Brieser CONSTRUCTION

Section 42
Safety Health and Environmental Manual

2025

Cold Stress Prevention

Cold Stress Prevention

Purpose

All employees who work outdoors in cold environments that may be at risk of cold stress. This section describes safety requirements for working outdoors in cold environments that may be subject to the following cold stresses:

- Hypothermia
- Frostbite
- Trench Foot
- Chilblains

Responsibilities

The Program Administrator: Brieser Safety Director

This person is responsible for:

- Issuing and administering this program and making sure that it satisfies all applicable federal, state, and local requirements.
- Ensuring all necessary precautions contained in this section by conducting field audits.

Equipment Manager

These people are responsible for:

- Ensuring that equipment is repaired when malfunctioning such as heaters in equipment equipped with enclosed cabs.
- Documenting that preventive maintenance is performed on machinery or equipment and retained for the life of the machinery or equipment.

Project Managers, Superintendents and Foremen

These people are responsible for:

- Review any current revision of this policy prior to implementation.
- Ensuring personnel assigned are sufficiently trained in this section.
- Performance of proper planning for cold environments, and ensuring correct practices are being utilized Such as:
    - Use of radiant heaters
    - Wind breaks
    - Temporary Shelters
    - Schedule outdoor work during the warmest part of the day
    - Allowing frequent breaks from the cold weather
- Conduct an assessment to identify the types of jobs or employees who are at risk for cold exposure.
- All employees should be informed of the dangers and destructive potential caused by unstable snow buildup, sharp icicles, and ice dams and know how to prevent accidents caused by them and be documented on the Brieser TSTI form or similar Job Hazard Analysis.
- Conduct a regular inspection on cold weather supplies (e.g., hand warmers, gloves, hardhat FR inserts, etc.) should be carried out to ensure that supplies are always in stock.

Employee

These people are responsible for:

- Dressing appropriately for cold weather conditions. The following are recommendations for working in cold environments:
    - Wear at least three layers of loose-fitting clothing. Layering provides better insulation. Do not wear tight fitting clothing.
    - An inner layer of wool, silk or synthetic to keep moisture away from the body.
    - A middle layer of wool or synthetic to provide insulation even when wet.
    - An outer wind and rain protection layer that allows some ventilation to prevent overheating.
    - 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 the face and mouth (if needed).
    - Use insulated gloves to protect the hands (water resistant if necessary).
    - Wear insulated and waterproof boots (or another footwear).

Employee continued.

- Have knowledge of this section and know the symptoms of cold stress.
- 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).
- Use proper engineering controls, safe work practices, and personal protective equipment (PPE) provided by your employer.

Definitions

Cold Stress – What constitutes cold stress, and its effects can vary across different areas of the country. In regions that are not used to winter weather, near freezing temperatures are considered factors for "cold stress." Increased wind speed also causes heat to leave the body more rapidly (wind chill effect). Wetness or dampness, even from body sweat, also facilitates heat loss from the body. Cold stress occurs by driving down the skin temperature, and eventually the internal body temperature. When the body is unable to warm itself, serious cold-related illnesses and injuries may occur, and permanent tissue damage and death may result. Types of cold stress or cold related illness include trench foot, frostbite, and hypothermia.

Hypothermia – When exposed to cold temperatures, your body begins to lose heat faster than it can be produced. When the core body temperature drops below the normal 98.6° F to around 95° F, the onset of symptoms normally begins. Prolonged exposure to cold will eventually use up your body's stored energy. The result is hypothermia, or abnormally low body temperature. A body temperature that is too low affects the brain, making the victim unable to think clearly or move well. This makes hypothermia particularly dangerous because a person may not know it is happening and will not be able to do anything about it.

Frostbite – Frostbite is an injury to the body that is caused by freezing. Frostbite causes a loss of feeling and color in the affected areas. It most often affects the nose, ears, cheeks, chin, fingers, or toes. Frostbite can permanently damage body tissues, and severe cases can lead to amputation. In extremely cold temperatures, the risk of frostbite is increased in workers with reduced blood circulation and among workers who are not dressed properly.

Trench Foot – Trench foot, also known as immersion foot, is an injury of the feet resulting from prolonged exposure to wet and cold conditions. Trench foot can occur at temperatures as high as 60 degrees F if the feet are constantly wet. Injury occurs because wet feet lose heat 25-times faster than dry feet. Therefore, to prevent heat loss, the body constricts blood vessels to shut down circulation in the feet. Skin tissue begins to die because of lack of oxygen and nutrients and due to the buildup of toxic products.

Chilblains – Chilblains (*CHILL-blayns*) are caused by the repeated exposure of skin to temperatures just above freezing to as high as 60 degrees F. The cold exposure causes damage to the capillary beds (groups of small blood vessels) in the skin. This damage is permanent, and the redness and itching will return with additional exposure. The redness and itching typically occurs on cheeks, ears, fingers, and toes.

General Requirements

Workers should avoid exposure to extremely cold temperatures when possible. When cold environments or temperatures cannot be avoided, workers should follow the instructions contained within this policy.

Symptoms & First Aid of Cold Illnesses

All employees who are required to perform work in cold conditions should be knowledgeable on how to administer first aid treatment on cold induced injuries or illnesses.

- **Hypothermia**
  - Symptoms (time sensitive)
    - Early Symptoms
      - Shivering
      - Fatigue
      - Loss of coordination
      - Confusion and disorientation
    - Late Symptoms
      - No shivering
      - Blue skin
      - Dilated pupils
      - Slowed pulse and breathing.
      - Loss of consciousness
  - First Aid
    - Alert the supervisor and request medical assistance.
    - Move the victim into a warm room or shelter.
    - Remove their wet clothing.
    - Warm the center of their body first-chest, neck, head, and groin-using an electric blanket, if available; or use skin-to-skin contact under loose, dry layers of blankets, clothing, towels, or sheets.
    - Warm beverages may help increase the body temperature, but do not give alcoholic beverages. Do not try to give beverages to an unconscious person.

        - After their body temperature has increased, keep the victim dry and wrapped in a warm blanket, including the head and neck.
        - If victim has no pulse, begin cardiopulmonary resuscitation (CPR).

- **Frostbite**
    - Symptoms
        - Reduced blood flow to hands and feet (fingers or toes can freeze)
        - Numbness
        - Tingling or stinging
        - Aching
        - Bluish or pale, waxy skin
    - First Aid
        - Get into a warm room as soon as possible.
        - Unless necessary, do not walk on frostbitten feet or toes-this increases the damage to the tissue.
        - Immerse the affected area in warm-not hot-water (the temperature should be comfortable to the touch for unaffected parts of the body).
        - Warm the affected area using body heat; for example, the heat of an armpit can be used to warm frostbitten fingers.
        - Do not rub or massage the frostbitten area; doing so may cause more damage.
        - Do not use a heating pad, heat lamp, or the heat of a stove, fireplace, or radiator for warming. Affected areas are numb and can be easily burned.

- **Trench Foot**
    - Symptoms
        - Reddening of the skin
        - Numbness
        - Leg cramps
        - Swelling
        - Tingling pain
        - Blisters or ulcers
        - Bleeding under the skin
        - Gangrene (the foot may turn dark purple, blue, or gray)
    - First Aid
        - Remove shoes/boots and wet socks.
        - Dry their feet.
        - Avoid walking on feet, as this may cause tissue damage. Get into a warm room as soon as possible.

- **Chilblains**
  - Symptoms
    - Redness
    - Itching
    - Possible blistering
    - Inflammation
    - Possible ulceration in severe cases
  - First Aid
    - Avoid scratching.
    - Slowly warm the skin
    - Use corticosteroid creams to relieve itching and swelling.
    - Keep blisters and ulcers clean and covered.

Cold Stress Prevention Controls

- **Engineering Controls**

  - Use radiant heat sources to help raise the temperature of the work area.
  - Use of shields to block the wind to reduce wind chill.

- **Administrative/Work Practice Controls**

  - Use Table 6.4 Threshold Limit Values Work/Warm-Up Schedule to gauge work rest schedules.
  - Scheduling jobs that expose workers to the cold weather in the warmer part of the day
  - Regularly used walkways and travel routes shall be sanded, salted, or cleared of snow and ice as soon as practicable.
  - Before any task is started, all employees shall be informed of the dangers and destructive potential caused by unstable snow buildup, sharp icicles, and ice dams in and around the work area and travel routes. These hazards shall be document with the appropriate hazard elimination or reduction technique on Brieser's TSTI or equivalent Job Hazard Analysis.
  - Avoiding exposure to extremely cold temperatures when possible
  - Limiting the amount of time spent outdoors on extremely cold days.
  - Using relief workers to assign extra workers for long, demanding jobs.
  - Providing warm areas for use during break periods
  - Providing warm liquids (no alcohol) to workers
  - Monitoring workers who are at risk of cold stress

- Implement a "Buddy System" to ensure that no employee is working alone in cold work environments.

- **Administrative/Work Practice Controls continued**

  - Monitoring the weather conditions during a winter storm, having a reliable means of communicating with workers and being able to stop work or evacuate when necessary.
  - Acclimatizing new workers and those returning after time away from work by gradually increasing their workload, and allowing more frequent breaks in warm areas, as they build up a tolerance for working in the cold environment.
  - Having a means of communicating with workers, especially in remote areas
  - Train all employees that have the potential to be exposed to cold weather environments on this section and test for knowledge.

Table 6.4 Threshold Limit Values Work/Warm-Up Schedule for Four-Hour Shift*

Air Temperature		No Noticeable Wind		5 mph Wind		10 mph wind		15 mph wind		20 mph wind	
Sunny Sky		Max		Max		Max		Max		Max	
°C (Approx.)	°F (Approx.)	Work Period	No. of Breaks	Work Period	No. of Breaks	Work Period	No. of Breaks	Work Period	No. of Breaks	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			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		Non-emergency work should cease	
-38 to –39	-35 to -39	40 min	4	30 min	5	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease	
-40 to –42	-40 to -44	30 min	5	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease	
-43 and below	-45 and below	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease	

Notes:

1. Schedule applies to moderate to heavy work activity with warm-up breaks of ten (10) minutes in a warm location. For light to moderate work (limited physical movement): apply the schedule one step lower. For example, at -35°C (-30°F) with no noticeable wind (step 4), a worker at a job with little physical movement should have a maximum work period of 40 minutes with four breaks in a 4-hour period (step 5).

2. The following is suggested as a guide for estimating wind velocity if accurate information is not available: 5 mph: light flag moves; 10 mph: light flag fully extended; 15 mph: raises newspaper sheet; 20 mph: blowing and drifting snow.

3. If only the wind chill cooling rate is available, a rough rule of thumb for applying it rather than the temperature and wind velocity factors given above would be: (1) special warm-up breaks should be initiated at a wind chill cooling rate of about 1,750 W/m2; (2) all non-emergency work should have ceased at or below a wind chill of 2,250 W/m2. In general, the warm-up schedule provided above slightly under-compensates for the wind at the warmer temperatures, assuming acclimatization and clothing appropriate for winter work. On the other hand, the chart slightly over-compensates for the actual temperatures in the colder ranges, since windy conditions rarely prevail at extremely low temperatures.

4. TLVs apply only for workers in dry clothing.

- **Personal Protective Equipment**

Employers must provide personal protective equipment (PPE), for example, fall protection, when required by OSHA standards to protect workers' safety, and health. However, in limited cases specified in the standard (29 CFR 1910.132), there are exceptions to the requirement for employers to provide PPE to workers. For instance, there is no OSHA requirement for employers to provide workers with ordinary clothing, skin creams, or other items, used solely for protection from weather, such as winter coats, jackets, gloves, parkas, rubber boots, hats, raincoats, ordinary sunglasses, and sunscreen (29 CFR 1910.132(h)(4)).

- Dressing properly is extremely important to preventing cold stress. When cold environments or temperatures cannot be avoided, the following would help protect workers from cold stress:
  - Wear at least three layers of loose-fitting clothing. Layering provides better insulation.
  - An inner layer of wool, silk or synthetic (polypropylene) to keep moisture away from the body. Thermal wear, wool, silk or polypropylene, inner layers of clothing that will hold more body heat than cotton.
  - A middle layer of wool or synthetic to provide insulation even when wet.
  - An outer wind and rain protection layer that allows some ventilation to prevent overheating.
  - Tight clothing reduces blood circulation. Warm blood needs to be circulated to the extremities. Insulated coat/jacket (water resistant if necessary)
  - Knit mask to cover face and mouth (if needed)
  - Hat that will cover your ears as well. A hat will help keep your whole-body warmer. Hats reduce the amount of body heat that escapes from your head.
  - Insulated gloves (water resistant if necessary), to protect the hands.
  - Insulated and waterproof boots to protect the feet Schedule Defects observed in machinery or equipment shall be reported to a supervisor and must be repaired or replaced before being used again.

Recordkeeping

Training records shall be maintained by Human Resources and updated, as necessary.
Any medical records that have been produced by a medical facility as a result where an employee suffered a cold related illness as defined in this policy shall be maintained and kept in the Human Resources office.

Training Procedure

Workers exposed to cold should receive initial and annual training regarding the health effects of cold exposure, proper rewarming procedures, recognition and first aid for frostbite and hypothermia, required protective clothing, proper use of warming shelters, the buddy system, vehicle breakdown procedures, and proper eating and drinking habits for working in the cold.

Brieser CONSTRUCTION

BRIESER CONSTRUCTION
SAFETY & HEALTH MANUAL
SECTION 42
COLD STRESS PREVENTION
SUB-SECTION TRAINING

BRIESER CONSTRUCTION GENERAL CONTRACTORS		Developed:	2/27/2017
		Revised:	09/2023
CORPORATE SAFETY, HEALTH & ENVIRONMENTAL MANUAL		Revision:	02
		Reviewed:	12/17/24 KMC
STANDARD OPERATING PROCEDURE:	**Cold Stress Prevention**		
CROSS REFERENCE:	**Section 5(a)(1) of the Occupational Safety and Health Act of 1970** **ACGIH TLV/BEI**		

Cold Stress Prevention Learning Test

Score: %

Employees Name:		**Date:**	
Company:		**Instructor:**	
Employee #:		**Job Title:**	

Answer the following questions "True" or "False" by circling the appropriate letter.

T **F** 1. All employees who work outdoors in cold environments may be at risk of the following cold stresses: Hypothermia, Frostbite, Trench Foot, and Chilblains.

T **F** 2. All employees should be informed of the dangers and destructive potential caused by unstable snow buildup, sharp icicles, and ice dams and know how to prevent accidents caused by them and be documented on the Brieser TSTI form or similar Job Hazard Analysis.

T **F** 3. When exposed to cold temperatures, your body begins to lose heat faster than it can be produced. This is called Hyperthermia

T **F** 4. Some signs and symptoms of Hypothermia are Shivering, Fatigue, Loss of coordination, Confusion, and disorientation

T **F** 5. Some measures you can use as first aid for frostbite are: Rubbing or massage the frostbitten area and using a heating pad, heat lamp, or the heat of a stove, fireplace, or radiator for warming.

T **F** 6. According to the Threshold Limit Values Work/Warm-Up Chart for 4-Hour Shift - When it is -30°F to -39°F with a 15-mph wind You can work 4 hours with a warmup break every 15 mins.

T **F** 7. Some examples of the Administrative and Work Practices Controls that should be implemented are: Limiting the amount of time spent outdoors on extremely cold days, using relief workers to assign extra workers for long, demanding jobs Providing warm areas for use during break periods, and implementing a "Buddy System" to ensure that no employee is working alone in cold work environments.

T **F** 8. There is no need to have any extra PPE or dress in layers because of the amount of breaks you will get when it is cold.

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Score: _____ **%**

Employees Name: **ANSWER KEY** **Date:** _____
Company: _____ **Instructor:** _____
Employee #: _____ **Job Title:** _____

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T **F** 8. There is no need to have any extra PPE or dress in layers because of the amount of breaks you will get when it is cold.