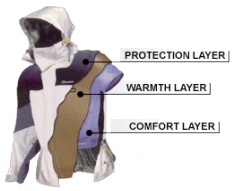
Introduction

Working in cold weather can make workers vulnerable to frostbite and hypothermia, which can be fatal.

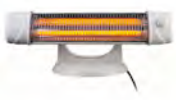
Critical Task Inventory

- Why Worry About Cold?
- Cold-Induced Injuries
- Wind Chill
- Working in Cold Temperatures
- Working in Dampness
- Physical Needs in the Cold
- Space Heaters in Cold Weather
- Prepare for Vehicle Breakdowns

PPE Requirements Summary

Image	Description	Standard
	Layered Clothing	Required
	Hat	Required
	Gloves	Required
	Insulated Boots	Required

Safety Equipment Summary

Image	Description	Standard
	Thermal Insulated Material	Required on Equipment Handles
	Heat Source (air jet or radiant heater)	May be Required

Safety Equipment Summary

Image	Description	Standard
	Warming Shelter or Wind Shield	May be Required
	Spare Set of Clothes	Recommended
	Communication Device	Required

Why Worry About Cold?

In cold temperatures, employees and managers need to take extra steps to keep personnel and worksites safe. Cold weather takes away body heat. Cold stress can cause a decrease in dexterity and sensitivity. Too much heat loss can cause the inner body (core) temperature to fall to dangerously low levels causing hypothermia and even death. Exposed body parts may freeze in extreme weather resulting in frostbite.


cold

Hazard Assessment

Task Steps and Hazards	F	S	P	R
• Cold-Induced Injuries and Illnesses (H and S)	3	3	2	8
• Musculoskeletal Injuries (S)	3	2	1	6
• Frostbite (S)	3	2	2	7
• Hypothermia (S)	3	3	1	7

Controls

General Cold Weather Precautions

- Standing, sitting still and driving or any other job that has a low activity level can increase the danger from the cold.
- Wet skin, clothing or shoes from being wet with water, gasoline, alcohol, solvent or other liquid that evaporates can be detrimental to your overall health and comfort when working in cold weather.
- Overdressing can be extremely dangerous when you are working in cold weather. Avoid wearing too-thick clothing rather than layers; tight-fitting belt, clothing or shoes that restrict circulation; and waterproof clothing that restricts evaporation.

Frequency of Exposure (F)	Severity of Loss (S)	Probability of Loss (P)	F + S + P = Risk Rating (R)
1 = Up to Weekly 2 = Up to Daily 3 = 1+ Times / Day	1=Class C – Minor, non-disabling, non-disruptive 2=Class B – Serious injury or disruptive loss 3=Class A – Major injury, permanent disability or loss	1=Limited chance adverse event will occur 2=Adverse event likely to occur 3=Adverse event likely to occur soon	**7 to 9 = High Risk** **5 to 6 = Medium Risk** **3 to 4 = Low Risk**

Type Of Hazard: H= Health (acute or chronic) S= Safety (people and equipment) Q= Quality P = Production E= Environment

Why Worry About Cold? (continued)

Controls

General Cold Weather Precautions

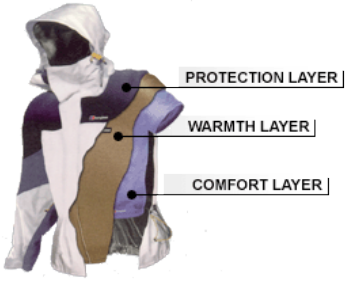
- Working in cold weather increases the risk of musculoskeletal injuries such as back strain. Do warm up exercises and stretching before handling heavy equipment and material.
- Below -1 deg C use thermal insulating material on equipment handles. This will reduce the amount of heat that the equipment will draw from your body.

Proper Clothing

When you dress warmly, and in layers, you can regulate your body temperature by taking off or putting on layers as necessary. You'll be a lot safer, too. Getting wet and cold causes hypothermia.

Inner Layer

The inner layer of clothing should be made of materials, such as polypropylene, that draws moisture (perspiration) to the outside.



Middle Layer

The middle layers should be made of material like wool or Thinsulate that provides insulation without adding significant weight.

Outer Layer

The outer layer of clothing is used for wind and water protection and should be water repellent. These fabrics, such as Gore-Tex, are breathable, allowing body heat to be released and providing easy evaporation of moisture.

Head

- Wear a hat. Up to 30% of body heat can be lost when the head is left exposed.
- Hats, hoods and facemasks will prevent heat loss leading to frostbite.

Hands

Wear gloves to prevent injury while not hindering dexterity. Mittens can be layered for maximum protection.

Feet

Wear insulated boots or other footwear.

Cold-Induced Injuries

Cold-induced injuries are painful, lingering and can lead to death.

Hazard Assessment

Task Steps and Hazards	F	S	P	R
• Hypothermia (S)	3	3	1	7
• Frostnip (S)	3	2	1	6
• Frostbite (S)	3	2	2	7
• Trench/Immersion Foot (S)	3	2	1	6
• Chillblain (S)	3	2	1	6

Controls

Hypothermia

When body temperature falls from 37 degrees Celsius to 35 degrees and below, hypothermia sets in. The result is a loss of coordination, loss of awareness and an overall slowing of actions.

- Persons with hypothermia need heat.
- If shivering stops, the situation is critical, get any assistance available to get the person to a medical facility.

Frostnip

Symptoms of frostnip begin with pain and redness and progresses toward frostbite with increased pain, pale skin, tingling and numbness. The frozen extremity may appear completely white or may be mottled with blue and white patches. Hands and feet are the most common areas affected by frostnip and frostbite; however, any unprotected skin is susceptible.

- Get out of the cold as quickly as possible.
- Strip the affected body part of all clothing and covering.
- Place the affected body part in the warm water until it is fully rewarmed - that is, all discoloration is gone, and the tissue is soft and pliable.
- See a doctor right away if you can. If you cannot, take extra care to avoid letting the area refreeze.

Frequency of Exposure (F)	Severity of Loss (S)	Probability of Loss (P)	F + S + P = Risk Rating (R)
1 = Up to Weekly 2 = Up to Daily 3 = 1+ Times / Day	1=Class C – Minor, non-disabling, non-disruptive 2=Class B – Serious injury or disruptive loss 3=Class A – Major injury, permanent disability or loss	1=Limited chance adverse event will occur 2=Adverse event likely to occur 3=Adverse event likely to occur soon	7 to 9 = High Risk 5 to 6 = Medium Risk 3 to 4 = Low Risk

Type Of Hazard: H= Health (acute or chronic) S= Safety (people and equipment) Q= Quality P = Production E= Environment

Cold-Induced Injuries

Frostbite

Frostbite will occur if human skin is unprotected from cold temperatures. Depending on the temperature and degree of wind chill, frostbite can occur in less than 5 minutes.

- Do not rub or bump the affected area.
- Do not use direct heat such as a heating pad or hair dryer to warm the affected area.
- Do not pop blisters that appear. Popping blisters on frostbitten skin can cause infection.
- Keep warm with clothes and blankets.
- Soak frostbitten area in warm water (between 101° to 104° F). If you don't have a thermometer, dip your elbow in the water. If the water is too hot for your elbow, it's too hot. Maintain temperature of water by adding warm water if necessary.
- Soak affected area until it becomes pink.
- Seek medical attention as soon as possible for a thorough exam and additional treatment.
- Avoid further exposure to the cold – especially with the affected areas.

Trench / Immersion Foot

Trench or Immersion Foot occurs if part of the body is covered with water or wet mud that is just above freezing, the area may become chronically swollen, weak, and sensitive to the cold.

- Rotate your shoes every other day to allow them to dry thoroughly.
- Avoid synthetic materials like rubber or vinyl, wear leather or cloth that can absorb moisture.
- Frequent changes of socks to wick away moisture.
- Use talc or baby powder daily to wick away moisture.

Chilblain

Chilblain is identified by red, swollen skin, usually on hands and feet, that feels hot, tender and itchy after cold exposure.

- Keep affected area warm.
- Avoid scratching the affected area.
- Use a mild anti-itch lotion such as Calamine.

Wind Chill

Be aware of dropping temperatures as the temperature decreases and the wind speed increases.

Hazard Assessment

Task Steps and Hazards	F	S	P	R
• Frostnip / Frostbite (H)	3	2	2	8
• Hypothermia (H)	3	3	1	7

Controls

- Avoid working outside when high wind chills are present.
- Below -12 deg C workers should be under observation by a co-worker or supervisor.

Wind Chill Chart

Wind Speed (km/h) \ Temperature (°C)	5	0	-5	-10	-15	-20
5	4	-2	-7	-13	-19	-24
10	3	-3	-9	-15	-21	-27
15	2	-4	-11	-17	-23	-29
20	1	-5	-12	-18	-24	-30
25	1	-6	-12	-19	-25	-32
30	0	-6	-13	-20	-26	-33
35	0	-7	-14	-20	-27	-33
40	-1	-7	-14	-21	-27	-34
45	-1	-8	-15	-21	-28	-35
50	-1	-8	-15	-22	-29	-35
55	-2	-8	-15	-22	-29	-36
60	-2	-9	-16	-23	-30	-36
65	-2	-9	-16	-23	-30	-37
70	-2	-9	-16	-23	-30	-37
75	-3	-10	-17	-24	-31	-38
80	-3	-10	-17	-24	-31	-38

Working in Cold Temperatures

When working in cold temperatures, Employees need to take extra steps to keep safe.

Hazard Assessment

Task Steps and Hazards	F	S	P	R
• Slip on Ice (S)	3	2	2	7
• Hypothermia (H)	3	3	1	7
• Frostbite (H)	3	2	2	8
• Frost Nip (H)	3	2	1	6

Controls

Personal Protection

- Wear insulated boots or other appropriate footwear for the conditions.
- Wear clothing suitable for current and potential weather conditions.

Frequency of Exposure (F)	Severity of Loss (S)	Probability of Loss (P)	F + S + P = Risk Rating (R)
1 = Up to Weekly 2 = Up to Daily 3 = 1+ Times / Day	1=Class C – Minor, non-disabling, non-disruptive 2=Class B – Serious injury or disruptive loss 3=Class A – Major injury, permanent disability or loss	1=Limited chance adverse event will occur 2=Adverse event likely to occur 3=Adverse event likely to occur soon	7 to 9 = High Risk 5 to 6 = Medium Risk 3 to 4 = Low Risk

Type Of Hazard: H= Health (acute or chronic) S= Safety (people and equipment) Q= Quality P = Production E= Environment

- Change into a full set of dry clothing in case work clothes become wet.

Keeping Warm

- Heat sources such as air jets, radiant heaters can be used to help warm up.
- Warming shelters and wind shields should be used where practical.
- Below -1 deg C use thermal insulating material on equipment handles.
- Keep your core body temperature up.
- Avoid walking through water and wet mud.
- Avoid covering any part of the body with water or wet mud.
- Below -12 deg C workers should be under observation by a co-worker or supervisor.

Working in Dampness

Working in damp conditions can lead to cold-induced injuries and illnesses.

Hazard Assessment

Task Steps and Hazards	F	S	P	R
• Cold-Induced Injuries and Illnesses (H and S)	3	3	2	8
• Sweating (S)	3	3	2	8

Controls

Cold-Induced Injuries

Wear clothing suitable for current and potential weather conditions.

Sweating

- A complete change of clothes needs to be on hand in case clothes get wet or there is excessive sweating.
- Keep work rate fast enough to keep warm, but not so fast as to cause heavy sweating.
- When entering a heated shelter, snow or frost on clothing should be brushed off before it melts. Remove your outer layer and the remainder of the clothing should be loosened to permit sweat evaporation. Snow should be kept out of clothing, boots and gloves.

Physical Needs in the Cold

Uncomfortably cold working conditions can lead to lower work efficiency and higher accident rates. Accidents are more likely to occur in very cold working conditions.

Hazard Assessment

Task Steps and Hazards	F	S	P	R
• Dehydration (S)	3	3	2	8
• Drop in Energy Levels (S)	3	3	3	9
• Physical Fitness Decreased (S)	3	2	2	7
• Pre-existing Medical Conditions (S)	3	2	2	7
• Fatigue (S)	3	2	2	7

Controls

Hydration

- Drink plenty of fluids – warm and sweet preferably.
- Limit coffee, tea, and cola and nicotine intake.

Diet

Diet is important in preventing problems when working in cold environments. The average person will need 4000 calories per day when working in cold conditions. Poor dietary habits can make people more susceptible to cold weather injuries.

- Increase caloric intake by 10-15%.
- Maintain a healthy diet.

Medical Condition

Inform co-workers and supervisor of any ailments such as diabetes, hypertension or cardiovascular disease that may be affected by the cold.

Fatigue

Come to work well rested.

Frequency of Exposure (F)	Severity of Loss (S)	Probability of Loss (P)	F + S + P = Risk Rating (R)
1 = Up to Weekly 2 = Up to Daily 3 = 1+ Times / Day	1=Class C – Minor, non-disabling, non-disruptive 2=Class B – Serious injury or disruptive loss 3=Class A – Major injury, permanent disability or loss	1=Limited chance adverse event will occur 2=Adverse event likely to occur 3=Adverse event likely to occur soon	7 to 9 = High Risk 5 to 6 = Medium Risk 3 to 4 = Low Risk

Type Of Hazard: H= Health (acute or chronic) S= Safety (people and equipment) Q= Quality P = Production E= Environment

Space Heaters in Cold Weather

Using propane or kerosene heaters that are poorly ventilated can cause drowsiness, headaches and dizziness from reduced oxygen levels and build-up of carbon monoxide.

Hazard Assessment

Task Steps and Hazards	F	S	P	R
• Headaches, Dizziness (S)	2	2	2	6
• Carbon Monoxide Poisoning (H)	2	3	2	7

Controls

- Allow a fresh air vent by opening a window or door.
- Follow the manufacturer's instructions for safe use of the heating device.
- Consider using electric heaters in enclosed areas with limited ventilation.

Carbon monoxide is colourless, odourless and has no taste. It is a killer.

Prepare for Vehicle Breakdowns

Travelling in cold weather increases the chance of a vehicle breakdown for which you need to be prepared.

Hazard Assessment

Task Steps and Hazards	F	S	P	R
Prepare for Vehicle Breakdowns				
• Being Unprepared (S)	3	3	2	8
• Cold-Induced Injuries (S or H)	3	2	1	6

Controls

- Workers who must travel in cold weather should be supplied with extra warm clothing, gloves and blankets.
- Communication device required.
- See list of possible cold-induced injuries.

Frequency of Exposure (F)	Severity of Loss (S)	Probability of Loss (P)	F + S + P = Risk Rating (R)
1 = Up to Weekly 2 = Up to Daily 3 = 1+ Times / Day	1=Class C – Minor, non-disabling, non-disruptive 2=Class B – Serious injury or disruptive loss 3=Class A – Major injury, permanent disability or loss	1=Limited chance adverse event will occur 2=Adverse event likely to occur 3=Adverse event likely to occur soon	**7 to 9 = High Risk** **5 to 6 = Medium Risk** **3 to 4 = Low Risk**

Type Of Hazard: H= Health (acute or chronic) S= Safety (people and equipment) Q= Quality P = Production E= Environment