

PURPOSE/APPLICATION

Canadian Plains Energy Services (CPES) shall attempt to minimize risks to personnel, equipment and property by conducting operations during safe and tolerable working weather conditions. However, when conditions are extreme, the following safe work practice will be followed.

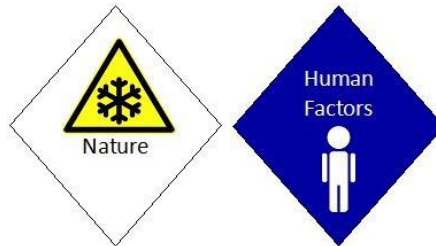
PPE

- CPES minimum requirements
- Warm clothing

TRAINING

HAZARDS & CONCERNS

- Cold Stress
- Frost Bite
- Frost Nip
- Hypothermia



DEFINITIONS

Cold Stress: Excessive exposure to cold.

Frost Nip: Frostnip is a mild form of frostbite. Continued exposure leads to numbness in the affected area. As your skin warms, you may feel pain and tingling. Frostnip doesn't permanently damage the skin.

Frost Bite: Frostbite is an injury caused by freezing of the skin and underlying tissues and is most common on the fingers, toes, nose, ears, cheeks, and chin. Exposed skin in cold, windy weather is most vulnerable to frostbite but frostbite can occur on skin covered by gloves or other clothing.

Hypothermia: Dangerous overcooling of the body. Can be fatal if not treated immediately.

PRECAUTIONS

- Cold exposure can cause frost nip and, more seriously, frost bite.
- At very cold temperatures, the most serious concern is the risk of hypothermia. Hypothermia could be fatal in absence of immediate medical attention.
- A cold environment challenges the worker in three ways: by air temperature, air movement (wind speed), and humidity. To work safely, these challenges must be addressed through proper insulation (layered protective clothing), physical activity, and controlling the worker's exposure to cold (work/rest schedule).
- When a worker may be exposed to cold conditions that may create a risk to the worker's safety or health, the employer must ensure that the worker is provided with information, instruction and training in the symptoms of thermal stress and the precautions to be taken to avoid injury from thermal stress.
- 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.

Concern	Signs & Symptoms	First Aid
Frost Nip	<ul style="list-style-type: none"> ▪ Skin starts turning whiter or paler ▪ Loss of cold sensation or even feeling warmth in the affected area ▪ Skin becomes less pliable and soft ▪ Increasing feeling of pain 	<ul style="list-style-type: none"> ▪ Get in out of the cold ▪ Warm up gradually ▪ Change into warm dry clothing
Frost Bite	<ul style="list-style-type: none"> ▪ At first, cold skin and a prickling feeling ▪ Numbness ▪ Red, white, bluish-white or grayish-yellow skin ▪ Hard or waxy-looking skin ▪ Clumsiness due to joint and muscle stiffness. ▪ Blistering after rewarming, in severe cases 	<ul style="list-style-type: none"> ▪ Get out of the cold into a warm space ▪ Remove wet clothes and wrap up in a blanket ▪ Gently rewarm frostbitten areas ▪ Don't rub the affected skin ▪ Seek medical attention
Hypothermia	<ul style="list-style-type: none"> ▪ Shivering ▪ Exhaustion or feeling very tired ▪ Slow, weak pulse ▪ Fumbling, irritability, confusion ▪ Memory loss ▪ Slurred speech ▪ Drowsiness 	<ul style="list-style-type: none"> ▪ Seek medical attention immediately ▪ Handle the affected person gently ▪ Remove person from the cold ▪ Remove wet clothing and cover with blankets ▪ Do not apply direct heat

THE DO'S

DO Select clothing to suit the temperature, weather conditions (e.g., wind speed, rain), the level and duration of activity, and job design so that the amount of heat and perspiration a worker generates while working is regulated. Excessive sweating will cause the inner layer to become wet and the insulation value of the clothing will decrease dramatically. This increases the risk for cold injuries.

DO Wear clothing in multiple layers. The air between layers of clothing provides better insulation than the clothing itself. Open or remove a layer before you get too warm and start sweating or add a layer when you get too cold. Successive outer layers should be larger than the inner layer, otherwise the outermost layer will compress the inner layers and will decrease the insulation properties of the clothing.

DO Wear an inner layer that provides insulation and is able to "wick" moisture away from the skin to help keep it dry.

DO Ensure that the additional layers of clothing provide adequate insulation for the weather conditions and are easy to open or remove before you get too warm to prevent excessive sweating during strenuous activity. Outer jackets should have the means for closing off and opening the waist, neck and wrists to help control how much heat is retained or given off. The outer layer of clothing should provide sufficient protection from wind or water penetration.

- DO** Wear a wool knit cap or a liner under a hard hat to reduce excessive heat loss. Almost 50 percent of body heat is lost through the head.
- DO** Wear winter footwear that provides enough insulation to prevent cold exposure injuries, enough traction for the surface they will be used on and protects against other hazards that may be present due to the task or work environment.
- DO** Keep clothing as dry as possible. Remove snow from clothing prior to entering heated shelters.
- DO** Allow perspiration to escape by opening the neck, waist, sleeves and ankle fasteners or by removing outerwear while in a heated area. If the rest area is warm enough it is preferable to take off the outer layer(s) so that the perspiration can evaporate from the clothing.
- DO** Eat balanced meals and drink adequate liquids to maintain body heat and prevent dehydration. Eat properly and frequently. Working in the cold requires more energy than in warm weather because the body is working to keep the body warm. It requires more effort to work when wearing bulky clothing and winter boots especially when walking through snow.
- DO** Monitor yourself and your co-workers for signs of cold stress.
- DO** Remind coworkers to take warm up breaks.

The DON'TS

- DON'T** Forget to drink fluids often especially when doing strenuous work. For warming purposes, hot non-alcoholic beverages or soup are suggested. Caffeinated drinks such as coffee should be limited because it increases urine production and contributes to dehydration. Caffeine also increases the blood flow at the skin surface which can increase the loss of body heat.
- DON'T** Sit or stand still for prolonged periods. Keep moving to keep the blood flowing.
- DON'T** Consume alcohol as it causes expansion of blood vessels in the skin and impairs the body's ability to regulate temperature (it affects shivering that can increase your body temperature). These effects cause the body to lose heat and thus increase the risk of hypothermia.
- DON'T** allow clothing to become excessively dirty. Dirt fills air cells in fibers of clothing and destroys its insulating ability.
- DON'T** maintain prolonged contact with cold objects such as tools equipment or piping as this may cause frostbite even though the worker's clothing.
- DON'T** allow your clothing to come in to contact with water or other liquids as it may increase the rate of cold transmission through to the worker's skin, making frostbite more likely, replace wet clothing as soon as possible.
- DON'T** allow contact of bare skin with cold surfaces (especially metallic) below -7°C and avoid skin contact when handling evaporative liquids (gasoline, alcohol, cleaning fluids) below 4°C, which can dramatically increase the rate of evaporative cooling of the skin.
- DON'T** ignore the signs of frost bite in yourself or your co-workers. Seek help immediately.

REFERENCES / ADDITIONAL INFORMATION

Figure 1: Suggested Exposure Limits Based on Four-Hours Exposure Temperature and Windchill

Sunny sky air temperature		No noticeable wind		Wind 8 km/h (5 mph)		Wind 16 km/h (10 mph)		Wind 24 km/h (15 mph)		Wind 32 km/h (20 mph)	
°C below zero*	°F below zero*	Max. work period	Number of breaks**	Max. work period	Number of breaks**	Max. work period	Number of breaks**	Max. work period	Number of breaks**	Max. work period	Number of breaks**
26 to 28	15 to 19	120 minutes	1	120 minutes	1	75 minutes	2	55 minutes	3	40 minutes	4
29 to 31	20 to 24	120 minutes	1	75 minutes	2	55 minutes	3	40 minutes	4	30 minutes	5
32 to 34	25 to 29	75 minutes	2	55 minutes	3	40 minutes	4	30 minutes	5	Non-emergency work should stop	
35 to 37	30 to 34	55 minutes	3	40 minutes	4	30 minutes	5	Non-emergency work should stop			
38 to 39	35 to 39	40 minutes	4	30 minutes	5	Non-emergency work should stop					
40 to 42	40 to 44	30 minutes	5	Non-emergency work should stop							
43 and below	45 and below	Non-emergency work should stop									

* All temperatures are approximate.

**Includes a normal break after two hours and the number of additional warm-up breaks needed.

Developed by:	1.	Angie Anton	Date:	August 5, 2008
Revised by:	1.	Ray Dawson	Date:	August 25, 2011
	2.	John Artym		
Revised by:	1.	Todd Penney	Date:	March 21, 2019
	1.	Amanda Campbell		
Revised by:	1.	Amanda Campbell	Date:	November 1, 2020
Approved by:	1.	HSE Committee	Date:	February 2021