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Aerospace Medicine

**PREVENTION OF HEAT/COLD STRESS
INJURIES**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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OPR: 354 MDOS/SGOAB
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This instruction implements AFD 48-1, Aerospace Medicine Program. It describes procedures to protect personnel from the adverse health effects of heat/cold stress. This instruction applies to all personnel assigned, attached or associated with Eielson AFB, Alaska.

1. Concept and History. Among U.S. Army and Army Air Force troops, there were over 90,000 cold injuries requiring medical treatment during World War II and another 10,000 during the Korean War, accounting for 10% of all casualties experienced during these conflicts. Given the average air temperature recorded when cold injuries were experienced during World War II was 30° Fahrenheit (F), and temperatures this low are experienced over about 60% of the earth's surface, leaders must appreciate cold-weather effects on airmen's health and performance. **Prevention of cold injuries is the responsibility of supervisors at all levels.** This instruction provides commanders and supervisors with guidance for operations in hot and cold environments. This instruction applies to both peacetime and contingency/exercise operations.

2. References.

- 2.1. AFMAN 32-4005, "Personnel Protection and Attack Actions," 1 March 1999.
- 2.2. Heat Illness: "A Handbook for Medical Officers," US Army Research Institute of Environmental Medicine Natick, MA, Report Number TN 91-3, 3 June 1991.
- 2.3. "Threshold Limit Values for Chemical Substances and Physical Agents," American Conference of Governmental Industrial Hygienists, 2000.
- 2.4. "Fighter Index of Thermal Stress (FITS): Guidance for Hot Weather Aircraft Operations," Aviation Space and Environmental Medicine, June 1979.

2.5. "Sustaining Health and Performance in the Cold: Environmental Medicine Guidance for Cold-Weather Operations," US Army Research Institute of Environmental Medicine, Report Number TN 92-2, July 1992.

3. Definitions: Standard terminology, symptoms, and first aid for cold/heat stress related injuries are contained in **Attachment 1**. This attachment should be used to conduct initial and periodic training for all Iceman team members.

4. Responsibilities.

4.1. The Bioenvironmental Engineering (BEE) element (354 MDOS/SGOAB) will:

4.1.1. Maintain this instruction, and ensure it reflects the most current information and standards.

4.1.2. Assign a heat stress condition for the major exposure groups of support/ground personnel (includes outdoor/flightline, outdoor/shade and hazmat/fire-fighting). **Attachment 2** contains the calculation procedures. This calculation is not intended for use by other organizations.

4.1.3. Report the heat stress condition and recommended protective measures to the command post (during routine operations) or the survival recovery center (during exercise or contingency operations).

4.1.4. Conduct health risk assessments for heat/cold injury routine workplace visits.

4.2. The Public Health Office (354 MDOS/SGOAM) will: Help supervisors provide training to their workers about the signs, symptoms, prevention and self-aid/buddy care for heat and cold stress.

4.3. The Weather Station (354 OSS/OSW) will:

4.3.1. Configure the Airfield Observer System (AOS) to calculate equivalent chill temperature (ECT), and indicate the appropriate cold stress condition, as defined in this instruction

4.3.2. Relay wind speed, temperature and dewpoint readings to the BEE element via the telephone, when requested, and report this information to the wing operations center during exercises/contingencies.

4.4. Command Post (FW/OC)

4.4.1. The Command Post will observe the Airfield Observer System (AOS) and determine the current cold stress condition. Command Post will notify the two agencies, listed in the table below, with the current 12-hour cold stress condition forecast. These notifications only need to occur whenever equivalent wind chill temperatures are below 40 degrees Fahrenheit or when the cold stress conditions change.

4.4.2. Command Post will receive the current heat stress condition from BEE via telephone during the summer. During routine operations, the Command Post will advise the following two agencies of the current heat stress condition and appropriate precautions.

Table 1. Agencies of Current Heat Stress Condition and Appropriate Precautions

Organization	And Performs These Actions
354 FW/OS	Maintenance Operations Center will notify 18 FS, 355 FS, and 354 MXS maintainers via the maintenance net.
354 CES/CEO	Control Center will notify CES personnel via the CE net.

4.4.3. During exercise or contingency operations, 354 FW/CC will decide work/cooling and work/warming cycles and MOPP options on a case by case basis using the recommendations provided by BEE. During contingency/exercise operations, the SRC will communicate the appropriate heat/cold stress conditions and precautions to the unit control centers.

4.5. Supervisors will:

4.5.1. Provide cool drinking water convenient to the work area when the heat stress condition is caution or above (see [Attachment 4](#)). Provide warm, sweet liquids or soup when cold stress conditions are caution or above (see [Attachment 4](#)). Consumption of caffeine during these cold stress conditions should be discouraged.

4.5.2. Monitor workers for signs of heat/cold stress and intervene when appropriate, or implement and enforce a "buddy system" whenever heat/cold stress conditions are moderate or above.

4.5.3. Train workers on heat/cold stress symptoms and prevention and document training on the AF Form 55, **Employee Safety and Health Record**. Supervisors may use [Attachment 1](#), and the information available on the BEE website as training materials.

4.5.4. Implement work/cooling and work/warming cycles in accordance with paragraphs [5](#). and [6](#). and 354 FWVA 48-1 ([Attachment 3](#)).

4.5.5. Ensure proper facilities are available for cooling/warming cycles (indoors or shade during hot environments and a warm place during cold environments). Take proper precautions to ensure personnel are not overexposed to diesel exhaust from the H1 heaters when heating warming shelters (hardened shelters, vans, and bubbles). H1 heaters must be placed downwind from the shelter, the heater intake facing into wind, and a minimum of two heating ducts (in series) used. Personnel should exit the shelter any time they feel light-headed, dizzy, and/or nauseous. If symptoms persist or warrant medical attention, dial 911 immediately for prompt medical care. Users should not adjust the H1 heaters' thermostats. Contact 354 MXS AGE to exchange the H1 heaters if they are not providing adequate heat.

4.5.6. Post copies of 354 FWVA 48-1 on the workplace safety board.

4.6. All Iceman Team members will:

4.6.1. Adhere to work/cooling and work/warming cycles.

4.6.2. Increase electrolyte intake during hot weather by either increasing salt intake or by periodically drinking sports drinks, such as Gatorade®, Powerade® or Exceed®.

4.6.3. Stay hydrated. Drink small amounts of water frequently (1 cup every 15 minutes) during warm weather. Consume liquids frequently during cold weather and increase sodium intake during

hot conditions (see **Attachment 2**). Moderate consumption of alcohol and caffeine since these have a dehydrating effect, and reduce tolerance to heat and cold stress.

4.6.4. Maintain good physical condition. A balanced diet, adequate rest and routine aerobic exercise greatly increase an individual’s tolerance to heat and cold stress.

4.6.5. Receive training from their supervisors on heat/cold stress symptoms and prevention using **Attachment 2**.

4.7. Commanders will:

4.7.1. Enforce these precautions for their subordinates

4.7.2. Purchase protective equipment, such as warming/cooling vests (when prescribed by BEE) and cold weather gear for routinely exposed workers.

4.7.3. Avoid scheduling outdoor formations when conditions are caution or above.

4.8. 354 FW Civilian Employees will follow the temperature restrictions outlined in the current Labor Management Agreement, Article 15.

4.9. Air National Guard Civilian Employees will follow the temperature restrictions outlined in the current Labor Management Agreement, Article 26.

5. Heat Stress Conditions. Support/Ground Personnel. Heat stress is rarely encountered at Eielson AFB due to its location. There may be occasions where individuals could be effected by heat stress. BEE will announce the heat stress condition for the following exposure groups: hazardous materials response/ fire-fighting and MOPP (during exercises and contingencies). BEE will notify the SRC of the conditions during exercises. BEE will notify the Fire Department of the hazardous materials response/fire-fighting heat stress index directly. **Attachment 2** contains definitions of these conditions. Supervisors and workers will follow the appropriate work/cooling cycle for their announced condition. These are in the following table.

Table 2. Heat Stress Conditions

Heat Stress Condition	Required Hourly Work/Cooling Cycle
Standard	None Required
Moderate	45 min work/15 min cooling
Caution	30 min work/30 min cooling
Danger	15 min work/45 min cooling
Extreme	Mission critical tasks only#

Cooling should be in an air-conditioned environment whenever possible, and in the shade as a minimum.

Implement the "buddy system" whenever conditions are moderate or higher.

The unit commander will determine which tasks are mission critical.

6. Cold Stress Conditions. Supervisors and workers will follow the appropriate work/warming cycle and precautions for their announced condition. These are in the following table.

Table 3. Cold Stress Conditions.

Equivalent Chill Temperature (°F)	Cold Stress Condition	Required Precautions and Hourly Work/Warming Cycle
41 to 60	Standard	Wear gloves. Do not perform work with bare hands for more than 10 minutes. Cover metal handles and bars with thermal insulation.
1 to 40	Moderate (Green)	Follow Standard Precautions. No outdoor operations with water (vehicle/aircraft washing). 50 min work/10 min warming. Wear gloves and total body protection. Avoid heavy sweating. Change wet clothes immediately. Implement the "buddy system."
-20 to 0	Caution (Yellow)	Follow Standard and Moderate precautions. Wear mittens, not gloves. 40 min work/20 min warming.
-39 to -20	Danger (Blue)	Follow Standard through Caution actions. 30 min work/30 min warming.
<-40	Extreme (Black)	Mission critical work only

Warming must be in an indoor, heated environment.

The unit commander will determine which tasks are mission critical.

7. Chemical-Biological Warfare Defense (CBWD) Cold Weather Operations:

7.1. Commanders should not consider cold conditions a deterrent to CW agent use. Agent physical properties are affected by temperature, but the effectiveness is not always degraded at very low temperatures. The major threat from the employment of chemical warfare weapons in cold regions is the delayed action. The danger is created when nerve and blister agents are carried into heated shelters on clothing, footgear, or other equipment. The warmth of the shelter will reactivate these agents creating a chemical vapor and/or a liquid hazard in the enclosed area.

7.2. During CERE operations, the 354 FW will adhere to the following cold weather procedures:

7.2.1. Cold weather clothing (parka, BDU jacket, B1 mittens, etc) is to be worn OVER the ground crew ensemble (GCE) if the individual needs protection from the cold. This is an appropriate practice during exercises and war. Items worn over the GCE will become contaminated upon contact with CW/BW and must be properly discarded during decontamination procedures.

7.2.2. Do not wear cotton inserts below 32° F. For temperatures between 32° F and -10° F, personnel should wear polypropylene gloves and wool inserts under the rubber gloves. Personnel may also wear winter or leather gloves over the rubber gloves. When temperatures fall below -10° F, personnel should wear polypropylene gloves, wool inserts, and winter gloves (minus the rubber gloves).

7.2.3. For safety reasons, personnel should use extreme caution when wearing the black lace-up chemical protective boots when snow and ice are present on paved surfaces. When these conditions exist, specific concerns should be up-channeled to the Survival Recovery Center (SRC). The SRC will issue a Battle Staff Directive (BSD) detailing specific actions required by personnel.

Personnel should wear military-issue winter boots, such as mukluks or sorrels if a BSD is issued prohibiting the wear of the black lace-up chemical boots. Vapor barrier boots (i.e. "bunny boots") are always an approved alternative to chemical warfare overboots.

7.2.4. In extremely cold temperatures, the MCU-2AP mask becomes very rigid and is difficult to don. When donned at these temperatures, the protective mask causes instantaneous frostbite on the individual's face. Due to this potential, 354 FW personnel will not wear the MCU-2AP gas-mask outdoors, during exercises, when Equivalent Chill Temperatures (ECT) reach 0° F. If moving from indoors to outdoors, remove mask and dry face prior to going outside. Personnel will wear the mask when indoors.

7.2.5. When temperatures are above 0° F personnel will observe the appropriate MOPP level, including wear of the gas-mask. Below freezing, personnel should be aware the mask may still be very cold and be somewhat rigid. Also, the mask eye lenses may fog and freeze when the mask is donned. In addition, breath condensation may freeze the valves and the voicemitter assembly. To minimize this, the mask must be carried under outer garments to remain relatively warm from the individual's body heat. Please refer to AFMAN 32-4005, paragraph A7.3.1.1, for specific instructions for cold-weather use of the mask. These instructions are essential for the proper functioning of this piece of equipment.

BOB D. DULANEY, Brig Gen, USAF
Commander

Attachment 1

GLOSSARY OF TERMS AND TRAINING INFORMATION

A1.1. Definitions.

A1.1.1. Ambient Temperature: The temperature of the air without regard to the effects of humidity, radiant heat of the sun, or wind.

A1.1.2. Wet Bulb Globe Temperature (WBGT): A method of measuring how the human body perceives the relative heat of an environment. WBGT takes into account the effects of humidity, and the radiant heat from the sun.

A1.1.3. Wind Chill Temperature (°F): The temperature adjusted for the cooling effect of the wind.

A1.2. Thermal Stress Condition: A four level advisory based on the risk of injury or illness due to the effects of working in extreme temperatures.

A1.2.1. Condition Standard: The risk of thermal-related injury/illness is real, but typical workloads can continue with proper hydration, clothing, and surveillance. All outdoor workers should have current training on the symptoms of overexposure and first aid measures. Implement work/cooling rest or work/warming cycles as appropriate. Bioenvironmental Engineering (BEE) will declare heat condition moderate.

A1.2.2. Condition Moderate: The risk of thermal-related injury/illness is significant. Supervisors should periodically observe workers for heat/cold stress symptoms, and enforce the appropriate work/rest cycle and water intake.

A1.2.3. Condition Caution: The risk of thermal-related injury/illness is high. Supervisors should increase surveillance of their workers for heat/cold stress systems and enforce work/rest cycles.

A1.2.4. Condition Danger: The risk of thermal-related injury/illness is extreme. For heavy work in hot environments and any work in cold environments, only emergency and mission critical tasks. Implement work/rest cycles as appropriate.

A1.3. Symptoms and First Aid Measures for Heat Related Conditions.

A1.3.1. Heat Cramps: Usually affect people who sweat a lot during strenuous activity, depleting the body's salt and fluids. The low salt level in the muscles causes painful cramps and spasms--usually in the abdomen, arms, or legs. Heat cramps may also be a symptom of heat exhaustion. Stop all activity and sit in the coolest available place. Drink clear juice or a sports beverage. Seek medical attention if cramps do not stop in an hour.

A1.3.2. Heat Exhaustion: The body's response to an excessive loss of water and salt contained in sweat. Symptoms includes heavy sweating, paleness, muscle cramps, weakness, dizziness, headache, nausea or vomiting and sometimes fainting. The skin may feel cool and moist, and the pulse rate will be fast but weak. Breathing will be fast and shallow.

A1.3.3. Untreated heat exhaustion may progress to heat stroke. Immediately provide cool beverages as tolerated, and cool the body by removing heavy clothing, giving a cool shower/bath, or wetting the clothing, and place in an air conditioned environment. Seek medical attention if the symptoms are severe or last longer than an hour.

A1.3.4. Heat Stroke: Heat stroke occurs when the body is unable to control its temperature. The body's temperature rises rapidly, the sweating mechanism fails or is ineffective (as when sweat cannot evaporate), and the body is unable to cool down. Heat stroke can cause death or permanent disability if emergency treatment is not given. Warning signs include a high body temperature (above 103 degrees Fahrenheit, orally), dry skin which is red and hot, rapid strong pulse, throbbing headache, dizziness, nausea and confusion which may progress to unconsciousness.

A1.3.5. First aid is required while immediately transporting to medical care. Start cooling the victim by any method available as described for heat exhaustion, with the addition of vigorous fanning. If uncontrollable muscle twitching or vomiting occur, protect the victim from injury and keep the airway open by turning on his or her side.

A1.4. Cold Stress. The human body cannot adapt to cold except through proper clothing, shelter, and behavior changes, such as the warming cycles listed in [Attachment 3](#).

A1.4.1. Cold weather can lower body temperature, resulting in impaired performance and cold injuries. Cold weather is often accompanied by wind, rain, snow, and ice, which can worsen the effects of cold. Inactivity for long periods increases the risk of cold injury. This is a particular concern for Defensive Fighting Positions (DFPs) or small vehicle crew compartments where movement is restricted.

A1.4.1.1. For any given air temperature, the potential for body-heat loss, skin cooling and decreased body temperature is increased by wind and moisture. Any source of nicotine, such as smoking or chewing tobacco, can increase susceptibility to cold injury. An early warning sign of inadequate clothing and shelter is shivering, which increases heat production. Over the counter drugs such as aspirin, ibuprofen, and acetaminophen, can interfere with shivering.

A1.4.1.2. Vigorous physical activity will also increase heat production, but adds to the risk of cold injury if clothes become wet with sweat. When body heat loss exceeds the body's ability to produce and retain heat, body temperature decreases. When body temperature falls below 95°F, hypothermia, a life-threatening condition, follows. To reduce heat loss, the body decreases blood flow to the arms, legs, and skin. Although this protects the internal organs, the decreased blood flow increases susceptibility of hands, feet, ears, etc., to nonfreezing (trench foot) and freezing (frost-bite) cold injuries.

A1.4.2. Clean, dry, loose layers of clothing, including insulated headgear (watch caps/hoods), multiple gloves, and double socks, help prevent heat loss. The outer layer should provide wind protection. Adjust layers to minimize sweating. If clothing, including socks, become wet, change them immediately. Size boots to accommodate extra socks without restricting blood circulation. Cover exposed skin to help prevent frostbite, especially when wind chill temperatures are below -20°F.

A1.4.3. Metal objects and liquid fuels left in the cold can pose a serious hazard. Fuels and solvents remain liquid at very low temperatures. Skin contact with fuel or metal at below freezing temperatures can result in nearly instantaneous freezing injury.

A1.4.4. Minimize the risk of cold injuries in DFPs by placing pads, tree boughs, etc., inside these positions. Maintain adequate food consumption to make up for increased energy requirements in cold weather. Eat normal meals with frequent nutritious snacks between meals. Maintain adequate hydration with fluid intake of .5 to 1 liter per hour. The low absolute humidity associated with severe cold

will cause dehydration with normal breathing. Avoid caffeine, tobacco, and alcohol. Keep hands, feet, and skin dry. Change socks whenever they become wet or sweaty.

A1.4.5. Cold stress leads to reduced performance and lack of concentration. People are not always the best judge of their own condition. Supervisors must be aware of the risks of cold weather operations and enforce the buddy system to help prevent cold injuries. Individual tolerance to cold exposure varies greatly for a variety of reasons, including genetic and racial differences. Low body fat decreases tolerance, while higher body fat is protective. Use the recommended warming cycles ([Attachment 3](#)) as well as the response of individuals to trigger actions to prevent cold injuries.

A1.4.6. Symptoms of Cold Injuries.

A1.4.6.1. Chilblain: A nonfreezing cold injury which, although painful, causes little or no permanent impairment. It appears as tender, red, swollen skin that is hot to the touch and may itch. This can worsen to an aching, prickly (“pins and needles”) sensation and then numbness. It may develop in only a few hours in skin exposed to cold.

A1.4.6.2. Immersion or Trench Foot: Develops when feet are exposed to moisture and cold for prolonged periods (12 hours or longer). The combination of cold and moisture softens skin, causing tissue loss and, often, infection. Untreated, trench foot can eventually require amputation. Often, the first sign of trench foot is itching, numbness or tingling pain. Later the feet may appear swollen, and the skin faintly red, blue or black. Commonly, trench foot shows a distinct “water-line” coinciding with the water level in the boot.

A1.4.6.3. Frost Nip: Involves freezing of water on the skin surface. The skin will become red-dened and possibly swollen. Although painful, there is usually no further damage after re-warming. Repeated frost nip can dry the skin, causing it to crack and be sensitive. Frost nip should be taken seriously since it may be the first sign of impending frostbite.

A1.4.6.4. Frostbite: Involves freezing of deeper layers of tissue. Ice crystal formation and lack of blood flow cause tissue damage. Skin freezes at about 28°F. The skin becomes numb and turns a gray or waxy white color, is cold to the touch and may feel stiff.

A1.4.6.5. Hypothermia: A life threatening condition in which body temperature falls below 95°F. Generally, body temperature will not fall until after many hours of exposure to cold air or shorter exposure to cold water. Body temperature can fall even when air temperatures are above freezing if conditions are windy, clothing is wet, and/or the person is inactive. The first signs of developing hypothermia include confusion, bizarre behavior, and withdrawal from group interaction. Victims of hypothermia may be unconscious, with nearly undetectable breathing and pulse.

A1.4.7. First Aid for Cold Injuries.

A1.4.7.1. Chilblain and Trench Foot: Prevent further cold exposure. Remove wet or constrictive clothing. Gently wash, dry, and elevate the injured part. Cover the injured area with layers of loose warm clothing and allow to re-warm. Pain and blisters may develop. Do not pop blisters, do not apply lotions or creams, do not massage, do not expose to extreme heat, and do not allow victim to walk on injury. Seek medical attention.

A1.4.7.2. Frostbite: Prevent further cold exposure and remove wet or constrictive clothing. Gradually re-warm the injury by direct skin to skin contact between injured area and non-injured skin of victim or a buddy. Evacuate for medical treatment. Victims with foot injuries should not walk,

but should be evacuated by litter. Do not thaw frostbite injuries if there is a possibility of refreezing during evacuation.

A1.4.7.3. Hypothermia: Prevent further cold exposure and remove wet clothing. Initiate CPR if required. Re-warm by covering with blankets, sleeping bags or body to body contact if necessary. Get the victim off the ground. Handle gently during treatment and evacuation because rough handling of hypothermic victims can cause dangerous irregular heartbeats or seizures. Apparently lifeless victims are never pronounced dead, even by physicians, until they are "warm and dead".

A1.5. Visual Aids: Much of this information is summarized in 354 FWVAs and . These are posted on the workplace safety bulletin board.

Attachment 2

**HEAT STRESS CONDITION CALCULATION
HEAT/COLD STRESS CALCULATION PROTOCOL
FOR BIOENVIRONMENTAL ENGINEERING**

1. Heat Stress Conditions for Ground Crews:

a. Set WBGT meter that conforms to ACGIH requirements over a concrete surface to simulate radiant heat exposure from the flightline.

b. Read WBGT hourly when dry bulb is more than 70°F, and during exercises/contingencies when dry bulb is more than 60°F.

c. Calculate or read indoor WBGT.

d. Determine heat stress categories for the following:

(1) Outdoors/Flightline: assume moderate work. Add one degree to WBGT to compensate for heat load added by BDU's/T-shirt.

(2) Indoors/Unairconditioned Hangars: Assume moderate work. Add two degrees to WBGT reading to compensate for heat load added by cotton coveralls.

(3) HazMat Response/Firefighting. Assume heavy work (spill clean-up, SCBA). Add 12.5 degrees to WBGT to compensate for bunkers/chemical protective clothing and acclimatization.

(4) MOPP Gear. Assume heavy work (carrying IPE). Add 12.5 degrees to WBGT to compensate for MOPP and acclimatization.

Table A2.1. Heat Stress Conditions for Various Workloads

Light	Moderate	Heavy	Condition
87	82	79	Moderate (Green)
89	84	82	Caution (Yellow)
90	88	86	Danger (Blue)
92	90	88	Extreme (Black)

2. Cold Stress.

a. Receive wind chill temperature from the Airfield Observer System.

b. Determine cold stress condition from the following table:

Table A2.2. Cold Stress Condition Table

Equivalent Chill Temperature (°F)	Cold Stress Condition
41 - 60	Standard
1 - 40	Moderate (Green)
-20 - 0	Caution (Yellow)
-41 - -20	Danger (Blue)
< -40	Extreme (Black)

Attachment 3

354TH FIGHTER WING VISUAL AIDS 48-1A/B

Table A3.1. Sample of a 354FW VA 48-1a, Heat Stress Condition

354th FIGHTER WING HEAT STRESS CONDITIONS	
Heat Stress Condition	Required Hourly Work/ Cooling Cycle
Standard	None Required
Moderate	45 min work/15 min cooling
Caution	30 min work/30 min cooling
Danger	15 min work/45 min cooling
Extreme	Mission critical tasks only
<p>FOR HEAT STRESS CONDITIONS MODERATE OR ABOVE:</p> <p>Take cooling/rest breaks in the shade or air-conditioned building.</p> <p>Drink approximately 1 cup of cool water every 15 minutes.</p> <p>Avoid alcohol and caffeine.</p> <p>Increase electrolyte intake by salting food or drinking sports drinks.</p> <p>Watch co-workers for signs and symptoms of heat stress.</p>	

Table A3.2. 354FW VA 48-1b, Cold Stress Conditions

**354th FIGHTER WING
COLD STRESS CONDITIONS**

<u>Condition</u>	Required Hourly Work/ Warming Cycle	Other Precautions
Standard	None Required	Wear gloves. Cover metal handles with thermal insulation.
Moderate	50 min work/10 min warming	Follow all "Standard" precautions. No outdoor operations with water. Wear total body protection. Avoid heavy sweating. Change wet clothes immediately.
Caution	40 min work/20 min warming	Follow all "Standard and Moderate" precautions. Wear mittens, not gloves.
Danger	30 min work/30 min warming	Follow "Standard - Caution" precautions.
Extreme	Mission critical tasks only	

FOR COLD STRESS CONDITIONS MODERATE OR ABOVE:

Avoid wearing cotton garments whenever possible.

Wear wicking socks and glove liners.

Change boot insoles daily or wear vapor barrier boots (i.e., "Bunny Boots")

Be sure to change out of wet clothes as soon as possible.

Increase fluid intake to prevent dehydration. Avoid alcohol and caffeine.

Attachment 4

RECOMMENDED WATER AND SODIUM INTAKE

