

USAREUR Pamphlet 350-7

Training

Winning in the Cold

**Headquarters
United States Army, Europe
and Seventh Army
Unit 29351
APO AE 09014
22 November 1995**

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Winning in the Cold

For the Commander in Chief:

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Summary. This pamphlet provides information on cold weather operations.

Applicability. This pamphlet applies to every soldier in USAREUR.

Supplementation. Commanders will not supplement this pamphlet without Commander in Chief,

USAREUR (AEAGC-TD-TM), approval.

Interim Changes. Interim changes to this pamphlet are not official unless authenticated by the Deputy Chief of Staff, Information Management, USAREUR. Interim changes will be destroyed on their expiration dates unless sooner superseded or rescinded.

Suggested Improvements. The proponent of this pamphlet is the Office of the Deputy Chief of Staff, Operations, HQ USAREUR/7A (AEAGC-TD-TM). Users may send suggestions to improve this pamphlet on DA Form 2028 (Recommended Changes to Publications and Blank Forms) to the Commander in Chief, USAREUR, ATTN: AEAGC-TD-TM, Unit 28130, APO AE 09114.

Distribution. Distribute according to DA Form 12-88-E, block 0315, command level A.

*This pamphlet supersedes USAREUR Pamphlet 350-7, 30 August 1993.

PREFACE

Hypothermia is a killer! It stalks its victim in 30 to 50 °F weather. You could be its next fatality during the next exercise.

Hypothermia is the subnormal temperature of the body caused by exposure to the cold. It is the number 1 killer of outdoor recreationists and could be a major killer of soldiers involved in winter training.

There are two clear steps in this killer's method of operation:

1. The instant your body begins to lose heat faster than it can produce heat you suffer from exposure. When you begin exercising to stay warm, your body adjusts as it attempts to retain normal temperature in your vital organs. Your response to the cold drains your energy reserves.

2. Once your energy reserves are exhausted cold reaches your brain depriving you of judgment and reasoning. Next, you will lose control of your hands, and your internal temperature will slide downward. Without treatment, hypothermia brings about stupor, collapse, and death!

If you want to outsmart the killer, take action during the period of exposure and gradual exhaustion. Here's how:

- 1. Stay dry.** Wet clothes lose 90 percent of their insulating value. Choose clothes that have proven effective against wind-driven rain. Cover your head, neck, body, and legs.

- 2. Beware of the wind.** A slight breeze carries heat away from bare skin much faster than still air. Wind drives cold air under and through clothing. Wind refrigerates wet clothes by evaporating moisture from the surface. Two-piece woolen underwear (or long wool pants and sweater or shirt) and a knit cap that protects the neck and chin are the best types of clothing in cold weather. Appendix A includes a windchill chart.

- 3. Understand cold.** Most hypothermia cases develop in air temperatures between 30 and 50 °F. Many people underestimate the danger of being wet at such temperatures—with fatal results. The cold that kills is cold water running down the neck and legs, cold water held against the body by sopping wet clothes, and cold water flushing body heat from the surface of the clothes. Don't ask, "How cold is the air?" Ask instead, "How cold is the water against my body?"

- 4. End exposure.** If you can't stay dry and warm under existing weather conditions, get out of the

wind and rain or build a fire. A stormproof tent gives the best shelter. Never ignore shivering. Persistent or violent shivering is a clear warning that you are on the verge of hypothermia.

5. Forestall exhaustion. Make camp before you get tired. Remember: exposure greatly reduces your normal endurance.

6. Beware of "hypothermia weather." Watch carefully for warning symptoms of hypothermia. Choose equipment with hypothermia in mind. Think hypothermia—your life depends on it!

Unless stated otherwise, masculine nouns or pronouns in this pamphlet do not refer exclusively to men.

The following abbreviations are used in this pamphlet:

APC armored personnel carrier
MOPP mission-oriented protective posture

NATO North Atlantic Treaty Organization
POL petroleum, oils, and lubricants
TB technical bulletin
VT variable timed

The following publications are referenced in this pamphlet:

NATO Handbook on Emergency War Surgery.

Field Manual 21-11, First Aid for Soldiers.

Field Manual 31-70, Basic Cold Weather Manual.

Field Manual 100-5, Operations.

Technical Bulletin Medical 508, Occupational and Environmental Health—Cold Injury.

Cold Injury, Ground Type, by Colonel T. F. Whaune, Department of the Army, 1938.

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CHAPTER 1

USAREUR WINTER OPERATIONS

INTRODUCTION

Each USAREUR leader must consider Europe's winter environment as part of the terrain. Field Manual 100-5 states:

Perhaps the most important effect of weather is on the soldier's ability to function effectively in battle. Inclement weather generally favors the attacker because defending troops are less alert.

As in other seasons, the winner in winter will be the side that trains troops to produce full effectiveness

from their weapons; concentrates its combat power at the critical place and time; controls and directs its forces decisively; and better uses cover, concealment, suppression, and combined arms teamwork. Fighting in winter calls for special training.

COVER

In general, winter changes few of the imperatives for seeking and using cover on the modern battlefield. Frozen soil is more impervious to fire, and well-prepared defensive positions that exploit both frozen ground and a mantle of snow are particularly difficult to defeat. Both

frozen ground and snow, however, complicate the construction of such positions. Snow itself, depending how densely packed it is, can stop bullets and smother artillery or mortar bursts. In deep snow, foxholes can be dug in the snow with an overhead cover of logs and packed snow. Water thrown over packed snow to form ice, or a mixture of water, snow, and sand ("iccrete") can be used to harden fighting positions. Table 1 shows minimum thickness of snow or ice cover for protection against small arms or shell fragments.

CONCEALMENT

Concealed positions and routes, reconnoitered when the leaves are on the trees, are often found to be exposed in winter. Cold increases the possibility that vehicle "rooster tails" of exhaust smoke, vapor clouds, and heat waves from running engines can pinpoint locations of a unit under cover. Cold also makes any type of thermal sensor more effective. "Near infrared" detectors function more efficiently when heat sources stand out against cool backgrounds (for example, an uncovered generator in a forest).

The main threat to concealment is "far infrared" detectors (especially weapon sights that use thermal imagery). By day or by night, any person or man-used object can readily be detected against winter terrain by such sights, which portray

temperature differentials. Against a cold winter landscape, a heated tank or any other vehicle will stand out like a sore thumb.

In experiments at Baumholder in 1978 and 1979, tanks were positioned side by side, one with a personnel heater turned on and the other without. Shut down simultaneously, the heated tank glowed very plainly in a thermal sight 4 hours later while the unheated tank cooled to invisibility within 30 minutes. Thermal radiation, the heat "signature," can be detected by thermal sights through darkness, smoke, haze, fog, light snow and rain, and normal screen camouflage at ranges up to 3,000 meters.

Leaders must be aware that thermal signatures provide significant tactical advantages for the defender.

In cold weather the attacker is more exposed than ever since his powerpack and suspension system will be easily detectable, and killable by the defender's weapons systems equipped with thermal sights.

The defender, on the other hand, may remain virtually undetectable since his system can be cooled to near ambient temperature and placed in ambush under a shed or behind some other thermally-opaque

Table 1
Snow or Ice Minimum Thickness for Protection Against Small Arms
and Shell Fragments

MATERIAL	FEET	METERS
Newly fallen snow	13	4
Firmly frozen snow	8	2.5
Packed snow	6.5	2
Frozen snow and water	4	1.2
Ice	3	1
Icecrete	1	0.3

screen (such as a tarpaulin, a snow bank, sheet, or blanket). Villages throughout the general defense plan area offer excellent thermal concealment opportunities.

Thermal sights require a complete reappraisal of measures for concealment. Leaders must routinely operate at night as in daylight, discount visual obscuration, and use thermal screens.

In the long nights of winter, leaders must use their nightvision equipment to the maximum. Light-intensification sights available for individual or crew-served weapons are combat multipliers because they strip the concealment of night away from the enemy and render our weapons more deadly.

Because of light-intensification sights, camouflage and concealment requirements are no longer different for day and light.

Snow presents another challenge to concealment in winter. While snow on the ground does not completely invalidate brown, green, and black camouflage screens or vehicular paint, snow makes them less universally useful. Any nonwhite camouflage net that is snow-covered hides superbly, but if the net has to be removed (for example, to fire a cannon), the snow-free net may give away the position. Generally, fighting positions that are in woodlines or in villages (where weapons can be concealed amid a cluster of naturally dark objects) are easier to camouflage than positions in the open. Tanks or other

vehicles that must occupy snowy positions deprived of such concealment should be camouflaged using one or more of the following techniques:

1. Splotch whitewash over darker camouflage paint tones.
2. Drape with bed sheets or white-painted tarps.
3. Apply wet white paper swatches and allow to freeze.
4. Obtain and use a standard white camouflage net.

Tracks in snow can destroy concealment. Overhead reconnaissance can readily detect even well-camouflaged positions unless leaders take pains to confine the movement of vehicles and personnel to the fewest tracks, preferably those shared with civilian traffic, and employ simple deceptive measures such as looping tracks past positions and back onto roads.

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concealment in winter works by different rules. Soldiers pay a heavy price for leaders not knowing and following these rules.

SUPPRESSION

No movement on the battlefield should take place without suppressive fire, which is fire aimed at

destroying the enemy if possible but at least driving him to cover and disrupting his own fire and movement. Generally, U.S. weapons function as well in cold weather as they do in warm weather (app B). Extreme cold may alter established zero and lead to inaccuracy with first rounds. Some increased obscuration from kicked-up snow or ice in front of guns may occur, mortar ranges may be reduced for some charges, and rockets and missiles may have an increased hazard in their backblast area from after-burning propellant. Cold weather usually calls for use of different lubricating procedures and keeping fire control instruments free of frost. Leaders must be aware that tracked vehicles must be moved periodically to preclude tracks from freezing fast as mud congeals. Also, some care must be taken with mortar baseplates and machinegun tripods to ensure that they are properly seated and that they can be free of frozen soil when displacement is required. By and large, however, leaders and troops can use their weapons as they have been trained all year.

Artillery and mortar shells work better against exposed personnel on frozen ground since clods and chunks of ice become additional missiles, but loose snow reduces the effective radius of bursts. Delayed-action fuzes will cause the round to penetrate the snow to attack the cover underneath, but fragmentation will be smothered. To attack

personnel on snow in the open, superquick or variable timed (VT) fuzes are best.

Heavy machineguns (.50 caliber) are especially effective winter weapons because they will punch through snow and ice more effectively and deprive the enemy of more cover than the M60. All machineguns require care in sitting since neither unprepared frozen ground or snow is likely to provide a stable gun platform.

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nning the enemy down in snow or on frozen ground exposes him not only to indirect fire, but also to cold injury.

COMBINED ARMS TEAMWORK

Communication is the lifeblood of teamwork; and winter poses special hazards of iced antennas or signals weakened by snow-covered evergreens. Even messengers are slower and less reliable.

Terrain reinforcement is more difficult in winter. Frozen soil sometimes makes bulldozer work easier because the blade cuts more efficiently; however, shovel work is harder and slower. Most fighting positions will require machine assistance at least to cut through the frost layer. Mine laying, either mechanically or manually, may be limited to placement on top of the

frozen ground; the mines must, in any event, rest atop a firm base, and then be covered with snow if possible. A shallow snowfall on top of already prepared obstacles and fighting positions will effectively conceal them, but an exceptionally heavy snow could negate the value of a minefield or even a tank ditch. On the other hand, such heavy snow would slow the enemy under the fires of the obstacle-covering weapons.

Because winter generally slows ground movement, commanders can put less emphasis on reinforcement from great distances or on withholding forces for counterattack. Commanders should push forces forward so that subordinates have enough combat power to deal with local situations and otherwise simplify plans for concentrating forces. While attack helicopters can fly in winter weather and are especially effective against tanks slowed by ice or snow, winter's reduced visibility is bound to cut their contribution to the battle.

All leaders at every echelon must understand that even simple tasks are harder in winter and that units will respond more slowly. Troop-leading procedures must allow for the extra time winter exacts for reconnaissance, assembly, maintenance, refueling, warming of troops and equipment, and other essential undertakings. Routine jobs (such as feeding) that can be ignored or postponed in warm weather become

critical in winter.

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everything is harder and slower in the cold from wrench-turning to chow. Leaders must plan accordingly.

Winter makes concerned leadership more important than ever. Personal contact and communications by leaders are essential for keeping soldiers alert, informed of what is happening, and involved in what their unit is doing. Keeping soldiers informed in winter may be tantamount to saving their lives. It is crucial for teamwork.

The main obstacle to teamwork in winter is cold and its affect on personnel. Soldiers naturally dislike cold; and many, when

bundled up in winter gear, tend to withdraw—their parkahoods or vehicles become cocoons. Their hearing deadened and their vision limited, they become oblivious to their comrades' sluggishness and drowsiness. Whole groups can hibernate in sleeping bags or tents and become withdrawn and somnolent. Such lethargy not only destroys teamwork and makes them easy prey for the enemy, it also makes soldiers candidates for cold injuries.

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eaders must keep soldiers active except when they are told to sleep.

There is no denying that winter operations are more difficult, but whatever difficulties we face, our potential enemies must contend with most of the same problems.

CHAPTER 2

SOLDIER READINESS

INTRODUCTION

American military history is not reassuring about the durability of the American soldier in winter warfare. Of the Continentals who began winter of 1777-1778 at Valley Forge, only two-thirds remained in the ranks when spring came and, of these, half were unfit for duty. In the Civil War and World War I, winter quartering practices kept losses to cold injury

down, but in World War II, the U.S. Army fought hard winter campaigns and lost heavily to cold. Trenchfoot and frostbite seriously weakened the fighting strength of U.S. divisions; in the winter of 1944-1945 alone, U.S. forces fighting in Europe evacuated 71,000 cold weather casualties. This is more than the soldiers that now man the entire V Corps. During the War in Korea, cold injury struck as decisively as the Chinese Army.

One U.S. division, during November and December of 1950, fielded an average strength of 22,496, but lost fully one-third that number (7,338) as nonbattle casualties—chiefly from frostbite and trenchfoot.

In USAREUR today, every soldier assigned is essential to our success in the first battle of the next war. No unit can afford to allow cold injuries or winter accidents to sap its strength.

We need every USAREUR soldier for our wartime mission, especially in winter. Leaders must not squander human resources through ignorance, carelessness, or lack of training for cold weather operations.

Yet in recent winter exercises some units experienced losses that in wartime could spell the difference between winning and losing. During a division exercise in the winter of 1978, nearly 2 percent of the force was lost in 110 days; hundreds of soldiers were medically evacuated with suspected frostbite or with winter-related injuries (falls on ice, burns from careless fires, vehicular collisions, or other accidents). One senior noncommissioned officer was killed by a passing civilian car while checking a convoy at a halt. A jeepload of soldiers were killed traveling with doors closed when struck by a train at a marked

crossing. An armored personnel carrier (APC) crew drank some wine, locked themselves inside their vehicle with the heater running, fell asleep, and died from carbon monoxide poisoning. Post exercise investigation concluded that—

In virtually every case, a concerned leader could and should have prevented the loss, or a knowledgeable soldier could have avoided the danger.

COLD INJURY: THE SCOPE OF THE PROBLEM

Among the losses leaders can prevent most easily are those from frostbite, a form of cold injury. General Mannerheim, the Finn who defeated the Soviet army in the Winter War of 1939-1940, has stressed that—

Losses among the troops because of frostbite weigh heavier on the commander's conscience than battle casualties, because in this case there always remains the disturbing feeling that losses due to cold might possibly have been avoided if greater precautions had been taken.

Several infantry regiments have historic bitter reasons for concern for cold injury. The 87th Infantry, in its fighting for Kiska, Alaska, in 1943,

suffered heavily from cold casualties. The 13th Infantry and 28th Infantry lost heavily to cold injury in late 1944 and 1945. The heaviest losses were suffered by the 28th Infantry Black Lions while cut off in the Hurtgen Forest. Infantry-men of isolated forward companies subjected to 2 weeks of continuous enemy fire while in wet muddy foxholes without hot food or drink were severely hit by cold injuries.

The message is clear: troops who were on the move and in the attack

*****Our men and women are the Army's most vital resource. Even if winter supplies, personal bags, tents, stoves, and camouflage require diversion of transport from ammunition basic load, frontline soldiers must get what they need to survive in order to fight.

Indications are that the very advantages of being mechanized can cause carelessness in some leaders. During the past 3 years some leaders never thought to take advantage of new technology (for example, improved insulated boots, gortex socks, gortex glove inserts). Some leaders allowed troops to go without warming or hot drink for periods of up to 3 days and they paid the inevitable price in cold injuries.

had few cold weather injuries; troops in the defense, improperly led and supervised, became needless cold casualties.

No unit needs such risk of widespread cold injury. We have armored fighting vehicles to bring food and hot drink on the battlefield even under direct fire. This mobility also assures adequate rotation of individuals and units from exposed positions back to warming areas. No soldier need stand in a flooded foxhole; an APC bilge pump can be rigged to pump the hole dry quickly and efficiently.

Cold injuries tend to occur more often among troops defending or delaying than in troops attacking, because the attacker can use the initiative to keep troops warmer and better rested while the defender must spread his forces over wide frontages (where warming is hard) and keep them out in the cold on the alert. In recent exercises, however, some units, no matter what their tactical posture, accomplished their mission with

no cold injuries. The difference plainly is better leadership.

 Too many leaders regard cold weather operations in Europe to be nothing more than business as usual. They think cold can simply be "gutted-out" until the end of the exercise. Nothing could be further from the truth.

Each leader must understand who in the unit is vulnerable to cold injury and devote special attention to those soldiers more likely than others to become a casualty. Losses to cold injury for the past 3 years were concentrated among young junior soldiers, most of whom were in the field during winter weather for the very first time. Table 2 shows the profile of cold injuries from 1989 through 1992.

Table 2 Profile of Cold Injuries From 1989 through 1992	
Male	88%
Female	12%
Age 18, 19, or 20	94%
Black	70%
From the South	55%
Service less than 2 years	75%
Injured feet	90%

Based on hard-learned and relearned experience, leaders must focus on—

1. Infantry. Three out of four injured were in infantry units. The majority of the injuries occurred while the soldiers were on guard or manning an observation post on a perimeter.

2. Kids. Both lack of experience and lack of motivation to keep active contributed.

3. Blacks. It is a statistical fact that blacks are especially prone to cold injury (TB MED 508).

Young blacks require extra vigilance.

4. Southerners. Most of the cold-injured came from the Carolinas southward and westward to Texas.

5. Newbies. For most, the field training exercise came during their first winter in Germany.

6. Feet. Almost all had duties requiring prolonged contact with snow-covered, wet, or frozen ground. While all were issued overboots and had them in the field, three out of four were wearing plain leather boots when injured.

The NATO Handbook on Emergency War Surgery, which is based on U.S. Army experience in Korea (1950 thru 1953), defines cold injury as including the following types:

1. Chilblain. Usually affects the hands and the feet, may result from exposure to air temperatures from above freezing to as high as 60 °F (16 °C), and is often associated with high humidity and repetitive exposures over periods of days or weeks.

2. Immersion foot. Implies an injury caused by exposure usually for more than 12 hours to water at temperatures usually below 50 °F (10 °C).

3. Trench foot. May also occur in the hands, results from prolonged exposure (48 to 72 hrs) to cold at temperature ranges from just above freezing to 50 °F (10 °C), often in a damp environment and usually in connection with immobilization of the extremities.

4. Frostbite. Implies the crystallization of tissue fluids in the skin or subcutaneous tissues after exposure to temperatures of 32 °F (0 °C) or lower. Depending on the ambient temperature or windchill, the exposure necessary to produce frostbite varies from a few minutes to a few hours.

5. Carbon monoxide poisoning. Results from inhaling carbon monoxide, which is a colorless, tasteless, and virtually odorless gas produced by the incomplete combustion of coal, oil, or other fuels used in such equipment as motor vehicles, field ranges, lighting, and heating devices. Carbon monoxide poisoning is usually the result of faulty equipment, improper use of equipment, or inadequate ventilation.

Cold injury occurs when an unprepared soldier encounters winter. His clothing, the type of combat operations in which he is involved, and his physical and mental makeup influence whether or not he will be injured and how badly. The NATO Handbook cites the following causative factors:

1. Weather. Temperature, humidity, precipitation, and wind modify loss of body heat. Low temperatures and low relative humidity (dry cold) favor the development of frost bite. Windchill accelerates the loss of body heat and the development of cold injury.

2. Type of action. Soldiers in combat support and combat service support units are injured far less frequently than those in combat units. A soldier is more likely to be injured if he is often in contact

with the ground, if he is immobile for long periods (such as riding in a crowded APC), if he stands in water in a foxhole, if he is kept out in the cold for days without warming, or if he lacks opportunities to carry out his personal hygiene. His vulnerability goes up with fear, fatigue, dehydration, and lack of nutrition. Defense, delay, observation post, and sentinel duties create these conditions more often than offensive action.

3. Clothing. Most soldiers who suffer an injury are improperly dressed. Leaders must require troops to dress as lightly as possible consistent with the weather to reduce the danger of excessive perspiration and subsequent chilling. A large proportion of cold weather injuries results from too few clothes being available to individuals when the weather suddenly turns colder. All soldiers must have their complete cold-weather gear available in winter (incl sleeping bag, insulated boots, gloves, field jacket liner) and know how to use them. Improper use of equipment (for example, sleeping with boots on in a sleeping bag) often causes cold injuries. Because of the difference in individual metabolism, each soldier produces heat and loses it at his own rate. Leaders must not be arbitrary in specifying exactly what each soldier should wear; winter underwear (esp bottoms) however, should be required at all times. Other

clothing should be worn loose and in layers so that it can be vented at the neck. Clothing and footgear that are too tight restrict circulation and invite cold injury. Tight garments lessen the volume of trapped air layers and thereby reduce the insulation and ventilation available to the body. Headgear is especially important as heat loss is often greatest from the head. Heat may flow from a soldier's body at a rate equal to or greater than the rate at which it is produced. A man generates 100 watts when still but up to 10 times as much when working. When heat loss exceeds production, the body uses up the heat stored in tissue causing a rapid drop in body temperature, especially in the extremities. Excessive heat loss can result in shivering, a sort of emergency action in which the body uses energy to produce heat. Shivering is an important warning that clothing must be added or that exercise, food, or warmth are needed to prevent cold injury.

4. Branch and rank. Frost-bite and trenchfoot are maladies occurring overwhelmingly among lower-ranking riflemen. In World War II, 90 percent of all cold injury casualties were riflemen. The experiences in Korea and the 8th Infantry Division's 1978 experience were parallel. Since only 15 percent of the 8th Infantry Division now fights on foot, compared with 30 percent in World

War II, heavy losses among a combat-critical minority of fighters-on-foot pose serious replacement problems.

5. Previous cold injury. Individuals with prior cold injury have a higher-than-normal risk of subsequent cold injury. These individuals are unlikely to be injured in the same location on their body, but their overall individual susceptibility is surely higher.

6. Fatigue. Both mental and physical weariness contribute to apathy, which leads to inactivity, personal neglect, carelessness, reduced heat production, and cold injury.

7. Other injuries. Wounds or sickness may lead to a soldier's being immobilized. This will affect blood circulation and predispose him to cold injury.

Injuries resulting in significant blood loss or shock reduce the blood flow to extremities and make the individual a prime candidate for cold injury.

Casualties and the sick persons need special measures to be kept warm.

Other factors that must not be overlooked include—

1. Discipline, training, and experience. Cold injury is preventable. Well-trained and disciplined soldiers can be protected even under the most adverse circumstances if they and their leaders know the hazards of cold exposure and the importance of personal hygiene (esp care of the feet, exercise, and use of protective clothing).

2. Psychological factors. Fear reduces the body's ability to rewarm itself and, thus, increases the incidence of cold injury. Scared soldiers are vulnerable. Cold injury is also more likely in passive, negative, and hypochondriacal individuals. Such persons show less muscular activity in situations in which activity is unrestricted (hence producing less body heat) and are careless about precautionary measures (especially warming activity when cold injury is a threat).

3. Race. In all studies of World War II and Korea, black soldiers were from four to six times more likely to suffer cold injuries than their caucasian counterparts matched for geographic origin, training, and education. This is not to say, however, that blacks cannot be protected against injury or that they cannot fight in the cold. It means, rather, that both the black soldier and his leader must be especially careful in cold weather.

4. Sex. No known differences. Cold injuries occur in both sexes if proper preventive actions are not taken.

5. Drugs and medication. Any drug that modifies the body's responses, alters sensation, or affects judgment or motivation (including alcohol), can have disastrous effects on individual performance and survival in the cold. Alcohol poses a special danger for cold injury, because it affects both judgment and speeds heat loss from the body.

COLD INJURY: FIRST AID

Leaders and soldiers must be made to understand that cold injury is very painful and possibly disabling for life. They must treat it seriously.

Many soldiers suffer cold injuries without knowing what is happening to them. They sense cold and experience general discomfort, but they do not notice the injured part because heat loss numbs it. Superficial cold injury usually can be detected by numbness, tingling, or stinging ("pins and needles") sensations. These symptoms can often be relieved simply by loosening boots or other clothing and exercising to increase circulation. In more serious cases

involving deep injury, the injured soldier often first becomes aware of the injury when the affected part of the body feels a stump or like a block of wood.

Early signs of cold injury that are visible include skin discoloration at the injury site (in lighter-skinned persons, reddening is followed by pale or waxy white; in darker-skinned persons, grayness is usually evident). An injured foot or hand feels cold to the touch. Evident swelling is an indication of deep injury. Soldiers working in pairs (buddy teams) should check each other for signs of such discoloration and other symptoms. Leaders checking or inspecting soldiers also should be alert.

Once cold injury is suspected, the problem of administering first aid within the unit is to estimate whether the injury is superficial or deep. Cases of superficial frostbite may be adequately treated by immediate warming of the affected part using body heat (for example, covering cheeks with hands, putting finger tips under armpits, placing feet under the clothing next to the belly of a buddy). Under no circumstances should the injured part be massaged, exposed to a fire or stove, rubbed with snow, slapped, chafed, or soaked in cold water. Pain will occur on rewarming. Walking on injured feet will be avoided. If the estimate is deep injury, the injured

soldier should be moved at once to an aid station where the affected part can be rewarmed under medical supervision. Intense pain, further discoloration, swelling, and other symptoms develop after rewarming. Table 3 shows symptoms and first aid procedures for cold injuries.

Often suspected deep injury will turn out to be a false alarm, and the soldier, warmed and rested, will be returned to duty. But no one

familiar with how scarce our frontline evacuation and medical holding resources truly are will underestimate the seriousness of having to evacuate the soldier in the first place. Prevention, not first aid and certainly not evacuation, is preferred. In case of doubt, evacuate. Diagnosis, even by a doctor, is difficult when the patient is first seen. If injury has in fact occurred, it will be evident within hours of rewarming. Degrees of injury are medically reported as shown in table 4.

Injury	Signs and Symptoms	First Aid
Chilblain	Red, swollen, hot, tender, itching skin. Continued exposure may lead to infected (ulcerated or bleeding) skin lesions.	Area usually responds to locally applied rewarming (body heat). Do not rub or massage area. Seek medical treatment.
Immersion-foot/trench-foot	Affected parts are cold, numb, and painless. Parts may then be hot with burning and shooting pains. In advanced stage, pale skin with bluish cast; decreased pulse. Blistering, swelling, heat hemorrhages, and gangrene may follow.	Gradually rewarm by exposure to warm air. Do not massage or moisten skin. Protect affected parts from trauma. Dry feet thoroughly; avoid walking. Seek medical treatment.
Frostbite	Loss of sensation or numb feeling in any part of the body. Sudden blanching (whitening) of the skin of the affected part followed by a	Warm the area at the first sign of frostbite, using firm steady pressure of hand, underarm, or abdomen. Face, ears, nose: cover area with hands (casualty's own or buddy's).

Table 3		
Cold Injury First Aid—Continued		
Injury	Signs and Symptoms	First Aid
	<p>momentary tingling sensation. Redness of skin in light-skinned soldiers; grayish coloring in dark-skinned soldiers. Blisters. Swelling or tender areas. Loss of previous sensation of pain in affected area. Pale, yellowish, waxy-looking skin. Frozen tissue that feels solid (or wooden) to the touch.</p>	<p>Hands: open field jacket and place casualty's hands against body, then close jacket to prevent heat loss.</p> <p>Feet: remove casualty's boots and socks and place exposed feet under clothing and against the body of another soldier. Avoid walking if possible. Do not attempt to thaw the casualty's feet or other seriously frozen areas if the soldier will be required to walk or travel to a medical center to receive additional treatment. The possibility of injury from walking is less when the feet are frozen than after they have been thawed. Thawing in the field increases the possibility of infection, gangrene, and injury.</p> <p>Loosen or remove constricting clothing and remove jewelry.</p> <p>Increase insulation (cover with blanket or other dry material). Ensure casualty exercises as much as possible, avoiding trauma to injured part.</p> <p>Seek medical treatment.</p>
Snow blindness	<p>Eyes may feel scratchy. Watering, redness, headache, and increased pain with exposure to light can occur.</p>	<p>Cover the eyes with a dark cloth.</p> <p>Seek medical treatment.</p>
Carbon monoxide poisoning	<p>The symptoms of carbon monoxide poisoning come rapidly and in quick succession. Dizziness, headache, noise in the ears, and throbbing in the temples are quickly followed by a feeling of sleepiness and weakness.</p>	<p>Move the soldier into fresh air immediately and administer artificial respiration. It is safe to administer mouth-to-mouth respiration to a carbon monoxide victim. Keep the soldier quiet and transport to a medical treatment facility.</p>

Table 4
Degrees of Injury

First degree	Discolored skin chapping, possible aches, and sensitivity to cold.
Second degree	Swelling, blisters, formation of blackened tissue that falls off leaving vulnerable new skin; persistent throbbing deep aching, and sensitivity to cold.
Third degree	Involvement of the whole skin with blistering and ulceration; formation of hard, black, dry chunks that fall off; burning; throbbing, and shooting pains.
Fourth degree	Gangrene; destruction of an entire part, bone and tissue, mummification, or loss of damaged part. Fourth degree injury will lead to medical reclassification or discharge.

COLD INJURY: PREVENTION

The successful prevention and control of cold injury depends on vigorous command leadership, provision of adequate clothing, and a number of individual and group measures. These measures include—

1. Command, staff, technical, and combat component personnel thoroughly appreciating and comprehending the losses that may occur from cold injury, both in winter combat and in other circumstances in which cold injury has been known to occur.

2. Fully supporting a comprehensive and practical cold injury prevention and control program by the command. This is a command, not a medical, responsibility. TB MED 508 requires each platoon and squad or comparable-sized unit to have a cold

injury control officer or noncommissioned officer.

3. Indoctrinating personnel in the prevention of cold injury individually and by units.

4. Providing adequate supplies of clothing and footgear and correctly using them to avoid exposure to cold. The supply program must provide enough dry clothing for the daily needs of the soldier who is farthest forward in combat; it also must provide for the correct fitting of clothing and boots. All clothing must be fitted to avoid constriction of the extremities and tightness over the back and thighs. Clothing for cold weather, based on layering principles, is now designed as an assembly for protecting of the head, torso, and extremities. The clothing should be worn in loose layers with air spaces between the layers under an outer wind-resistant

and water-resistant garment. Body heat will thus be conserved. Garments will be flexible and inner layers will be removable for comfort and efficiency in higher temperatures or during strenuous physical exertion.

a. Preventing loss of body heat by properly protecting the body is as important as efficiently using appropriate dry footgear and warm dry gloves.

b. The most efficient clothing is of no value unless, through training, a high level of individual and unit foot and clothing discipline are maintained.

5. Besides the regular rotation of troops, specially protecting racial and other groups that are especially susceptible to cold injury. It should be remembered that patients with exposed wounds and injuries are particularly liable to cold injury because blood and discharge from their wounds will freeze from the clothing inward.

6. Implementing effective policies for sorting casualties in forward areas with provisions for early evacuation and treatment of persons actually suffering from cold trauma.

7. Evaluating factors to establish specific measures for particular units or groups that will reduce the significant number of cases caused

by—

a. Barehanded contact with cold metal or petroleum, oils and lubricants (POL). POL handlers are subject to cold injury from flash freezing of skin resulting from POL spills. POL products do not freeze at 32 °F as water does, and they remain in a liquid state at temperatures far below those that turn water to ice. POL products at these temperatures can produce instant flash freezing on contact with skin. POL handlers should wear the proper uniform at all times (incl protective gloves) and immediately change POL-soaked clothes to avoid cold weather injury.

b. Rapid deployment of troops seated in unheated vehicles without interruption for short rewarming marches every few hours.

c. Air drops of troops into cold areas without adequate protective equipment and training.

d. Several hours' confinement of arctic-equipped, airborne troops in heated aircraft followed by a drop into a subzero environment after their insulating clothing has been saturated with perspiration.

The NATO Handbook, TB MED 508, reports from previous wars, and recent experience all point to the need for a comprehensive command approach to meeting the cold weather challenge in Europe today.

CHAPTER 3

USAREUR SOLDIER POLICY FOR WINTER OPERATIONS

INTRODUCTION

The USAREUR plan for fighting in cold weather has eight main points. Each point is broken down as officer business and sergeant business (table 5). It will require the concerted effort of all leaders to make the plan a reality.

UNIFORM AND INDIVIDUAL EQUIPMENT

Proper clothing is crucial to prevent cold injury. The winter clothes issued to each soldier are adequate if they fit, are worn correctly, and are available when needed. Check the fit on the soldier. The fit of all clothing should be loose and, while it is better for troops to be overdressed and venting than underdressed, leaders should understand that too much clothing hampers soldiers, causes them to sweat, and dehydrates and then chills them because of wet undergarments. Overwhite camouflage uniforms, since they are in limited supply, should be issued only to those fighters-on-foot likely to be in forward positions.

Appendix C covers special considerations for wearing mission-oriented protective posture (MOPP) gear in the cold.

Leaders must check for the small items troops need in winter (face masks for drivers, tank commanders, and air guards; scarfs; chapsticks; dark inserts for goggles or sunglasses; waterproof matches, heat tablets, or candle ends; extra sock pinned to shirt; gloves and liners (with dry extras)).

ROTATE AND WARM TROOPS

The feet perspire more and are generally less well ventilated than other parts of the body regardless of the type of boot being worn. The insulated boot, while better for troops in contact with the ground for prolonged periods, may be less desirable than leather boots and overshoes when activity is so intense that the feet sweat heavily and the socks become wringing wet.

Whenever there is danger of cold weather and prolonged exposure to the cold, personnel must be equipped with both the insulated boot and over-shoes.

Table 5 USAREUR Policy For Fighting In The Cold	
OFFICER BUSINESS	SERGEANT BUSINESS
Uniform and Individual Equipment	
Provide soldiers adequate winter clothing and personal equipment, and ensure these are available in forward elements in the field.	Supervise issue, accountability, proper fit, storage, use, and maintenance of each soldier's clothing and equipment.
Rotate and Warm Troops	
Conserve fighters-on-foot for tactical use at night and in reduced visibility by directed periods of exercise. Alternate warming, nourishment, and rest with alerts in tactical positions.	Set up and check the unit's system for rotating troops in squads, platoons, or sections from fighting positions operations, to sleeping shelters and exercise and feeding facilities.
Buddy Teams	
Limit risk of cold injury by identifying among fighters-on-foot (and reassigning to lower exposure duties) soldiers with medically recorded cold injuries. Prescribe at least two soldiers per mission or duty post.	Install, enforce, and check the buddy-team system for every fighting position, guard post, vehicle on the road, and any other job.
No Sleeping in Armored Vehicles	
Prohibit soldiers from sleeping in, or using personnel heaters for, armored fighting vehicles. Provide an alternate sleeping plan supported by appropriate equipment.	Implement unit sleeping plan by designating sites. Supervise use and maintenance of equipment (esp tents, sleeping bags, and heating gear).
Exchange of Socks and Clothing	
Furnish to combat units direct exchange for clean socks, underwear, and other clothing. Arrange for unit baths at least once a week.	Inspect troops to ensure that each soldier washes and shaves at least once a day and changes his socks. Soldiers will change their socks twice a day and whenever they get wet. When soldiers change their socks, they will massage and dry their feet.
Crew and Squad Messing	
Supply combat units with a crew or squad messing capability.	Require troops to consume three meals and three cups of soup or other hot drink between meals each day.
No Alcohol or Drug	
Prohibit consumption or possession of alcohol or any controlled substance.	Enforce rules against having or using beer, wine, or other liquor and any kind of illegal drug.
Training, Evaluating, and Knowing When Measures Are Required	
Plan, manage, and conduct training for cold weather operations. Regard every winter day (in garrison, in the field, at peace, or at war) as a training day. Know when cold defensive measures are necessary.	Conduct training on cold weather operations for record on each soldier. Evaluate that training by inspecting for compliance with instructions daily, focusing on soldiers vulnerable to cold injuries (fighters-on-foot, new, young, black).

In the cold, wet winters in Central Europe, leather boots should not be worn without overshoes. Insulated boots are recommended during the winter season. The insulated boot however, is not a cure-all since cold injuries still can occur when proper foot and sock care are not observed. Such injuries usually result from inactivity (for example, sitting) or dependency on the foot (for example, standing without foot or leg movement). TB MED 508 indicates that particular attention should be given after exercise because of increased sweating, retention of sweat, and the decreased insulating quality of wet socks.

TB MED 508 prescribes frequent changing of socks and massaging of feet to eliminate cold weather injuries to the feet.

USAREUR policy is that in a field environment feet will be checked at least every 4 hours and socks will be changed and feet massaged at least twice a day.

Leaders must manage infantrymen, scouts, and others who fight on foot to meet security requirements during winter's reduced visibility. Long roadmarches and lengthy cross-country moves in cold weather often jam soldiers in cramped positions in APCs and subject air guards to special hazards from windchill.

Leaders must interrupt such moves at least once an hour to exercise troops vigorously. Group calisthenics are a good solution. Track commanders, drivers, and air guards require extra protection against windchill and may have to be rotated or exercised even more often. Dug-in fighting positions can be equipped to warm troops (for example, a stove under an overhead cover, a candle in a poncho-covered foxhole, a warming shelter). A tent or a building must be provided where troops can be sent at least every 2 hours for warming, rest, or refreshment.

BUDDY TEAMS

Leaders should not assign any soldiers with a record of cold injury to a job that requires prolonged exposure on the ground. These soldiers should be used for tasks that assure close supervision, plenty of activity, and ready access to a warm area.

No soldiers anywhere will be assigned to any job alone.

Buddy teams will be used. Each soldier should know that he is responsible for checking his buddy for signs of cold injury and, in a fighting position, for taking turns with his buddy so both have chances to warm up.

NO SLEEPING IN

ARMORED VEHICLES

Personnel heaters in armored vehicles are likely to be viewed through enemy thermal sights. This greatly complicates concealment and is therefore prohibited. Sleeping in armored vehicles of any type, whether heated or not, is a dangerous practice and is also forbidden. Aside from the hazards of carbon monoxide poisoning, an armored vehicle surrounds a sleeping soldier with hard cold surfaces that rapidly conduct heat away from the body.

Each unit must have a sleeping place. Each tank, for instance, might carry two shelter halves with pins and poles so that two soldiers may sleep while two are on watch in the tank; a rifle squad might carry a small hexagonal tent. Leaders must appreciate that cold injury strikes many soldiers while they are asleep. Never permit a soldier to crawl into a sleeping bag with boots on. Sleeping with boots on restricts circulation and invites frostbite. Since clothing worn in the bag can bind and restrict circulation as the sleeper turns, soldiers should pull on their bag over the least possible clothing and never over wet clothing (esp wet socks). Soldiers should put as much insulation under the sleeping bag as possible, preferably the air mattress.

Each soldier should be taught to exercise vigorously before getting into the bag so bodyheat will heat the bag quickly. A small person should fold a loose bag underneath his body inside the sleeping bag to reduce the amount of air needed to be warmed.

Shelter for sleepers is necessary, but a stove or other heat source is not essential. If a stove is used, the leader must ensure that it is safely positioned and tended. Sleeping shelters should be placed in covered and concealed positions out of the wind and as close to vehicles or fighting positions as possible.

EXCHANGE OF SOCKS AND CLOTHING

A soldier can wash his entire body with the equivalent of two canteen cups of water using half for soaping and washing and half for rinsing. Washing is important in promoting circulation and maintaining skin health. Washing feet, and hands, crotch, and armpits is especially important. Access to a bath unit or to showers in a building should be arranged weekly and those occasions should be used to inspect clothing and to replace soiled or damaged items by direct exchange. Clean socks should be provided and special attention should be given to headgear and underwear. Clothes matted with dirt and grease lose much of their insulating properties;

air pockets formed by the cloth fibers become clogged or crushed and heat is readily transmitted.

It is a good idea to wear summer underwear under winter underwear to help keep the latter clearer of body oils. Wet socks or gloves can be dried by pinning them, unfolded under the shirt where bodyheat will dry them. Each soldier should have at least two extra pairs of dry socks in his possession so that he can change socks at least twice a day. Each time he does, he should massage his feet, preferably washing them, and dry them thoroughly before replacing his boots.

Beards should be shaved and the hair combed daily. A beard adds very little insulation and soils clothing and headgear with natural oils. More importantly, facial hair forms a base for buildup of ice on the face from breath moisture and can hide frostbite symptoms. A beardless face is important for use of the protective mask against chemical attack, because an airtight seal is difficult to maintain even with stubble on the face.

CREW AND SQUAD MESSING

The body derives the energy to keep itself warm from food. Proper nutrition is therefore essential to warding off cold in-

jury. Of course commanders would like to provide soldiers three hot meals a day as they can in garrison, but in war that is sometimes impossible. Even in peacetime winter exercises, ice and snow conditions are frequently so bad that moving cooked food to forward elements is very dangerous if not impossible. Dehydration can occur as often in winter as in summer. Soldiers working hard while wearing winter clothing lose a lot of body water. If not replaced, fluids lost through perspiration and elimination soon affect physical ability and mental attitude. A dehydrated soldier generally feels tired and weak; in his torpor he becomes especially vulnerable to cold injury.

When fighting under similar circumstances during World War II, British troops proved more resistant to cold injury than Americans largely because the British insisted on pausing during operations so that each tank crew or rifle section could "brew up tea."

It is important that each small unit (for example, armored fighting vehicle crew, gun crew, communications team) be equipped and trained to warm their own rations and to prepare their own hot beverages.

Digesting a cold ration requires the body to expend as much food as the ration provides.

Commanders must issue heat tablets, stoves, and appropriate rations. Supplemental candy bars are especially useful to the frontline soldier, since they can be carried in the pocket and used for heat-generating snacks whenever the soldier feels chilled. Leaders of small units using squad or crew mess techniques must observe sanitation practices carefully and require troops to clean utensils thoroughly. Many troops profess to dislike heating field rations and to dislike soup; but they must be required to eat and to drink warm liquid between meals to keep their energy up and to avoid cold injury. Individual ration heating tablets are available as well as assigned single- and double-burner squad stoves. The individual squad activity has to be supplemented by a company distribution effort of vacuum jugs with hot fluids (such as coffee, cocoa, or soup) to the platoon warming area. The ration distribution program in USAREUR now provides for supplemental issues for field exercises without units having to request them. The ration supply system provides dehydrated soup mix in no. 2½ cans, which lend themselves to individual or squad

preparation at the designated "brew up" times.

Following up the responsibility for providing hot food with an effective sanitation program must not be overlooked. Because immersion heaters will normally be located in the company training area, the leader must provide for some hot-wash capability. For this purpose leaders can also obtain and use food service disinfectant (national stock number 6840-00-810-6396) to augment the sanitation program.

NO ALCOHOL OR DRUGS

Alcohol is a depressant. Alcohol causes body temperature to drop, furthers dehydration, deadens pain that might otherwise signal cold injury, and renders soldiers drowsy and inactive. Most other drugs similarly invite cold injury. Drugs, alcohol included, sharply increase the possibility of accident and injury or death from carbon monoxide asphyxiation, falls, and vehicular accidents. Bad news in any season, drugs spell death in winter.

TRAINING, EVALUATING, AND KNOWING WHEN MEASURES ARE REQUIRED

The main problem in training to avoid cold injury is that many of those soldiers most likely to be injured are precisely those most

likely to be absent from training when the all-too-often proforma unit "classes" are held—the more junior troops away on detail, and the new arrivals inprocessing. A single "class" in November, furthermore, is not likely to be remembered in February. Here is a training management problem that calls for battalions to plan and provide resources and for first-line supervisors to train according to tasks, conditions, and standards established by division.

Preoperation evaluations must be followed up in the field by daily inspections for compliance. In all training from October through March, dedicated attention must be paid to soldier readiness for winter warfare and, whether in garrison or not, trainers must seek opportunities to practice foot care.

In the final analysis, it is far more important to train noncommissioned officers and junior officers to know what must be done in the field to meet the challenge for winter warfare than to try to train every single soldier in garrison.

In war and in field exercises, meeting winter warfare standards will crucially depend on the caliber of leadership provided in forward platoons and sections. These leaders must overcome both the environment and the enemy and never allow energies directed into the former struggle to prevent success in the latter. Leaders must be thoroughly knowledgeable and be in superior physical condition if they are personally to meet winter warfare on its own terms.

APPENDIX A

WINDCHILL

Cold injuries result from prolonged exposure to cold. Wind is a big factor in cold injury because it increases the loss of heat by reducing the thin layer of warm air next to the skin.

ture is below freezing and the wind removes heat faster than the body can replace it, cold injury occurs.

Heat loss increases as wind speed increases. When the air tempera-

The combined effects of wind and temperature are expressed as a perceived temperature (windchill) shown in table A-1.

Table A-1													
Windchill Chart													
Estimated wind speed in miles per hour	Actual Thermometer Reading (Fahrenheit)												
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60	
	Windchill (Fahrenheit)												
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60	
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68	
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95	
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112	
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-124	
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133	
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140	
35	27	11	-4	-21	-35	-51	-67	-82	-98	-113	-129	-145	
40	26	10	-6	-24	-37	-53	-69	-85	-100	-116	-132	-148	

NOTE: To use the chart—

1. Find the estimated or actual wind speed in the left column.
2. Locate the actual degrees Fahrenheit in the top row.
3. The equivalent temperature is where the two readings intersect.

APPENDIX B

WEAPONS SAFETY

Sure, cold weather affects people — but what does it do to that M16 you're carrying? Extreme cold weather can cause weapon malfunctions and breakages.

Snow is a big reason for malfunctions. It can get into the working parts, sights, and even the barrel of a weapon. So when moving through snow-covered woods or digging a foxhole in the snow, take care of your weapon. Keep it out of the snow and always check it for snow-clogs before firing it.

Breakage can result when a weapon is warmed up too quickly in a cold environment. Extreme cold makes tempered steel brittle. Rapid firing of the weapon can further weaken the temper by heating the barrel and gun to sudden temperatures up to 750 °F.

Cold weapons should first be fired at a slow rate of fire. Once the parts have warmed up, the rate of fire may be increased to normal speed.

A "sweating" weapon can also cause problems. Condensation forms on a weapon taken from extreme cold into a heated shelter. When the weapon is taken back outside, the "sweat" freezes on and in the weapon. This can cause malfunctions and even breakage.

Do not take a "sweaty" weapon out in the cold. Get rid of sweat completely, even if it means disassembling the weapon and re-oiling it after cleaning.

There are other weapons problems caused by cold weather operations. Field Manual 31-70 has more information. It could prevent real trouble during your next exercise.

APPENDIX C

**MISSION-ORIENTED PROTECTIVE
POSTURE GEAR IN THE COLD**

Unit leaders must ensure soldiers take precautions to prevent cold weather injury while wearing mission-oriented protective posture (MOPP) gear.

Perspiration collects inside the facepiece and may freeze when MOPP gear is removed outside. Soldiers should wipe their faces and inside of masks with a cloth (for example, an extra glove, sock, handkerchief, wool scarf) to keep perspiration from freezing after unmasking in the open air.

Exposed metal buttons inside the facepiece may contribute to discomfort and frostbite to that part of the face. Soldiers should—

1. Place a small piece of tape over the exposed metal rivets inside the facepiece. The tape should be only large enough to cover the metal and not so large that it interferes with putting on or wearing the mask.

2. Not tape over metal buckles on the protective mask. The metal buckles should have little or no contact with the skin if the mask is worn properly. Taping buckles could interfere with proper adjustment and fit of the mask and could lead to problems in properly clearing and sealing the mask.

Hands are susceptible to cold weather injury when soldiers wear

chemical protective gloves. Soldiers should wear—

1. The green wool liners from the black shell gloves underneath the protective gloves instead of the white glove liners.

2. Standard work gloves, standard issue cold weather mittens, or black leather shells over the butyl-rubber gloves.

Ears are susceptible to cold weather injury while soldiers wear the protective mask and hood. Soldiers outside the Arctic who are not issued a combination skimask and cap should be encouraged to wear one of the following:

1. Hooded cold weather parka over the MOPP jacket, mask with hood, and helmet.

2. Sleeping cap issued with the cold weather sleeping bag.

Anything worn over the MOPP gear that cannot be decontaminated must be discarded.
