


UC  
485  
.C2A5

# Canadian Military Clothing



# CANADIAN MILITARY CLOTHING

 Produced by  
THE DEPARTMENT OF INDUSTRY, TRADE AND COMMERCE  
in co-operation with  
THE DEPARTMENT OF NATIONAL DEFENCE

OTTAWA, CANADA



## FOREWORD

The military clothing and equipment presented in this booklet has been designed and manufactured for the Canadian Serviceman to increase his combat effectiveness under extremes of climatic conditions.

Canada, although primarily in the temperate climatic zone, can and does offer extremes of temperature and precipitation. Temperatures range from a high of over  $+ 110^{\circ}\text{F}$  ( $+ 43^{\circ}\text{C}$ ) to a low of  $- 81^{\circ}\text{F}$  ( $- 63^{\circ}\text{C}$ ). Precipitation in some areas exceeds 107 inches (2.7 m) annually, including snowfall of up to 342 inches (8.7 m). These extremes illustrate the problems the designers of Canadian environmental clothing have encountered, and the wide limits of climate under which this clothing is highly effective.

The equipment described and illustrated in the booklet does not constitute the complete range procured for the Canadian Serviceman, nor does the information provided include detailed specifications, and the quality assurance measures governing production. Price and delivery times are not quoted because several factors such as size of order and timing significantly affect delivery or production costs. For these reasons enquiries regarding additional technical details, production costs and delivery should be addressed to:

International Defence Programs Branch,  
Department of Industry, Trade and Commerce,  
112 Kent Street,  
Ottawa 4, Ontario, Canada  
(Attention: AV&S Section)

or to the Canadian Commercial Counsellor or Trade Commissioner nearest to you.

# TABLE OF CONTENTS

	Page
<b>COMBAT CLOTHING</b>	
Introduction .....	CC-1&2
Cap, Combat .....	CC-3
Shirt/Coat, Combat .....	CC-3
Trousers, Lightweight .....	CC-3
Coat, Combat .....	CC-4
Trousers, Combat .....	CC-4
Undershirt & Drawers, Cotton .....	CC-3
Cap, Knit (Toque) .....	CC-5
Scarf .....	CC-5
Sweater .....	CC-5
Liner, Coat, Combat .....	CC-5
Face Mask .....	CC-6
Parka .....	CC-6
Wind Pants .....	CC-6
Parka & Trousers, Camouflage, White .....	CC-7
Undershirt & Drawers, Extreme Cold .....	CC-7
Jacket & Trousers, Field Rainwear .....	CC-8
<b>SPECIAL PURPOSE CLOTHING</b>	
Introduction .....	SP-1
Winter Flying Suit .....	SP-2
Combat Flying Suit .....	SP-3
Transport Flying Suit .....	SP-3
AFV Suit, Cold Weather .....	SP-4
Parka & Trousers, Foul Weather, Naval .....	SP-5
Mask Protective, CW .....	SP-6&7
Chemical Warfare Protective Clothing .....	SP-8
<b>HANDWEAR &amp; FOOTWEAR</b>	
Introduction .....	HF-1
Gloves, Combat .....	HF-2
Mitten Shells, Winter .....	HF-2&3
Mitten Inserts, Winter .....	HF-2&3
Gloves, Anti-Contact .....	HF-3
Gloves, Leather, Aircrew .....	HF-4
Gloves, Flying, Inner, Woolen .....	HF-4
Gloves, Chemical Warfare .....	HF-5
Boots, Combat, General Service .....	HF-6&7
Overboots, Combat .....	HF-8
Cold Weather Footwear System .....	HF-9
Boots, Service, Ankle Height .....	HF-10
Overboots, Flying, Winter .....	HF-10
Boots, Fleet .....	HF-11
Overboots, Chemical Warfare .....	HF-12



## OVERSNOW EQUIPMENT

Introduction .....	SE-1
Toboggan, 100 lb. Capacity .....	SE-2
Toboggan, 200 lb. Capacity .....	SE-3
Cargo Pack, Fabric .....	SE-3
Snowshoe, Trail, Magnesium .....	SE-4
Snowshoe Binding .....	SE-5
Skis, Poles & Bindings .....	SE-6
Ski Maintenance Kit .....	SE-7
Snow Kit .....	SE-8

## LOAD CARRYING EQUIPMENT & ACCESSORIES

Introduction .....	LC-1
Web Belt, Suspenders & Carriers .....	LC-2
Cargo Pack .....	LC-3
Universal Rucksack, C-2 .....	LC-4
Plastic Water Bottle .....	LC-5
Water Container, Plastic, 5 Gallon .....	LC-6

## TENTAGE & SLEEPING EQUIPMENT

Introduction .....	TS-1
Tent Modular .....	TS-2
Tent, Lightweight, Arctic, 10 Man .....	TS-3
Tent, Lightweight, Arctic, 5 Man .....	TS-3
Sleeping Bag, Cold Weather .....	TS-4&5
Air Mattress .....	TS-4&5
Multi-Purpose Sheet .....	TS-6&7
Sleeping Bag, General Service .....	TS-8

## PLASTIC HARDWARE

Introduction .....	PH-1
Buckles & Hasps .....	PH-2&3
Rings, Loops, Hooks, Clamps & Buttons .....	PH-4

TEXTILES .....	T-1 to 4
----------------	----------

## COMBAT CLOTHING

Canadian Combat Clothing was designed to satisfy infantry requirements for world-wide use in both combat and peace keeping roles. While the primary designs were based on temperate climates, secondary capabilities for cold weather and tropical conditions were part of the design criteria. Since its introduction the Canadian Combat Clothing has been used extensively in temperate conditions in Canada and Europe and has been very favourably reported upon after use in the hot/dry and hot/wet conditions experienced in the Middle East and Africa. The cold weather supplement has been found to be very satisfactory in Northwest Europe and the Canadian North.

The success of this equipment is based not only on the application of modern materials and techniques but also on the wide use of the "layer principle" of clothing. To demonstrate this principle an example will be considered: the Combat Coat and Trousers worn in a temperate climate can be augmented by adding the Coat Liner for colder temperate conditions. Still further insulation, thus warmth, is achieved by another layer, the Parka and Windpants.

All Canadian Combat Clothing is produced in a green camouflage colour designed to give protection against visual detection. While eleven sizes are available there is also provision for custom requirements beyond this range.

Two types of fabric are used in combat clothing:

Cloth, cotton/nylon twist, 5 oz./sq. yd. A lightweight cloth primarily intended for the tropical and warmer temperate regions. It does not have a water repellent finish. There are two reasons for this: first, chemically treated fabrics can not yet provide the degree of protection required for tropical rain areas and second, they inhibit the absorption of perspiration which is a basic function of the uniform. Accordingly, in these areas field rainwear would be used.

Cloth, cotton/nylon twist, 8.3 oz./sq. yd. Used in the heavier garments and has a "Quarpel" water repellent finish. This finish is one of the most durable and effective currently available.



The concept of the use of the Combat Clothing ensemble is illustrated in the following table where the soldier wears the most appropriate combination for the prevailing weather and climatic conditions.

	TROPICAL	TEMPERATE	COLD WEATHER
1. Cap, Combat	x	x	
2. Shirt/Coat, Combat	x	x	x
3. Trousers, Lightweight	x	x	
4. Coat, Combat		x	x
5. Trousers, Combat		x	x
6. Cap, Knit (Toque)		x	x
7. Scarf		x	x
8. Sweater, V-Neck		x	x
9. Liner, Coat		x	x
10. Face Mask			x
11. Parka			x
12. Windpants			x
13. Parka and Trousers, Camouflage, White			x
14. Jacket and Trousers, Field Rainwear	x	x	
15. Undershirt and Undershorts, cotton	x	x	
16. Undershirt and Drawers, Extreme cold			x

The varying combinations of this clothing, employing the "layer principle" are considered to be adequate for the ranges — 65°F (— 54°C) to 125°F (52°C).

The items in the above table and those described between pages CC-3 & CC-8 bear the same numbers for your ease of reference.

## TROPICAL

### 1. CAP, COMBAT

**Material:** Cloth, Cotton/Nylon Twist, 8.3 oz./sq. yd. olive green, "Quarrel" treated. (See page T-1)

**Design:** The cap has a semi-soft brim which can be worn either up or down to give additional weather protection. Ear flaps are provided which fold inside the cap when not in use.

### 2. SHIRT/COAT, COMBAT

**Material:** Cloth, Cotton/Nylon Twist, 5 oz./sq. yd. olive green. (See page T-1)

**Design:** The Hip length shirt has a front button closure with drawcords at waist and bottom hem. Adjustable wrist closures are included. Breast pockets are designed for carriage of small arms magazines; one inside pocket for personal belongings and side cargo pockets for carriage of such items as first aid kits, emergency rations and extra magazines. This dual purpose garment is used as an outer garment under tropical conditions and as an inner garment under other climatic conditions.

### 3. TROUSERS, LIGHTWEIGHT

**Material:** Same as (2).

**Design:** Designed to be worn with suspenders or to be self-supporting. Two side pockets and two cargo pockets on the side of each thigh and one right hip pocket are provided. The bottoms of the trouser legs have drawcords which allow the trousers to be closed over the boot and also have inner sleeves which fit inside the boot preventing the entry of insects, etc. The seat and knee areas are reinforced with a layer of extra material. The fly zipper, with a two way action, may be opened from the bottom or the top.

### 15. UNDERSHIRT AND UNDERSHORTS, COTTON

**Material:** The V-Neck, short sleeve undershirt is made of a circular knit cotton jersey. The undershorts are made from 4 oz./sq. yd. cotton broadcloth with elastic waist. Combat underwear is dyed olive green to reduce camouflage problems when the items are drying in the field.

**BOOTS, COMBAT, GENERAL SERVICE** (See pages HF-6 & 7)







## TEMPERATE

1. CAP, COMBAT (See page CC-3)

### 4. COAT, COMBAT

*Material:* Cloth, Cotton/Nylon Twist, 8.3 oz./sq. yd. olive green, "Quarrel" treated.

*Design:* The design is similar to the Shirt/Coat in the arrangement of the pocket system. The front is closed by a slide-fastener underneath a button flap for extra weather protection. The collar is faced with corduroy to provide extra warmth and comfort. The slotted type button described on page PH-4 is used on this garment.

### 5. TROUSERS, COMBAT

*Material:* Same as (4).

*Design:* Similar to the lightweight trousers (Item 2) except that there are no reinforcing patches. The fly zipper, with a two way action, may be opened from the bottom or the top.

GLOVES, COMBAT (See page HF-2)



## TEMPERATE

### 6. CAP, KNIT (TOQUE)

*Material:* Worsted spun olive green yarn of 80% wool and 20% nylon.

*Design:* Close fitting for wearing under the steel helmet to give cold weather protection to the head, forehead and ears. The ear flaps can be rolled up if desired.

### 7. SCARF

*Material:* Open knitted olive green cotton.

*Design:* The scarf is 72" (183 cm) long by 24" (61 cm) wide and is designed to provide additional comfort under temperate and cold weather conditions.

### 8. SWEATER, V-NECK

*Material:* Worsted spun olive green yarn 80% wool and 20% nylon.

*Design:* The V-Neck, long sleeve sweater is provided in small, medium and large sizes.

### 9. LINER, COAT, COMBAT

*Material:* Polyester batting, laminated both sides to nylon taffeta. This material was developed to produce a more effective and lighter insulant. (See page T-3)

*Design:* The liner is provided with buttons for attachment to the combat coat at the front facing, the neck and sleeve cuff. A knitted cuff gives additional comfort at the wrist areas and reduces heat loss.

The model is indicating Liner with his right hand.







## COLD WEATHER

### 10. FACE MASK

*Material:* White nylon tricot laminated to polyurethane foam. The mouth cup is made from laminated paper. (See page T-3)

*Design:* The mouth cup has a wire reinforcement around the edge which enables it to follow the contour of the nose and cheeks. This design prevents hot exhaled breath from passing upwards towards the eyes thus reducing the problems of condensation on goggles and of the eye lashes freezing. Slits are provided above the ears to allow spectacles to be worn. The excellent fit made possible by the flexibility of the polyurethane foam and the easy breathing characteristics of the mouth cup, give a high degree of protection against frozen skin and lungs where extreme cold and high wind chill factors are common. An adjustable head harness is provided.

### 11. PARKA

*Material:* Cloth, Twill, Nylon Warp, Cotton Weft "Quarapel" treated olive green. (See page T-2) The inner-lining is polyester batting laminated to nylon tricot. The hood is trimmed with wolf fur.

*Design:* The pocket system follows the pattern of the Shirt/Coat. There are drawcords at the waist and bottom hem. The front is closed by a slide fastener and button system similar to the Coat, Combat. The sleeves are closed with a knitted cuff. The hood is capable of being worn over a steel helmet. The front of the fur trimmed hood has a wire reinforcement which enables the front opening to be reduced in size and to stand out from the face to form a highly effective wind shield. Tabs are provided at the front and back for rank identification.

### 12. WINDPANTS

*Material:* Cloth, Twill, Nylon Warp, Cotton Weft olive green, "Quarapel" treated.

*Design:* The trousers are supported by a waist drawcord and can also be closed at the ankles by drawcords. Side openings give entry to the combat trousers worn underneath and two further outside pockets are also provided.

**MITTEN SHELLS & INSERTS, WINTER** (See pages HF-2 & 3)

**MUKLUKS** (See page HF-9)



## COLD WEATHER

**13. PARKA AND TROUSERS, CAMOUFLAGE, WHITE**  
*Material:* Lightweight, White Polyester Twill.

*Design:* In operations under snow conditions the olive green colour of the parka and windpants does not meet camouflage requirements, therefore, special white camouflage garments are provided. The camouflage parka and trousers are of simple design and completely cover the insulated parka and windpants. The parka has a button front and attached hood. Both garments can be compressed to so little bulk that they can be carried conveniently in the pocket of the insulated parka.

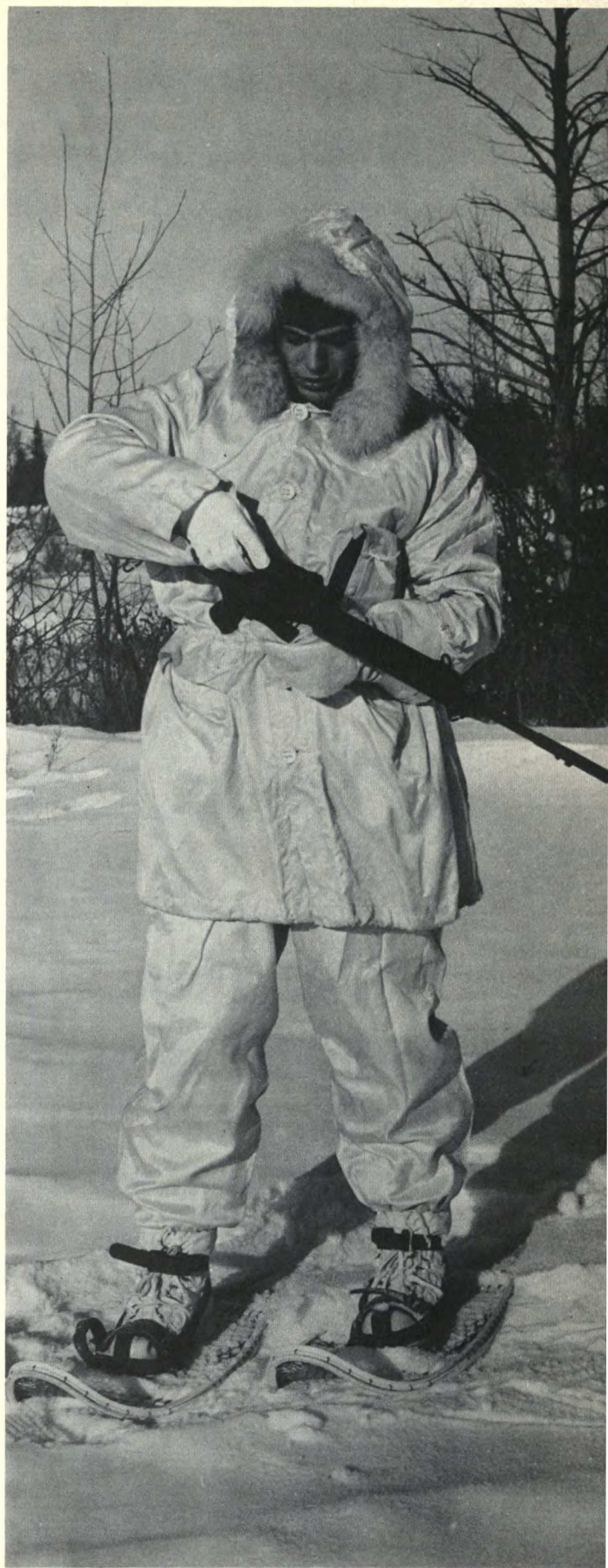
In this illustration the model, with his right hand, is demonstrating the Anti-Contact Glove which provides the dexterity for some operations such as affixing and adjusting this Sniper Sight without the risk of frost damage to his hands. See page HF 2 & 3.

**16. UNDERSHIRT & DRAWERS,  
EXTREME COLD WEATHER**

*Material:* Honeycomb knit, carded cotton, olive green or white.

*Design:* The construction is found highly effective as an insulating layer in that the honeycomb construction provides a layer of still air next to the skin.

SNOWSHOES, TRAIL, MAGNESIUM (See page SE-4)







## TROPICAL / TEMPERATE

### 14. JACKET AND TROUSERS, FIELD RAINWEAR

*Material:* Neoprene Coated Nylon 4.75 oz./sq. yd. olive green. (See page T-2)

*Design:* The jacket is single breasted with slide fastener and button front closure. It is provided with a detachable hood with button attachment to the collar. There is a drawcord at the bottom hem. The trousers are slip-on type with a waist drawcord, side openings to the pockets of inner-wear, and drawcord ankle closures. The field rainwear is designed to give protection to the soldier in heavy rain when he is involved in relatively static duties. The weight of the jacket and trousers combined is currently 26 oz. (737 gms) while an 11 oz. (312 gms) ensemble is under development.

OVERBOOTS, COMBAT (See page HF-8)

### **FLYING CLOTHING**

The Canadian Forces utilizes three basic types of Flying Clothing which are: (a) the Combat type, for use in high performance aircraft; (b) the Transport or General Purpose type and (c) the Winter Flying Suit. The Combat garment is slim fitting and designed to be compatible with such life support systems as parachute harnesses, life jackets, ejection seats, etc. It is provided with sufficient pockets to cater for flying and survival needs. The Transport garment is of simpler design to meet the relatively unsophisticated needs of transport aircraft. The Winter Flying Suit provides sufficient insulation for wear under cold conditions and is used in all types of aircraft and also provides ground environmental protection. These ensembles have given excellent service in terms of durability for a number of years with a high degree of user acceptance.

### **AFV CREW CLOTHING**

Combat Clothing, with its bulky pocketing system so necessary to the infantry soldier, provides endless problems to those who operate in Armoured Fighting Vehicles or other types such as scout cars where space is at a premium. The AFV, studded with control levers and similar projections, can only be operated with assurance and ease when a suit has been designed to meet this closely confined environment. The Canadian Forces now have such a cold weather suit while a temperate climate model is under development.

### **FOUL WEATHER CLOTHING, NAVAL**

The older garments, which were heavy, bulky and not particularly durable have now been replaced by a lightweight suit. Sea trials have proven that the new design and materials have overcome these shortcomings under extreme wet conditions.

### **CHEMICAL WARFARE PROTECTIVE CLOTHING**

After extensive field trials the Chemical Warfare Protective Clothing system described on page SP-8 was adopted by the Canadian Forces and has generated considerable interest in other countries.





#### WINTER FLYING SUIT

**Material:** Cloth, Nylon Warp, Cotton Weft Twill, rifle green, "Quarpel" treated. Insulation is polyester batting laminated to nylon tricot.

**Design:** A two-piece suit consisting of jacket and overalls. The jacket has an overlapped slide-fastener front closure and has a mouton collar. Diagonal slide-fastener closed pockets are provided on each side together with two inside pockets. Pencil slots are located on the left sleeve. The overalls have a high

back and front and are worn with suspenders. A drop-seat is incorporated. The trouser pockets are similar to the Combat Flying Suit.

The Parka and Windpants (page CC-6) may be worn over this suit under adverse ground conditions. Associated Handwear and Footwear are described on pages HF-4 and HF-10.



### COMBAT FLYING SUIT

**Material:** 6 oz./sq. yd. Polyester/Wool, rifle green.

**Design:** One-piece coverall of purely functional design, with a two-way slide-fastener front closure. Patch pockets with slide-fastener closures are located on each breast, on the side of each lower leg and on the left thigh. The waist is adjusted by "Velcro" strap and loop. Wrist and ankles are closed by slide-fasteners. Pencil slots are placed on the left sleeve and a map clip on the left thigh. All closures and fastenings are designed to withstand the stresses of high speed ejection.



### TRANSPORT FLYING SUIT

**Material:** Same as Combat Flying Suit.

**Design:** One-piece coverall with a front slide-fastener closure. There are two button-fastened breast pockets and side pass-through openings and the wrists and ankles can be closed by means of "Velcro" tabs. This garment provides an acceptable standard of uniform dress for out-of-aircraft activity.





#### AFV CREW CLOTHING, COLD WEATHER

**General:** This clothing was developed for wear in the temperature ranges — 40°F to 32°F (— 40°C to 0°C) and has been in service for three years.

**Material:** Cloth, Nylon/Cotton Twist, 8.3 oz./sq. yd., olive green, "Quarapel" treated. The insulating layer is polyester batting laminated to nylon tricot.

**Design:** A two-piece suit consisting of a jacket and overalls. The overlapping jacket is waist length with a slide-fastener front closing. Knitted wrist cuffs give additional warmth and a hood, which can be rolled to form a collar, is also provided. Pencil slots are located on the left front together with a slide-fastener closed pocket for carriage of small items. Lifting straps for the retrieval of injured crewmen are provided on each shoulder and at the centre back. There are loops at the waist of the jacket for attachment to the overalls.

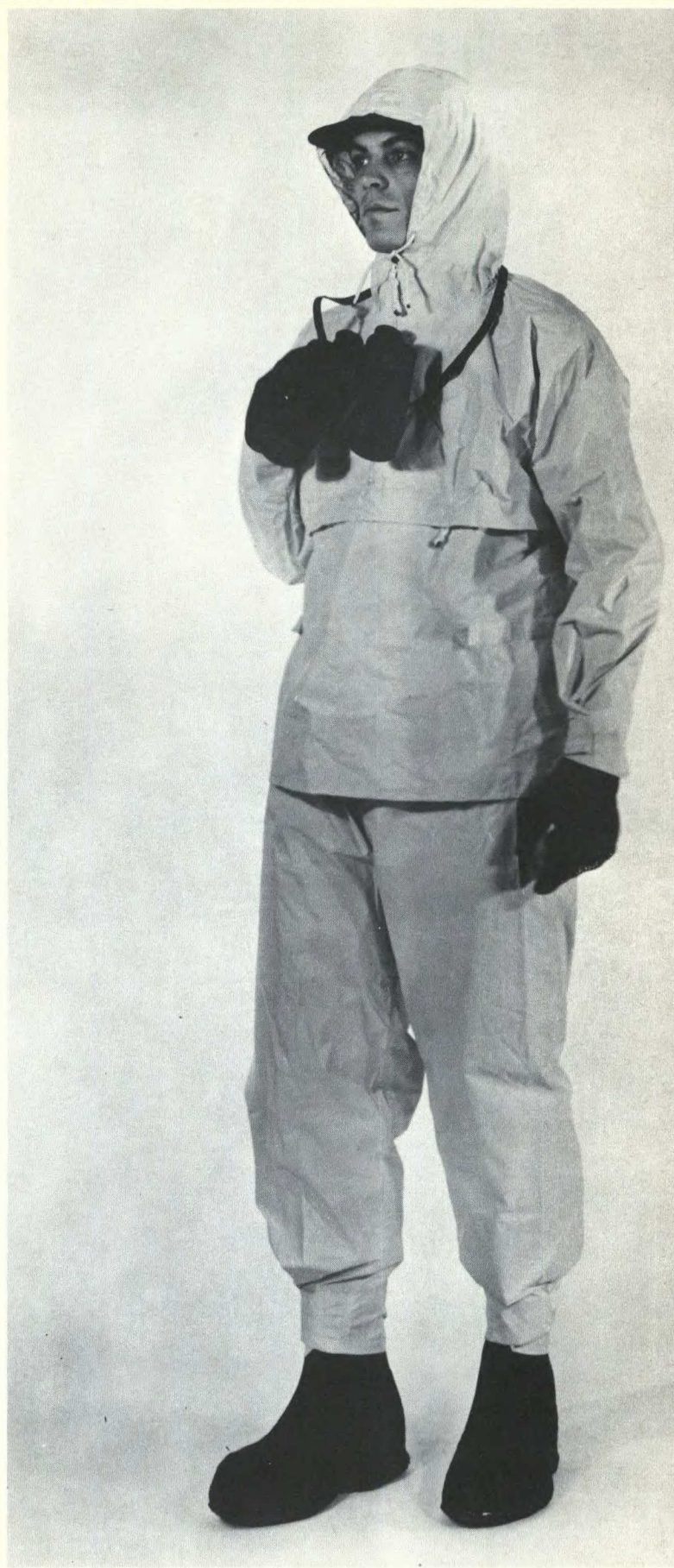
The overalls are provided with a high front and back for extra insulation and are worn with suspenders. The overalls have slide-fastener closures at the side waist and the trouser legs bottoms which provide ventilation as well as ease of donning and doffing. A drop-seat is incorporated. Cargo pockets are provided on the right and left thigh regions as well as two side pockets for carriage of personal belongings which are closed with "Velcro" fastenings.



**PARKA AND TROUSERS, FOUL WEATHER, NAVAL**

**Material:** 2.7 oz./sq. yd. Polyurethane Coated Nylon, yellow or rifle green. Yellow is used where high visibility is required.

**Design:** The parka is a pullover type with attached hood which is adjusted by a drawcord and a slide-fastener. A large patch pocket is provided across the chest. The sleeves utilize "Velcro" closures. Trousers are pull-on type with elasticized waist and "Velcro" closures. All seams are sealed with cement to ensure a waterproof garment.







**PROTECTIVE MASK, NBCW**

The Canadian Forces protective mask is for protection against the inhalation and ingestion of chemical and biological agents as well as radio-active material.

This mask, of Canadian design, provides protection from all NBCW toxicological agents to the respiratory tract, the face and eyes and maintained, meets all





the NATO operational requirements except that the mask does not incorporate a liquid feeding device.

The mask assembly consists of three main components:

The Face Piece which is moulded rubber with laminated eyepieces for vision, an inlet valve for incoming air, an outlet valve for exhaled air, a noseclip for separating incoming from exhaled air, a noseclip valve to equalize internal pressure, a speech transmitter to facilitate communications, a canister mount for the protective canister, and molded rubber lugs for six-point attachment of an adjustable head-harness.

The Canister which is easily replaceable, containing activated charcoal and a particulate filter. Removable rubber plugs are provided to prevent deterioration of the charcoal due to moisture when in storage.

The Mask Carrier is a rugged canvas. The carrier is designed to fit Canadian web equipment and is waterproof with a quick-opening device giving instant access to the mask. The carrier has a side pocket for the carriage of eyepiece antifogging kit, disinfecting cloth, etc.

The mask is made in three sizes, Normal, Small and Large. These sizes provide satisfactory fitting and protection to all but the most abnormal faces. The proportion of the three sizes required will depend on

the ethnic origins of the group of individuals to be protected. Sizing devices are available.

The normal size mask weighs 19½ oz (0.55 kg) as worn, the large and small sizes vary less than one ounce (28 gm.) from this weight.

Packaging consists of a plastic bag for the face piece assembly, a face-piece "former" to maintain the correct shape of the face-piece during storage, and a cardboard carton 12" x 6¼" x 8¼" (30 x 16 x 21 cm) containing all the mask components and accessories. The packaged weight is 3 lb 15 oz (1.7 kg). Normally eight individual cartons are packed in a corrugated shipping carton.

Although individual instruction cards are provided with each mask, additional detailed instructions for the fitting, carriage inspection and maintenance are available in the form of Canadian Forces Training publications.

All masks are thoroughly tested to Canadian Forces specifications prior to packaging. Recognizing the importance of the standards of protection required from equipment of this type, performance specifications can be made available on request to governments considering procurement of this mask. Similarly the accessories to be included with each mask should be the subject of detailed discussions, as should the number of spare canisters required.





#### CHEMICAL WARFARE PROTECTIVE CLOTHING OVERGARMENT

*Material:* Shell material is Cloth, Nylon/Cotton Twist, 5 oz. / sq. yd., "Quarapel" treated, olive green (See page T-2) The lining is charcoal-impregnated polyurethane foam, laminated to nylon tricot. (See page T-3)

*Design:* The coverall, with an attached hood, has a slide-fastener and a "Velcro" front closure. The wrist and ankle openings are also closed by "Velcro". Elastic webbing stirrups are provided on each leg to ensure that there is a satisfactory overlap of the pant leg and the coverboot. The garment is provided in four sizes and there is a built-in suspender adjustment to cater for height variations within each size. There are two breast pockets for the carriage of small arms magazines. The hood is designed to give a close fit around the Canadian Protective Mask and has been modified on request for other custom applications.

**MASK, PROTECTIVE, CW (See pages SP-6&7)**

**GLOVES, CHEMICAL WARFARE (See page HF-5)**

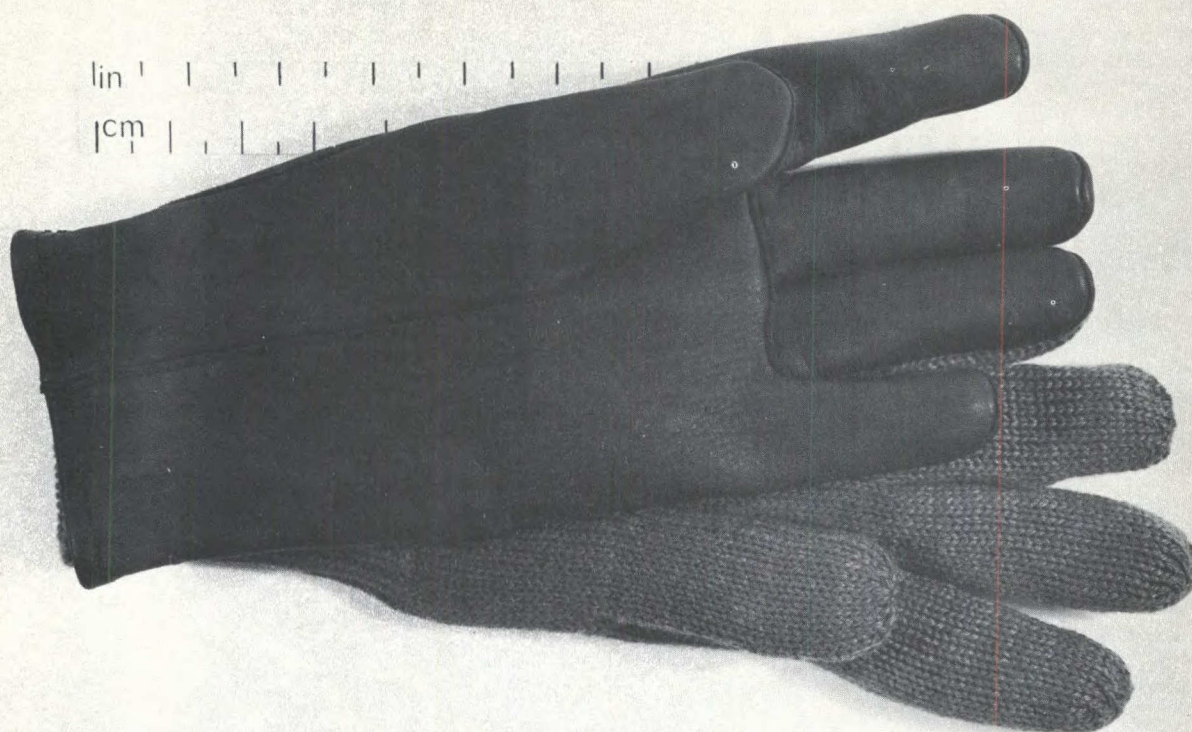
**OVERBOOTS, CHEMICAL WARFARE (See page HF-12)**

The service man, to be able to carry out his assigned tasks, depends largely on his ability to use his hands effectively and to maintain his personal mobility. Consequently handwear and footwear have been developed to improve manual dexterity under adverse climatic conditions, and to give him maximum foot mobility and comfort. New materials and designs have been used, and new approaches to old problems have been adopted.

A good example of these approaches is in the combat boot. While every effort has been made to make the boot waterproof it has been realized that the addition of the combat overboot would not only ensure the waterproof state but also provide further protection from cold, again using the layer principle.

Handwear follows much the same pattern and recognizes the need for cleaning and drying by having removeable liners where required. In all cases excellent dexterity, tactility and gripping characteristics have been provided.





## HANDWEAR

### TEMPERATE

#### GLOVES, COMBAT (SHELL AND LINER)

These gloves were designed to complement the temperate combat clothing system shown on pages CC-4&5 — and may be worn with or without the removeable liner. They have good tactility and dexterity characteristics. The black horsehide leather shell is of a curved hand and finger design and has an elasticized wrist.

The removeable liner is of seamless knitted construction with tapered fingers and ribbed cuff. It is produced from a shrink-resistant and moth-proofed yarn, 3/8<sup>s</sup> worsted count — 58<sup>s</sup> quality wool, olive green in colour and containing 20% to 25% of nylon staple.

**Sizes:** The shell and liner are provided in Small, Medium, Large and Extra Large.

### COLD WEATHER

#### MITTEN SHELLS, WINTER, C1, A1 MITTEN INSERTS, WINTER, C1

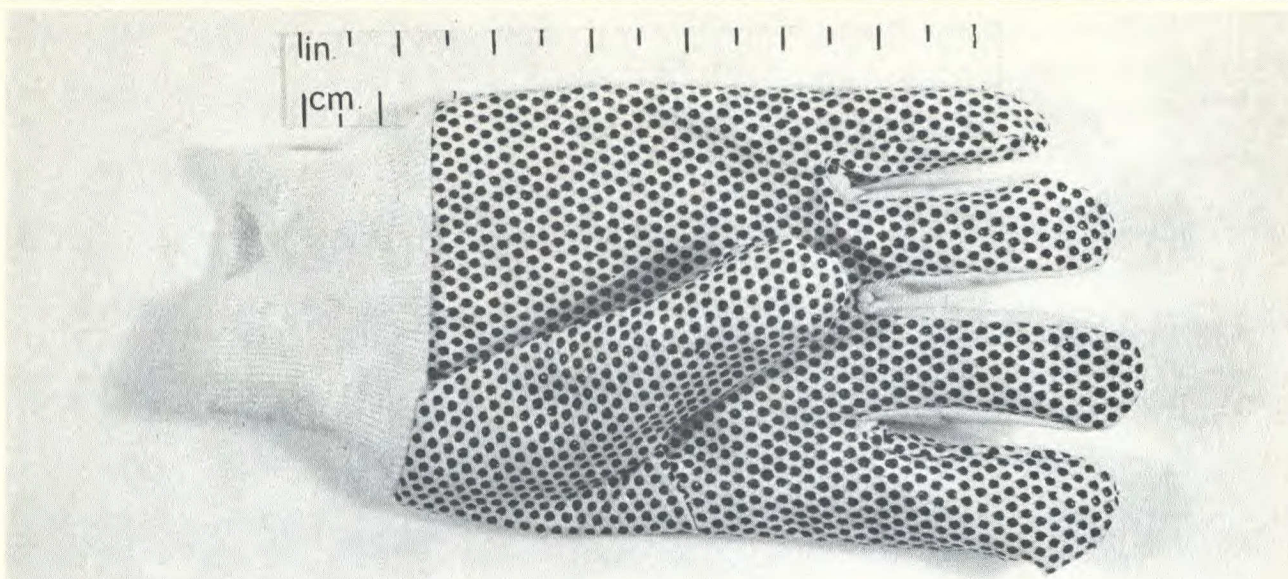
The mitten shells and mitten inserts are of a curved palm design and provide protection to the hands in extreme cold conditions.

The hand portion of the shell is made from a chrome tanned horsehide leather and the gauntlet cuff is nylon canvas with a cotton canvas interlining. The wrist portion is elasticized and the cuff closure is affected by the use of a webbing strap and quick-release buckle. A wool pile "face warmer" is attached to the back.

The insert is removeable to permit cleaning and drying and is manufactured from a quilted nylon twill backed 10 oz. synthetic nylon batting and lined with wool flannel. The cuff is stiffened with cotton canvas. The insert is held in place in the shell with four stud fasteners positioned at the top of the cuff.

**Sizes:** The shell and insert are provided in Small, Medium and Large.



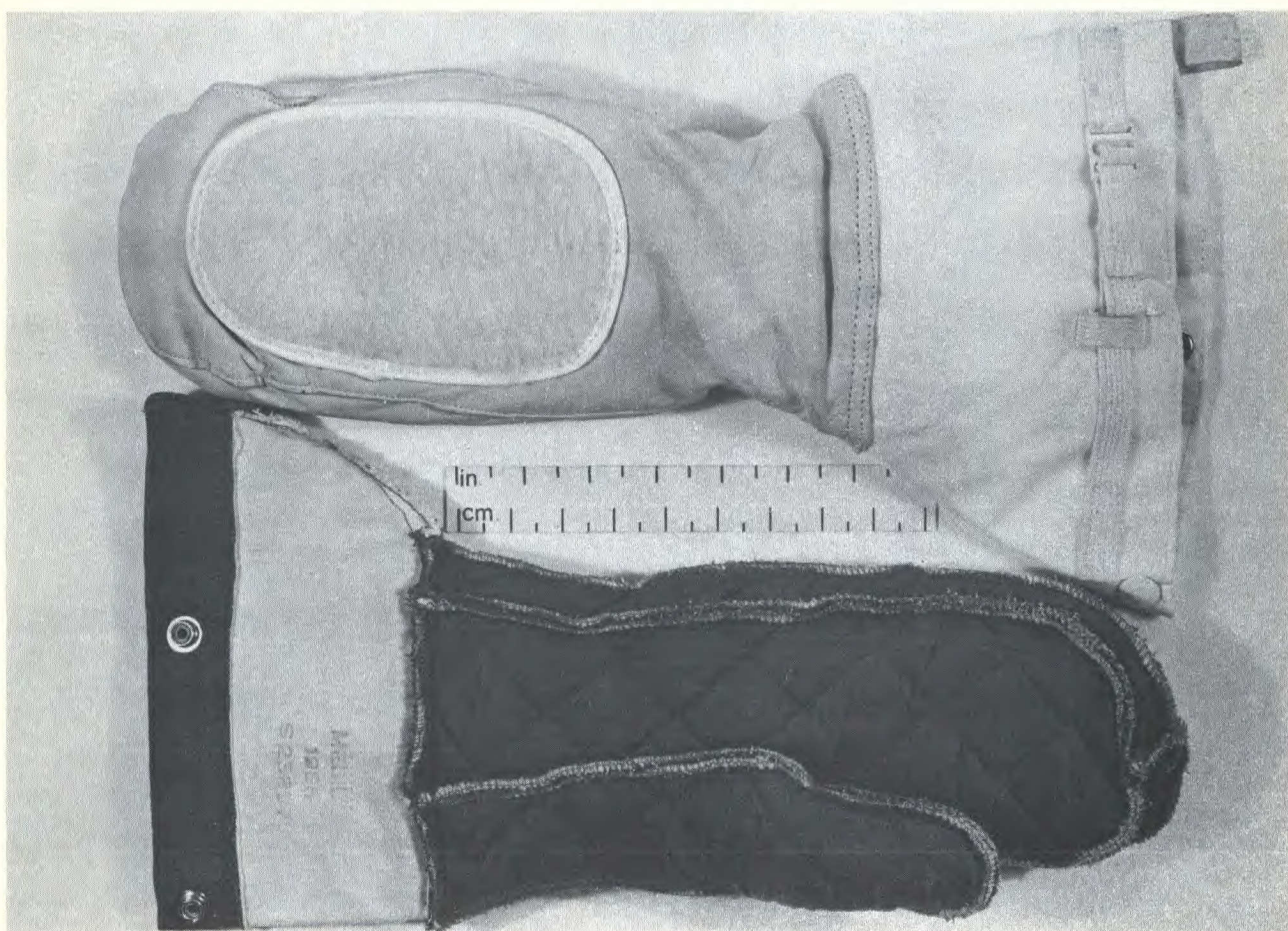


#### GLOVES, ANTI-CONTACT

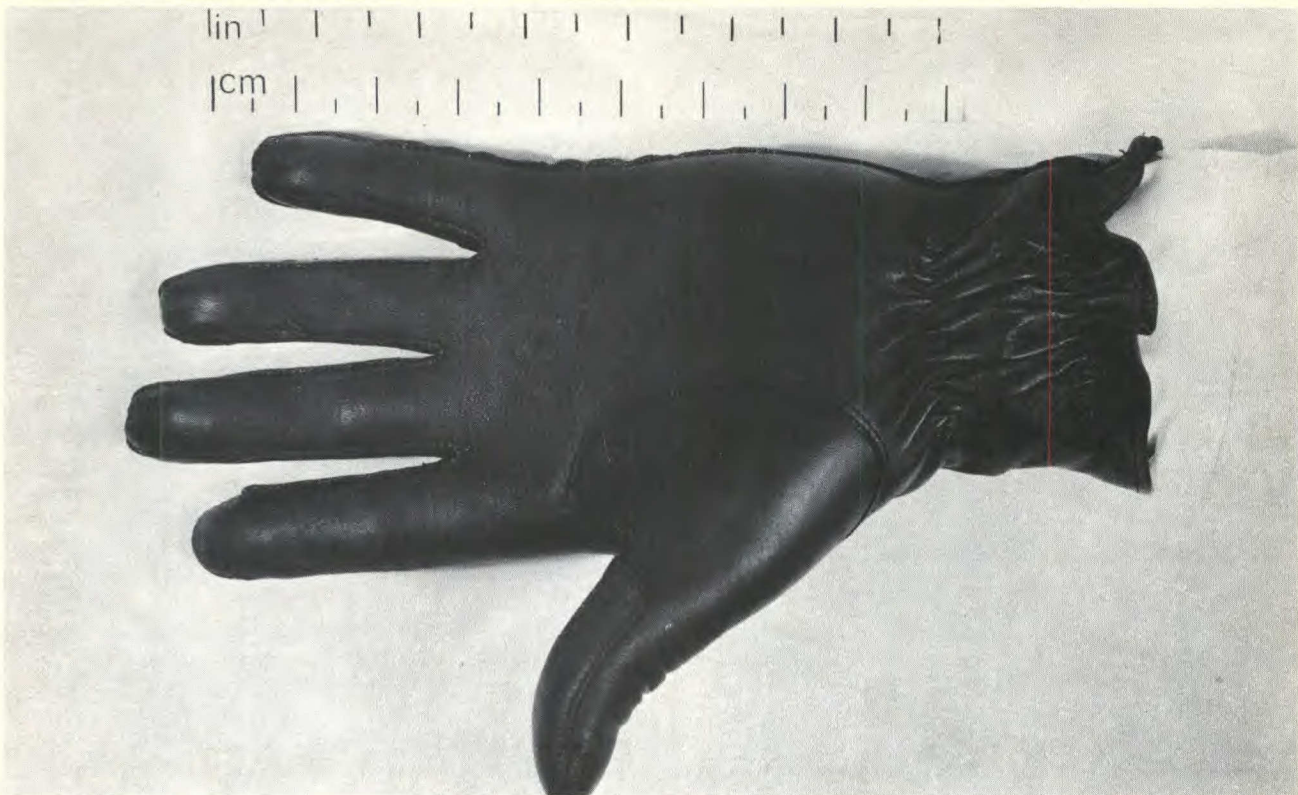
This item is designed to complement the extreme cold weather system of handwear. It provides hand protection for a limited time against "cold burn" in extreme cold weather and enables the user to manipulate small objects with dexterity and tactility for short periods of time while re-warming the hands as necessary. The glove is manufactured from a white cotton twill with a white cotton knitted cuff. The surface of

the glove has small raised plastic dots attached to it to further prevent contact with cold metal, etc.

Sizes: The glove is provided in Small, Medium, Large and Extra Large.







#### GLOVES, LEATHER, AIRCREW

These items are designed to complement the aircrew clothing shown on pages SP-2&3. The glove has an elasticized wrist. The hair type sheep leather (South African Cape) has a tacky finish which provides good gripping characteristics. The glove is "table cut" and all closing operations are full pique (PK) sewn. The item provides excellent dexterity and tac-

tility characteristics. Additional wear life is obtained on the palmar surface of the thumb through the employment of a leather patch.

**Sizes:** The glove is provided in sizes 8 - 12 inclusive, including half sizes.







#### ◀ GLOVE, FLYING, WINTER, INNER, WOOLLEN

This item is designed to be worn in combination with Gloves, Leather, Aircrew in cold conditions. The glove is a knitted type with tapered fingers and a ribbed cuff. It is knitted from a shrink-resistant and mothproofed yarn, 2 ends 2/20s worsted count, 64s quality wool, natural colour and containing 10 to 15% of nylon staple.

**Sizes:** The glove is provided in Small, Medium, Large and Extra Large sizes.

#### ▲ GLOVES, CHEMICAL WARFARE

The gloves are part of the system of protective clothing and they are worn in conjunction with the CW protective garment and CW protective overboots (see page SP-8).

The gauntlet type of glove is of a curved finger and palm configuration. It is manufactured from a duo-stretch nylon fabric coated with butyl and overcoated with a polyvinyl chloride material which has good low temperature and gripping characteristics. To assist in the dissipation of hand moisture the dorsal area of the hand portion incorporates a patch manufactured from a combination of cloth, nylon/cotton twist, 5 oz./sq. yd. "Quarapel" water repellent finish and a nylon tricot, laminated to 3/32" (.02 mm) charcoal-impregnated foam. The gloves are of an olive drab colour. To provide additional warmth for the hands the Glove, Combat, Liner on page HF-2, can be worn inside the gloves. The gauntlet portion of the glove is worn under the sleeve of the CW protective garment.

**Sizes:** Gloves are provided in Small, Medium and Large.

## **BOOTS, COMBAT, GENERAL SERVICE**

Prior to the introduction of the current combat boot the boot used by the Canadian Army was a legacy from World War II and even before that time. The so-called "ammunition boot" or "general service boot" was heavy and stiff, absorbed water readily and had to be worn with puttees or gaiters. It also increased the logistic burden as it required a boot repair facility in the field to maintain it.

The Combat Boot utilizes a new process of footwear manufacturing — the direct-moulded sole. In this process the uppers are cut from leather and lasted in the normal fashion, a steel shank added and the sole and heel are moulded and vulcanized in one piece onto the uppers. This provides a waterproof seam at the juncture of the uppers and the sole. To further prevent entry of moisture the pattern was designed with a one-piece vamp and thus the only seam entering the juncture of sole and upper is at the back of the boot. Water-repellency is maintained during the life of the boot by the application of silicone compounds; a small can of silicone with an applicator is issued for this purpose.

The sole has a tread pattern to assist traction and the life of the sole is approximately equal to that of the uppers. Canadian Forces experience has indicated that an 18-month field wear-life can be expected and there are many instances of boots still in service after three years of use. Only minor repairs are provided for, such as stitching in the uppers, although this is seldom required because nylon thread is used. Re-soleing and heeling are a thing of the past and when the sole is eventually worn out, the boot is replaced.

This boot is 8" (20.3 cm) high and thus eliminates the need for puttees or gaiters. The Canadian Forces found it to be less expensive than the old GS boot plus puttees/gaiters. It is leather-lined and has a strong leather insole to permit the absorption of foot moisture. Other design features are too numerous to detail but the Mk II version incorporates a speed-lace closure, modification to the pattern to give even greater protection from moisture and improved counter (heel stiffener) materials.

### **DETAILS**

#### **UPPER LEATHER:**

**Chrome tanned (Mk I)**

**Chrome/Glutaraldehyde tanned (Mk II)**

#### **LINING LEATHER:**

**Chrome tanned (Mk I)**

**Chrome/Glutaraldehyde tanned (Mk II)**

#### **INSIDE LEATHER:**

**Chrome retanned bends**

#### **SOLE COMPOUND:**

**70% Butadiene-acrylonitrile/30% pvc**

#### **LACES:**

**Braided "Taslanized" nylon**

#### **FINISH:**

**Uppers treated with silicone water-repellent on grain side.**

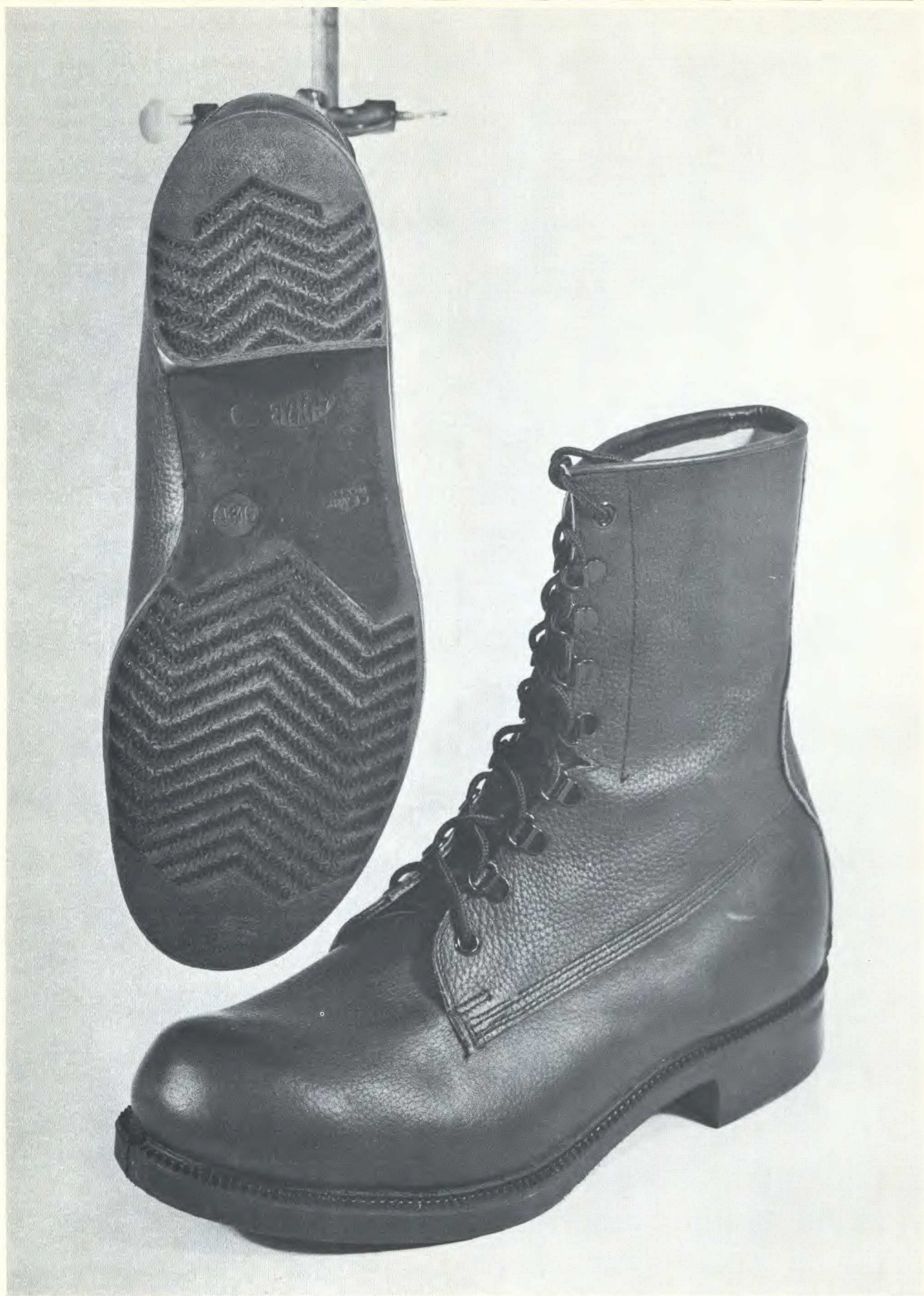
#### **WIDTHS:**

**D, E & F**

#### **SIZES:**

**4-14 (incl. half sizes)**









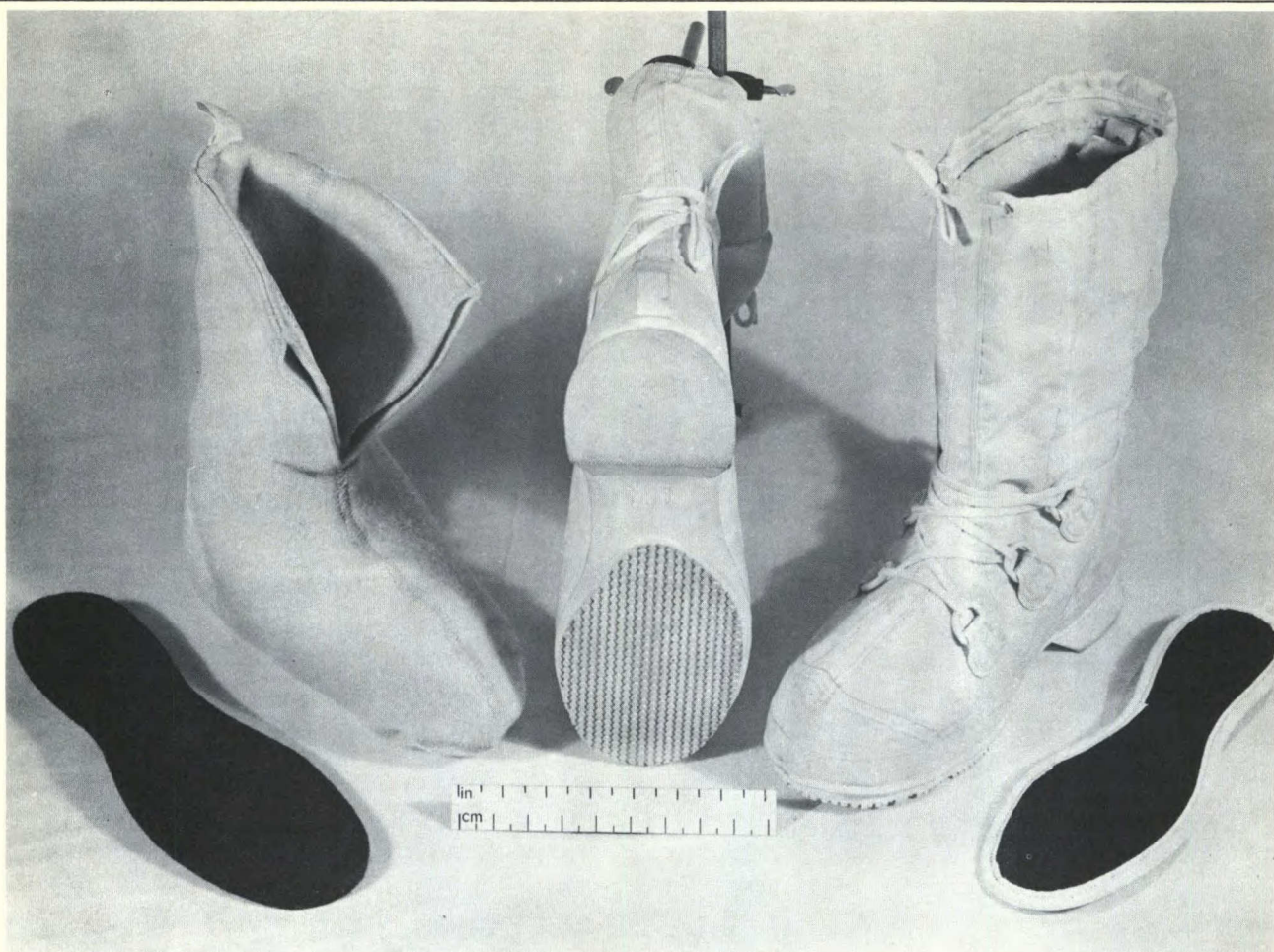
#### **OVERBOOTS, COMBAT**

This black rubber overboot is designed to complement the combat clothing system described on page CC-8 and is normally worn over the combat boot under cold/wet conditions. The outsole is of a medium-course knurled design and has a high resistance to abrasion. It is completely waterproof and employs a slide-fastener type of closure. A felt insole encased by a coated nylon tricot cover is used as the insulating medium. An expanded latex foam material is imbedded between the gum cover and the lining to provide insulation to the lower part of the boot. To facilitate quick donning and doffing a nylon tricot

insole cover and back strip are used internally. All components are cemented and vulcanized under the differential pressure cure system.

**Sizes:** The overboot is provided in one width and in sizes 5 to 14 inclusive, including half sizes. The height is 11" (28 cm).





#### COLD WEATHER FOOTWEAR SYSTEM

This system comprises the Mukluk, the Duffel Sock and Insoles, with each item being dependant upon the other for effectiveness.

The overall height of the Mukluk ranges from 13½" (34.2 cm) for sizes 4 to 6 to 16½" (42 cm) for sizes 11 and up. The uppers are manufactured from a white polyester fabric 8¾ oz./sq. yd. The outsole, heel and bottom reinforcing components are manufactured from a white synthetic rubber compound which meets low temperature requirements. Instep closure is effected through the use of 6 "D" rings and nylon laces. The top of the boot is closed by the use of a nylon drawstring. The rubber sole and reinforcing components are vulcanized to the upper under a differential pressure cure system. Full sizes from 4 to 12 inclusive are available in narrow and medium widths.

The Duffel Sock is manufactured from 31 oz./sq. yd. wool/viscose duffel cloth with the heel and toe reinforced with nylon fabric. Two layers of material are used in the construction. All edges of the sock material are blanket stitched and the seam closing is serged. A pull-tab is provided at the back of the sock. Full sizes are available from 4 to 12 inclusive.

The Plastic Insole is manufactured from a polyvinylidene chloride mono-filament material which is woven into a plain weave for the outer and middle layers and a honeycomb weave for the two inner

layers. The outer edges of the insole are fused together by heat sealing and then bound with a white bias binding which is stitched in place. Full sizes from 4 to 12 inclusive with narrow and medium widths.

The Felt Insole is cut from ½" (12.7 mm) felt material containing a mixture of 50% wool and 50% cattle hair. Full sizes from 4 to 12 inclusive.





#### **OVERBOOTS, FLYING, WINTER**

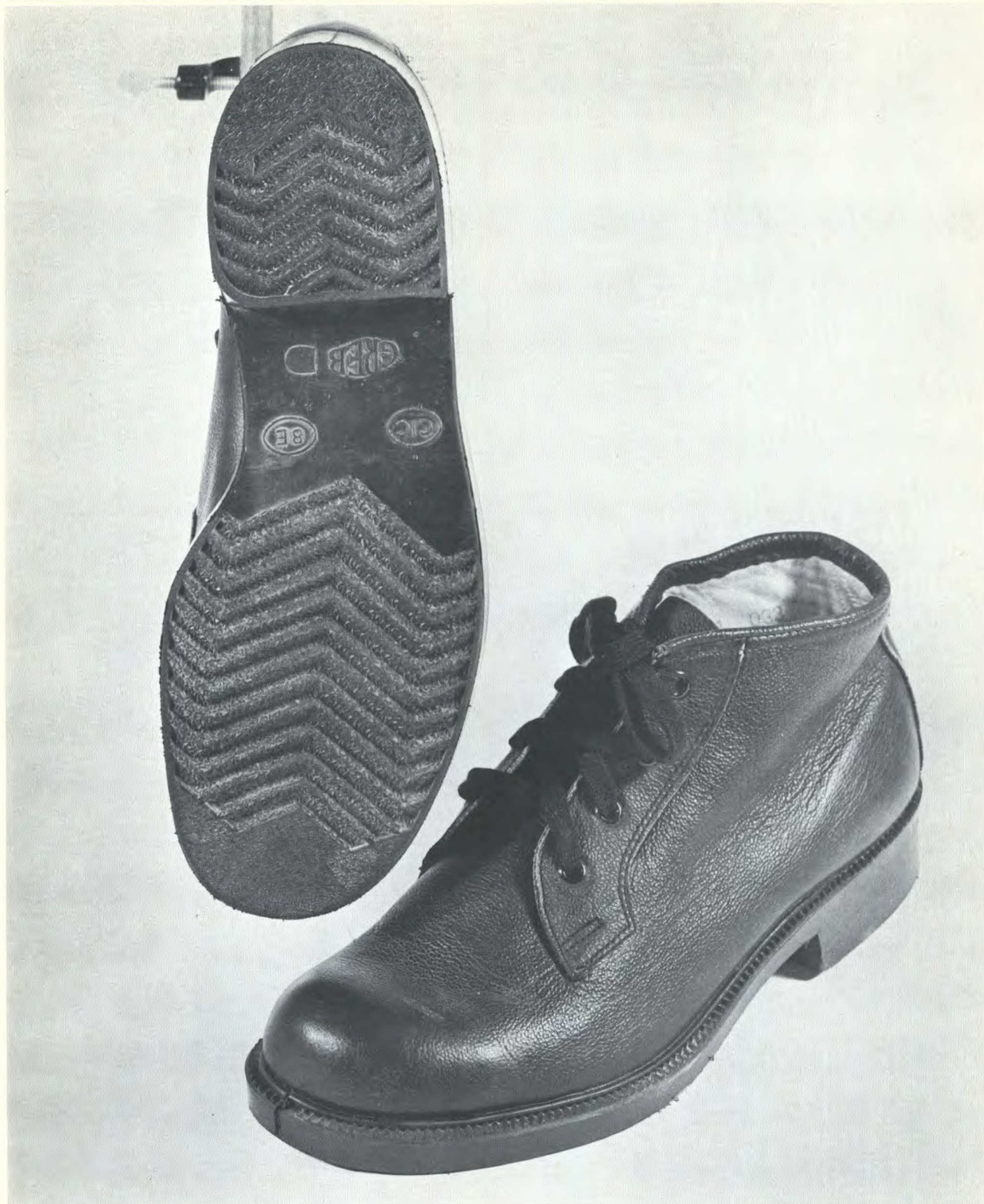
This boot is of mukluk design and is used with the Cold Weather Flying Suit. The system is similar to the army mukluk except that the height and sole area are reduced for compatibility with flying clothing and aircraft controls. The ankle strap prevents loss of the boot during high-speed ejection.

#### **BOOTS, SERVICE, ANKLE HEIGHT**

This item is a part of the air and ground crew clothing system. It is worn in temperate conditions where it provides traction and is resistant to gasoline, oil and other lubricants. The boot is manufactured on the Goodyear welt process and is of a blucher design with a plain toe vamp, outside counter pocket, box toe and a fabric lined vamp. It incorporates a leather insole and a full leather midsole. The outsole and heel are manufactured from a neoprene/cork material. In addition to the eyelet and lace closure system it has a leather strap and buckle closure at the top of the quarters to prevent loss of the boot during high-speed ejection. The uppers are manufactured from a chrome tanned black leather. Reinforced leather fibre counters, steel shanks and polystyrene box toes are also incorporated.

**Sizes:** The boot is provided in sizes 4 to 13 inclusive, including half sizes and in D, E and F widths.





#### **BOOTS, FLEET**

This item is a part of the shipboard crew clothing system, worn in temperate conditions and provides good traction as well as being water repellent and resistant to petroleum products. The boot is manufactured on the Direct Moulded Sole system and is of a one-piece leather plain-toe vamp and quarter

design with outside eyelet facings and full bellowed tongue. It is fully lined and has a leather insole.

Sizes: Widths D & F — 5-13 inclusive, full sizes only.  
Width E — 6-13 inclusive, full and half sizes.





#### **OVERBOOTS, CHEMICAL WARFARE**

The overboots are part of the system of the CW protective clothing (see page SP-8). They are worn over Boots, Combat and in conjunction with the CW Protective Garment and Gloves.

The overboot is 11" (28 cm) in height, made in left and right, to fit over the combat boots. Closure is effected by means of plastic "D" rings and a nylon lace. The upper is made from a neoprene/butyl coated duo-stretch nylon fabric. The outsole and upper reinforcing components are made from neoprene rubber.

An internal liner, insole cover and back strip are provided to facilitate quick donning and doffing. After lasting, all components are vulcanized together under a differential pressure cure system.

Sizes: The overboot is provided in one width and in sizes 6½, 8, 9½, 11 and 12½.



## OVER SNOW EQUIPMENT

---

The basic means of ground transportation in snow covered areas are still the snow-shoe, the ski and, where a load carrying capability is required, the toboggan. The origin of these items is in antiquity for the problem is as old as the climatic conditions which bring about their use.

The design of the traditional equipment, while simplicity itself, was based on useage by persons and materials indigenous to these regions. The improvement of such time-honoured equipments can only be found in basic approaches and it was here that the Canadian Forces, in their early experimental studies, looked for and found their gains. The two obvious areas were in the application of new materials and in designs which not only took advantage of materials but also recognized the fact that men with no knowledge of snow or operation in it would require extensive training which could not be simulated.

The design of the 100 and 200 lb. capacity toboggans provides for them to be loaded and used as airdrop platforms to facilitate airborne service. Both toboggans are used to transport equipment. The design of the 200 lb. capacity toboggan pays particular attention to the movement of casualties.



#### 100 LB. CAPACITY TOBOGGAN (45.4 kg)

This toboggan is used to transport fuel and tent group equipment for troops operating under extreme cold conditions. It is capable of being para-dropped while loaded to capacity and of being pulled by one man. While it is shaped like a conventional toboggan, it is fabricated from magnesium sheet .081" thick and is 50" in length and 19" in width (.21 mm x 127 cm x 48 cm). The sides are reinforced with a 1/2" x 1" (12.7 mm x 25.4 mm) extrusion which is welded to the sheet and there are two plastic runners on the bottom of the toboggan. There is a fabric cover with secure latching attachments which protects and stabilizes the load. The design incorporates a feature which permits the joining of the back ends of two toboggans by means of a reinforcement bar and thus provides a longer load-carrying base.







#### 200 LB. CAPACITY TOBOGGAN (91 kg)

This toboggan, which has an extruded magnesium alloy frame covered with a magnesium alloy sheet welded to the frame, is boat-shaped. For lateral stability there are two plastic runners riveted into "U" channel extrusions which are in turn welded to the frame. There is a tubular control device mounted at the end of the toboggan which is provided with "D" ring attachments for the harness. This toboggan also has a fabric cover with secure strapping features which attaches to the gunwales of the toboggan.

These toboggans, which are also used extensively by the medical services as a means of transporting casualties to a point where they may be treated or evacuated, may be moved by manpower but the intent is that they are to be used with a prime mover where four or more toboggans in tandem sequence may make up a casualty train.

Movement of this toboggan should be considered under the following headings:

(a) Para-dropped from supply aircraft;

(b) Moved by manpower over snow;

(c) Moved in trains by tractor over the snow;

(d) The tractor and toboggan train as a whole transported by wheeled or tracked load-carrying vehicles to a point where operational snow conditions exist.

The physical characteristics of the toboggan are as follows:

Length: 78" (200 cm)

Width — Overall: 22" (56 cm)

Width — at Runners: 11" (28 cm)

Sheet thickness: .125 (3.2 mm)

Steering Handle fully extended: 62½" (159 cm) beyond the length of the toboggan.

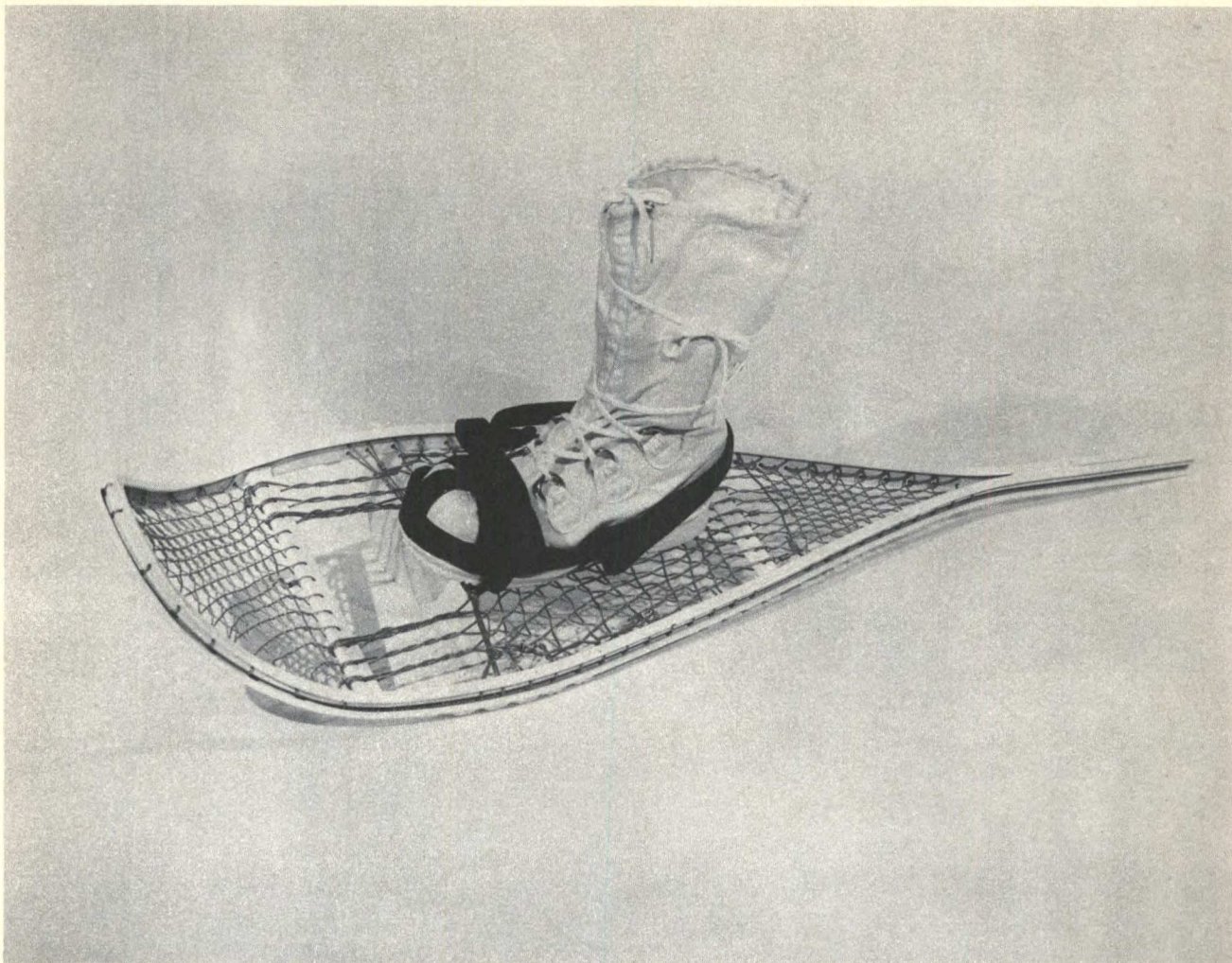
Width of Cargo Pack: 26½" (66 cm)

Weight: 40 lbs. (18 kg.)

CARGO PACK, FABRIC

The covers for both toboggans are fabricated from a nylon canvas, 6.4 oz./sq yd and are polyurethane coated on one side.





#### SNOWSHOE, TRAIL, MAGNESIUM

A series of exercises held in the Canadian Arctic after World War II were aimed at delineating areas of development which would produce new equipment for the Canadian Forces. While there was much in favour of the wooden snowshoe it was found that there were two major weaknesses, namely the unacceptable rate of breakage and deterioration in storage.

Early development, which dates back to 1949, considered all existing commercial types and then went on to consider models fabricated from a wide variety of materials ranging from reinforced plastics to light metal extrusions for the frame. With respect to the stringing, nylon covered steel cables, wide nylon and cotton cordage, as well as sheet metal and plastics were considered before the existing equipment was adopted.

The basic frame of the snowshoe consists of a magnesium extrusion resembling the letter "E" in cross-section. This "E" shaped extrusion makes provision for the stringing to be laced around the centre bar of the "E" and considerably reduces string breakage. The extrusion has a high section modulus through the axis and also incorporates a rounded lip around the outside which greatly reduces the possibility of interlocking the two snowshoes while travelling.

The stringing or mesh of the snowshoe is nylon covered galvanized aircraft cable which is a standard commercial item. Two sizes of cable are used for varying snow densities and to meet optimum floatation characteristics. Slippage is reduced by gripping strips which are welded to the bottom of the frame.

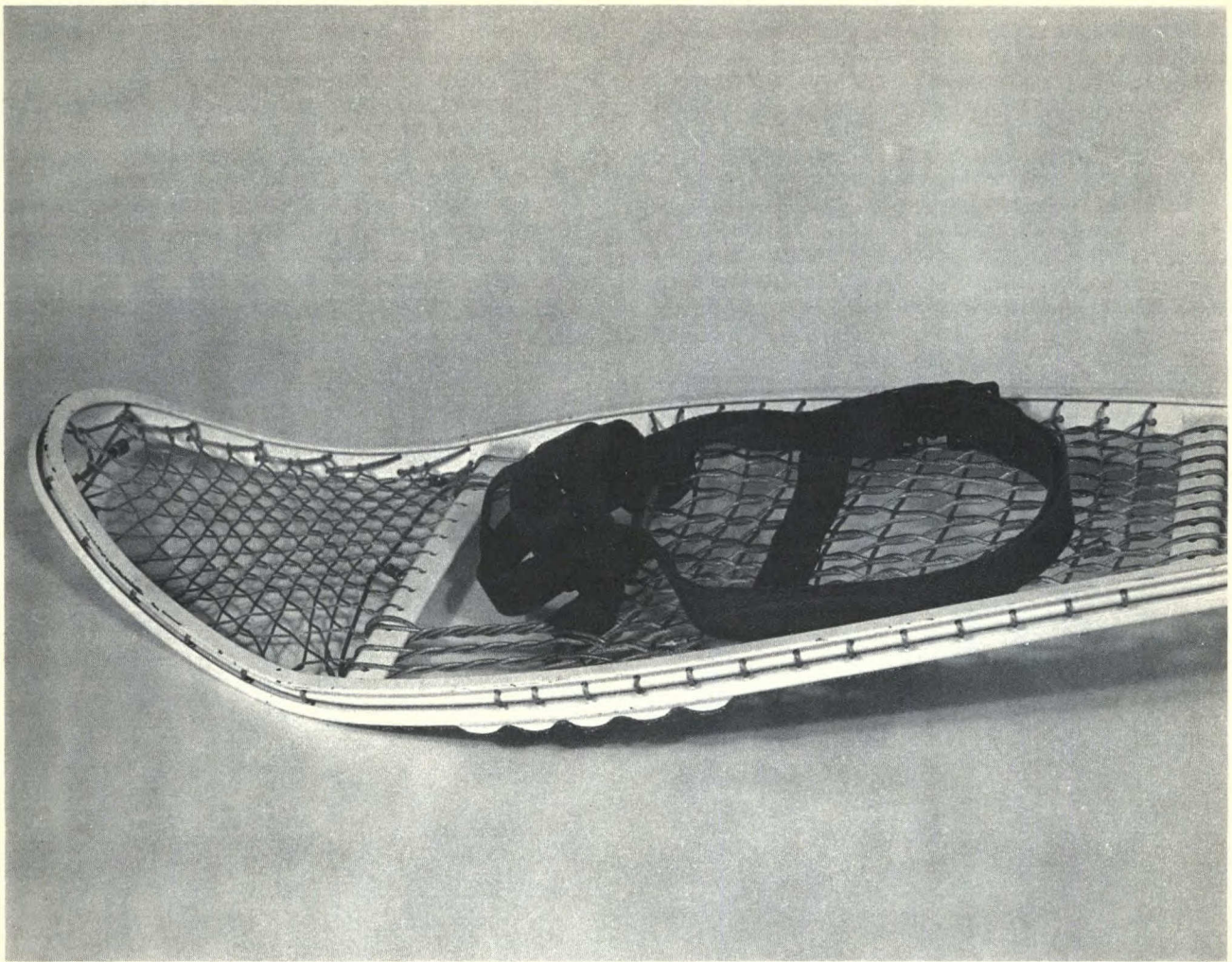
This snowshoe, which has been adopted by other countries, has proved itself over the years in terms of effectiveness and durability.

The physical characteristics of the snowshoe are as follows:

Length: 48" (122 cm)	Turn-Up Height at Toe: 4½" (11.5 cm)
Width: 12" (30.5 cm)	Weight Per Pair: 3 lbs. with binding (1.36 kg)

This item has been adopted by the U.S. Forces and is in use in the Antarctic by Australia.





#### SNOWSHOE BINDING

The standard one-piece leather binding used with the conventional wooden snowshoe was found unsuitable because it could not be handled or adjusted when cold weather handwear was worn. The leather also presented a storage problem as it has a tendency to dry out and lose its durability.

Early development included a two-piece binding which incorporated a quick-release feature and eliminated exposure of the hand which could result in frost damage. Further trials with this model indicated that the same advantages might be found in a one-piece binding and development was continued along this line until today's acceptable equipment was achieved.

The present equipment is a one-piece binding made from cotton webbing and includes an adjustable toe and heel strap. To prevent the binding from riding too high an arch strap is provided. The binding is made in one size only and there is no difference in the left or right fitting.





#### SKIS, POLES & BINDINGS

As a result of service troop trials it was found that available commercial equipment required modification to meet military requirements. The skis did not incorporate the necessary flexibility and the poles also required modification to meet the more rugged service requirements.

The service ski is of the cross-country type of laminated construction with a hickory running surface having steel edges and a gradual upturn at the toe section. It is 7' long (2 m) and approximately 2½" wide (6.4 cm). The toe section has a chamfered hole to provide for towing services during survival operations. Product improvement is in progress and will incorporate an anti-slip device.

The ski pole has a tapered steel shaft and an aluminum snow ring secured to the ski by a moulded synthetic cross-strap arrangement. Leather wrist straps are provided which accommodate military handwear. The poles come in two sizes, 52" (132 cm) and 57" (144 cm) and are zinc plated to meet camouflage requirements.

The military characteristics covering the Universal Ski Bindings for the Canadian Forces state that they must be useable with mukluks, insulated boots and combat boots, with or without overboots. The development of such a binding was complicated by the fact that the mukluks, and to a lesser extent, the insulated boots have non-rigid soles and soft toes which do not permit the use of conventional cross-country bindings. This made it necessary to design a binding having its own sole-plate and heel-cup.

The current universal binding has a moulded high-density polyethylene sole-plate to which is riveted a moulded nylon heel-cup. The heel-cup makes provision for a threaded heel strap. The toe-plate is aluminum to which a rubberized strap is riveted. The design of the binding provides for two adjustments which covers a foot size range from 6 to 12 and is mounted on the ski by four wood screws.





#### SKI MAINTENANCE KIT

The kit consists of a canvas container which houses the various components.

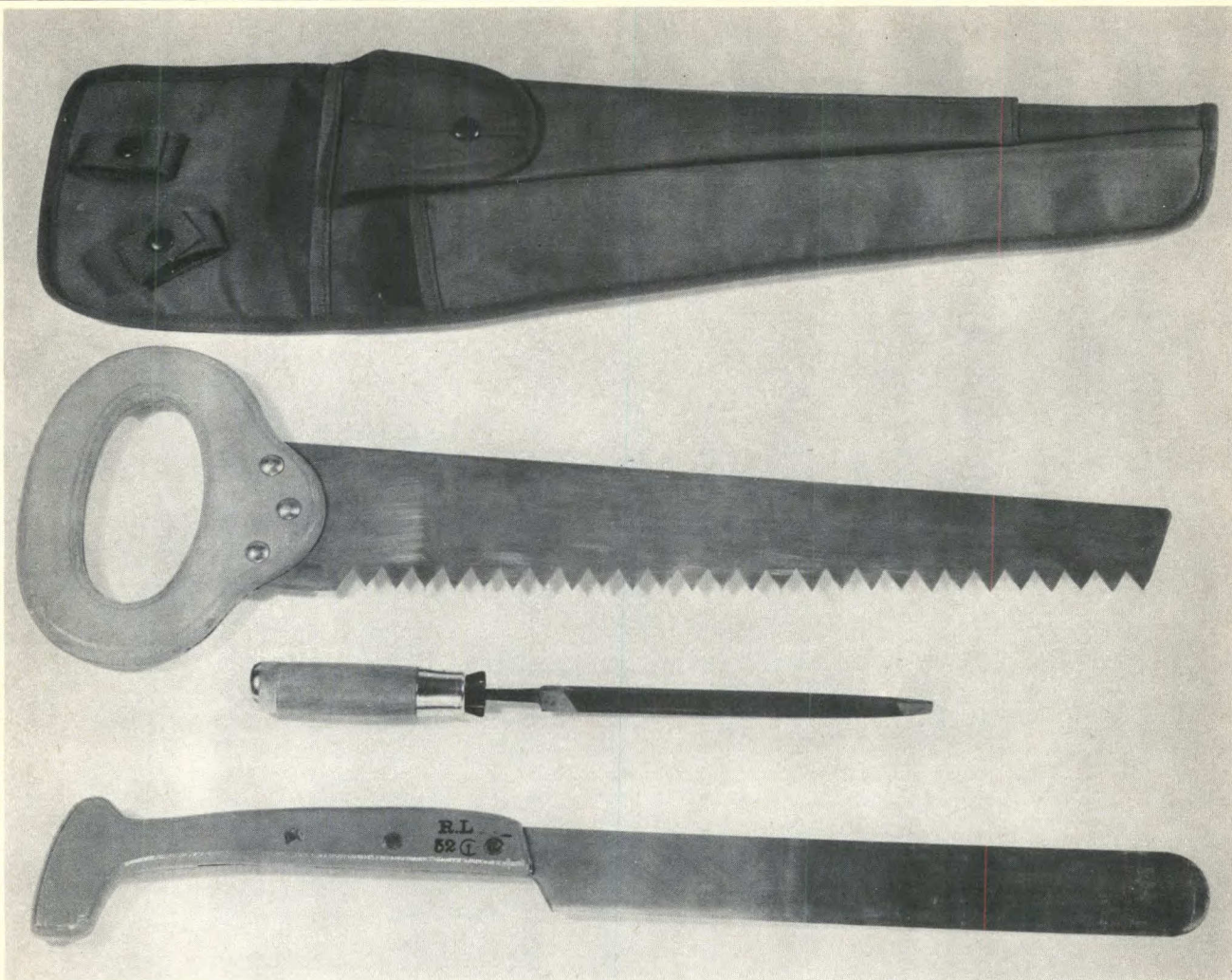
- Two metal ski tips to be used in the event that tips are broken thus allowing the ski to be used until proper replacement can be made.
- Two additional ski pole rings complete with cotter-pins and grommets.
- Four sticks of ski wax for varying cross-country conditions.
- A small quantity of steel edges and screws.
- A roll of steel wire for emergency use in the repair of broken equipment.

- Screwdriver.
- Pliers.

The closed dimensions are as follows:

Length: 14.5" (36 cm)	Thickness: 4.5" (11 cm)
Width: 8.25" (21 cm)	Weight: 5.5 lbs. (2.5 kg)





#### SNOW KIT

These items, adopted by the Canadian Forces, have seen more than twenty years use in the Arctic zones. The Saw and Knife are used to cut hard-packed snow and ice for emergency shelter requirements.

The saw is 24½ inches (61.2 cm) in length with a stainless steel blade having an exposed length of 18 inches (45.7 cm). The handle which is painted orange for easy identification, is made of wood, oval in shape, has an opening large enough to accommodate arctic mittens.

The knife is 23½ inches (59.7 cm) in length having a stainless steel blade, 13½ inches (34.3 cm) exposed length and the wooden handle is also painted orange. The file is 14 inches (35.7 cm) in length including wooden handle; effective filing surface (3 sides) is 7 inches (17.8 cm) long. The carrying case is made of nylon/cotton fabric, vinyl impregnated olive green in colour. The compartments for the saw and knife are reinforced with leather.



The web equipment adopted by the Canadian Forces and introduced in 1964 was designed in conjunction with the load carrying capabilities of the combat clothing. The system provides for the carriage of personal clothing and equipment, ammunition and rations and caters for various operational conditions. The basic system is a web belt with suspenders to which carriers for specialized equipment can be attached. An independently suspended cargo pack is also provided.

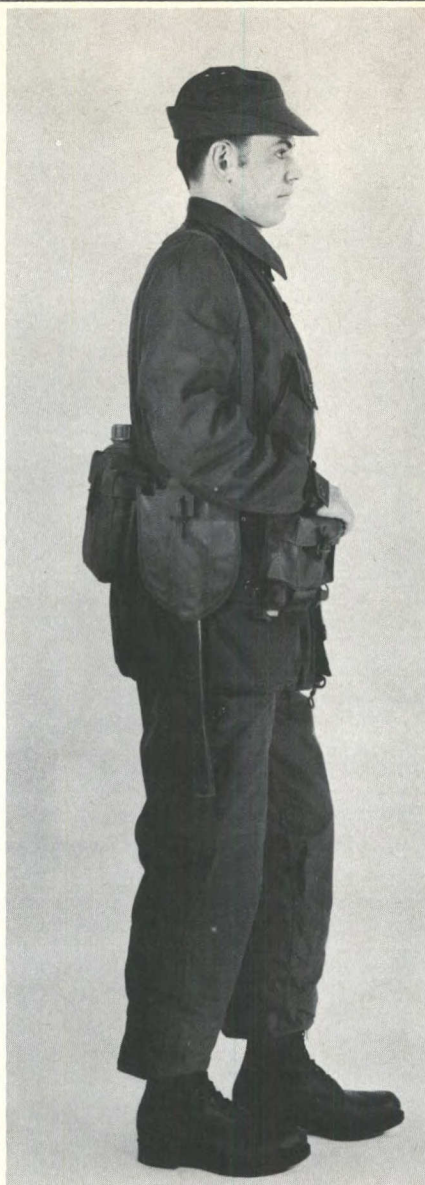
The improvements now featured in the Canadian Forces web system were not due to new designs or new materials alone but rather to an amalgum of these facets of product improvement. The introduction of field trialled plastics as well as the proven capabilities of "Velcro" closures have permitted these radical advances.

Plastic hardware reduces the weight of all equipments with which it is associated and is permanently camouflaged without losing the durability found in the previous metal hardware. The design of the personal load carrying ensemble has been considerably simplified by reducing the total number of individual pieces and by eliminating time consuming and often ineffective methods of attachment of the components. In this respect "Velcro" hook and pile strip has been used to advantage where it provides proven, secure attachments. The "Velcro" strips have been so positioned on the items that they are not affected by mud, snow, etc., nor are they prone to accidental opening.

In this field of basic equipment, realistic and meaningful improvement is difficult and here the rucksack may serve as an example of the advances made. The rucksacks from the commercial market, did not meet service requirements with respect to durability and the particular needs of airborne troops. Once again it was necessary to undertake development on what apparently was old and proven equipment but in the light of modern service use, was not.

Another basic piece of equipment, the water bottle, has seen improvement through the application of new materials. Following World War II the Canadian Army adopted an aluminum water bottle of U.S. design which has proven to be too expensive and its construction did not solve hygienic and bacteriological problems caused by the retention of food particles, etc. During development phases it was realized that the application of plastics to water carriers would result in the necessary improvements and would considerably reduce production costs.





#### WEBBING

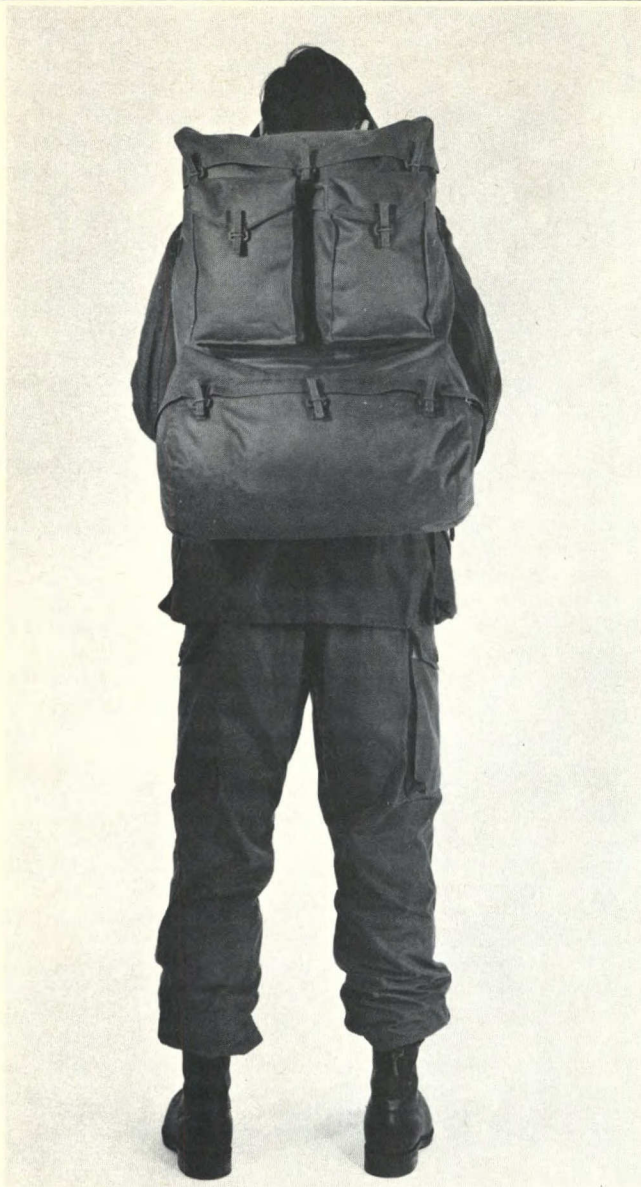
**Web Belt:** Constructed from a rot resistant, olive green, cotton webbing, the ends of which are protected by a vinyl impregnation. Adjustment for girth is achieved by "Velcro". A moulded nylon buckle, olive green, provides the closure (see page PH-3).

**Suspenders:** Constructed from a rot resistant, olive green, cotton webbing with an adjustment for height provided by three 1" centre bar buckles. The suspenders are attached to the belt by means of "Velcro" hook and pile closure.

**Individual Carriers:** Individual carriers for the following items are provided: grenades, water bottle, mess tins, entrenching tool, bayonet, NBCW Protective Mask, pistol and respirator. All carriers are attached

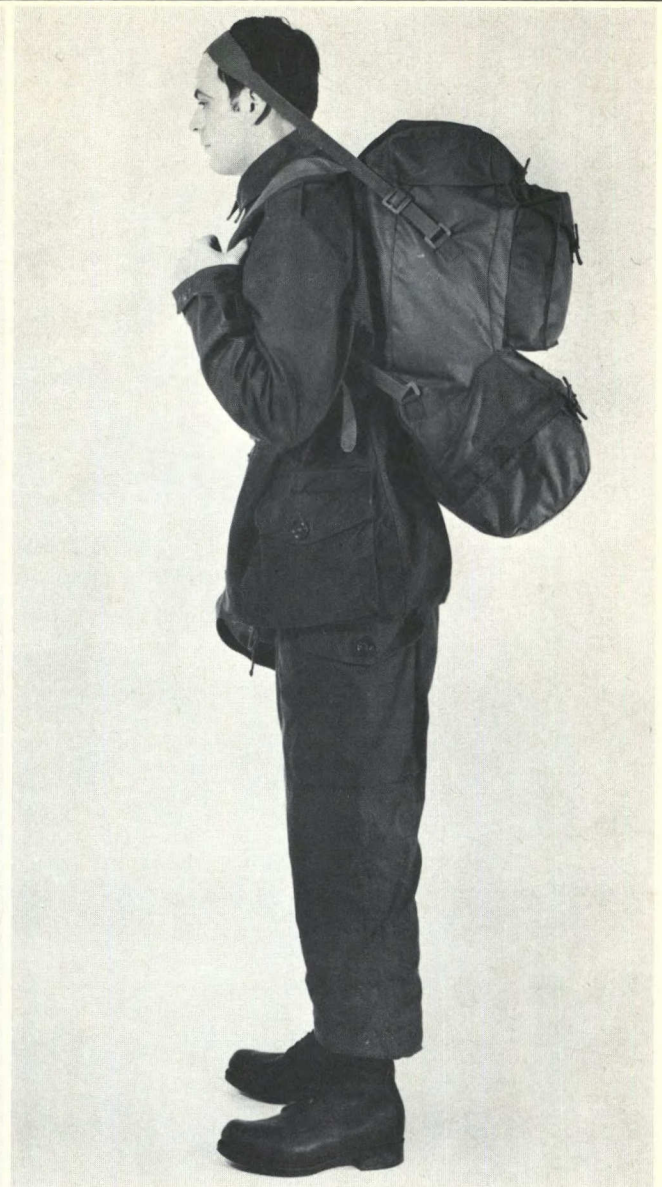
to the belt by means of loops which are closed by "Velcro" hook and pile. The carriers can be arranged on the belt to meet varying operational circumstances and to suit individual preference. All items are constructed from vinyl impregnated nylon/cotton canvas and also utilize plastic hardware as shown on pages PH-1 to 4.





#### CARGO CARRYING

**Cargo Pack:** This pack has one large compartment for general storage with two smaller compartments on the outside capable of carrying the mess tins and water bottle. Below this is a compartment for sleeping equipment which is closed by a slide-fastener protected by a flap. This compartment is canted away from the back to reduce bumping and continual contact. Padded shoulder straps are provided and a three-dimensional honey-comb type material is incor-



porated to give air circulation between the pack and the man's back for improved comfort. A "tumpline" (head strap) is also provided.

**Material:** The pack is constructed from vinyl impregnated nylon/cotton canvas and cotton webbing, olive green, and uses plastic hardware as shown on pages PH-2, 3 & 4.





#### UNIVERSAL RUCKSACK, C-2

The rucksack is not normally a part of the personal load carrying equipment ensemble and is usually used as the major carrier under extreme cold conditions. Following evaluation of many different models the Canadian Forces Rucksack was adopted consisting of:

- A tubular frame.
- A cargo shelf.
- A neoprene-coated nylon bag
- A waist belt with quick release fastening device.

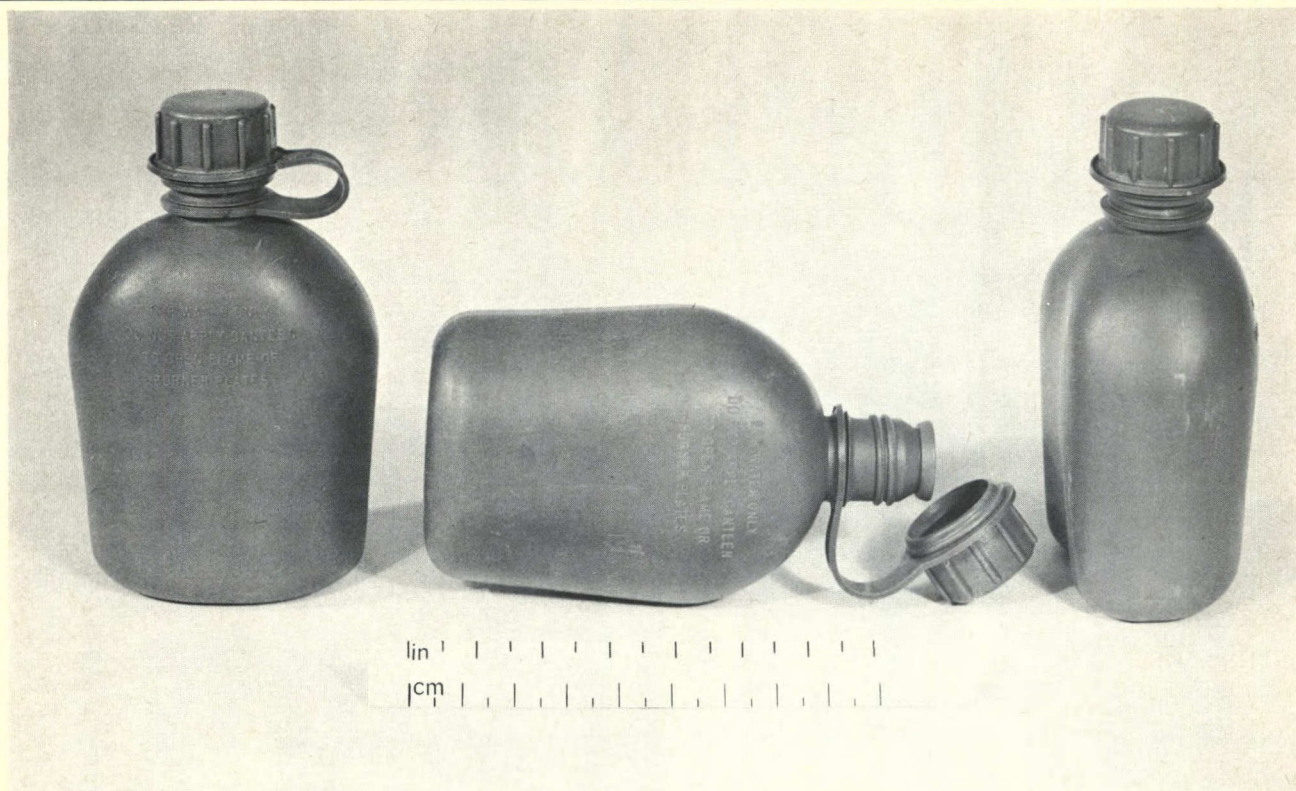
**The Frame:** Holds the load off the wearer's back and allows air to circulate between his body and the load. It consists of aluminum tubing to which a series of strap keepers are welded to hold webbing in place. A strap retainer is welded to the top of the frame to hold the shoulder straps in place and a bracket, welded on the right side of the frame midway between the top and the middle horizontal bars, is used to assist in carrying the rifle.

**Cargo Support Shelf:** Fabricated from aluminum alloy and may be attached to the centre or bottom horizontal bars on the frame. It is used to assist in carrying square, rectangular or box-type items such as radios, gasoline cans, water cans and insulated food containers. It has pockets with quick release tabs, back straps and side straps for attachment to the frame, a double eyelet webbing hanger and securing straps on each side for attachment of canteen and mess tin cargoes.

**Bag:** It is fabricated from a waterproof, neoprene-coated nylon fabric. The straps and shoulder straps are cotton webbing with plastic hardware fittings. All components are olive green.

A white cotton camouflage cover in the form of a large rectangular sheet having grommets attached along the edges and corners which allow the cover to be draped over the rucksack and fastened with cord, is available for use with this equipment. Recent user trials carried out by the Royal Marines indicate that this particular rucksack, which was tested under field conditions with various kits and loads up to 60 lbs. in weight, was preferred above all others on trial and has been recommended for worldwide use.



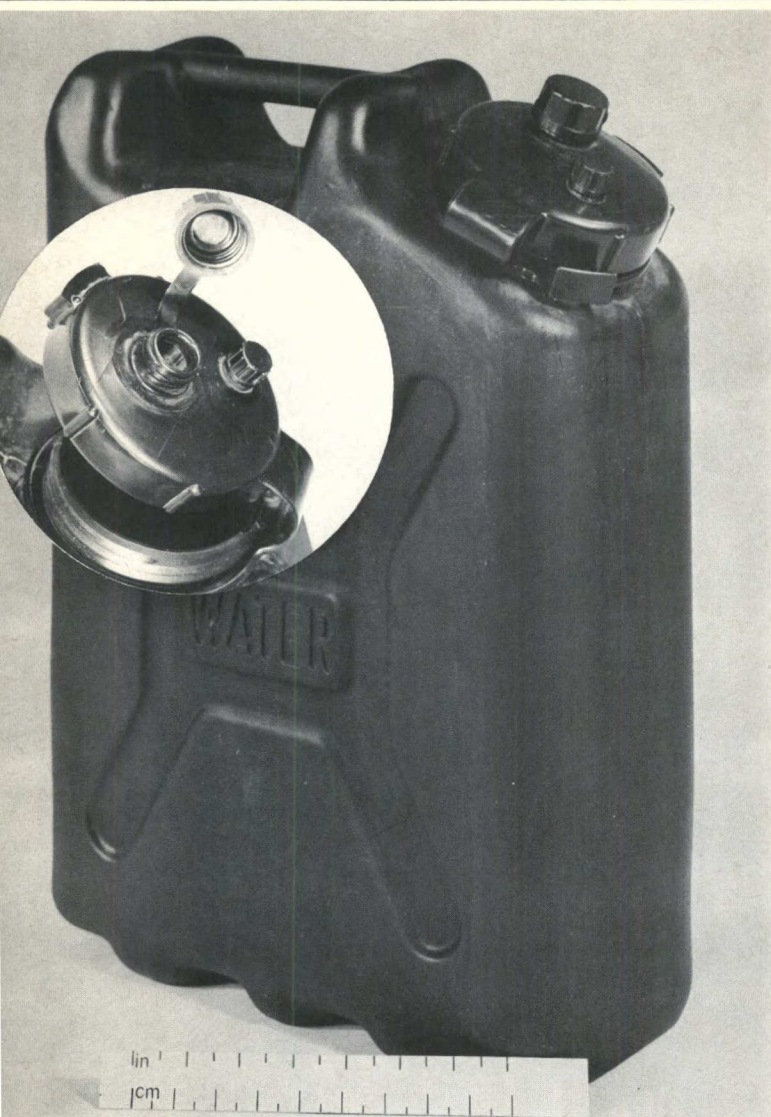


#### **WATER BOTTLE, PLASTIC**

The body of the canteen is blow-moulded in one piece from high density linear polyethylene. The neck of the bottle, which forms a sealing surface against the cap, is flat, smooth and free from nicks and depressions. The neck is threaded with a buttress type thread for a minimum of two full turns and prevents leakage. The wall thickness at any point on the body is not less than .036" (.91 mm). The cap and strap are injection moulded of high density polyethylene. The canteen and its cap weighs 120 grams. The olive green camouflage colour is maintained throughout the life of the bottle.

*Both the U.S. Army and U.S. Marine Corps have adopted the Canadian water bottle and it is in operational use.*





#### WATER CONTAINER, PLASTIC, 5 GALLON

During various experimental and development trials relative to plastic water containers and fuel containers it was found that non-metallic containers offered decided advantages when applied to bulk water carriers.

The plastic water container developed by the Canadian Forces has the following advantages:

- 50% lighter than the metal item.
- Does not rattle during handling.
- Will not rust.
- Capable of being stacked.
- Requires no maintenance.
- 30 to 40% less expensive.
- More durable and permits freezing of contents without fracture.

The rectangular container has an integral carrying handle and the screw-cap has a tab which locks onto the body in the event, through vibration, the cap should attempt to come loose. The body walls have a minimum thickness of .10" (2.5 mm).

**Cap and Strap Assembly:** The large cap, strap (with locking tab), pouring spout and breather cap are injection moulded and fabricated from low density polyethylene. The large cap is locked in the tightened position by means of a tab on the cap and strap assembly. Superimposed on the large cap is the small pouring spout, with its cap, as well as the breather cap assembly.

**Physical Characteristics:**

Capacity:	5 Gals. (US)
Height:	19" (48 cm) (19 liters)
Length:	13 1/8" (33 cm) Weight: (Empty): 5 lbs.
Width:	6 7/16" (17 cm) (2.27 kg)

The item has been adopted by the U.S. Army and Marine Corps.



### TENTAGE

To meet operational requirements for accommodation tentage, a study of tentage available in the U.S., Britain, France and West Germany was carried out in 1963 and the survey report selected a modular concept to be used as the basis for Canadian development. This design concept consists of three main tent frame components which can be elongated by the addition of one or more centre sections in multiples of 8 feet (2.4 m). This provides tentage accommodation for field and training forces in the following categories:

- (a) Offices, stores, field sleeping, canteens and messes;
- (b) Medical installations;
- (c) Field cooking equipment and weapon servicing and maintenance;
- (d) Light aircraft maintenance shelter.

### SLEEPING EQUIPMENT

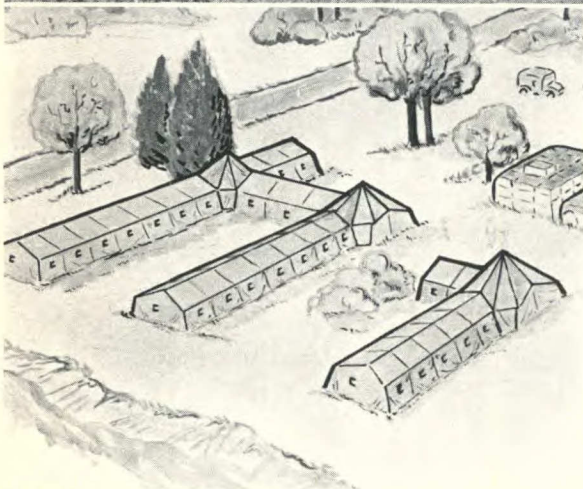
Field exercises in northern Canada in the winter demonstrated the absolute necessity of providing the best possible sleeping equipment so as to maintain the combat efficiency of troops.

Canadian Forces field sleeping gear caters for two environments, temperate and cold weather. The temperate sleeping system consists of a general service sleeping bag and a multi-purpose sheet. The cold weather ensemble consists of an air mattress and a heavier sleeping bag complete with a detachable nylon cover and insulated hood. The cold weather system, with periodic product improvement, has seen satisfactory service for the past 15 years. The temperate system was only currently introduced.

Development is currently in progress for the production of an improved sleeping bag using a novel method of construction which will largely eliminate the problem of insulation migration. Preliminary results indicate that the method is satisfactory and further field testing is being undertaken.

It will be noted that the development program has examined the problem of field sleeping and the relationship of sleeping gear to other items of personal equipment. As a result we have been able to introduce improved insulation materials and replaced such items as the poncho and ground sheet with more effective pieces of equipment.





## TENTAGE

### TENT, MODULAR, FIELD SERVICE

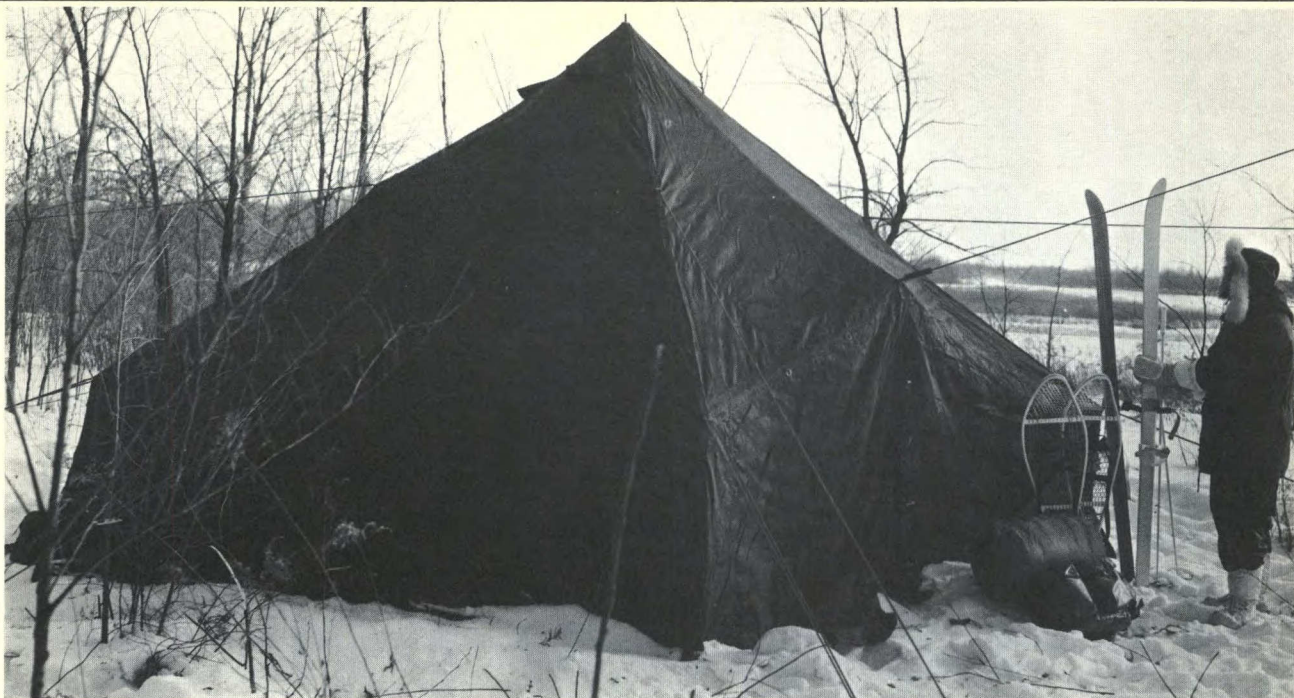
The basic unit of the modular system measures 8'4" (2.55 m) in length, 18' (5.5 m) wide at the base, 15'5" (4.7 m) wide at the eaves, 9'8" (3 m) high at the ridge and 5'7" (1.7 m) high at the side (vertical). It has a self-supporting hinge framework fabricated from aluminum alloy tubing with die cast hinge brackets and fixtures. The framework consists of only two components, hinge ties and longitudinal connectors and can be assembled without special tools. The framework, while offering an unobstructed inside space and interchangeability of components, also eliminates the need for external guy ropes by pegging down on the base of the frame. It is quickly and easily erected and can withstand winds of high velocity.

The canvas sections of each unit consist of a roofed covering, which includes windows and a chimney passage, and is attached to the end walls by a series of loops and grommets normally known as "Dutch lacing". The standard end walls consist of a black-out porchway and a plain wall having a split opening to allow entry of large equipment into the tent. To meet other requirements such as a storage tent or a light maintenance shelter, special walls are available to permit the tent to be joined to a vehicle on a semi-permanent basis or to allow the nose of an aircraft into the tent and provide suitable cover from climatic conditions or as an aid to maintenance.

The tents can be extended by one or more units without any difficulty due to the fact that all the side walls and roof sections are identical and match one to the other. The front and rear ends are interchangeable. The canvas sections are fabricated from olive green polyester/cotton core-spun material 12 oz./sq. yd., water, rot and flame resistance treated.

The white liner is fabricated from a plain weave vinyon (polyvinyl chloride), inherently flame resistant material, weighing approximately 4 oz./sq. yd.





#### **TENT, LIGHTWEIGHT, ARCTIC, 10-MAN**

This tent provides shelter for 10 men and their personal equipment when operating in extreme cold conditions. The outside fabric is an olive green, cotton warp/synthetic fibre filling oxford cloth finished with "Quarapel" water repellent, 5.6 oz./sq. yd. The white liner is fabricated from a plain weave vinyon (polyvinyl chloride), inherently flame resistant material weighing 4 oz./sq. yd. It provides insulation for the tent and prevents freezing of the condensate on the inside of the tent.

The tent is a 5-sided pyramid supported by a telescopic magnesium pole with a base plate at the

centre. A stove pipe opening is located at one side near the eave. The dimensions are as follows:

Length: 10'6" (3.2 m)	Door Opening: 5' (1.5 m).
each side.	Floor Area: 175 sq. ft.
Height: 8'6" (2.6 m).	(16.3 sq. m).
Wall Height: 2' (61 cm).	Weight (including poles, base plate, tent pegs, tent & liner) is approx. 72 pounds (32.7 kg.).

#### **TENT, LIGHTWEIGHT, ARCTIC, 5-MAN**

The configuration is similar to the 10-Man tent and uses the same materials. The dimensions are as follows:

Length: 8'2" (2.5 m)	Weight: 57 lbs (25.9 kg.).
each side.	Area: 100 sq. ft. (9.3 sq. m).
Height: 8'2" (2.5 m)	
at the peak.	
2' (61 cm) at the wall.	

The tent pole, baseplate and pegs are common to both tents.



#### SLEEPING BAG, COLD WEATHER

The cold weather sleeping bag consists of five components, weighing 11½ lbs. (5 kg) complete.

- a carrying bag
- a cotton flannelette liner
- an outer insulated bag
- a separate insulated hood
- an inner insulated bag

The inner and outer bags are of similar design with channels for the control of the insulation which run longitudinally. The bag has a centre front opening closed by a free-running slide-fastener. The inner and outer bags are fastened together by means of tying tapes and the flannelette liner, which is provided for hygienic reasons, is similarly attached. The bags have a neck drawcord making them snug-fitting at the neck and shoulders. A combination of down and feathers is used as the insulant and a lightweight nylon fabric is used for the shell.

The insulated hood, which has a cowl-like cape fitted with elastic straps to fasten under the arms and a "Velcro" front closure, is designed to give warmth to the head. The main advantage to the separate hood is that when the man turns during his sleep the hood turns with him. This design overcomes the problem experienced with other bags having an attached hood where the exhaled breath may be released into the sleeping bag proper thus causing condensation which freezes and reduces insulation.

#### AIR MATTRESS

The air mattress is provided solely for cold weather sleeping and is primarily designed for insulation value rather than comfort.

*Design:* The mattress is approximately 72" long by 30" wide at the shoulders tapering to 20" at the foot (183 x 76 x 51 cm). This design facilitates the placing of mattresses in the arctic tent so as to use a minimum floor area. The mattress uses a pillow inflation system. This is a device attached permanently to the head of the mattress and is found to be superior to conventional hand pumps in that less effort is required, it is impossible to lose the inflation device and it prevents the entry of moisture laden air into the mattress. "D" rings are attached to the sides of the mattress to enable it to be secured to the ground or to the bag as necessary.

*Material:* Neoprene coated nylon with all seams vulcanized.

It has been the Canadian experience that commercially available air mattresses will not meet the military requirement for durability and low temperature flexibility. This mattress is much stronger than the available commercial types and meets all the low temperature requirements.



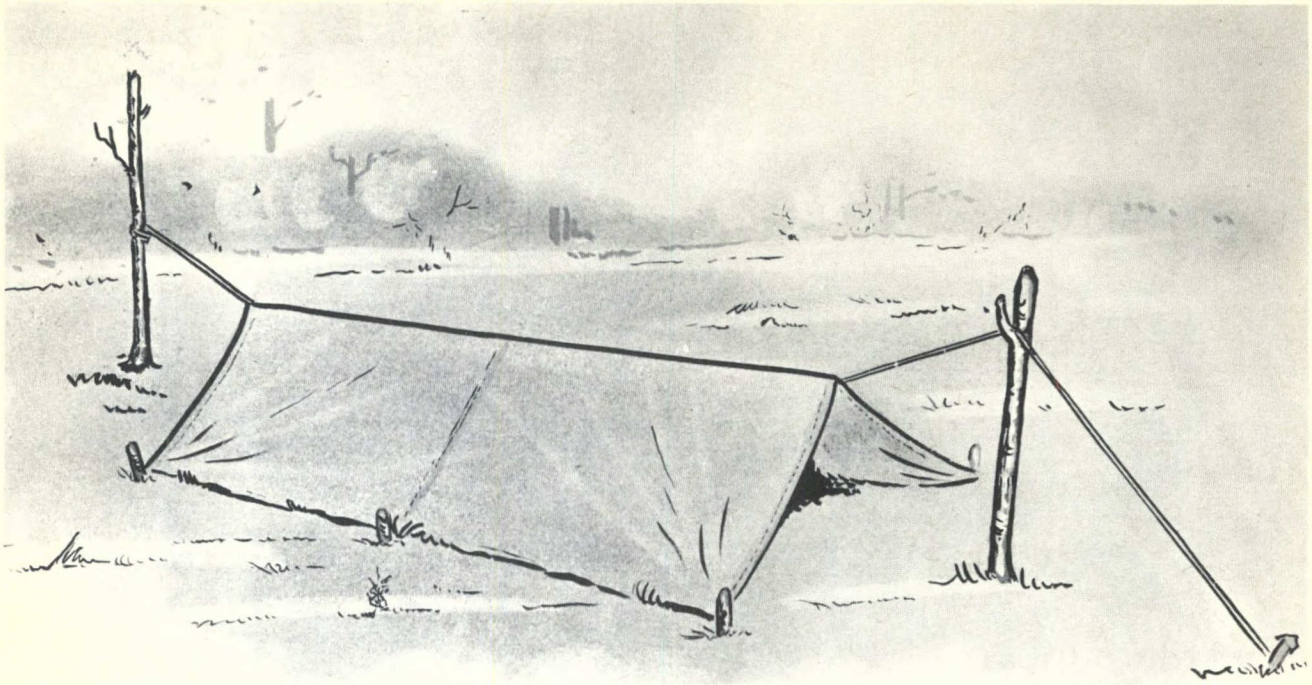


*This picture illustrates the independent hood system of the Cold Weather Bag. The model is holding the inner sheet/liner, which is removeable for washing, in his left hand and in his right he is holding the inner bag. The outer bag is in the foreground.*



*The Air Mattress can be seen under the sleeping bag.*





*A single sheet shelter.*

#### **MULTI-PURPOSE SHEET**

This waterproof item was designed in 1967 and was primarily intended to provide protection to the sleeping soldier by using it as an improvised bivouac or as a ground sheet. When used as a bivouac it is connected to the general service sleeping bag to provide a "sleep-in" ensemble. In addition to these functions, the sheet can also be used for many other purposes examples of which are: a hammock; an improvised litter; a rain-catch; a burial pouch; a sun screen or as overhead foxhole protection.

**Design:** The sheet is 60" by 108" (1.5 x 2.7 m). Six eyelets reinforced by nylon webbing are placed on each short edge and a full length separating slide-fastener is attached to the long edge of the sheet. This enables a number of sheets to be rapidly fastened together to form larger shelters. The current weight of this item is 28 oz (794 grams) but development is in progress to reduce this to 12 oz. (340 grams).

**Material:** 4.75 oz./sq. yd. polyurethane-coated nylon.



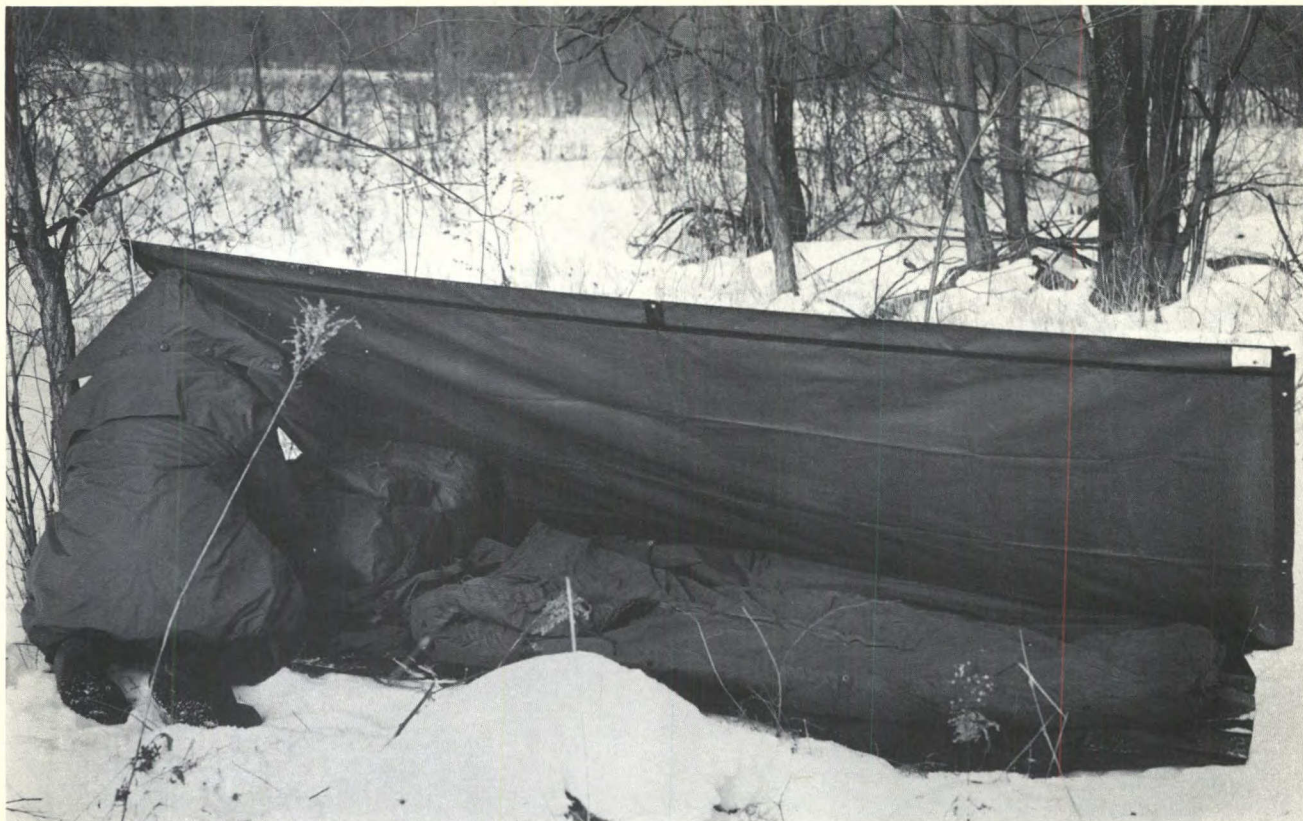


*Two sheets joined to provide more cover.*



*Three sheet joined to provide tent-like accommodation.*





The Temperate Bag is being given additional protection here by the Multi-Purpose Sheet being used as a lean-to type of shelter.



#### SLEEPING BAG, GENERAL SERVICE

**Design:** The bag is of rectangular shape, 80" (203 cm) long by 30" (76 cm) wide with a centre front slide fastener, 54" (137 cm) in length, and has a neck drawstring. The bag rolls up into an attached case which can also be used as a pillow. Conventional bags of this type use quilted insulation; however, this lends to "cold spots" and a relatively inefficient bag. To overcome this problem a novel feature has been developed which allows the insulation to be stabilized without quilting.

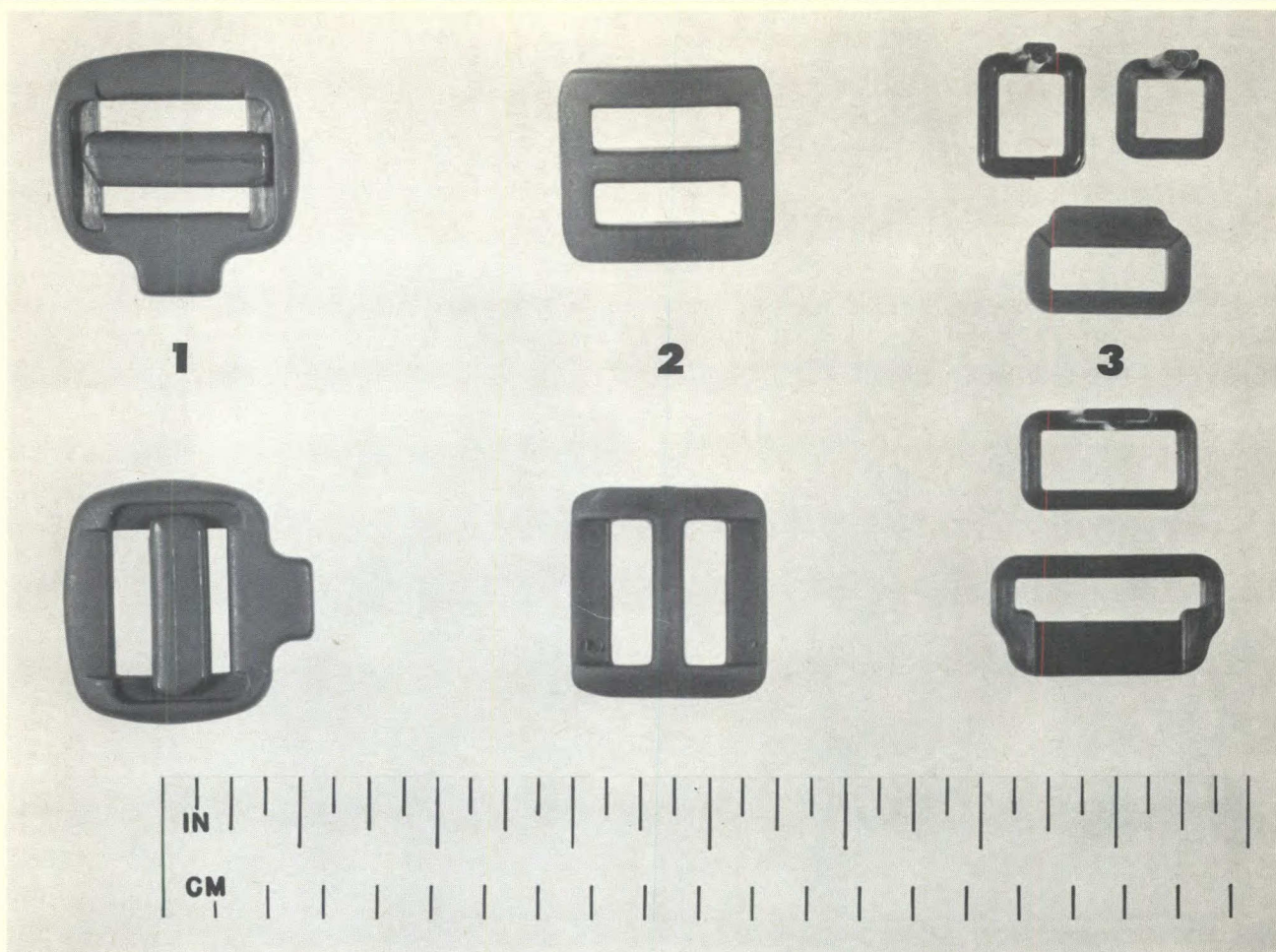
The bottom of this bag is made from a waterproof coated fabric thus eliminating the need for a ground sheet. When the bag is used in conjunction with the multi-purpose sheet the user is completely protected from the wet weather.

**Material:** Shell material is 2.35 oz./sq. yd. nylon twill. The insulation is 16 denier resin bonded polyester batting (see page T-4). The bottom is waterproofed with polyurethane-coated nylon.



In the course of investigations to improve service equipment by taking advantage of modern technology, it was realized that the utilization of plastic hardware for web equipment and other applications could present a financial saving of approximately 30% as well as a weight reduction of 66% relative to the time-honoured and costly brass hardware. Further, non-ferrous materials, such as brass, invariably are in short supply in times of emergency whereas the basic plastic materials are produced in large quantities in Canada.





#### BUCKLES

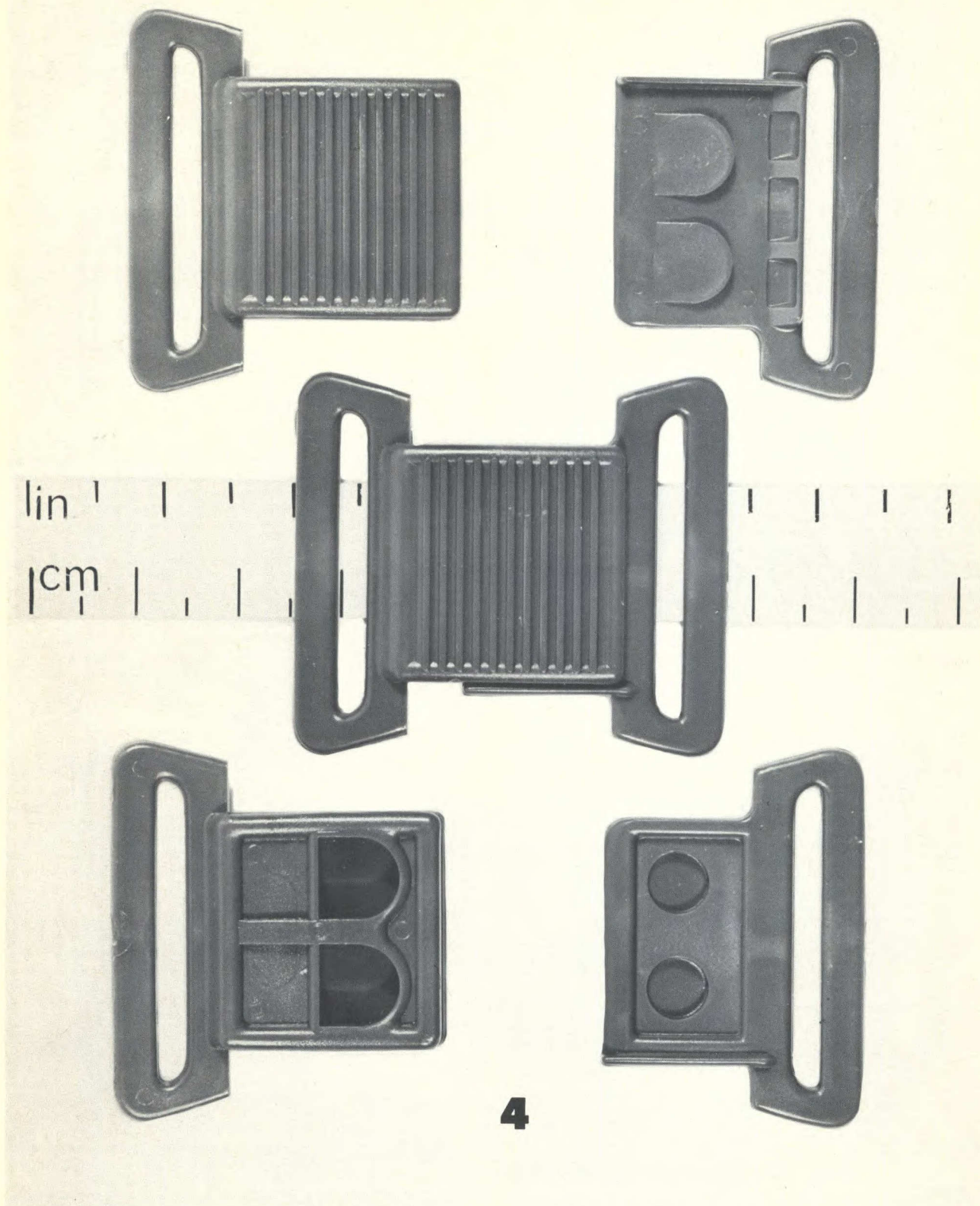
A buckle is only fully effective when used with the webbing for which it was designed and should not be mis-matched with materials outside of the design parameters.

**1. Buckle, Centre Bar, Slide, 1" (2.54 cm).** This buckle has a centre slide bar which locks the webbing in any given position. It also has a small tapered extension with a small hole to accommodate a thong which may be used to release pressure on the buckle. This buckle must always be used under tension and is employed on tentage and load carrying equipment.

**2. Buckle, Centre Bar, 1" (2.54 cm).** This buckle has a permanent centre bar and is used as a locking device. It is adjustable and normally used on cover flaps, rifle slings and tentage.

**3. Hasp and Staple, Quick-Release.** They are used in conjunction with specially made quick-release strap arrangements. Comes in two sizes to accommodate 1" (2.54 cm) and ½" (1.2 cm) webbing. Effects quick release on flaps on many non-rigid carriers.

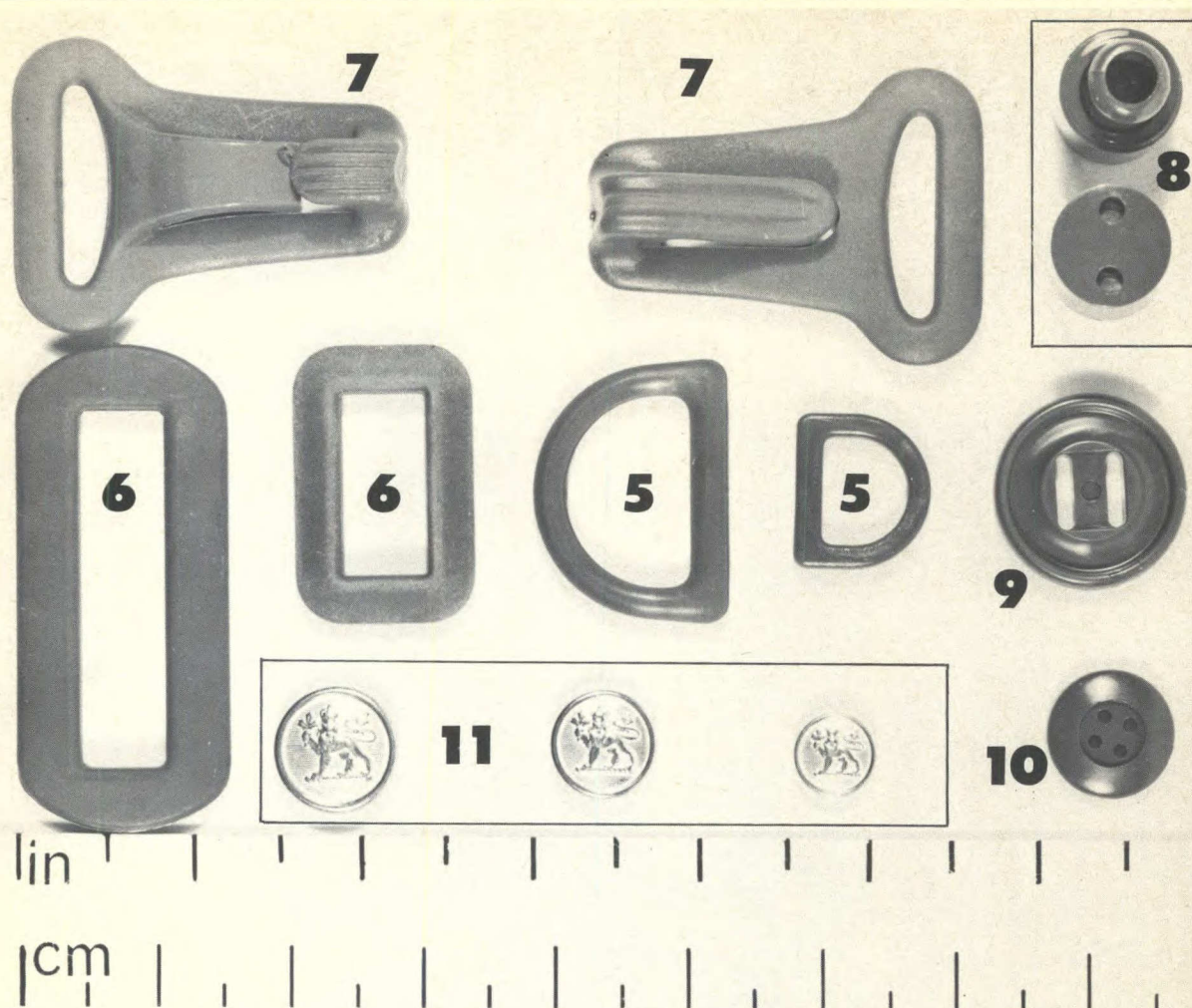




**4. Belt Buckle.** This buckle is used in conjunction with 2¼" (5.7 cm) waist belts on load carrying equipment. It incorporates a quick-locking and unlocking design

feature and can be easily fastened when the belt is loaded with other non-rigid carriers.





**"D" RINGS, BUTTONS, ETC.**

5. "D" Ring. Used in conjunction with an open hook or snap fastener and it accommodates cotton and synthetic webbing; also used for quick lashing purposes. Two sizes are available, 1" (2.54 cm) and  $\frac{3}{8}$ " (1.6 cm) while a  $\frac{3}{8}$ " (1 cm) type is under development.

6. Loop, 1" (2.54 cm) and 2" (5 cm), Strap Fastener. Used to join two straps or to link non-rigid carriers.

7. Open Hook 1" (2.54 cm) and Snap Hook 1" (2.54 cm). Used in conjunction with the 1" (2.54 cm) "D" Ring for fastening tent flaps, large cargo valises and tarpaulins.

8. Clamp, 2-Cord. Used for drawstring closures on such items as bags, door openings and parkas.

9. Button, 45 Ligne ( $1\frac{1}{8}$ " (2.9 cm) diameter), Bar Type. Has two slots to allow attachment of the button to material by means of tape loops and is used on functional clothing and tentage. The slotted button was developed to overcome the problems experienced with conventional sewn-on buttons. The tape attachment ensures that the buttons will stay attached for the life of the garment and it provides flexibility of adjustment and location.

10. Button, 30 Ligne ( $\frac{3}{4}$ " (1.9 cm) diameter). Has four holes and is sewn in the conventional manner.

11. Gold Plated Plastic Button with Insignia. This button, used on uniforms, is produced in three sizes — 30 ligne ( $\frac{3}{4}$ " (1.9 cm), 26 ligne ( $\frac{5}{8}$ " (1.6 cm) and 20 ligne ( $\frac{1}{2}$ " (1.2 cm). The button illustrated bears the Canadian Forces insignia but they can be made to custom design. It is moulded from phenolic compound with a metal eye shank embedded during the moulding process. The moulded item is then given various metal finishes with the final one being an electro gold plating. This button has overcome the many disadvantages of metal buttons which were susceptible to dents, excessive scratching and loosening of the shank.



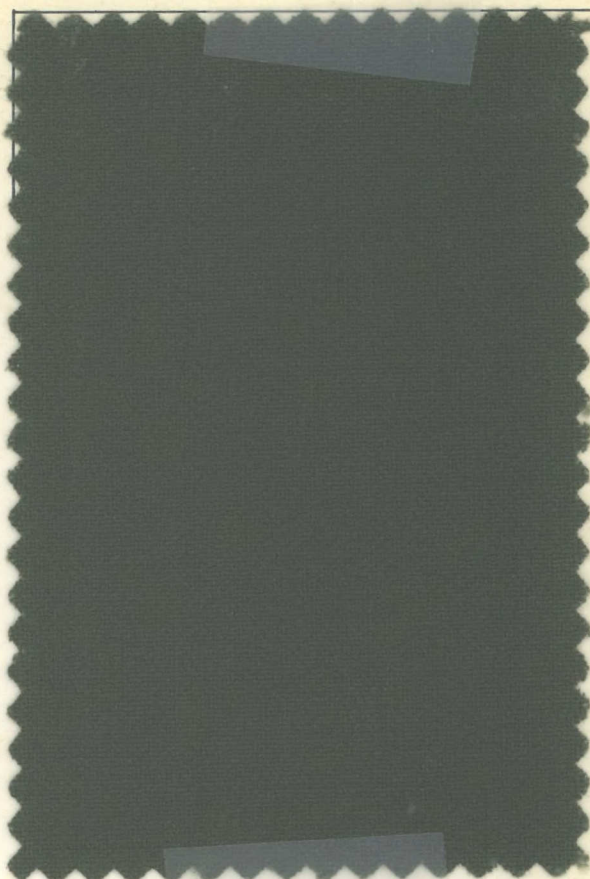
## TEXTILES

### 1. CLOTH, TWIST, NYLON/COTTON, 8.3 OZ./SQ. YD. (QUARPEL TREATED)

The adoption of the Canadian combat clothing ensemble (page CC-4) necessitated development of a suitable strong and reasonably lightweight fabric for temperate use. Of the Canadian fabrics developed for this purpose the present nylon/cotton twist fabric proved to be the most satisfactory. Subsequent troop trials and useage have confirmed the many advantages of this material for this purpose. This fabric is a very tightly woven material utilizing nylon/ cotton twist yarns which afford the very high strength, tear and abrasion resistance characteristics required for the land forces combat gear. The "Quarpel" type water repellent treatment applied to this material is formulated from pyridinium and fluorocarbon compounds and provides a very high standard of water repellency which also withstands field launderings.

*Details:* Yarns: Filament nylon twisted with cotton plain weave. Tensile strength — warp: 340 lbs. (154 kg) weft; 325 lbs. (147 kg). Tear strength — warp: 15 lbs. (68 kg) weft: 15 lbs. (68 kg).

This material is also used in AFV clothing.



### 2. CLOTH, TWIST, NYLON/COTTON, LIGHTWEIGHT, 5 OZ./SQ. YD.

As part of the development of suitable materials for the Canadian combat clothing ensemble (page CC-3), this lightweight fabric was designed for the hot weather components. The olive green material is manufactured from nylon/cotton twist yarns. It is designed with a more open weave than the 8.3 oz. material and still affords very high strength, tear and abrasion resistance. This "Quarpel" treated fabric is also used as the shell fabric for the chemical warfare overgarment (see Page SP-8).

*Details:* Yarns: Filament nylon twisted with cotton. Plain weave. Tensile strength: warp — 210 lbs. (95 kg), weft — 190 lbs. (86 kg). Tearing strength: warp — 11 lbs. (5 kg), weft — 11 lbs. (5 kg).





**3. CLOTH, TWILL, NYLON/COTTON (QUARPEL TREATED), 5 OZ./SQ. YD.**

This material has been proven in use for a number of years and has now replaced a 100% nylon material in such items as parkas, windpants and cold weather flying clothing (see Pages CC-6 & SP-2). This fabric does not generate noise as did the 100% nylon fabric. The danger of burns inflicted by molten polymer experienced in nylon fabric is not present. A further advantage is its capability to accept "Quarapel" treatment which provides a high standard of water repellency. Electro-static build-up in cold, dry areas is also lessened by the use of this material.

*Details:* Yarns: warp — filament nylon, weft — cotton twill. Tensile strength: warp — 220 lbs. (100 kg), weft — 90 lbs. (41 kg.).



**4. NEOPRENE COATED NYLON, 4.75 OZ./SQ. YD.**

One of the main advantages of this new waterproof fabric lies in the high abrasion resistance of the neoprene coating which is necessary in view of the rugged nature of field useage to which it is normally subjected.

*Details:* Tensile strength: warp — 130 lbs. (59 kg) weft 110 lbs. (50 kg). Tearing strength: warp — 2 lbs. (.9 kg), weft 1.5 lbs. (.68 kg). Hydro-static resistance: 125 psi. Resistance to blocking: Excellent. Resistance to cold, 0°F (— 17.8°C): No cracking or flaking.

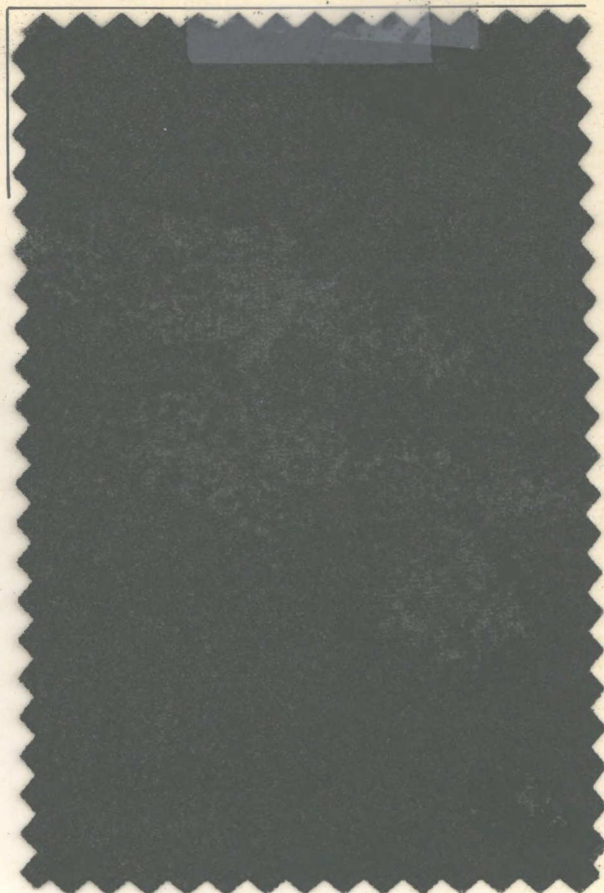


#### 5. POLYURETHANE FOAM LAMINATED TO NYLON TRICOT

This particular piece of material is that version which is charcoal impregnated and is used as the protective layer in the CW overgarment (see page SP-8).

In the case of the cold weather face mask (page CC-6) the same material less the charcoal is used in order to achieve optimum fitting, as the stretch qualities of this fabric have been utilized to advantage in providing fitting to the contours of the face. The polyurethane foam component, which is in contact with the face, provides a more comfortable item during extreme cold weather wear.

**Details:** Nylon tricot: Knitted from 40 denier nylon filament, 36 wales and 42 courses, 2 oz./sq. yd. Polyurethane foam:  $\frac{3}{32}$ " (2.38 cm) thick, 2 oz./sq. yd. Laminate: Flame (heat fusion) bonded to nylon tricot.



#### 6. BONDED POLYESTER BATTING, LAMINATED NYLON TWILL

Wool pile, which in the past provided the insulation liners of most Canadian cold weather garments such as parkas, etc. is considered to be too heavy, too expensive and is no longer available in the quantities required. To overcome these deficiencies, product improvement development covering several types of textiles has taken place. This has included matted pile fabrics and bonded polyester battings and the latter showed sufficient promise to warrant troop trial evaluation. This batting, weighing 7.5 oz./sq. yd., provides the required insulation value with a significant reduction in weight and cost.

When used as a liner in the general service combat jacket (page CC-4) the batting is laminated on both sides to a 2.3 oz./sq. yd. nylon twill. When used as the insulation in the lightweight parka (page CC-7) the batting is laminated to the same nylon twill on one side only.

**Details:** 6 denier 2" (5 cm) resin-bonded polyester staple fibre. Batting weight: 5 to 5½ oz./sq. yd. Laminated weight: nylon twill on one side — 7½ oz./sq. yd.; nylon twill on both sides — 9½ oz./sq. yd.



## 7. VELCRO\*

Velcro\* is a woven tape fastener consisting of two mating tapes. The hook, or male section, is covered with very small stiff hooks. The loop, or female section, is covered with equally small soft loops. When placed together the hooks and loops engage, creating a highly versatile and secure closure, yet capable of easy adjustment. To open, it is simply peeled apart. Velcro\* closures have been opened and closed up to 32,000 times and still have demonstrated no likelihood of failure. Normal widths of the tapes are  $\frac{5}{8}$ " (1.6 cm),  $\frac{3}{4}$ " (1.9 cm), 1" (2.54 cm) and 2" (5 cm).

The tapes can be constructed from a variety of materials, with nylon being the most commonly used for clothing and equipment. They are also available in polyester, Nomex (high temperature resistant nylon), stainless steel, Nomex/stainless steel and Beta glass/teflon.

Velcro\* is a registered trade mark of Canadian Velcro Limited.

## TO DISENGAGE

Place one finger here →

Grasp upper piece here →  
— peel away from lower



## 8. BONDED POLYESTER BATTING, 7.5 TO 8 OZ./SQ. YD.

This resin-bonded batting is used as the insulant in the temperate sleeping bag (page TS-8). The method of manufacture provides a batting which has an excellent standard of resiliency and, as a result, the insulation value provided is superior to unbonded garnetted battings of textile fibres. The latter normally required quilting to hold the batting in position and to keep the fibres from migrating. This quilting operation itself results, to some extent, in a reduction of insulating value at points where the quilting stitch causes compression of the batting.

The batting is used in one or more layers according to the insulation requirements.

**Details:** 16 denier 2" (5 cm) resin bonded polyester staple fibre. Thickness: approximately 1.25" (38 mm). Weight: 7½ to 8 oz./sq. yd. Width: Can be processed and provided in widths of 86" (218 cm).



Reproduction of this book, in whole or in part, is prohibited without prior written approval from the International Defence Programs Branch of the Department of Industry, Trade and Commerce. March 1970.

INDUSTRY CANADA/INDUSTRIE CANADA



69732



