

Unit Leaders' and Instructors' Risk Management Steps for Preventing Cold Casualties

Risk Management is the Process of Identifying and Controlling Hazards to Protect the Force

Possible Outcomes of Inadequate Climatic Cold

- **Chilblain**
(due to bare skin exposed to cold humid air)
- **Immersion Foot (Trench Foot)**
(due to wet feet)
- **Frostbite**
- **Hypothermia**
(whole body temperature dangerously low)
- **Dehydration**
- **Snow Blindness**
- **Carbon Monoxide Poisoning**

The Five Steps of Risk Management Are:

1

Identify Hazards

- Cold (temperature 40° F and below)
- Wet (rain, snow, ice, humidity) or wet clothes
- Wind (wind speed 5 mph and higher)
- Lack of adequate shelter/clothing
- Lack of provisions/water
- Other Risk Factors include:
 - Previous cold injuries or other significant injuries
 - Use of tobacco/nicotine or alcohol
 - Skipping meals/poor nutrition
 - Low activity
 - Fatigue/sleep deprivation
 - Little experience/training in cold weather
 - Cold casualties in the previous 2-3 days
 - Overly Motivated Soldiers

2

Assess Hazards

Follow the Wind Chill Temperature Table to Determine the Danger Level

Do individuals have adequate shelter/clothing?

- Are clothes clean without stains, holes or blemishes (which could decrease heat-retaining function)?

Have meals been consumed?

- Are meals warm?

Are there other circumstances?

- Is there contact with bare metal or fuel/POL (petroleum, oils or lubricants)?
- Is the environment wet? Is there contact with wet materials or wet ground?
- Can soldier move around to keep warm?
- Are feet dry and warm?
- Is the soldier with a buddy who can assist/watch over to prevent cold injuries?

2

Assess Hazards continued

Using the Wind Chill Temperature Table

The wind chill index (see table below) gives the equivalent temperature of the cooling power of wind on exposed flesh.

- Any movement of air has the same effect as wind (running, riding in open vehicles, or helicopter downwash).
- Any dry clothing (mittens, scarves, masks) or material which reduces wind exposure will help protect the covered skin.

Trench foot injuries can occur at any point on the wind chill chart and -

- Are much more likely to occur than frostbite at “LITTLE DANGER” wind chill temperatures, especially on extended exercises/missions and/or in wet environments.
- Can lead to permanent disability, just like frostbite.

Wind Speed (mph) ↓	Air Temperature (°F)																	
	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
0	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95

GREEN LITTLE DANGER (frostbite occurs in >2 hours in dry, exposed skin)
YELLOW INCREASED DANGER (frostbite could occur in 45 minutes or less in dry exposed skin)
RED GREAT DANGER (frostbite could occur in 5 minutes or less in dry, exposed skin)

Wind Chill Category (see Wind Chill Temperature Table above)

Work Intensity	Little Danger	Increased Danger	Great Danger
High Digging foxhole, running, marching with rucksack, making or breaking bivouac	Increased surveillance by small unit leaders; Black gloves optional - mandatory below 0°F (-18°C);	ECWCS* or equivalent; Mittens with liners; No facial camouflage; Exposed skin covered and kept dry; Rest in warm, sheltered area; Vapor barrier boots below 0°F (-18°C) Provide warming facilities	Postpone non-essential training; Essential tasks only with <15 minute exposure; Work groups of no less than 2; Cover all exposed skin, Provide warming facilities
Low Walking, marching without rucksack, drill and ceremony	Increased surveillance; Cover exposed flesh when possible; Mittens with liner and no facial camouflage below 10°F (-12°C); Full head cover below 0°F (-18°C). Keep skin dry - especially around nose and mouth.	Restrict Non-essential training; 30-40 minute work cycles with frequent supervisory surveillance for essential tasks. See above.	Cancel Outdoor Training
Sedentary Sentry duty, eating, resting, sleeping, clerical work	See above; Full head cover and no facial camouflage below 10°F (-12°C); Cold-weather boots (VB) below 0°F (-18°C); Shorten duty cycles; Provide warming facilities	Postpone non-essential training; 15-20 minute work cycles for essential tasks; Work groups of no less than 2 personnel; No exposed skin	Cancel Outdoor Training

*ECWCS – Extended Cold Weather Clothing System

Note: These guidelines are generalized for worldwide use. Commanders of units with extensive extreme cold-weather training and specialized equipment may opt to use less conservative guidelines.

3

Develop Controls

Main Points to Stress to Soldiers

When using Cold-Weather Clothing, Remember . . .

C-O-L-D	Keep it.....	C lean
	Avoid.....	O verheating
	Wear it.....	L oose in layers
	Keep it	D ry

Main Points to Stress to Leaders

Follow these Wind Chill Preventive Medicine Measures Based on Wind Chill Temperature

- 30°F and below** Alert personnel to the potential for cold injuries
- 25°F and below** Leaders inspect personnel for wear of cold weather clothing. Provide warm-up tents/areas/hot beverages.
- 0°F and below** Leaders inspect personnel for cold injuries. Increase the frequency of guard rotations to warming areas. Discourage smoking.
- 10°F and below** Postpone non-essential outdoor training. For mission essential operations, initiate the buddy system - Have personnel check each other for cold injuries.
- 20°F and below** Consider modifying or curtailing all but mission-essential field operations.

NOTE: Trench Foot can occur at any temperature - Always Keep Feet Warm

General Guidance for all Cold-Weather Training

Skin: Exposed skin is more likely to develop frostbite, therefore cover skin. Avoid wet skin (common around the nose and mouth). Inspect hands, feet, face and ears frequently for signs of frostbite.

Clothing: Soldiers must change into dry clothing at least daily and whenever clothing becomes wet. Soldiers must wash and dry feet and put on dry socks at least twice daily.

Nutrition: 4500 calories / day / soldier. Equivalent to 3 meal packets in meal-cold weather (MCW) or 3-4 MREs.

Hydration: 3-6 liters (canteens) / day / soldier. Warm, sweet drinks are useful for re-warming.

Camouflage: Obscures detection of cold injuries; consider not using below wind chill of 32° F; not recommended below wind chill of 10°F.

Responsibilities: Soldiers are responsible for preventing individual cold injuries. Unit NCOs are responsible for the health and safety of their troops.

Cold injury prevention is a command responsibility.

3

Develop Controls continued

Personal Protection

Ensure Appropriate Clothes and Proper Wearing of Clothes –

- Wear clothing loose and in layers.
- Ensure all clothing is clean.
- Ensure proper boots are worn and are dry.
- Ensure clothes do not have holes, broken zippers, etc.
- Ensure hands, fingers, and head are covered and protected.
- Avoid spilling liquids on skin or clothes. Liquid stains will reduce clothing's protective efforts.
- Change wet, damp clothes ASAP.

Keep Body Warm

- Keep moving.
- Exercise big muscles (arms, shoulders, trunk, and legs) to keep warm.
- Avoid alcohol use (alcohol impairs the body's ability to shiver).
- Avoid standing on cold, wet ground.
- Avoid all tobacco products (they decrease blood flow to skin).
- Eat all meals to maintain energy.
- Drink water or warm non-alcoholic fluids to prevent dehydration.

Protect Feet

- Keep socks clean and dry.
- Wash feet daily, if possible.
- Carry extra pairs of socks.
- Change wet or damp socks ASAP; use foot powder on feet and boots.
- Avoid tight socks and boots; do not over-tighten boot or shoes.
- Wear overshoes to keep boots dry.

Protect Hands

- Wear gloves, mittens, or gloves/mittens with inserts.
- Warm hands under clothes if they become numb.
- Avoid skin contact with snow, fuel or bare metal. Wear proper gloves when handling fuel or bare metal.
- Waterproof gloves by treating with waterproofing compounds.

Physical Fitness Uniform

- Wind Chill >60 deg F: T-shirt and trunks
- Wind Chill 51-60 deg F: Add jacket
- Wind Chill <50 deg F: Add pants, cap, gloves

3

Develop Controls continued

Personal Protection continued

Protect Face and Ears

- Cover face and ears with scarf. Wear insulated cap with flaps over ears or balaclava.
- Warm face and ears by covering them with your hands. Do NOT rub face or ears.
- Consider not using face camouflage when wind chill is 32° F or below. Also not recommended below 10° F.
- Wear sunscreen.
- Exercise facial muscles.

Protect Your Eyes

- Wear sunglasses to prevent snow blindness.
- If sunglasses are not available, protective slit goggles can be made from cutting slits in cardboard (e.g., MRE cardboard box).

Protect Each Other

- Watch for signs of frostbite and other cold weather injuries in your buddy.
- Ask about and assist with re-warming of feet, hand, ears or face.

Prevent Carbon Monoxide Poisoning

- Use only Army-approved heaters in sleeping areas. (post Fire Guards)
- Do not sleep near exhaust of a vehicle while vehicle is running.
- Do not sleep in enclosed area where an open fire is burning.

Leadership Controls

- Discontinue/limit activities/exercise during very cold weather (see chart page 2).
- Use covered vehicles for troop transport.
- Have warming tents available. (with Fire Guards)
- Have warm food and drink on hand.

Facility Controls

- Use only Army-authorized heaters. (i.e., no kerosene or propane heaters).
- Ensure heaters are in working order and adequately ventilated.
- Ensure integrity of shelters for maximum protection from the cold.

4

Implement Controls

- Identified controls are in place
- Controls are integrated into SOPs
 - Educate soldiers of hazards and controls (including newly arrived soldiers)
 - Implement buddy system to check clothes/personal protection
- Decision to accept risk is made at appropriate level
- Buddy system to check each other
- Self checks
- Lip Balm (for high altitude training)

5

Supervise and Evaluate

- Ensure all soldiers are educated about prevention, recognition and treatment of cold weather injuries.
- Delegate responsibilities to ensure control measures have been implemented.
- Monitor adequacy/progress of implementation of control measures.
- Do frequent spot checks of clothes, personal protection and hydration.
- Record and monitor indicators of increasing cold risks, for example:
 - Increasing number of cold weather injuries
 - Increased complaints/comments about cold
 - Observations of shivering, signs of cold weather injuries
- Evaluate current control measures and strategize new or more efficient ways to keep warm and avoid cold injuries

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See <http://www.tradoc.army.mil/surgeon/index.htm> for electronic versions of this document and other resources

Cold Weather Casualties and Injuries Chart

- Train soldiers on the proper use of cold weather clothing
- Remember the acronym C-O-L-D when wearing clothing in cold weather (C: keep it Clean; O: avoid Overdressing; L: wear clothing Loose and in layers; D: keep clothing Dry)
- Maintain adequate hydration and ensure nutritional requirements are met

Cold Weather Casualties and Injuries			
Chilblain			
Cause	Symptoms	First-Aid	Prevention
<ul style="list-style-type: none"> ■ Repeated exposure of bare skin for prolonged periods from 20°-60°F with high humidity (for those not acclimated to cold weather). 	<ul style="list-style-type: none"> ■ Swollen, red skin (or darkening of the skin in dark-skinned soldiers). ■ Tender, hot skin, usually accompanied by itching. 	<ul style="list-style-type: none"> ■ Warm affected area with direct body heat. ■ Do not massage or rub affected areas. ■ Do not wet the area or rub it with snow or ice. ■ Do not expose affected area to open fire, stove, or any other intense heat source. 	<ul style="list-style-type: none"> ■ Use contact gloves to handle all equipment; never use bare hands to handle equipment, especially metal. ■ Use approved gloves to handle all fuel and POL* products. ■ In the extreme cold environment, do not remove clothing immediately after heavy exertion (PT); until you are in a warmer location. ■ Never wear cotton clothing in the cold weather environment.
Immersion foot (trench foot)			
Cause	Symptoms	First-Aid	Prevention
<ul style="list-style-type: none"> ■ Prolonged exposure of feet to wet conditions 32°-60°F. Inactivity and damp socks and boots (or tightly laced boots that impair circulation) speed onset and severity. 	<ul style="list-style-type: none"> ■ Cold, numb feet may progress to hot with shooting pains. ■ Swelling, redness, and bleeding. 	<ul style="list-style-type: none"> ■ If you suspect trench foot, get medical help immediately! ■ Re-warm feet by exposing them to warm air. ■ Do not allow victim to walk on injury. ■ Evacuate victim to a medical facility. ■ Do not massage, rub, moisten, or expose affected area to extreme heat. 	<ul style="list-style-type: none"> ■ Keep feet clean and dry; change wet or damp socks as soon as possible. ■ Wet or damp socks should be dried as soon as possible to allow them to be re-used. ■ The inside of Vapor Barrier boots should be wiped dry once per day, or more often as feet sweat. ■ Dry leather boots by stuffing with paper towels.
Frostbite			
Cause	Symptoms	First-Aid	Prevention
<ul style="list-style-type: none"> ■ Freezing of tissue. e.g.: fingers, toes, ears, and other facial parts. ■ Exposure to bare skin on metal, extremely cool fuel and POL*, wind chill, and tight clothing - particularly boots - can make the problem worse. 	<ul style="list-style-type: none"> ■ Numbness in affected area. ■ Tingling, blistered, swollen, or tender areas. ■ Pale, yellowish, waxy-looking skin (grayish in dark-skinned soldiers). ■ Frozen tissue that feels wooden to the touch. 	<ul style="list-style-type: none"> ■ Frostbite can lead to amputation! Evacuate immediately! ■ Start first-aid immediately. Warm affected area with direct body heat. ■ Do not thaw frozen areas if treatment will be delayed. ■ Do not massage or rub affected areas. ■ Do not wet the area or rub it with snow or ice. ■ Do not expose affected area to open fire, stove, or any other intense heat source. 	<ul style="list-style-type: none"> ■ Use contact gloves to handle all equipment; never use bare hands to handle equipment. ■ Use approved gloves to handle fuel and POL*. ■ Never wear cotton clothing in the cold weather environment. ■ Keep face and ears covered and dry. ■ Keep socks clean and dry. ■ Avoid tight socks and boots.
Hypothermia			
Cause	Symptoms	First-Aid	Prevention
<ul style="list-style-type: none"> ■ Prolonged cold exposure and body-heat loss. May occur at temperatures well above freezing, especially when a person is wet. 	<ul style="list-style-type: none"> ■ Shivering may or may not be present. ■ Drowsiness, mental slowness or lack of coordination. Can progress to unconsciousness, irregular heartbeat, and death. 	<ul style="list-style-type: none"> ■ This is the most serious cold exposure medical emergency and can lead to death! Get the soldier to a medical facility as soon as possible! ■ Even if a victim is cold and is not breathing, never assume someone is dead until determined by medical authorities! ■ Strip off wet clothing and wrap victim in blankets or a sleeping bag. ■ Place another person in sleeping bag as an additional heat source. ■ For the person with unconsciousness and very low heartbeat, minimize handling of the victim so as to not induce a heart attack. 	<ul style="list-style-type: none"> ■ Never wear cotton clothing in the cold weather environment. ■ Anticipate the need for warming areas for soldiers exposed to cold, wet conditions.
Additional Medical Considerations in the Cold Weather environment:			
Dehydration			
Cause	Symptoms	First-Aid	Prevention
<ul style="list-style-type: none"> ■ Depletion of body fluids. 	<ul style="list-style-type: none"> ■ Dizziness. ■ Weakness. ■ Blurred vision. 	<ul style="list-style-type: none"> ■ Replace lost water. Water should be sipped, not gulped. ■ Get medical treatment. 	<ul style="list-style-type: none"> ■ At a minimum drink 3-6 quarts of fluid per day.
Snow Blindness			
Cause	Symptoms	First-Aid	Prevention
<ul style="list-style-type: none"> ■ Burning of the cornea of the eye by exposure to intense UV rays of the sun in a snow-covered environment. 	<ul style="list-style-type: none"> ■ Pain, red, watery or gritty feeling in the eyes. 	<ul style="list-style-type: none"> ■ Rest and total darkness; bandage eyes with gauze. ■ Evacuate if no improvement within 24 hours. 	<ul style="list-style-type: none"> ■ Use sunglasses with side protection in a snow-covered environment. ■ If sunglasses are not available use improvised slit glasses.
Carbon Monoxide Poisoning			
Cause	Symptoms	First-Aid	Prevention
<ul style="list-style-type: none"> ■ Replacement of oxygen with carbon monoxide in the blood stream caused by burning fuels without proper ventilation. 	<ul style="list-style-type: none"> ■ Headache, confusion, dizziness, excessive yawning. ■ Cherry red lips and mouth, grayish tint to lips and mouth (in dark-skinned individuals). ■ Unconsciousness. 	<ul style="list-style-type: none"> ■ Move to fresh air. ■ CPR if needed. ■ Administer oxygen if available. Evacuate. 	<ul style="list-style-type: none"> ■ Use only Army-approved heaters in sleeping areas and ensure that personnel are properly licensed to operate the heaters. ■ Never sleep in running vehicles. ■ Always post a fire guard when operating a heater in sleeping areas.

ARMY COLD INJURY PREVENTION PROGRAM

Avoid Cold Casualties!

When using Cold-Weather Clothing,
Remember **C-O-L-D**

C ~ Keep it...**Clean**

O ~ Avoid...**Overheating**

L ~ Wear it...**Loose and in layers**

D ~ Keep it...**Dry**

How to Spot Trouble

Notify an instructor if you or your buddy

experience:

- Dizziness, weakness or blurred vision
- Swollen red or darkened skin
- Painful, tender, hot or itchy skin
- Numbness or tingling
- Bleeding or blistered skin
- Numb, gray or waxy skin that feels "wooden" to the touch
- Vigorous shivering
- Lack of coordination and impaired judgment
- Painful, red, watery or gritty feeling in the eyes (snow blindness)

Enclosed areas where heaters are used:

- Excessive yawning, cherry red lips or grayish tint to lips and mouth
- Confusion, disorientation or mental slowness
- Drowsiness, lack of coordination or unconsciousness

Army Values:
Loyalty
Duty
Respect
Selfless - Service
Honor
Integrity
Personal Courage



For more information, visit www.army.mil/coldinjury for electronic versions of this document and other resources.

Appendix C

Individual Guidance for Heat Acclimatization

This heat acclimatization guidance is for those soldiers who will be attending strenuous advanced military training in hot weather such as ABN / Ranger School or ROTC camp. It provides practical guidance to obtain optimal heat acclimatization to both maximize performance and minimize the risk of becoming a heat casualty.

Should you be concerned about hot weather?

If you are used to working in cool or temperate climates, then exposure to hot weather will make it much more difficult to complete your advanced training course. Hot weather will make you feel fatigued, make it more difficult to recover, and increase your risk of being a heat casualty. Soldiers with the same abilities but who are used to training in hot weather will out perform you.

What is heat acclimatization?

- a. Heat acclimatization refers to biological adaptations that reduce physiologic strain (e.g., heart rate and body temperature), improve physical work capabilities, improve comfort and protects vital organs (brain, liver, kidneys, muscles) from heat injury. The most important biological adaptation from heat acclimatization is an earlier and greater sweating response, and for this response to improve it needs to be invoked.
- b. Heat acclimatization is specific to the climate (desert or jungle) and physical activity level. However, acclimatization to desert or jungle climates markedly improves the ability to work in the other similar climates. Soldiers who only perform light or brief physical work will achieve the level of heat acclimatization needed to perform that task. If they attempt a more strenuous or prolonged task, additional acclimatization and improved physical fitness will be needed to successfully perform that task in the heat.

Table 1. Benefits of Heat Acclimatization

Thermal Comfort – Improved	Exercise Performance – Improved
Core Temperature – Reduced	Heart Rate - Lowered
Sweating – Earlier & Greater	Thirst - Improved
Skin Blood Flow - Earlier	Salt Losses (sweat and urine) – Reduced
Body Heat Production – Lower	Organ Protection - Improved

How do you become heat acclimatized?

- a. Heat acclimatization occurs when repeated heat exposures are sufficiently stressful to elevate body temperature and provoke profuse sweating. Resting in the heat, with limited physical activity to that required for existence, results in only partial acclimatization. Physical exercise in the heat is required to achieve optimal heat acclimatization for that exercise intensity in a given hot environment.
- b. Generally, about two weeks of daily heat exposure is needed to induce heat acclimatization. Heat acclimatization requires a minimum daily heat exposure of about two hours (can be broken into two 1-hour exposures) combined with physical exercise that requires cardiovascular endurance, (for example, marching or jogging) rather than strength training (pushups and resistance training). Gradually increase the exercise intensity or duration each day. Work up to an appropriate physical training schedule adapted to the required physical activity level for the advanced military training and environment.
- c. The benefits of heat acclimatization will be retained for ~1 week and then decay with about 75 percent lost by ~3 weeks, once heat exposure ends. A day or two of intervening cool weather will not interfere with acclimatization to hot weather.

How fast can you become heat acclimatized?

- a. For the average soldier, heat acclimatization requires about two weeks of heat exposure and progressive increases in physical work. By the second day of acclimatization, significant reductions in physiologic strain are observed. By the end of the first week and second week, >60 percent and ~ >80 percent of the physiologic adaptations are complete, respectively. Soldiers who are unable to run 2 miles in less than 15 minutes or are unusually susceptible to heat may require several days or weeks more to fully acclimatize.
- b. Soldiers who are able to run 2 miles in less than 14 minutes should be able to achieve heat acclimatization in about one week. However, several weeks of living and working in the heat (seasoning) may be required to maximize tolerance to high body temperatures.

What are the best heat acclimatization strategies?

- a. Maximize physical fitness and heat acclimatization prior to arriving in hot weather. Maintain physical fitness after arrival with maintenance programs tailored to the environment, such as training runs in the cooler morning or evening hours.
- b. Integrate training and heat acclimatization. Train in the coolest part of the day and acclimatize in the heat of the day. Start slowly by reducing training intensity and duration (compared to what you could achieve in temperate climates). Increase training and heat exposure volume as your heat tolerance permits. Use interval training (work / rest cycles) to modify your activity level.
- c. If the new climate is much hotter than what you are accustomed to, recreational activities may be appropriate for the first two days with periods of run / walk. By the third day, you should be able to integrate PT runs (20 to 40 minutes) at a reduced pace.

- d. Consume sufficient water to replace sweat losses. A sweating rate of >1 quart per hour is common. Heat acclimatization increases the sweating rate, and therefore increases water requirements. As a result, heat acclimatized soldiers will dehydrate faster if they do not consume fluids. Dehydration negates many of the thermoregulatory advantages conferred by heat acclimatization and high physical fitness.
- e. Do not skip meals. Food will replace the minerals lost in sweat as well as provide the needed calories. Salt food to taste, and do NOT take salt tablets. Consult AR 40-25, Table 2-1, available on http://www.usapa.army.mil/pdffiles/r40_25.pdf for caloric requirements to meet your training needs.

Table 2. Heat Acclimatization Suggestions

Strategy	Suggestions for Implementation
Start early	<ol style="list-style-type: none"> 1. Start at least 1 month prior to school or training. 2. Be flexible and patient: performance benefits take longer than the physiological benefits
Mimic the training environment climate	<ol style="list-style-type: none"> 1. In warm climates, acclimatize in the heat of day. 2. In temperate climates workout in a warm room wearing sweats.
Ensure adequate heat stress	<ol style="list-style-type: none"> 1. Induce sweating. 2. Work up to 100 minutes of continuous physical exercise in the heat. Be patient. The first few days, you may not be able to go 100 minutes without resting. 3. Once you can comfortably exercise for 100 minutes in the heat, then continue for at least 7-14 days with added exercise intensity (loads, or training runs).
Teach yourself to drink and eat	<ol style="list-style-type: none"> 1. Your thirst mechanism will improve as you become heat acclimatized, but you will still under-drink if relying on thirst sensation. 2. Heat acclimatization will <u>increase</u> your water requirements. 3. Dehydration will negate most benefits of physical fitness and heat acclimatization. 4. You will sweat out more electrolytes when not acclimatized, so add salt to your food, or drink electrolyte solutions during the first week of heat acclimatization. 5. A convenient way to learn how much water your body needs to replace is to weigh yourself before and after the 100 minutes of exercise in the heat. For each pound lost, you should drink about one-half quart of fluid. 6. Do not skip meals, as this is when your body replaces most of its water and salt losses.

Appendix D

Instructions on use of Wet Bulb Globe Thermometer (WBGT)

This Wet Bulb Globe Thermometer (WBGT) guidance is for units in garrison and in the field who will conduct continuous activity in hot weather. It provides practical guidance to obtain optimal work and training productivity for acclimatized, and unacclimatized personnel. WBGT readings can differ at various locations throughout an Installation. Depending on the wind speed, humidity, and cloud cover, the WBGT index can be different in a wooded area as opposed to an open field. Because of these influencing factors- **WBGT readings must be taken in the immediate vicinity of the activity site and be read every hour.**

GENERAL INSTRUCTIONS
WET BULB-GLOBE TEMPERATURE INDEX
(FSN 6665-159-2218)

1. The wet bulb-globe temperature kit is an instrument for providing information on hot weather risks affecting the health of troops undergoing training. The information is in the form of an index computed by the weighted readings obtained from three different thermometers (see figure):

a. The stationary wet bulb (WB) thermometer exposed to the sun and prevailing wind. The bulb is covered by a moistened white absorbent wick.

b. A similarly exposed "black globe" (BG) thermometer with copper sheath painted black that is enclosed in a perforated shield.

c. A dry bulb (DB) thermometer with bulb shielded from the direct rays of the sun by an aluminum shield.

2. The Index is computed as follows:

WBGT = 0.7 WB temperature
+0.2 BG temperature
+0.1 DB temperature

The three readings are added on the attached slide rule with the weighting of each automatically achieved by the proportional scale sizes.

3. The thread in bottom of case is for attachment to a standard lightweight photographer's tripod that is not supplied with this kit.

a. Open kit by depressing box gently to disengage the latch.

b. Position thermometer assembly up and out (see figure). NOTE: Examine the bore of each thermometer. If the liquid has separated, heat the thermometer bulb slowly and carefully until the liquid reunites.

c. Wet the bulb wick thoroughly. NOTE: The little bottle may be filled with clean, preferably deionized or distilled water and utilized as indicated in figure. The water should be changed daily and the wick washed with soap and water. To avoid erroneous readings, the water and wick must be free of salt and soap.

d. Hold the kit with thermometers toward the sun, with the "black globe" thermometer closest to the sun. Wait 10 minutes for stabilization of temperatures...

e. Review instructions on face of the slide ruler assembly. Assume for purposes of instruction that BG reading is 120, DB reading is 100, and WB reading is 80.

- (1) Move 70 on BG scale to 70 on WBGT scale.
- (2) Slide X-hair to 120 on BG scale.
- (3) Move 70 on DB scale under X-hair.
- (4) Slide X-hair to 100 on DB scale.
- (5) Move 70 on WB scale under X-hair.
- (6) Slide X-hair to 80 on WB scale.
- (7) Read WBGT index. NOTE: If you have performed the calculations correctly, the index should read 90.

"REPLACEMENT PARTS"

	<u>WEKSLER PART NO.</u>
(a) Black-Globe Thermometer	23-68
(b) Web Bulb Thermometer	23-69
(c) Dry Bulb Thermometer	23-70
(d) Braided Wick	29-40
(e) Water Reservoir	M27-562
(f) Transparent Perforated Shield (Black Globe Analog)	M12-979
(g) Receiver, Radiant Energy	M12-978

