

# **FIELD SANITATION TEAM CERTIFICATION COURSE**



## **LESSON 12 - COLD INJURY**

**FSTCC0012-1**

## **Lesson Objectives**

- ***Define the types of cold injury.***
- ***Select the factors that influence cold injury.***
- ***Select the measures to prevent cold injuries.***
- ***Determine the windchill temperature.***

# *Introduction to Cold Injury*



**FSTCC0012-3**

# Categories of Cold Injury





**Freezing**  
**Frostbite –**  
**Produced by**  
**exposure to**  
**freezing**  
**temperatures**

- **High Altitude Frostbite**

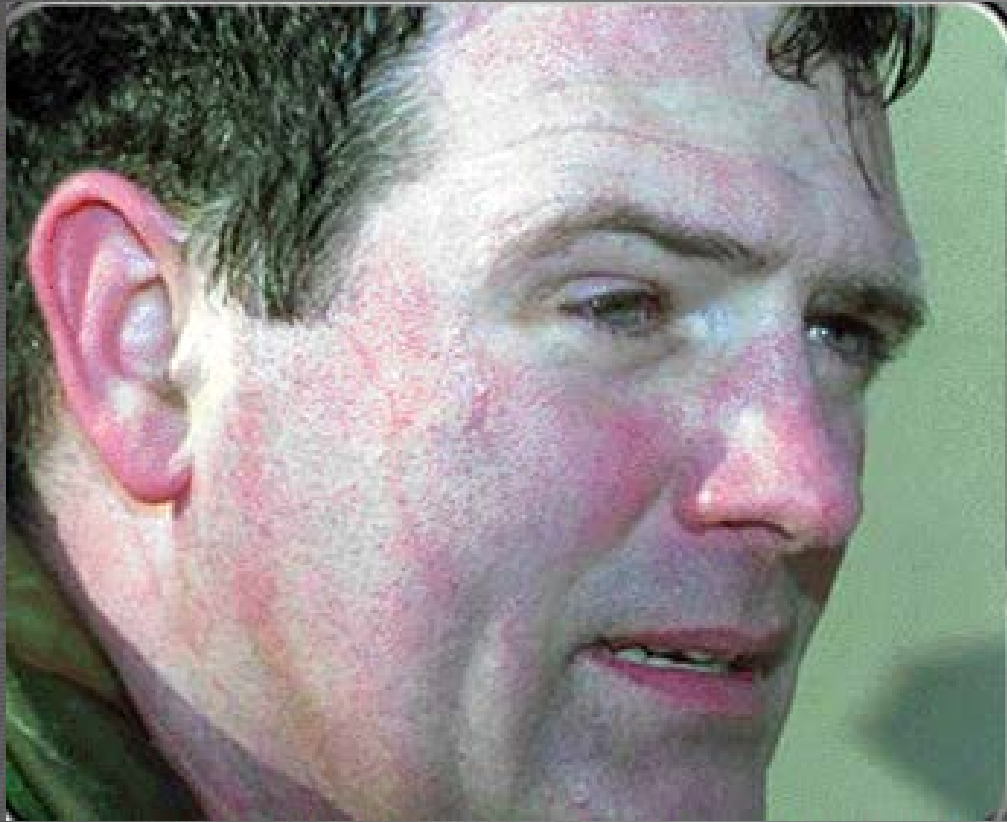
# High Altitude Frostbite



## *Freezing*

- *Frostbite*
- *High Altitude Frostbite – Produced by exposure to temperatures between  $-20^{\circ}\text{F}$  and  $-80^{\circ}\text{F}$  at high altitudes*

# **Chilblain**



## **Non-Freezing Chilblain (frostnip)**

- **Hypothermia**
- **Trench Foot**
- **Immersion Foot**
- **Snowblindness**

**Results from exposure to temperatures  
between 60°F and 32°F with high humidity**

# Hypothermia



*The body loses heat faster than it can produce it.*



# ***Fatigue and Hypothermia***



***Caution:***  
***Exhaustion makes a soldier more prone to hypothermia***

# **Trench Foot**



*Results when the feet remain cold and wet in temperatures below 50°F for three days or more*

## **Non-Freezing Chilblain (frostnip)**

- **Hypothermia**
- **Trench Foot**
- **Immersion Foot**
- **Snowblindness**

# ***Immersion Foot***



## ***Non-Freezing Chilblain (frostnip)***

- ***Hypothermia***
- ***Trench Foot***
- ***Immersion  
Foot***
- ***Snowblindness***

***Results from exposure to cold water  
at temperatures below 50°F in excess  
at 12 hours***

# **Snow Blindness**



## **Non-Freezing Chilblain (frostnip)**

- **Hypothermia**
- **Trench Foot**
- **Immersion Foot**
- **Snowblindness**

**Results from reflection of the  
sun off a snow covered surface**

# Dehydration

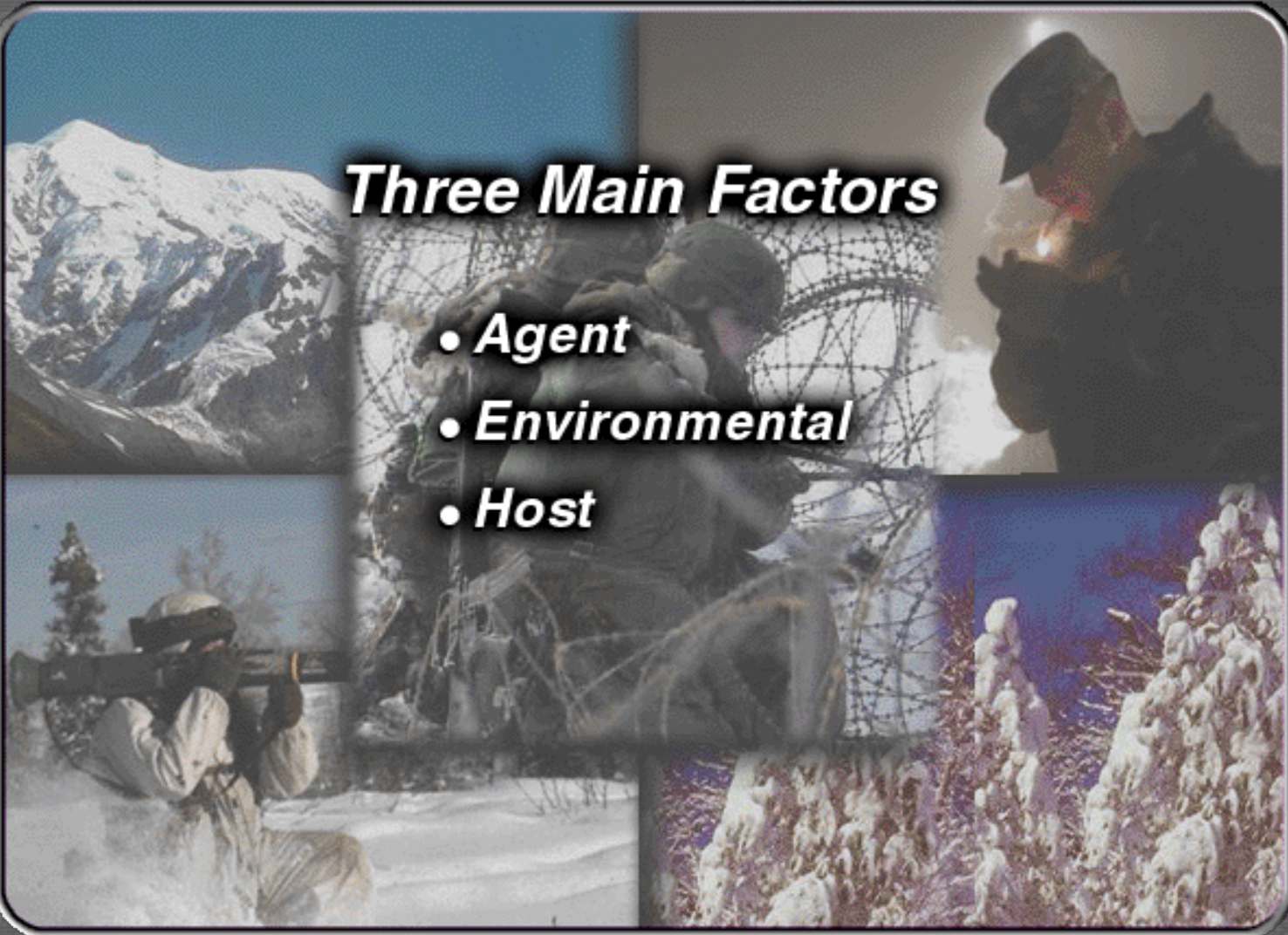


***Dehydration** is a significant factor for heavy exertion missions (e.g. dismounted patrols)*

# ***Factors That Influence Cold Injury***

## ***Three Main Factors***

- ***Agent***
- ***Environmental***
- ***Host***



# Agent Factors



Agent Factor  
• Cold

# ***Environmental Factors***



## ***Environmental Factors***

***Weather • Combat Action • Clothing***



# *Effects of Weather*



## *Environmental Factor* *Weather*

*Wind - Temperature - Humidity - Precipitation*

# *Combat Action*



*Environmental Factor*

*Combat action*

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# ***Clothing Principles***



- ***Adequate clothing properly worn is essential to survival.***
- ***Clothing for cold weather is designed to accommodate a variety of weather conditions and activity levels.***
- ***Avoid skin contact with metal objects and liquid fuels.***

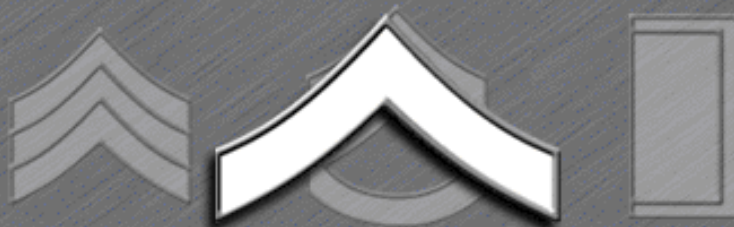
## **Host Factors**

- **Rank**
- **Previous cold injury**
- **Fatigue**
- **Discipline, training and experience**
- **Psychosocial factors**
- **Age**
- **Race**
- **Geographic origin**
- **Nutrition**
- **Activity level**
- **Drugs and medications**
- **Dehydration**

# Rank



*Lower ranks are more susceptible*



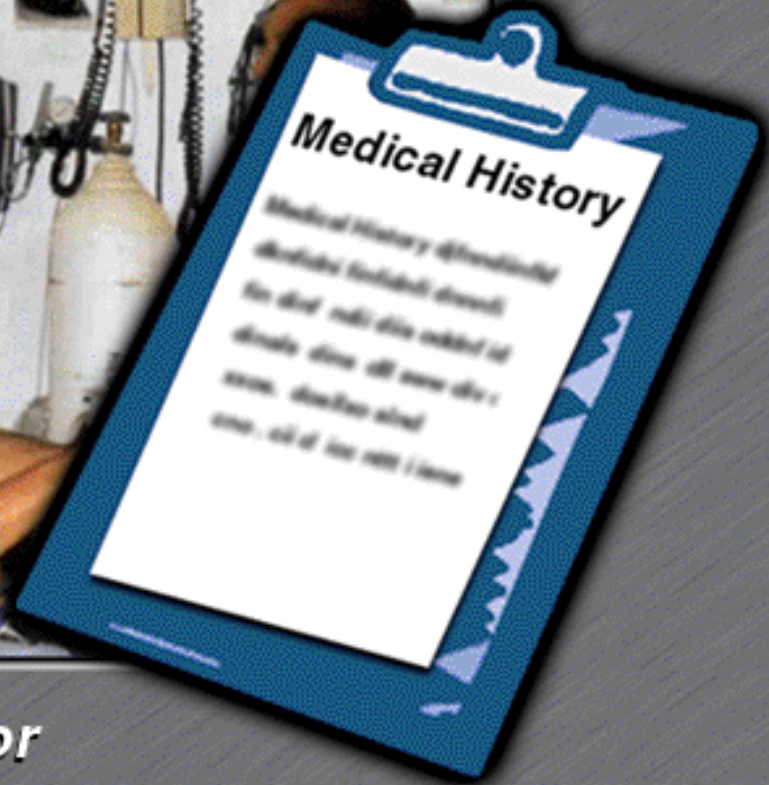
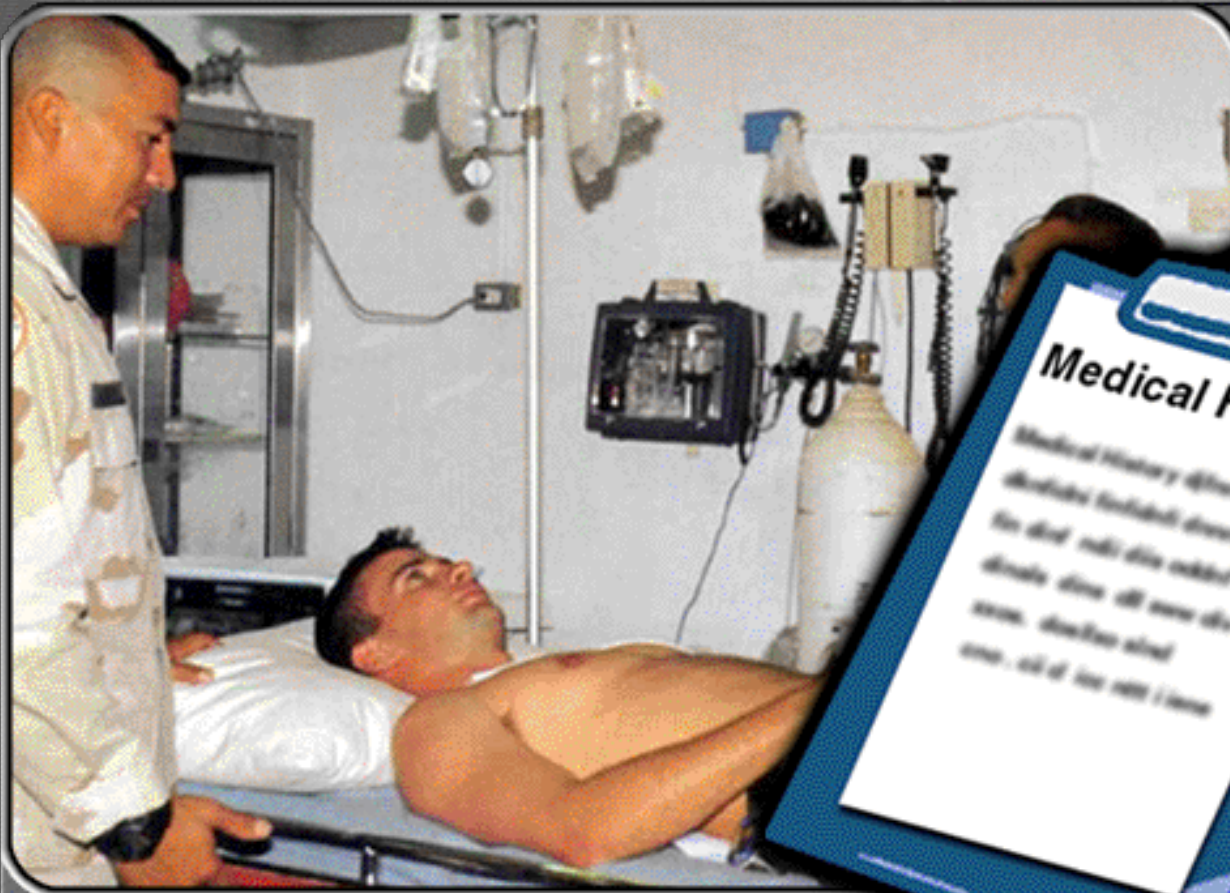
**Host Factor  
Rank**



*Higher ranks are less susceptible*



# History of Cold Injury



**Host Factor**  
*Previous cold injury*

## ***Host Factors***

### ***Fatigue***

***Causes soldiers to  
abandon normal  
personal hygiene  
practices***

***Can be reduced with  
rotation of duties  
and personnel***



# ***Discipline, Training and Experience***



***Host Factors***

***Discipline, training, and experience***



# ***Age and Dehydration***



***Host Factor***  
***Age and Dehydration***

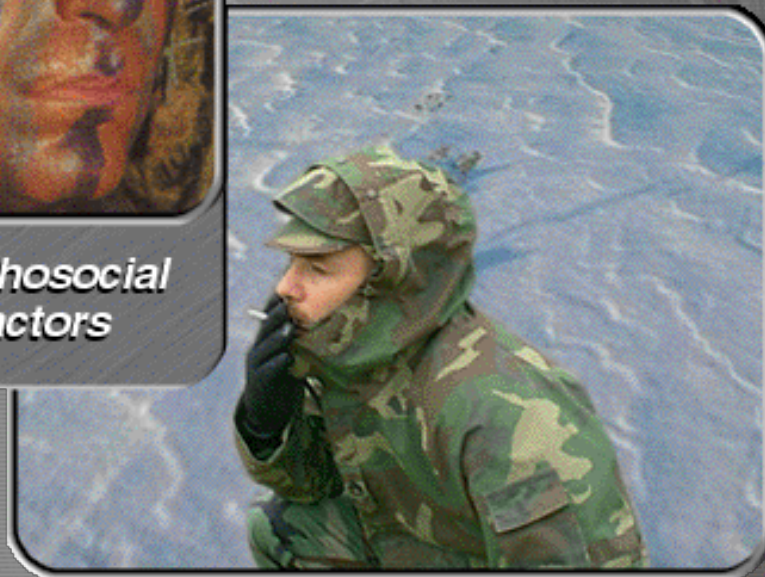
# Psychosocial Factors



*Host Factors*



*Psychosocial factors*



# Geographic Origin



*Host Factor*

*Geographic Origin*

# ***Race***



***Host Factor***

***Race***

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- *Poor nutrition puts a soldier at higher risk.*



***Soldiers can exist on military rations.***

# ***Activity Level***



## ***Host Factor Activity Level***

# ***Drugs and Medications***



***Host Factors***  
***Drugs and medications***



***Guidance should focus on:***

***Conserving body heat***

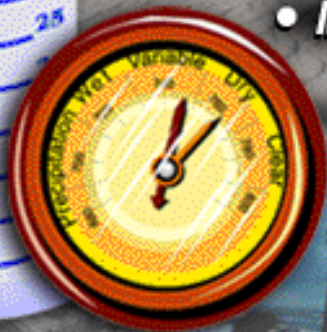
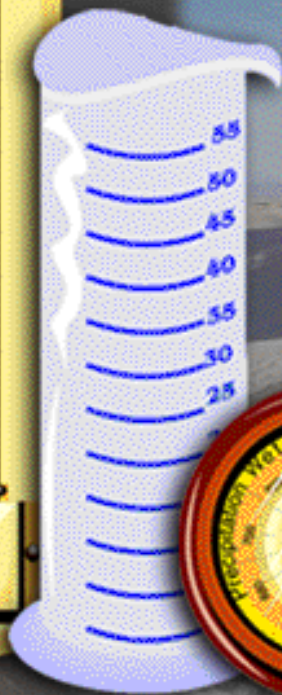
***Avoiding unnecessary exposure***

***Education of personnel***

# Using Meteorological Data

## Elements in the Prevention of Cold Injury

- **Meteorological data**
- Cold injury officer
- Buddy system
- Clothing
- Individual PMM



## *Elements in the Prevention of Cold Injury*

- *Meteorological data*
- *Cold injury officer*
- *Buddy system*
- *Clothing*
- *Individual PMM*

# The Buddy System



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# **WARNING**

*Pay attention to the warning sings of frostbite:*

*You cease to feel the sensation or cold followed by a pleasant feeling of warmth.*

# Clothing



- *Clothing should be layered.*
- *Clothing should be loose-fitting.*
- *Clothing should be clean, dry and in good condition.*

## ***Elements in the Prevention of Cold Injury***

- ***Meteorological data***
- ***Cold injury officer***
- ***Buddy system***
- ***Clothing***
- ***Individual PMM***

## ***Wear or Carry Adequate Clothing***



***Wear or carry clothes that are appropriate for the anticipated weather conditions.***



## ***Benefits of Loose-Fitting Layers***

- ***Layers hold air between them providing extra insulation.***
- ***Loose clothing permits good blood circulation to the extremities.***
- ***Layering allows for the removal of excess clothing.***

# Protect Your Hands



- *Choose mittens over gloves.*
- *Never touch cold objects with your bare hands.*

# Avoid Immobility



# Protect Soldiers "At Risk"



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# *Understand the Effects of Windchill*



## *Windchill:*

*The effects of wind speed  
on chilling the body.*

# The Windchill Chart

Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent Chill Temperature (°F)											
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	-121
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	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect.)	<b>LITTLE DANGER</b> in less than one hour with dry skin. Maximum danger of false sense of security.			<b>INCREASING DANGER</b> Danger from freezing of exposed flesh within one minute.				<b>GREAT DANGER</b> Flesh may freeze within 30 seconds.				
	<p><b>NOTE: 1. Trench foot and immersion foot may occur at any point on this chart.</b></p> <p><b>2. <math>F = 9/5 C + 32</math>.</b></p>											

# Data Along the Top of the Chart

Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent Chill Temperature (°F)											
<i>calm</i>	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
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NOTE: 1. Trench foot and immersion foot may occur at any point on this chart. 2. $F = 9/5 C + 32$ .												

The windchill factor is based on air temperature and wind speed.

# The Body of the Chart

Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
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	Equivalent Chill Temperature (°F)											
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# Determine the Windchill

Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
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Equivalent Chill Temperature (°F)												
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
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**LITTLE DANGER**  
in less than one hour with dry skin. Maximum danger of false sense of security.

**INCREASING DANGER**  
Danger from freezing of exposed flesh within one minute.

**GREAT DANGER**  
Flesh may freeze within 30 seconds.

**NOTE:** 1. Trench foot and immersion foot may occur at any point on this chart.  
2.  $F = \frac{9}{5} C + 32$ .

# ***SUMMARY***