

	WESTERN MILLCRAFT INC. 12506 – 128 STREET EDMONTON, AB, T5L 1C8	Effective Date: 1 OCTOBER, 2011	Revised by: JFK
	OCCUPATIONAL HEALTH & SAFETY MANUAL COMPANY RULES AND REGULATIONS FATIGUE POLICY	Page 1 of 5	HSE: 3.10 Revision: 00

Western Millcraft Inc. is committed to a strong Health, Safety, and Environment program, with a goal of zero incidents and injuries. Western Millcraft Inc. K&T Metal Industries Ltd. will enforce safety in the workplace and will take appropriate measures to comply with all applicable legislation and industry standards to protect and promote the health and safety of all employees, subcontractors, the public and the environment. It is the responsibility Western Millcraft Inc. that everyone complies with all rules, regulations, and legislation at Western Millcraft Inc.

Western Millcraft Inc. is committed to providing all employees with the proper equipment, training, policies, practices and procedures, and for all employees to participate in the Health, Safety, and Environment Program.

Working excessive hours creates a hazard that puts all employees at risk both on the jobsite and when driving to or from the worksite.

Fatigue is a state of being tired and can be caused by long hours of work, long hours of physical or mental activity, inadequate rest, excessive stress, cold and/or hot weather, and/or combinations of these factors. In addition to physical signs and symptoms, fatigued workers may have their ability to perform mental and physical tasks impaired.

In order to protect employees from fatigue and/or impair employee's ability to perform their jobs mentally and physically in a safe manor, Western Millcraft Inc. will ensure that:

- The basic maximum work shift shall be 12 hours
- Any work shift extending over 12 hours requires the affected employees to take a break and re-assess the work hazards and anticipated time required to complete the tasks, being objective about the absolute requirements for the job completion
- Any work shift over 14 hours requires management approval and management must assess fatigue, work type and conditions before approving continuation of the work shift
- Employees must take an 8 hour work break between work shifts, and no employee will be required to return to work without an 8 hour continual break from their last work shift.
- Projects requiring continuous days of work must observe Provincial Legislation regarding the required days off over extended periods of work which is a maximum of 24 days on with 4 days off
- between shifts

WORKING IN THE HEAT:

What are the health effects of exposure to heat?

When the body is exposed to heat and it cannot cope, this is call heat stress. The body tires to cope mainly by evaporation - sweating. As the temperature in the work environment increases, so too does the body's temperature. This triggers sweating and a flow of blood to the skin where it can be cooled by evaporation. Excessive sweating leads to loss of water from the body, dehydration and loss of salt, resulting in potentially serious health effects.

Possible consequences of excessive heat:

1. **Increase in the likelihood of accidents:** Due to reduced concentration; slippery, sweaty palms; increase of discomfort of some personal protective gear, resulting in reduced protection and unsafe conditions, etc
2. **Skin Rashes:** "prickly heat"
3. **Heat Cramps:** Muscle spasms as a result of heavy sweating without restoring the body's salt/water balance
4. **Heat Exhaustion:** Dehydration following heavy sweating causes clammy, moist skin, weakness and fatigue, nausea, vomiting, headache and giddiness. Reduced blood flow to the brain may lead to fainting



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5. **Heat Stroke:** Hot, dry skin and rapidly rising body temperature can lead to collapse, loss of consciousness, convulsions, even death
6. **Aggravation of other medical conditions and illnesses:** e.g. high blood pressure or heart disease due to increased load on the heart
7. **Aggravation of the effects of other hazards:** through interaction with other workplace hazards such as noise or exposure to toxic substances heat can compound their effects

Some of the problems and their symptoms experienced in the temperature range between a comfortable zone (20 - 27° C) and the highest tolerable limits (for most people) are summarized in the table below:

Problems and Symptoms Caused by Hot Temperatures:

Temperature range (°C)	Effects	
20 - 27 °C	Comfort zone	Maximum efficiency
As temperature increases.....	Discomfort Increased irritability Loss of concentration Loss of efficiency in mental tasks	Mental Problems
	Increase of errors: Loss of efficiency in skilled tasks More incidents	Pyscho-physiological problems
	Loss of performance of heavy work: Disturbed water and electrolyte balance Heavy load on heart and circulation Fatigue and threat of exhaustion	Physiological problems
35 - 40° C	Limit of high temperature tolerance	

WORK BREAKS:

Duration of paid rest breaks within each hour when the temperature reaches and/or exceeds temperatures shown	Temperature (Degrees Celsius)
15 minutes	23 degrees
30 minutes	30 degrees
45 minutes	34 degrees
60 minutes	36 degrees

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WORKING IN THE COLD:

The human body produces its own heat from chemical energy (breaking down food and building up molecules in all tissues) and may lose heat to a cool environment. When the human body is exposed to cold, it tries to minimize heat loss in two ways:

1. By decreasing heat loss by constricting the blood vessels in the skin and underlying tissues (vasoconstriction) leading to a corresponding reduction in the volume of blood reaching the skin. This significantly reduces the amount of convective heat loss from the body. A reduction in surface area by changes in posture, such as "hunching up the body", also assists in reducing heat loss.
2. By increasing the metabolic heat production rate, either by voluntary movements, such as exercise and the performance of work, or by shivering. Through shivering, it is possible to increase the metabolic rate of heat production 5 to 7 times for short periods of time. Shivering is a relatively inefficient way of increasing heat production when compared with active muscular work.

An increase in metabolism during cold exposure leads to increased oxygen consumption - up 3 to 5 times the normal resting rate. This is mainly due to shivering, increased voluntary movement caused by discomfort, and non-shivering thermo genesis. Non shivering thermo genesis is a defense mechanism that goes into action as a consequence of prolonged continuous exposure to cold environmental conditions.

What are the health effects of exposure to extreme cold?

Exposure to cold environmental conditions can result in a number of disorders. It should also be remembered that when working in clothing that is also damp with rain, body heat is lost even faster. Also the combined effect of wind and low temperature exacerbates conditions.

1. **Increased incidence of arthritis, rheumatism and bronchitis; muscle/tissue damage:**
 These conditions are commonly associated with the cold. Muscles and soft tissue are susceptible to damage when used in cold conditions.
2. **Decrease in dexterity and sensitivity:**
 As hands and feet become cold, stiff, numb, and painful, a worker cannot perform manual tasks with as much dexterity or skill. Shivering also makes it difficult to perform work skillfully or accurately
3. **Increase in accident rates:**
 Factors listed above promote an increased rate of incidents. Research has found that incident rates increase as the temperature falls below 19° C.
4. **Hypothermia:**
 Hypothermia is one of the most serious hazards of exposure to cold working conditions. It is a decrease in the core body temperature to a level at which normal muscular and cerebral functions are impaired.

The warning signs are:

- Numb hands
- Shivering not under voluntary control
- Loss of fine motor co-ordination (particularly in the hands - for example trouble with buttons, laces, zips)
- Slurred speech
- Difficulty in thinking clearly
- Irrational behavior - sometimes a person even begins to discard clothing

This may lead to unconsciousness, even death. Most cases of hypothermia occur in air temperatures between 1° C and 10° C, although the body can lose significant heat in air temperatures as high as 18° C or water temperatures as high as 22° C. Body heat is lost much faster when wet, either as a result of weather or perspiration.



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During activity, the body increases its metabolic heat production. This heat production drops by as much as one half when the body becomes inactive. Uncontrollable shivering followed by hypothermia is likely to result. The body's physiological response, designed to minimize heat loss becomes ineffective when the body's core temperature drops below 30° C.

5. Frostbite

Frostbite is a freezing of tissue (e.g. of the face, hands or feet) during exposure to temperatures well below freezing. Damage may range from mild, superficial tissue damage to massive tissue damage and gangrene

What is the wind-chill temperature?

At any temperature, you feel colder as the wind speed increases. The combined effect of cold air and wind speed is expressed as "equivalent chill temperature" (ECT) or simply "wind chill" temperature in degrees Celsius or Fahrenheit. It is essentially the air temperature that would feel the same on exposed human flesh as the given combination of air temperature and wind speed. It can be used as a general guideline for deciding clothing requirements and the possible health effects of cold.

In some parts of Canada the term "wind chill factor" is used. This is a measurement of a heat loss rate caused by exposure to wind and it is expressed as the rate of energy loss per unit area of exposed skin per second (e.g., joules/[second-meter] or watts/meter, W/m²).

		WIND CHILL CHART								
		Ambient Temperature (°C)								
		4	-1	-7	-12	-18	-23	-29	-34	-40
Wind km/h	Velocity mph	Equivalent Chill Temperature (°C)								
Calm										
0	0	4	-1	-7	-12	-18	-23	-29	-34	-40
8	5	3	-3	-9	-14	-21	-26	-32	-38	-44
16	10	-2	-9	-16	-23	-30	-35	-43	-50	-57
24	15	-6	-13	-20	-28	-36	-43	-50	-58	-65
32	20	-8	-16	-23	-32	-39	-47	-55	-63	-71
40	25	-9	-18	-26	-34	-42	-51	-59	-67	-76
48	30	-16	-19	-22	-36	-44	-53	-62	-70	-78
56	35	-11	-20	-29	-37	-46	-55	-63	-72	-81
64	40	-12	-21	-29	-38	-47	-56	-65	-73	-82

Adapted from: Threshold Limit Values (TLV™) and Biological Exposure Indices (BEI™) booklet; published by ACGIH, Cincinnati, Ohio

Little danger in less than one hour exposure of dry skin

DANGER – Exposed flesh freezes within one minute

GREAT DANGER – Flesh may freeze within 30 seconds

Maximum danger of false sense of security

Are there regulated exposure limits for working in cold environments?

In Canada, there are no maximum exposure limits for cold working environments. The "work warm-up schedule" developed by the Saskatchewan Department of Labor has been adopted by the American Conference of Governmental Industrial Hygienists (ACGIH) as Threshold Limit Values (TLVs) for cold stress.



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THRESHOLD LIMIT VALUES WORK/WARM-UP SCHEDULE FOR FOUR-HOUR SHIFT *

Air Temperature Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
° C (approx)	° F (approx)	Max. Work Period	No. of Breaks								
-26° to -28°	-15° to -19°	(Norm breaks) 1		(Norm breaks) 1		75 min.	2	55 min.	3	40 min.	4
-29° to -31°	-20° to -24°	(Norm breaks) 1		75 min.	2	55 min.	3	40 min.	4	30 min.	5
-32° to -34°	-25° to -29°	75 min.	2	55 min.	3	40 min.	4	30 min.	5	↓ Non-emergency work should cease ↓	
-35° to -37°	-30° to -34°	55 min.	3	40 min.	4	30 min.	5	↓ Non-emergency work should cease ↓			
-38° to -39°	-35° to -39°	40 min.	4	30 min.	5	↓ Non-emergency work should cease ↓					
-40° to -42°	-40° to -44°	30 min.	5	↓ Non-emergency work should cease ↓							
-43° to below	-45° & below	↓ Non-emergency work should cease ↓		↓ Non-emergency work should cease ↓		↓ Non-emergency work should cease ↓		↓ Non-emergency work should cease ↓			

Anyone who violates Health, Safety, and Environmental rules will face disciplinary action. Any individuals who do not fulfill their safety responsibilities will become accountable for any problems their negligence creates and may be liable under the law.

Signed: _____

Date: 1 OCTOBER 2011

GREG CLARK
WESTERN MILLCRAFT INC.

The Information in this policy does not take precedence over the OH&S Act, Regulation, Codes, or applicable Government Legislation

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