Heat stress a safety issue?

Traditionally, the effect of heat on employees in the workplace was mainly viewed as a matter of comfort rather than compliance. However, the prosecution of Weston Bakeries in 2004 changed this when they were convicted for the death of a bakery worker in one of its 15 bakeries. The worker had been unloading baked goods from an oven during a hot spell in August of 2001. The ministry found that the company had a heat stress plan, but it had not been fully implemented. Weston Bakeries pleaded guilty for failing to take the reasonable precaution of implementing a heat stress management program in the workplace and were fined $215,000 plus a 25% surcharge. Failing to take reasonable precautions for the protection of a worker is specified in the "general duty" clause, found in section 25(2)(h) of the OHSA.

Since the Weston Bakery decision, it has been clear that heat in the workplace is a serious hazard that can injure and kill, and so the Ministry of Labour has been requiring workplaces with heat-intensive exposures or activities to demonstrate that heat stress hazards are being properly managed to prevent illness.

The effect of heat on the body

In most areas in Canada, we are subject to a very wide range of ambient temperatures that stretch from -40°C in the winter to almost 40°C in the summer. Compare that with the narrow core body temperature range that our bodies have to maintain. Adding or subtracting 2.5°C from our normal 37°C core body temperature takes us from hypothermia to heat stroke!

Our bodies generate heat when converting food into energy. This heat is increased during physical activity or when exposed to external heat sources. Our bodies have to rid themselves of this heat in order to maintain the tight core temperature range. Our bodies respond to this need by increasing the amount of blood circulation at the skin surfaces and producing sweat, which evaporates and produces cooling. The "fuel source" for sweat is hydration, and all good heat stress prevention programs stress the importance of keeping the body hydrated by drinking significant amounts of water regularly while working.

Is there a maximum regulated allowable temperature?

In Ontario, there is no maximum temperature specified in regulation. This could be because heat stress illness is dependent upon many different factors in addition to the temperature of the workplace. Some of these factors are dependent on the individual and others on the workplace and ambient environment.

Heat Stress Factors	
Individual	**Workplace/Environment**
Age	**Sun/radiant heat load**
Overall health	**Humidity**
Diet	**Ventilation**
Medication	**Clothing and PPE**
Acclimatization	**Process heat loads**
Smoker/non-smoker	**Physical work demands**

There are methods to measure the heat load of a workplace. The most common method is a combined measurement/calculation index called wet bulb globe temperature, or WBGT. WBGT instruments measure ambient temperature, radiant heat and wet-bulb temperature and combine these together into the WBGT index.

Heat exposure guidelines are available to help employers determine a work/rest regime that may be applied with other workplace factors such as clothing worn and physical demands of the job. The most widely cited guideline is the Heat Stress and Heat Strain TLV published by ACGIH. This is a very thorough and technical document that is referenced by many regulatory bodies including the Ministry of Labour in Ontario. Other simplified guidelines using more common measures such as temperature and humidity are widely available on the internet.

Establishing due diligence

Whatever the method chosen by the employer, it is necessary to establish demonstrate sufficient program, training, and implementation to satisfy a due diligence defence. A properly designed and implemented program will bolster the health and safety of the workplace by reducing the risk of heat-related illnesses from occurring.

An effective heat stress prevention program uses a comprehensive approach:

- Written program outlining responsibilities
- Risk assessment to determine areas of greatest need
- Engineering controls to provide cooler workstations
- PPE for reflection of radiant heat and provide personal cooling
- Administrative controls to limit exposure
- Training for prevention and symptom awareness
- Continuous worker observation for symptoms
- First aid preparation in case of overexposure

PandRS has significant experience in heat stress prevention and can provide assistance for developing, training, and implementing an effective heat stress program.