually passed out on the floor of his hotel room. But the co-worker he was sharing the room with hadn’t been instructed on heat stress. So he didn’t recognize what was happening. He also made the situation worse by encouraging the boilermaker to drink beer and letting him go to work exhausted the next day. The company pleaded guilty and was fined $7,500 [R. v. Lorneville Mechanical Contractors, Ltd., [1993] N.B.J. No. 633, Jan. 7, 1993].

The 4 Indirect Regulation Jurisdictions

There are four jurisdictions—AB, NT, NU and ON—in which the OHS regulations don’t specifically mention heat stress. So you might assume that employers in these jurisdictions don’t have an obligation to protect workers from heat stress. But jumping to that conclusion would be a mistake. Heat stress is, in fact, regulated in these jurisdictions—it’s just done indirectly.

Explanation: All OHS statutes include a broadly worded provision that requires employers to ensure a generally safe and healthy workplace. For example, Sec. 25(2)(h) of the Ontario OHS Act requires employers to “take every reasonable precaution in the circumstances for the protection of the worker.” This section is generally referred to as the “general duty” clause. The government can use this clause to require employers to protect workers from hazards that aren’t specifically mentioned in the OHS regulations, such as heat stress.

For example, according to the Ontario Ministry of Labour (MOL), “Employers have a duty under the Occupational Health and Safety Act (OHSA) to take every precaution reasonable in the circumstances to protect workers. This includes developing hot environment policies and procedures to protect workers in hot environments due to hot processes or hot weather.”

Heat Stress Guidelines

Both jurisdictions that directly regulate heat stress and those that do so through the general duty clause often issue bulletins or guidelines that list specific measures for employers to take to protect workers from heat stress. Note that the heat stress recommendations in bulletins and guidelines may not technically be legally binding. But as a practical matter, when the agency that oversees OHS enforcement recommends use of specific measures to comply with the law, it’s almost as authoritative as actual law. Thus, failing to adopt heat stress recommendations in government guidelines puts your company in a precarious legal position, especially if a worker gets sick or dies due to heat stress.

Example: An Ontario bakery worker died of heat stress on the job. The outdoor temperature was 34°C; inside the bakery, the temperatures topped 36°C. The MOL charged the bakery with violating the general duty clause because it didn’t have a heat stress policy as required by the MOL guidelines. The bakery pleaded guilty and was fined $215,000 [Weston Bakeries Limited, Govt. News Release, Feb. 18, 2004].

The chart on the next two pages spells out exactly what each jurisdiction’s OHS laws say about heat stress.
KNOW THE LAWS OF YOUR PROVINCE: HEAT STRESS REQUIREMENTS

Here’s what you need to know about the heat stress requirements in your jurisdiction:

FEDERAL: OHS Laws: Sec. 125(1)(n) of the Canada Labour Code requires employers to ensure that temperature levels are in accordance with prescribed standards. Sec. 9.9 of the OHS Regs. sets the maximum temperature exposure limits for food preparation areas and personal service rooms at 29°C. Guidelines: No guidelines on heat stress.

ALBERTA: OHS Laws: Don’t address heat stress. Guidelines: Guidelines recommend use of engineering controls, administrative controls and/or PPE to protect workers from heat stress; also recommend use of the ACGIH exposure guidelines [Best Practice: Working Safely in the Heat and Cold].


MANITOBA: OHS Laws: Sec. 4.12 of the Workplace Safety and Health Reg. covers thermal stress (both heat and cold) and says that if heat could pose a risk to workers’ safety or health, employers must implement safe work procedures and controls to ensure that a) the ACGIH standards are followed; and b) workers get information, instruction and training on symptoms of heat stress and precautions to take. Guidelines: Guidelines flesh out requirements in more detail [Guideline for Thermal Stress].

NEW BRUNSWICK: OHS Laws: Secs. 22 and 23(1) of the OHS Regs. cover extreme heat and require: a) a competent person to measure and record thermal conditions at “frequent intervals” and report the findings; b) compliance with ACGIH TLVs; and c) a competent person to instruct workers exposed to extreme heat of the symptoms of heat stress and precautions to take. Guidelines: No guidelines on heat stress.

NEWFOUNDLAND/LABRADOR: OHS Laws: Sec. 44 of the OHS Regs. covers thermal environment (both heat and cold) including: a) compliance with ACGIH standards; b) monitoring of temperature; and c) controls under extremely hot working conditions, such as posting of warning notices, providing special equipment or clothing, medical supervision, cold drinks, acclimatization and limited work schedules with rest periods. Guidelines: Guidelines discuss dangers of heat stress, prevention and legal requirements [Health and Safety Guidelines: Heat Stress].


ONTARIO: OHS Laws: Don’t address heat stress. Guidelines: MOL guidelines cover the dangers of heat stress, acclimatization, engineering controls, administrative controls, PPE and managing heat from work processes and hot weather (include use of ACGIH TLVs) [Heat Stress Health and Safety Guidelines].

PRINCE EDWARD ISLAND: OHS Laws: Sec. 42.1 of the OHS Regs. covers temperature extremes (both heat and cold) and requires compliance with ACGIH TLVs. Guidelines: Workers’ comp guide recommends implementation of heat stress plans that include use of engineering and administrative controls and PPE [Guide to Prevention of Heat Stress at Work].

QUEBEC: OHS Laws: Section XIII of the Regulation respecting occupational health and safety covers heat stress, including: a) required measurements of temperature; b) method for measuring temperature; and c) methods to be taken to address excessive heat, including engineering and administrative controls and

**SASKATCHEWAN: OHS Laws:** Sec. 70 of the *OHS Regs.* covers thermal conditions (both heat and cold), including: a) maintenance of “reasonable thermal comfort” (accounting for air temperature, radiant temperature, humidity and air movement) in indoor workplaces; b) required measurement of conditions in indoor workplaces; c) measures to ensure workers’ thermal comfort and safety, such as PPE, cold drinks and cooling equipment; and d) provision of PPE and suitable clothing. **Guidelines:** Guide explains regulations in more detail and recommends use of rest break schedule based on ACGIH TLVs [Working under Hot Conditions](#). Guidelines for offices and retail outlets recommend compliance with thermal comfort guidelines from American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) [Thermal Comfort in Offices and Retail Outlets](#).

**YUKON: OHS Laws:** Sec. 9 of the *Occupational Health Regs.* covers thermal environment (both heat and cold) including: a) maintenance of “reasonable and appropriate” thermal condition (accounting for air temperature, radiant temperature, humidity and air movement) in indoor workplaces; b) required measurements of conditions in indoor workplaces; and c) measures to protect workers from thermal conditions, such as administrative controls and appropriate PPE or clothing. Sec. 12 deals specifically with heat stress, including: a) method for measuring thermal index; b) limits on type of work permitted based on thermal index; c) use of engineering and administrative controls and PPE when thermal index exceeds limits; d) worker training on heat disorders; and e) provision of water and salt supplements. **Guidelines:** Government bulletin explains requirements in more detail [Hot Working Conditions](#).
COMPLYING WITH HEAT STRESS REQUIREMENTS

As you now see, every employer in Canada has a legal obligation to protect workers from heat stress. But what exactly is your company supposed to do to fulfill this obligation? If you’re in one of the direct regulation jurisdictions, the OHS regulations may spell out the steps the company is required to take. If you’re in one of the indirect regulation jurisdictions—or if the heat stress requirements in your jurisdiction’s OHS regulations are vague or broad—look at the government bulletins and guidelines on heat stress.

The specific measures employers are required to take vary from jurisdiction to jurisdiction, but the differences are mostly in the details. All Canadian jurisdictions follow the same general approach to addressing heat stress in the workplace. Let’s look at these general principles.

General Principles

The starting point is that all jurisdictions treat temperature extremes (both hot and cold) as a physical hazard or agent, such as noise, vibration and electricity. So measures for controlling temperature extremes follow the same general principles that apply to controlling hazards associated with other physical agents:

- If possible, use engineering controls to eliminate the hazard—for example, keep the workplace cool enough with, say, air conditioning to lower the temperature and thus eliminate the risk of heat stress;
- If engineering controls aren’t possible, use administrative controls to make the hazard less dangerous—for example, let the work proceed in the heat but, say, require workers to drink water and take frequent breaks so that they’re less likely to suffer from a heat-related illness;
- Use PPE as a last resort or in conjunction with engineering and/or administrative controls—for example, provide workers with appropriate PPE and clothing; and
- Warn and educate workers of the dangers—that is, train them how to recognize and react to the symptoms of heat stress.

1. Engineering Controls

The most effective way to protect workers from heat stress is by using engineering controls, such as insulation, reflective heat barriers and air conditioning, to keep thermal conditions within safe levels. (Most jurisdictions specify using Threshold Limit Values (TLVs) for heat exposure set by the American Conference of Governmental Industrial Hygienists (ACGIH). See the chart on page 7 for those limits.) But it’s also the most burdensome and expensive solution. Consequently, the obligation to use engineering controls is subject to two qualifications:

- The regulations generally don’t mandate the use of any particular engineering control; they simply list the options employers may consider; and
- In most cases, engineering controls are required only if they’re “practicable.” So the obligation to use engineering controls in outdoor settings would be limited. “Practicable” also implies that the controls are affordable and worth the cost in proportion to the risk.

2. Administrative Controls

Administrative controls are the second best way to protect workers from heat stress because they allow employers to let work proceed without eliminating the source of the danger—the extreme heat—as long as measures are in place to make the work safer. Administrative controls include measures such as scheduling work for cooler parts of the day, allowing frequent breaks, having plenty of cold water on hand and providing medical oversight. Some jurisdictions only recommend such controls. But because these measures are easier to implement than engineering controls, the regulations tend to give employers less leeway on the use and choice of administrative controls.

3. PPE and Clothing

Ensuring the use of PPE and protective clothing is the third level of protection employers must use to protect workers from heat stress. The regulations generally don’t specify which PPE or clothing should be used, but some jurisdictions include detailed PPE and clothing recommendations in their guidelines.
4. Training
Last—but certainly not least—it’s incumbent upon employers to notify workers of heat stress risks and train them on how to deal with those risks. Such training should include, among other things, the symptoms of various heat-related illnesses and appropriate means of treating them (see the chart on page 8 for a summary of common heat-related illness, their symptoms and treatment). Remember that it was the failure to provide such instruction that led to liability in the New Brunswick case previously discussed.

<table>
<thead>
<tr>
<th>Allocation of Work in a Work/Rest Cycle</th>
<th>Acclimatized</th>
<th>Action Limit (Unacclimatized)</th>
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<tbody>
<tr>
<td>Light</td>
<td>Moderate</td>
<td>Heavy</td>
</tr>
<tr>
<td>75-100%</td>
<td>31.0</td>
<td>28.0</td>
</tr>
<tr>
<td>50-75%</td>
<td>31.0</td>
<td>29.0</td>
</tr>
<tr>
<td>25-50%</td>
<td>32.0</td>
<td>30.0</td>
</tr>
<tr>
<td>0-25%</td>
<td>32.5</td>
<td>31.5</td>
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</table>

Notes:
Assumes 8-hour workdays in a 5-day workweek with conventional breaks.
TLVs assume that workers exposed to these conditions are adequately hydrated, are not taking medication, are wearing lightweight clothing, and are in generally good health.

Examples of workloads:
Rest - sitting (quietly or with moderate arm movements)
Light work - sitting or standing to control machines; performing light hand or arm work (e.g. using a table saw); occasional walking; driving
Moderate work - walking about with moderate lifting and pushing or pulling; walking at moderate pace; e.g. scrubbing in a standing position
Heavy work - pick and shovel work, digging, carrying, pushing/pulling heavy loads; walking at fast pace; e.g. carpenter sawing by hand
Very Heavy - very intense activity at fast to maximum pace; e.g. shovelling wet sand

Adapted from: 2008 TLVs® and BEIs® - Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati: American Conference of Governmental Industrial Hygienists (ACGIH), 2008, p. 221.
# HEAT–RELATED ILLNESSES

A summary of heat–related illnesses, causes, symptoms, treatment and prevention is presented in the table below from the Ontario Ministry of Labour.

<table>
<thead>
<tr>
<th></th>
<th>Cause</th>
<th>Symptoms</th>
<th>Treatment</th>
<th>Prevention</th>
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<tbody>
<tr>
<td><strong>Heat Rash</strong></td>
<td>Hot humid environment; plugged sweat glands.</td>
<td>Red bumpy rash with severe itching.</td>
<td>Change into dry clothes and avoid hot environments. Rinse skin with cool water.</td>
<td>Wash regularly to keep skin clean and dry.</td>
</tr>
<tr>
<td><strong>Heat Cramps</strong></td>
<td>Heavy sweating from strenuous physical activity drains a person’s body of fluid and salt, which cannot be replaced just by drinking water. Cramps occur from salt imbalance resulting from failure to replace salt lost from heavy sweating.</td>
<td>Painful cramps commonly in the most worked muscles (arms, legs or stomach) which occur suddenly at work or later at home.</td>
<td>Move to a cool area; loosen clothing, gently massage and stretch affected muscles and drink cool salted water (¼ to ½ tsp. salt in 1 litre of water) or balanced commercial fluid electrolyte replacement beverage. If the cramps are severe or don’t go away after salt and fluid replacement, seek medical aid. Salt tablets are not recommended.</td>
<td>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.</td>
</tr>
<tr>
<td><strong>Fainting</strong></td>
<td>Fluid loss and inadequate water intake.</td>
<td>Sudden fainting after at least two hours of work; cool moist skin; weak pulse.</td>
<td>GET MEDICAL ATTENTION. Assess need for CPR. Move to a cool area; loosen clothing; make person lie down; and if the person is conscious, offer sips of cool water. Fainting may also be due to other illnesses.</td>
<td>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.</td>
</tr>
<tr>
<td><strong>Heat Exhaustion</strong></td>
<td>Fluid loss and inadequate salt and water intake causes a person’s body’s cooling system to start to break down.</td>
<td>Heavy sweating; cool moist skin; body temperature over 38°C; weak pulse; normal or low blood pressure; person is tired and weak, and has nausea and vomiting; is very thirsty; or is panting or breathing rapidly; vision may be blurred.</td>
<td>GET MEDICAL ATTENTION. 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.</td>
<td>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.</td>
</tr>
<tr>
<td><strong>Heat Stroke</strong></td>
<td>If a person’s body has used up all its water and salt reserves, it will stop sweating. This can cause body temperature to rise. Heat stroke may develop suddenly or may follow from heat exhaustion.</td>
<td>High body temperature (over 41°C) and any one 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.</td>
<td>CALL 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.</td>
<td>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.</td>
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HOW TO CREATE A HEAT STRESS PLAN

The best way to ensure that your company complies with its heat stress legal obligations is by creating a heat stress plan that implements the general principles discussed above by combining appropriate engineering and administrative controls along with PPE, clothing and worker training. There’s no such thing as a one-size-fits-all plan. The details of your company’s plan will vary according to industry, facility type, work process involved and the requirements of your jurisdiction’s law. But there’s a Model Heat Stress Plan on page 10 that sets out the elements a basic plan should include. Keep in mind that the measures in this plan are only the minimum typically required. Your jurisdiction might require additional measures, such as medical monitoring.

Like the Model Plan, your plan should:

Say when heat stress measures should be taken. Set a temperature or thermal index at which heat stress measures should take effect. Many jurisdictions limit heat exposure levels based on the ACGIH standard; some includes their own heat stress limits in their regulations. If your jurisdiction doesn’t specify a standard to use, you can use a humidex advisory, smog alert or specific temperature as your trigger.

Require periodic monitoring of temperature and humidity levels. You won’t know if the heat stress trigger has been reached unless you monitor temperature and humidity levels in the workplace (whether indoor or outdoor). It’s a good idea to put someone in charge of measuring the temperature and humidity levels at designated areas throughout your workplace. The OHS regulations and/or guidelines often spell out the method to be used to measure the temperature and/or humidity level.

Adopt engineering controls. Consider using engineering measures to control how hot your workplace gets, including:

- Installing insulation and reflective heat barriers;
- Venting hot air and steam;
- Air conditioning;
- Using fans to improve air circulation; and
- Using machinery, such as hoists and lift tables, to make work less strenuous.

Adopt administrative controls. Your plan should include administrative controls such as:

- Assessing job demands and monitoring control strategies for hot days and workplaces;
- Longer and more frequent rest breaks;
- Scheduling strenuous job tasks for cooler times of the day, such as early morning or evening;
- Providing cool drinking water for workers and remind them to drink a cup every 20 minutes or so;
- Limiting how long workers work in direct sunlight;
- Assigning additional workers or slowing down the pace of the work;
- Making sure everyone is properly acclimated to the temperature;
- Training workers to recognize the signs and symptoms of heat stress;
- Starting a “buddy system”; and
- Implementing first aid and emergency response plans for workers with symptoms of heat stress.

Require training. The plan should require all workers and supervisors to be trained on the signs, symptoms and prevention of heat stress. It should also describe the appropriate first aid measures for each form of heat stress, including heat cramps, heat exhaustion and heat stroke.

Require appropriate clothing. Your plan should also instruct workers to wear lightweight summer clothing. If they work outdoors, they should wear light colours. It might be appropriate to require clothing for high radiant heat and water or ice-cooled insulated clothing for extremely hot temperatures.
When the outside temperature reaches 30°C or the humidex reaches 35°C, the Company’s Health & Safety Coordinator shall implement this Heat Stress Plan. All affected supervisors will be contacted to ensure they’re aware of the proper procedures to be activated.

The Health & Safety Coordinator or a designate from the JHSC will measure the temperature as well as the humidity level at the locations listed below while the plan is active. These measurements will be taken at the beginning and halfway through the shift.

[insert list of locations where measurements will be taken, such as loading dock, kitchen, etc.]

A record of these measurements shall be kept in the Human Resource office.

The following are control measures that will be implemented when this plan becomes effective:

**Engineering Controls**
- Air conditioned rest areas
- Fans and air bag to increase air movement
- Full use of powered equipment – forklifts, transfer carts, cranes etc.

**Administrative Controls**
- Provide extra workers when possible
- Provide cool drinking water, as well as juice or Gatorade, near work stations and remind workers to drink a cup every 20 minutes or so
- Remind workers to salt their food (salt level drops in blood due to heavy sweating)
- Provide training for workers and supervisors to recognize the signs and symptoms of “heat stress”
- Encourage workers to wear lightweight summer clothing to allow free air movement
- Advise outside workers to wear light coloured clothing and sunscreen

An extra break of 5 minutes every hour will be given when the outside temperature reaches 33°C. The Health & Safety Coordinator shall ensure that all workers and supervisors will receive documented training which includes:

- Signs and symptoms of “heat stress”
- Prevention and control measures
- Factors that could increase the risk of illness
- First aid response

**First Aid Response**

If a worker is experiencing symptoms of “heat stress,” please follow these important steps:

1. Take the worker to an air-conditioned first aid room, cool him down with cold compresses, and give him mildly salted water to drink.
2. Contact the worker’s supervisor, who will ensure the worker’s safety by determining what heat stress illness or injuries are present.
3. If the worker appears to be suffering from “heat stroke,” call 9-11 immediately for medical assistance.

**A WORKER WHO IS SUFFERING FROM A HEAT-RELATED ILLNESS MUST NOT BE LEFT ALONE.**
HEAT STRESS RESOURCES

- CCOHS: *Extreme Hot or Cold Temperature Conditions*
- IAPA: *Heat Stress FastFacts*
- AB: *Best Practice: Working Safely in the Heat and Cold*
- MB: *Guideline for Thermal Stress; SAFE Work Tips—Outdoor Heat Stress*
- NB: *Risk Alert—Heat Stress Can Kill*
- NL: *Health and Safety Guidelines: Heat Stress*
- NS: *Heat Stress*
- ON: *Prevent Heat Stress*
- PEI: *Guide to Prevention of Heat Stress at Work*
- QC: *Guide to Preventing Heat Stroke* (in French)
- SK: *Working under Hot Conditions; Thermal Comfort in Offices and Retail Outlets*
- YK: *Hot Working Conditions*
- *Heat Stress Awareness Guide*