Regina
1870 Albert Street
S4P 4W1
Inquiry: (306) 787-4496
Toll Free: 1-800-567-7233

Saskatoon
Eighth Floor, 122-3rd Avenue North
S7K 2H6
Inquiry: (306) 933-5052
Toll Free: 1-800-667-5023

www.worksafesask.ca
www.lrws.gov.sk.ca

INFORMATION

Hot Conditions Guideline

- Section 70 of *The Occupational Health and Safety Regulations, 1996* requires employers in every indoor place of employment to maintain thermal conditions that are reasonable and appropriate for the work performed.
- The employer must take effective measures to protect workers from heat stress disorders if it is not reasonably practicable to adequately control indoor conditions, or where work is done outdoors.
- The employer must provide suitable monitoring equipment if workers are concerned about their thermal conditions.

This publication discusses how you can control hot conditions and prevent heat stress disorders. For more information, see the technical background publication *Working Under Hot Conditions.* Thermal comfort is addressed in the background publication *Thermal Comfort in Offices and Retail Outlets.*

Heat stress disorders

Heat cramps - Heat cramps in the stomach, arms and legs can result if heavy sweating drains a person of salt. Cramps may occur suddenly - at work or after hours. When they occur move the victims to a cool area, loosen their clothing and have them drink cool, salted water (mixed at one teaspoon of salt per gallon of water). If cramps continue, administer first aid and take victims to a doctor.

Heat exhaustion - Heat exhaustion occurs when the body's cooling system cannot keep up with the heat stress. Symptoms include: heavy sweating; cool moist skin; body temperature above 38ºC; weak pulse; and normal or low blood pressure. Victims may be tired, weak, clumsy, upset or confused. They are usually very thirsty, panting and may have blurred vision. Victims should be moved to a cool area, given salted water to drink and have their clothing loosened. Heat exhaustion can lead to heat stroke - give first aid and send victims to a doctor.

Heat stroke - Heat stroke develops when all the water and salt available for sweating has been used up. Body temperature rises to above 40ºC, the skin becomes hot, dry and red. Victims may act strangely, be weak, confused, have a fast pulse rate, headache or be dizzy. In later stages, victims may faint or have convulsions. **Heat stroke can kill** - take anyone in this condition to the hospital immediately. During transport: remove excess clothing from each victim; fan their bodies; and spray them with cool water. Offer sips of cool, salted water.

Prevention

In Sasktachewan, conditions that cause heat stress usually occur during summer heat waves or near hot, humid work processes. Engineering and administrative controls can be used to control heat stress. Both should be implemented by the employer with the help of the committee or representative.

Use engineering controls if workers must frequently work under hot conditions indoors.

- Use isolation, relocation, redesign or substitution to remove heat sources from work areas. Use air conditioning to cool the entire workplace and spot cooling for hot areas and worksites. Use local exhaust to remove heat from hot work processes. Use screens, awnings or other appropriate material to shield or block the sun's rays. Insulate hot equipment and surfaces to contain radiant heat. Ensure that your maintenance program quickly and effectively fixes problems that create hot conditions - such as steam leaks.
- Cover or contain heat sources - such as steaming tanks, vats and drains. Use labour saving devices to reduce hot work. Automate or replace hot processes.

Fans - Fans can increase the air flow and reduce humidity. Improving the air flow increases the cooling effect of sweating. However, if the air temperature is at or above body temperature, fans will simply expose the body to more hot air. This increases the heat load and the risk of heat stress.

Implement administrative and other effective measures for occasional hot work situations

- Provide rest breaks every hour as shown in the *Recommended Rest Break Schedules* tables on the next page. Provide adequate supplies of drinking water. Workers should be strongly encouraged to frequently drink small amounts of water or other cool (but not cold) fluids. Once cup of fluid every 15-20 minutes should replace water lost in sweat. If workers drink only when they are thirsty, they may not get enough fluid. Workers should be advised to salt their food well. This will maintain the correct levels of body salt. **Do not use salt tablets.**
- Train workers, supervisors and first aiders to recognize and treat heat stress disorders.
- Require workers to wear lightly coloured, light weight, loose-fitting cotton clothing. Schedule hot work for cooler times of the day. Where practicable, have workers set their own work pace.

OCCUPATIONAL HEALTH & SAFETY

WorkSafe™ SASKATCHEWAN
Work to live.

Saskatchewan Ministry of Labour Relations and Workplace Safety

- Consider workers with special needs. Where reasonably practicable, move pregnant employees away from hot work areas.
- Acclimatize workers to work in hot conditions by gradually increasing the time spent in hot work over a one week period. Re-acclimatize workers who have been away from the hot environment. During summer heat waves, acclimatization may not be possible. By the time a worker is acclimatized, the heat wave is over. In this case, consider engineering controls or put more emphasis on work pace, time of day and/or rest breaks.

Recommended Rest Break Schedules

Thermometer readings alone cannot measure the risk. Factors such as air temperature, humidity, air flow and radiant heat must be taken into account. To do this, an index known as the **wet bulb globe thermometer (WBGT)** has been developed. The WBGT index combines air temperature, humidity, air flow and radiant heat to measure the risk of heat stress disorders. In general, WBGT indices are substantially below simple thermometer readings. for example. a 26.1ºC WBGT could roughly be equivalent to an outdoor temperature of 35ºC in the sun and 36.7ºC in the shade. A WBGT must always be used to measure extreme conditions. The **Botsball** (or wet globe thermometer) can also be used to evaluate hot conditions. Botsball readings are based on the WBGT index. A Botsball should not be used in environments with very low humidity and/or with high radiant heat.

Wet Bulb Globe Temperature (WBGT) index				
Work Load	**Work Rate**			
	Continuous work	**15 minutes rest per hour**	**30 minutes rest per hour**	**45 minutes rest per hour**
Heavy	up to 25.0ºC	25.0ºC up to 26.0	26.0ºC up to 28.0ºC	28.0ºC up to 30.0ºC
Moderate	up to 27.0ºC	27.0ºC up to 28.0ºC	28.0ºC up to 29.0ºC	29.0ºC up to 31.0ºC
Light	up to 30.0ºC	30.0ºC up to 30.6ºC	30.6ºC up to 31.4ºC	31.4ºC up to 32.2ºC

Botsball Index				
Work Load	**Work Rate**			
	Continuous work	**15 minutes rest per hour**	**30 minutes rest per hour**	**45 minutes rest per hour**
Heavy	<23.0ºC	23.0ºC up to 24.0ºC	24.0ºC up to 25.0ºC	25.0ºC up to 27.0ºC
Moderate	<24.5ºC	24.5ºC up to 25.5ºC	25.5ºC up to 26.5ºC	26.5ºC up to 27.5ºC
Light	<27.0ºC	27.0ºC up to 27.5ºC	27.5ºC up to 28.0ºC	28.0ºC up to 28.5ºC

Notes and definitions

- The WBGT index in the above tables is based on American Conference of Governmental Industrial Hygienists (ACGIH) TLV Documentation. The Botsball Index is based on: Sundin et al, (1973) conversion of the ACGIH WBGT Index.
- These indices are not equivalent to regular thermometer readings. The tables apply only to acclimatized workers without special needs who are wearing lightweight, light coloured, loose-fitting cotton clothing. Adjustments must be made to these indices for workers with special needs.
- **Heavy work means** - Intermittent lifting, pushing or pulling (such as pick and shovel work) or hard sustained work, such as assembly line activities where workers are paced by machines and cannot stop.
- **Moderate work means** - (1) Work done in a sitting position, but requiring heavy arm and leg motions; or (2) work done while standing and involving moderate work at a machine or bench; or (3) work done while walking about and involving moderate lifting or pushing activities.
- **Light work means** - Sitting or standing; work at a machine or bench that requires mostly arm work.
- **Continuous work** - Assumes that there are short morning and afternoon breaks and a longer lunch break in an eight hour day.
- **Rest breaks** - Includes all breaks, such as regular work breaks and unscheduled pauses during work. If rest breaks occur in an area that is significantly cooler than the work position, the WBGT is modified. See the background publications for details.

Special situations

If a job requires specialized clothing such as heavy coveralls, “turn out gear” for firefighters or chemical-resistant clothing, the WBGT index must be adjusted down. The WBGT index should also be adjusted down for special needs workers, such as: persons over 40; the obese; alcohol abusers; and unconditioned or unacclimatized workers who are likely more susceptible to heat stress disorders. When dealing with these situations - or if the WBGT exceeds the values in the above tables - refer to the background publication *Working Under Hot Conditions* or obtain advice from a competent person.

For more information, contact The Occupational Health and Safety Division:

Regina Inquiry: 787-4496
1870 Albert Street
S4P 3V7
Toll Free: 1-800-567-7233

Saskatoon Inquiry: 933-5052
8th Floor, 122-3rd Avenue North
S7K 2H6
Toll Free: 1-800-667-5023