



Cold Elements

OSHA REGULATIONS: COLD STRESS AND EXTREME WEATHER EXPOSURE:

Although OSHA does not have a specific standard that covers working in cold environments, employers have a responsibility to provide workers with employment and a place of employment that are free from recognized hazards, including cold stress and hazards, which are causing or are likely to cause death or serious physical harm to them (Section 5(a)(1) of the Occupational Safety and Health Act of 1970). Employers should, therefore, train workers on the hazards of the job and safety measures to use, such as engineering controls and safe work practices, and PPE which will protect workers' safety and health.

ISSUES:

In a cold environment, most of the body's energy is used to keep the internal core temperature warm. Over time, the body will begin to shift blood flow from the extremities (hands, feet, arms, and legs) and the outer skin to the core (chest and abdomen). This shift causes the exposed skin and extremities to cool rapidly and increases the risk of hypothermia and frostbite. Combine this scenario with exposure to a wet environment or an extended wet condition trench foot and or chilblains may also be a problem. Wind conditions especially when individuals are wet can increase the possibility of:

- Hypothermia
- Frostbite
- Trench foot
- Chilblains

SERIOUSNESS:

Cold weather and extreme exposure to the elements are the leading cause of death among all weather-related phenomena in the United States. Although illness from exposure to cold elements is preventable, every year, thousands become sick from occupational cold element exposure, and some cases are fatal. Most outdoor fatalities, 50% to 70%, occur in the first few days of

working in cold environments because the body needs to build a tolerance to the cold elements gradually over time, and often protective PPE is not readily available. The process of building tolerance is called cold weather acclimatization. Lack of acclimatization represents a major risk factor for fatal outcomes.

COLD STRESS AND EXTREME WEATHER EXPOSURES CONDITIONS AND EXPLANATIONS:

Cold Stress occurs when the body's heating mechanisms are unable to regulate its internal temperature, leading to hypothermia, skin exposure causing frostbite, or lack of circulation developing issues such as trench foot or chilblain. Several factors contribute to Cold Stress, including:

- 1. Cold Temperatures, Getting Wet, and High Winds:** Cold and wet conditions make it harder for the body to keep its body temperature up. The length of time exposed to cold elements (low temperatures, wet conditions, and wind) is critical. Reference wind chill index above.
- 2. Intense Physical Activity Or Element Exposures:** Strenuous work or extensive exposure decreases the body's heat production by consuming excess energy and lowering the body's ability to maintain its core temperature.
- 3. Lack of Acclimatization:** Sudden exposure to cold temperatures without allowing the body to acclimate can increase the risk of cold stress illnesses and deaths.
- 4. Personal Factors:** Age, weight, fitness level, and underlying health conditions can affect an individual's susceptibility to cold stress illnesses and deaths.
- 5. Other Factors:**
 - **Medications:** such as antihistamines, diuretics, blood pressure medications, and others.

- **Health Conditions:** diabetes, obesity or overweight, high blood pressure, heart disease, and others.
- Physical Characteristics: older age, lower levels of physical fitness, pregnancy, acclimatization status, (i.e., if you have built tolerance to working in cold conditions), and others.
- **Behavioral Characteristics:** recent alcohol use, use of illicit drugs such as opioids, methamphetamine, and cocaine, a low intake of water, and others.

WHAT YOU NEED TO KNOW:

1. **How to recognize cold illness** such as Hypothermia, Frostbite, Trench Foot and Chilblain. These can all be life threatening.

- **Hypothermia** - Occurs when body heat is lost faster than it can be replaced and the normal body temperature (98.6°F) drops to less than 95°F. Hypothermia is most likely at very cold temperatures, but it can occur even at cool temperatures (above 40°F) if a person becomes chilled from rain, sweat, or submersion in cold water.
- **Frostbite** - A serious injury that occurs when skin and tissue freeze due to prolonged exposure to cold temperatures.
- **Trench foot** - Also known as immersion foot - is a cold injury that occurs when your feet are wet and cold for a prolonged period of time.
- **Chilblains** - Small, itchy, inflamed patches of skin that appear after exposure to cold or damp air. They are also known as pernio.

2. **Symptoms - If a worker experiences:**

- Confusion, shivering, slow breathing, skin, and lips may turn pale, blue, or gray
- Weakness or loss of coordination, drowsiness, fumbling hands, or memory loss.
- Pain, swelling, redness, numbness, burning, tingling, itching, and leg cramps.
- After a few days, blisters or ulcers may develop.
- Redness, itching, possible blistering or inflammation.

3. **Actions:**

- **Call 911 immediately** - then monitor heart rate and breathing. If less than 6 breaths a minute, begin rescue breathing. If there are no signs of life, begin CPR.
- Warm and dry the worker right away with dry clothes and/or cover with dry blankets.
- If possible, move the person to a warmer or heated area. Avoid extreme heat changes. Warm

the person slowly, starting with the core of the body. Offer warm (nonalcoholic) drinks.

- Stay with the worker until help arrives. After a few days, blisters or ulcers may develop.

4. **Prevention Strategies:**

- Avoid wearing wet clothes.
- Wear a hat or hood to help keep your whole body warmer. Hats reduce the amount of body heat that escapes from your head.
- Use a knit mask to cover your face and mouth (if needed).
- Carry extra socks, gloves, hats, jackets, and a change of clothes.
- Use insulated gloves to protect the hands (water resistant if necessary).
- Wear insulated and waterproof boots (or other footwear).
- Ensure that everybody knows the symptoms of cold stress.
- Monitor your physical condition and that of your coworkers.
- Take regular breaks to warm up when needed.
- Dress properly for the cold (wool and fleece are preferred).
- Stay dry in the cold because moisture or dampness, e.g., from sweating, can increase the rate of heat loss from the body.
- Keep extra clothing (including underwear) handy in case you get wet and need to change.
- Drink warm sweetened fluids (no alcohol).
- Avoid touching cold metal or wet surfaces with bare skin.
- Use proper engineering controls, safe work practices, and personal protective equipment (PPE) provided by your employer.

"Winter Weather - Preparedness | Occupational Safety and Health Administration." www.osha.gov/winter-weather/preparedness.

"Cold Stress Guide | Occupational Safety and Health Administration." www.osha.gov/emergency-preparedness/guides/cold-stress.

OSHA. "Heat - Overview: Working in Outdoor and Indoor Heat Environments | Occupational Safety and Health Administration." www.osha.gov/heat-exposure.

"Winter Weather - Cold Stress | Occupational Safety and Health Administration." www.osha.gov/winter-weather/cold-stress.

CDC. "Cold-Related Illnesses in Workers." Cold Stress, 2024, www.cdc.gov/niosh/cold-stress/about/related-illness.html.

"7 Winter Weather Worker Safety Tips - U-Teck." U-Teck, 13 Oct. 2022, www.uteck.com/2022/10/13/7-winter-weather-worker-safety-tips/. Accessed 18 Dec. 2024.

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