



PS Safety & Risk Management, LLC
Providing Safety Solutions for Today's Needs

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THE COLD STRESS EQUATION

U.S. Department of Labor
 Occupational Safety and Health Administration
 OSHA 3156
 1998

LOW TEMPERATURE + WIND SPEED + WETNESS = INJURIES & ILLNESS

When the body is unable to warm itself, serious cold related illnesses and injuries may occur, and permanent tissue damage and death may result.

Hypothermia can occur when *land temperatures* are **above** freezing or *water temperatures* are below 98.6°F/ 37°C.

Cold related illnesses can slowly overcome a person who has been chilled by low temperatures, brisk winds, or wet clothing.

	Wind Speed (MPH)	
	0	10 20 30 40
30° F/-1.1° C -		Little Danger (Caution)
20° F/-6.7° C -		Freezing to Exposed Flesh within 1 Hour
10° F/-12.2° C -		
0° F/-17.8° C -		Danger
10° F/-23.3° C -		Freezing to Exposed Flesh within 1 Minute
20° F/-28.9° C -		
30° F/-34.4° C -		Extreme Danger
50° F/-45.6° C -		Freezing to Exposed Flesh within 30 Seconds
-40° F/-40° C -		

Adapted from: ACGIH
 Threshold Limit Values,
 Chemical Substances and
 Physical Agents Biohazard
 Indices, 1998-1999.

FROST BITE

What Happens to the Body:

FREEZING IN DEEP LAYERS OF SKIN AND TISSUE; PALE, WAXY-WHITE SKIN COLOR; SKIN BECOMES HARD and NUMB; USUALLY AFFECTS THE FINGERS, HANDS, TOES, FEET, EARS, and NOSE.

What Should Be Done: (land temperatures)

Move the person to a warm dry area. Don't leave the person alone.

Remove any wet or tight clothing that may cut off blood flow to the affected area.

DO NOT rub the affected area, because rubbing causes damage to the skin and tissue.

Gently place the affected area in a warm (105°F) water bath and monitor the water temperature to **slowly** warm the tissue. Don't pour warm water directly on the affected area because it will warm the tissue too fast causing tissue damage. Warming takes about 25-40 minutes.

After the affected area has been warmed, it may become puffy and blister. The affected area may have a burning feeling or numbness. When normal feeling, movement, and skin color have returned, the affected area should be dried and wrapped to keep it warm. **NOTE:** If there is a chance the affected area may get cold again, do not warm the skin. If the skin is warmed and then becomes cold again, it will cause severe tissue damage.

Seek medical attention as soon as possible.

HYPOTHERMIA - (Medical Emergency)

What Happens to the Body:

NORMAL BODY TEMPERATURE (98.6° F/37°C) DROPS TO OR BELOW 95°F (35 C); FATIGUE OR DROWSINESS; UNCONTROLLED SHIVERING; COOL BLUISH SKIN; SLURRED SPEECH; CLUMSY MOVEMENTS; IRRITABLE, IRRATIONAL OR CONFUSED BEHAVIOR.

What Should Be Done: (land temperatures)

Call for emergency help (i.e., Ambulance or Call 911).

Move the person to a warm, dry area. Don't leave the person alone. Remove any wet clothing and replace with warm, dry clothing or wrap the person in blankets.

Have the person drink warm, sweet drinks (sugar water or sports-type drinks) if they are alert. **Avoid drinks with caffeine** (coffee, tea, or hot chocolate) or alcohol.

Have the person move their arms and legs to create muscle heat. If they are unable to do this, place warm bottles or hot packs in the arm pits, groin, neck, and head areas. **DO NOT** rub the person's body or place them in warm water bath. This may stop their heart.

What Should Be Done: (water temperatures)

Call for emergency help (Ambulance or Call 911). Body heat is lost up to 25 times faster in water.

DO NOT remove any clothing. Button, buckle, zip, and tighten any collars, cuffs, shoes, and hoods because the layer of trapped water closest to the body provides a layer of insulation that slows the loss of heat. Keep the head out of the water and put on a hat or hood.

Get out of the water as quickly as possible or climb on anything floating. **DO NOT** attempt to swim unless a floating object or another person can be reached because swimming or other physical activity uses the body's heat and reduces survival time by about 50 percent.

If getting out of the water is not possible, wait quietly and conserve body heat by folding arms across the chest, keeping thighs together, bending knees, and crossing ankles. If another person is in the water, huddle together with chests held closely.

How to Protect Workers

Recognize the environmental and workplace conditions that lead to potential cold-induced illnesses and injuries.

Learn the signs and symptoms of cold-induced illnesses/injuries and what to do to help the worker.

Train the workforce about cold-induced illnesses and injuries.

Select proper clothing for cold, wet, and windy conditions. Layer clothing to adjust to changing environmental temperatures. Wear a hat and gloves, in addition to underwear that will keep water away from the skin (polypropylene).

Take frequent short breaks in warm dry shelters to allow the body to warm up.
Perform work during the warmest part of the day.
Avoid exhaustion or fatigue because energy is needed to keep muscles warm.
Use the buddy system (work in pairs).
Drink warm, sweet beverages (sugar water, sports-type drinks). Avoid drinks with caffeine (coffee, tea, or hot chocolate) or alcohol.
Eat warm, high-calorie foods like hot pasta dishes.

Workers Are at Increased Risk When...

They have predisposing health conditions such as cardiovascular disease, diabetes, and hypertension.
They take certain medication (check with your doctor, nurse, or pharmacy and ask if any medicines you are taking affect you while working in cold environments).
They are in poor physical condition, have a poor diet, or are older.

The information in this Safety Meeting Topic was provided by OSHA.

For more information or training needs, contact **PS Safety & Risk Management, LLC** at
(225) 716-0029 or visit us at www.pssafety.net