Canadian NBC Protective Equipment

Canada

Canadian NBC Protective Equipment

International Trade
Department of External Affairs

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Introduction

Canadian equipment to counter the threat of nuclear, biological and chemical (NBC) warfare is recognized for its excellent quality and innovative design. For over 40 years, Canada's defence industry has been at the forefront of technology producing NBC protective equipment that is effective, dependable and easy to use.

From head to toe, the soldier is completely protected against chemical warfare attack in clothing and equipment developed and manufactured in Canada to the most stringent specifications. For added protection, the soldier carries Canadian chemical agent detectors which detect and identify a wide range of hazardous chemicals. If required, there are specially designed combat spectacles that fit comfortably under a gas mask without impairing the mask's effectiveness.

The soldier is also equipped to operate in a nuclear environment and has available a variety of Canadian-made instruments for detecting, measuring and monitoring radiation dose rates.

This catalogue, prepared by Canada's Department of External Affairs in collaboration with the Department of National Defence, provides a representative listing of Canadian companies that design, develop and manufacture NBC protective equipment.

Many of the items shown in this catalogue were developed by scientists at Defence Research Establishment Ottawa (DREO) working closely with Canadian industry. The research programs at DREO utilize and develop new materials and technologies that are used to protect the soldier against nuclear and chemical warfare. Innovative ideas and concepts that accrue from these research programs are further advanced through development contracts with Canadian industry to produce protective equipment. In this way the best possible NBC protective equipment is supplied to the Canadian Forces. This type of R&D activity provides a firm foundation on which Canadian industry can build its expertise in NBC protective products and results in continual improvement in the products they sell. By working closely with Canadian industry DREO is able to establish centres of expertise which can not only conduct the required research on the next generation of protective equipment that will be fielded by the Canadian Forces but also swiftly incorporate the more important advances in current equipment and better meet the needs of the operator today.

For additional information, readers are invited to contact the manufacturers of products reviewed in this guide or to get in touch with:

Defence Programs and Advanced Technology Bureau
Department of External Affairs
L.B. Pearson Building
125 Sussex Drive
Ottawa, Ontario
Canada K1A 0G2

The nearest Canadian Trade Office is also pleased to provide additional details you may require.

Other publications available are the *Canadian Defence Products Guide*, the *Canadian Security Products Guide* and the *Canadian Cold Weather Clothing and Equipment Guide*.

Canadian Commercial Corporation (CCC) is a Crown corporation owned by the Government of Canada. The corporation was established in 1946 by Act of Parliament "to assist in the development of trade between Canada and other nations."

CCC's principal role is to act as the contracting agency when foreign governments and international agencies wish to purchase goods or services from Canada on a government-to-government basis. Contracting for the corporation is carried out by the Department of Supply and Services, the central procurement agency of the Government of Canada. The customer is assured that the Canadian supplier is considered by the Government of Canada to be financially and technically capable of conforming with bid specifications, contract terms, and supplier warranties.

The availability of CCC's services does not prevent foreign governments or international agencies from contracting directly with Canadian manufacturers if they so desire. However, the corporation can provide foreign buyers with the same level of purchasing services as enjoyed by the Government of Canada when it purchases for its own account. Using the services of the government's own purchasing experts, CCC can identify competent sources and assure customers that prices and terms from Canadian suppliers are equitable. In addition, the financial aspects of transactions are simplified; approved customers receive open-account privileges and CCC assumes responsibility for paying suppliers' invoices and performing contract audits where required.

Arrangements can also be made to have Quality Assurance and acceptance of defence goods carried out in Canada on behalf of the customer government by the Canadian Department of National Defence.

Enquiries concerning CCC should be addressed to the Canadian Embassy, High Commission or Consulate in your country, or directed to:

Canadian Commercial Corporation
Metropolitan Centre, 11th Floor
50 O'Connor Street
Ottawa, Ontario
Canada K1A 0S6
Tel: (613) 996-0034
Telex: 053-4359
Fax: (613) 995-2121

The Acton Rubber Ltd.

P.O. Box 300
881 Landry Street
Acton Vale, Quebec
Canada J0H 1A0
Tel: (514) 546-2776
Fax: (514) 546-2779
Telex: 055-60364

One of the most prominent Canadian manufacturers of military rubber footwear, gloves and overboots, Acton is internationally recognized for its excellent quality NBC protective products. The company's comprehensive product line includes military combat overshoes, extreme cold-weather mukluk boots and flyer boots, environmental flying boots, CW (chemical warfare) butyl gloves for ground and air crews, and CW combat overboots designed for protection, safety and comfort.

Gloves – general purpose
An integral part of the individual CW protective clothing system are Acton's gloves which are available in a choice of styles. The gloves consist of a duo-stretch knitted cotton lining coated with butyl rubber and chloroprene (Neoprene) for maximum protection and durability. The soft butyl rubber gives a minimum of 24 hours of protection against persistent CW agents and the thin Neoprene coating adds resistance to petroleum, oil and lubricants. The finger and palm of curved configuration offer excellent manipulative dexterity and finger tactility.

The gloves have a gauntlet-type cuff that is worn under the sleeve of the CW protective coverall. Olive green in colour, these Acton gloves are available in small, medium, large and extra-large sizes.

Lightweight CW gloves offer exceptional tactility.

Gloves – lightweight for specialist duties
Lightweight extra thin, unsupported (no cotton lining) gloves are manufactured by Acton for personnel who require exceptional tactility for the performance of their tasks. Made of butyl rubber and coated with Neoprene, these gloves are equally as resistant to persistent CW agent penetration as the lined CW gloves.

Overboots
Acton's CW overboot is a slip-on-design with four elastic loop closures. The 28-cm-high upper is made from Neoprene and butyl rubber coated duo-stretch cotton fabric. The outersole and upper reinforcing components are shaped from Neoprene which imparts resistance to petroleum, oil and lubricants. An inner liner, insole cover and back strip ensure that the overboot is quick and easy to put on and take off.

The CW overboots from Acton are worn over the combat boots and together with the CW protective coverall and gloves provide more than 24 hours of protection against persistent CW agents. Acton offers its CW overboots in sizes 4 to 14 (approximately 35 to 49 in European sizes).

Lined CW butyl gloves are designed for protection, comfort and durability.

Easy to put on and take off, CW overboots are rugged and dependable.

Anachemia Canada Inc.

P.O. Box 147
Lachine, Quebec
Canada H8S 4A7
Tel: (514) 489-5711
Fax: (514) 363-5281
Telex: 055-66129

Anachemia is a well-known Canadian supplier of chemical warfare detection equipment and protective clothing systems.

Chemical agent water testing kit M272

The chemical agent water testing kit M272 is designed by Anachemia to test for Lewisite, nerve, cyanide and mustard chemical agents which may be present in water. It requires a minimum of training.

The kit consists of:

- a heat-resistant, plastic test container with rubber stopper and connector;
- chemical agent detector tubes banded with blue or red;
- chemical agent test reagents;
- nerve agent test tickets;
- training simulants to demonstrate tests and results to trainees;
- a thermometer;
- waterproof matches and a striking strip;
- a tube holder that fits in the case lid, a clip, extra rubber connectors;
- a plastic-coated instruction sheet.

The nerve agent test requires:

1. wetting the white patch on the ticket using the water sample;
2. clipping it for the time specified;
3. pressing it against the opposite white patch on the ticket. If the patch turns blue no nerve agents are present.

The tests for Lewisite, mustard and cyanide are carried out by:

1. filling the test container with the water sample;
2. adding the indicated reagent;
3. breaking the ends of either the blue-banded or red-banded glass tubes and inserting the tubes into the rubber connector;
4. heating the test container base. This will produce a colour change in the glass tubes which can then be compared with the sample colour chart on the instruction card to determine which agents, if any, are present.

Chemical agent water testing kit M272.

Chemical agent liquid detectors – 3-Way, M-8, M-9

The chemical agent liquid detector papers were designed to provide a simple, rapid method of detecting and differentiating between the three major groups of liquid chemical warfare agents. The detector papers can quickly determine the presence of G, V or H agents in liquid form.

Paper chemical agent liquid detector following exposure to liquid chemical agent spray – 3-Way liquid adhesive backed.

Chemical agent liquid detector – 3-Way testing paper.

The detectors include:

- dye-impregnated paper sensitive to liquid chemical agents;
- booklets with adhesive-backed sheets (3-Way);
- booklets of sheets without adhesive (M-8);
- dispenser rolls with adhesive backing (M-9);
- colour comparison charts and instructions.

The test consists of:

1. detaching a piece of the detector paper from a booklet or dispenser roll;
2. touching the paper to the surface suspected of contamination or exposing the paper on a surface of possible contamination in the future.

On contact with a chemical agent, the paper changes colour. The 3-Way and M-8 papers turn three different colours to identify the presence of G, V or H agents. M-9 paper develops a single colour that indicates the presence of any of the above agents.

Custom configurations are readily available on request.

Chemical agent liquid detector M9.

Chemical agent nerve vapour detector

The chemical agent nerve vapour detector from Anachemia is a simple inexpensive, expendable device designed for the individual soldier to detect nerve gas vapours.

The detector can be used to quickly determine:

- if a chemical attack detected by a "gas alarm" system is dangerous in the immediate vicinity of the individual;
- when it is safe for the individual to unmask.

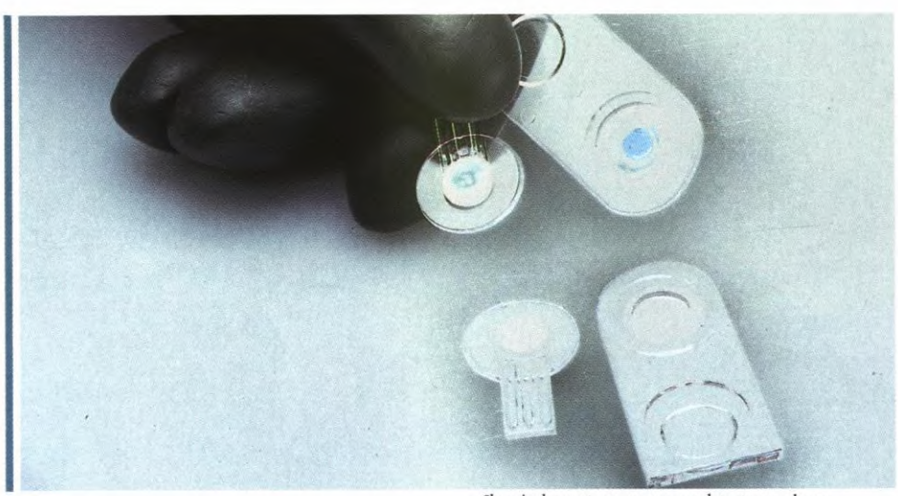
The detector consists of:

- a plastic detector body containing an enzyme-impregnated test paper;
- a plastic holder containing a chemically impregnated test paper;
- an instruction sheet.

The test is carried out by:

1. moistening the test paper in the detector body and exposing it to the atmosphere;
2. pressing the detector body into the holder so that the papers are in contact. The test paper will turn blue or green in the absence of nerve agent vapour. If such vapour is present or the test has been incorrectly performed, the test paper colour will remain unchanged.

Chemical agent nerve vapour detector. Gloved hand holds detector showing negative results; other detector shows positive results indicating presence of nerve agent vapour.



Chemical agent nerve vapour detector package.

Chemical agent detector kit C-2
The Anachemia chemical agent detector kit C-2, designed for issue to a small unit, is easily operated by one person with a minimum of training.

The kit may be used to:
- determine the presence or absence of chemical agents;
- identify chemical agents;
- collect vapour samples of unknown chemical agents for laboratory identification;
- identify when it is safe to unmask for either short (1/2 hour) or long (12 hour) periods;
- test for the presence of chemical agents after decontamination procedures.

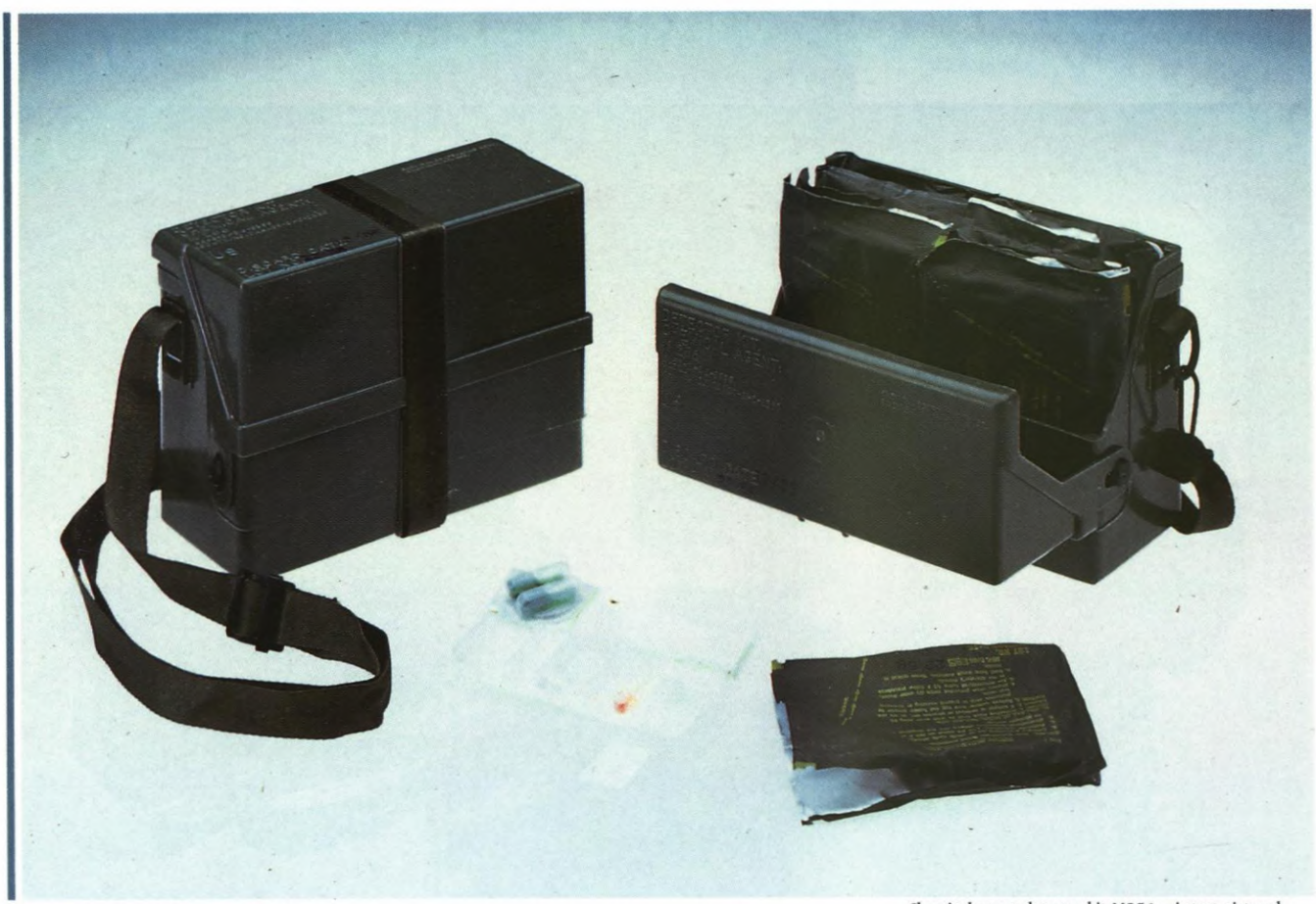
The kit consists of:
- vinyl-coated carrying case designed to withstand severe environmental conditions;
- chemical agent liquid detectors;
- chemical agent vapour detectors;
- white band detector tubes;
- plain detector tubes;
- three bottles of chemical reagents;
- air sampling pump;
- other miscellaneous items.

Chemical agent detector kit C-2 open on the left, displaying contents; and closed on the right showing carrying strap. Note the air sampling pump in the foreground.

Chemical agent detector kit M256
The M256 is a compact, simple-to-use kit designed to detect blister, nerve and blood agents.

The kit consists of:
- a plastic case with Velcro™ closure;
- a booklet of M-8 test paper sealed in a plastic bag;
- 12 pouches containing the chemical agent detector samplers;
- instruction cards.

The test is performed by following the simple instructions printed on the sampler packet. The test requires:
1. activating the sampler by breaking the integral crushable ampoules and releasing the test reagents;
2. exposing the activated test disc to ambient air;
3. comparing the observed colour change with the colour chart in the instructions to determine the presence or absence of chemical agents.



Chemical agent detector kit M256, air test pictured open and closed.

CW protective coverall.

Protective coverall, general service

The one-piece style coverall with attached hood provides maximum resistance to chemical agent entry under all conditions of movement of the wearer. The garment is made from an activated charcoal impregnated foam material that allows the passage of air but prevents penetration by chemical agents. Intended to be worn with or without uniform/clothing underneath, the CW protective coverall has the following features:

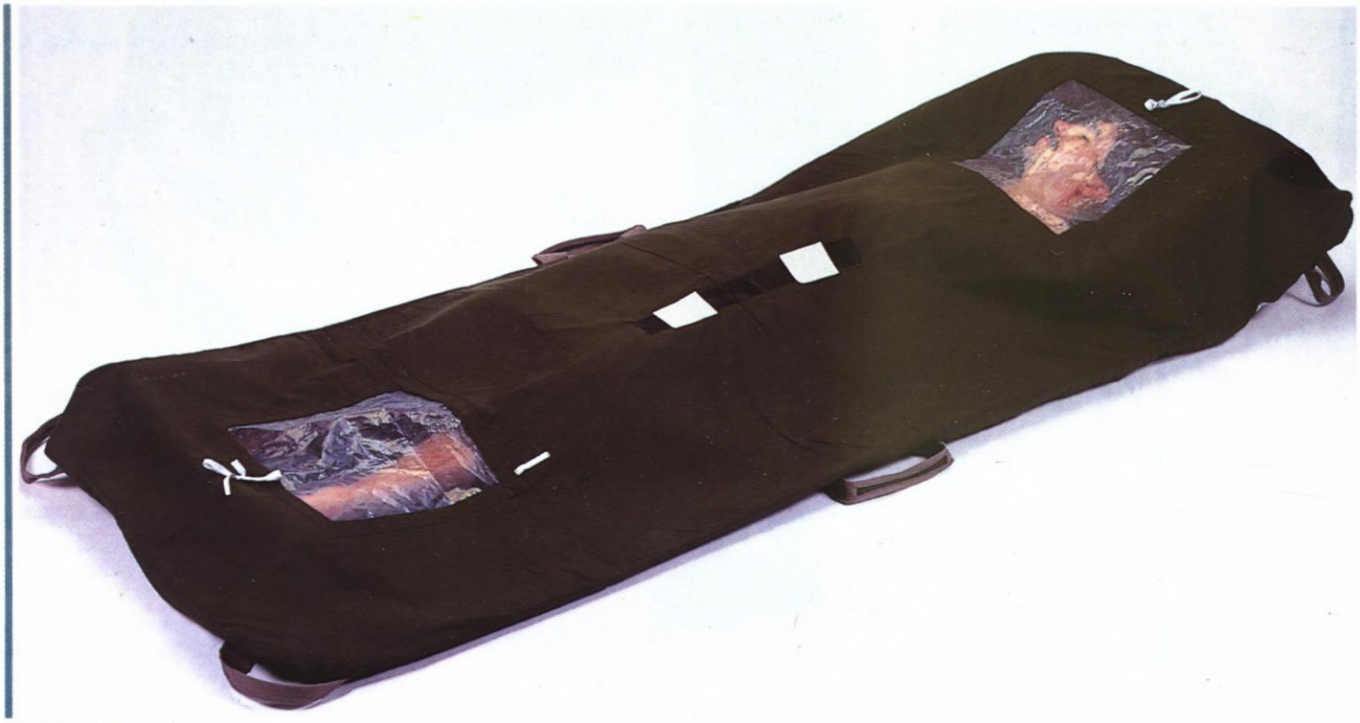
- unique one-piece design;
- inner shell of open-cell polyurethane impregnated with activated charcoal laminated to a knitted nylon lining;
- outer shell of lightweight nylon/cotton combat cloth;
- material treated with fluorochemical oil and water-resistant finish;
- slide fastener and Velcro™ front closure; complete adjustment with Velcro™ closures at wrist and ankles;
- elastic webbing stirrups on each pant leg for overlap of pant leg and overboot;
- built-in suspender adjustment for height variations within each size;
- adequate pockets;
- hood designed to fit closely around protective mask.

Anachemia supplies custom tailored modifications to the CW coverall on request.

Protective casualty bag

The protective casualty bag protects the person whose facial or head injuries prevent the wearing of a CW mask or whose clothing is no longer intact. The protective casualty bag has:

- outer shell of lightweight nylon/cotton combat cloth;
- material treated with fluorochemical oil and water-repellant finish;
- inner shell of open-cell polyurethane foam and activated charcoal laminated to a knitted nylon lining;
- zippered closure on one side and half-way across each end so that the casualty may be placed in the bag quickly with the minimum of discomfort;
- laminated plastic windows for patient monitoring;
- metal frame to keep bag away from face;
- webbing carrying handles.



CW protective casualty bag.

Astra Pyrotechnics Canada Limited

Kenilworth, Ontario
Canada N0G 2E0
Tel: (519) 323-1800
Fax: (519) 323-2381

Astra manufactures a wide range of pyrotechnic products developed specifically to meet the needs of today's technologically advanced armed forces. The company is also a major sub-contractor to other ordnance and defence engineering companies and provides components for weapons and ammunition systems.

Training of military personnel in realistic situations is critical to the development of fighting skills. Astra recognizes the need for cost-effective training devices that minimize the use of expensive conventional ammunition. Astra's experience in the manufacture and supply of pyrotechnics to the Canadian and United States governments has enhanced its capability to meet international product requirements.

At its explosive filling facilities, among the most modern in North America, Astra manufactures pyrotechnics ranging from sophisticated phosphorous-based marine markers for the navy to the more standard simulators and signalling devices for the army. Continuous investment in the development of new products and new production techniques ensures Astra's position at the forefront of modern pyrotechnics technology.

Sophisticated pyrotechnics used in training.

Aro Canada Inc.

51 Worcester Road
Rexdale, Ontario
Canada M5W 4K2
Tel: (416) 675-5611
Fax: (416) 675-6920
Telex: 06-989193

Aro, a well-known Canadian company, manufactures, assembles, tests, repairs and overhauls aeronautical life support equipment. Aro produces CW ventilator systems for aircrews and more recently for vehicles such as the Leopard tank.

Portable ventilator system designed for aircrew chemical defence.

Aircrew Chemical Defence Ventilator System (ACDVS)
The ACDVS from Aro consists of a blower/filter, C2 canister, air/oxygen respirator, boxed battery, and accessory hoses, clamps and connectors.

Aro blower/filter (P/N 100C1183)
This user-mounted blower/filter gives post-ejection protection and is much lighter at 308 g (without battery) than conventional models. The unit provides blown filtered air/oxygen flow to the respiratory assembly in accordance with NATO standards. Air from the blower creates positive pressure in the hood and mask part of the respirator assembly that demists and cools the head as well as eases breathing. Designed to operate continuously for a minimum of 1 000 hours, the blower is an inexpensive throw-away item. Suitable for all types of aircraft, the blower consists of a motorized centrifugal impeller that draws in ambient air, purified through the C2 canister filter before supplying it to the user via flexible hoses.

Lightweight blower/filter provides blown filtered air/oxygen flow to respirator assembly in accordance with NATO Standard.

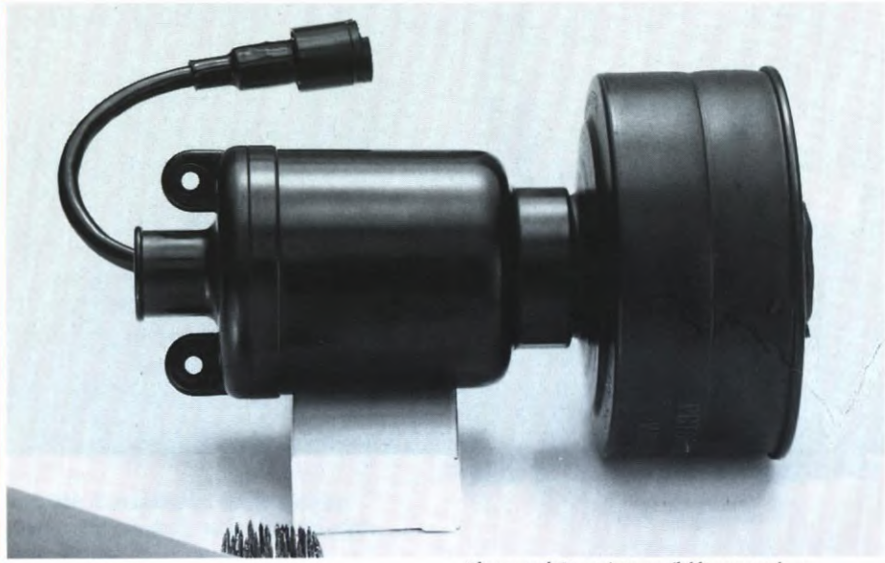
Aro C2 canister (P/N 100C1222)
The C2 canister utilizes a pleated paper particulate filter and a bed of activated charcoal to protect against chemical and biological tone agents and radioactive dust particles. The C2 design incorporates standard NATO thread and has a low breathing resistance.

Aro aircrew respirator (P/N 100D1194)
The Aro blower/filter serves the AR 5 respirator assembly (manufactured by Negretti Aviation) and is in service use with the Canadian air force under Aro P/N 100D1194. The Negretti air/oxygen model AR 5 aircrew respirator offers full physiological protection against nuclear fallout and biological and chemical agents in liquid, gas or vapour form, either entering the respiratory tract or contacting the eyes and skin above the shoulders, both in the air and on the ground.

Aro battery box (P/N 100C1187)
The battery box contains a lithium-sulphur type battery and is part of the ventilator system. It is available with an over-the-shoulder webbing carrying strap.

Aro battery (P/N 100B1223)
This non-rechargeable lithium-sulphur battery operates within −40°C to +40°C range. A lid assembly (P/N 100C1190) features an on/off switch and incorporates an electronic safety circuitry that automatically shuts down the battery before any cell breakdown can occur.

A rechargeable "NICAD" battery and charger are available.



Blower and C2 canister available separately or assembled.

Aro hoses
Aro hoses are manufactured of butyl rubber. The convoluted hoses are exceptionally flexible and are offered in various lengths and diameters. Connectors/quick disconnect fittings, both male and female types, are available.

Ventilated Respirator System (VRS)
The VRS is a vehicle-mounted system designed to provide clean filtered air under pressure to individual NBC respirators, preventing ingress of lethal gases or other toxic material in a nuclear, biological and chemical contaminated environment. The pressurized air flow eases breathing through a canister filter and cools the user's face.

The VRS is designed for installation in the Leopard tank but it can easily be adapted to any vehicle.

Battery box for lithium-sulphur type battery.

Bendix Avelex Inc.

P.O. Box 2140
Montreal, Quebec
Canada H4M 2L5
Tel: (514) 744-2811
Fax: (514) 342-3795
Telex: 05-826688

Bendix Avelex, a unit of Allied-Signal Aerospace, is a major domestic and international defence contractor, supplying and supporting critical electronic and electromechanical systems. The company manufactures night vision equipment, gun alignment and control systems, simulators, vehicle navigation systems and aircraft fuel controls. Bendix Avelex is approved to NATO AQAP 1 and its modern facilities meet all required military management, environmental, process and test standards.

Bendix Avelex is an approved Canadian support agency for the Chemical Agent Monitor (CAM) manufactured by Graseby Ionics Ltd. of Britain. The Support Services Division of Bendix Avelex can provide all life cycle support functions for CAM, including technical support, field maintenance and training, modifications, repair, spare parts provisioning, configuration control and reliability monitoring services.

Chemical Agent Monitor (CAM).

Canadian Centre for Advanced Instrumentation

15 Innovation Boulevard
Saskatoon, Saskatchewan
Canada S7N 2X8
Tel: (306) 933-7066
Fax: (306) 933-7446
Telex: 074-2484

The MINITUBE™ Air Sampling System.

The Canadian Centre for Advanced Instrumentation, a subsidiary of the Saskatchewan Research Council, specializes in custom-designed measurement and control instrumentation. The centre contributes to all phases of product development from design, testing and prototyping to manufacturing and servicing.

The MINITUBE™ Air Sampling System is a preprogrammed automated system designed by the centre to trap, collect and analyze airborne contaminants in the form of gases, vapours and aerosols.

Applications of the MINITUBE™ Air Sampling System include:

- sampling/analysis of ambient air inside military collective protection systems to evaluate integrity against ingress of chemical warfare agents;
- air sampling/analysis in support of outdoor field trials to determine the downwind hazard from explosively disseminated or sprayed chemical warfare agents;
- air sampling/collection/analysis to detect and confirm the suspected use of toxic agents in battlefield environments.

The MINITUBE™ Air Sampling System consists of a field-based microprocessor-controlled sampler and a specially modified gas chromatograph to perform sample analysis. Up to 10 field samplers can be operated from a single controller. Sampling can be initiated remotely by radio transmitter or locally, with a hand-held initiator.

Fell-Fab Products

P.O. Box 3303, Station C
Hamilton, Ontario
Canada L8H 7L6
Tel: (416) 560-9230
Fax: (416) 560-9846
Telex: 061-8673

Expendable decontamination mitt for applying bentonite clay individually packed in sealed pouch.

A leading Canadian manufacturer of textile products for the aviation, aerospace, defence, environmental control and transportation industries, Fell-Fab is recognized for its development of innovative proprietary products and outstanding quality control. The company operates to the quality assurance requirements of NATO AQAP1 and AQAP4, FAA, DOT and most international airlines and is cleared to NATO Secret.

The decontamination mitt manufactured by Fell-Fab is designed to quickly absorb liquid chemical or biological agents from the skin or other surfaces. Decontaminating powder contained in a pouch of the mitt passes through its outer layer when patted onto the contaminated surface. The loosely fitted mitt can conveniently be worn over other protective gloves on either the right or left hand.

Canadian Arsenals Limited

5, montée des Arsenaux
Le Gardeur (Québec)
Canada J5Z 2P4
Tel: (514) 581-3080
Fax: (514) 585-7302
Telex: 05-24642 ACLDR VDLG

In addition to armaments and related equipment, Canadian Arsenals produces protective masks noted for their high standards of safety, quality and reliability.

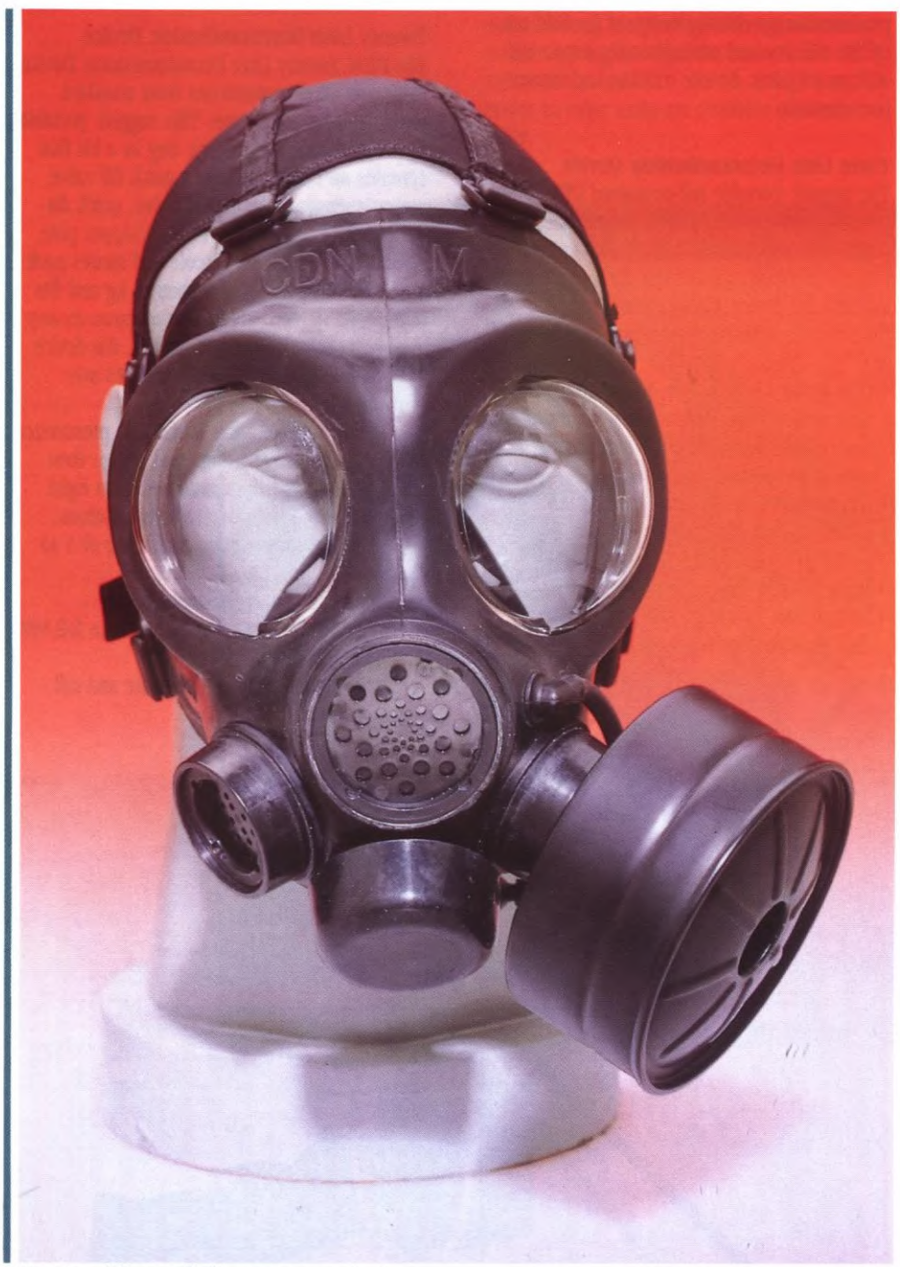
CML Bio C-4 Mask
Innovative in design, the NBC C-4 mask from Canadian Arsenals offers optimum protection for the wearer's respiratory tract, face and eyes against chemical and biological agents, radioactive dust and camouflage smoke. In addition to excellent protection, the NBC C-4 provides comfort and flexibility under the most diverse and rigorous field conditions. This lightweight mask is easy to put on, is simple to decontaminate and service in the field, and is compatible with optical and telecommunications equipment.

Each step in the evolution of the NBC C-4 has been thoroughly tested and evaluated. As a result, the mask meets all the operational characteristics established as firm requirements by NATO. The C-4 mask accepts any canister with NATO standard threads such as the C2 canister adopted by the Canadian Armed Forces.

Maximum protection
The bromobutyl rubber facepiece of the NBC C-4 with its reflex face seal and agent-resistant engineering thermoplastics gives maximum protection against field concentrations of all known NBC agents and screening smoke particulates and as well offers resistance to thermal radiation. Bromobutyl rubber has excellent resilience at normal and low temperatures and enhances the mask's resistance to ozone cracking.

The C4 mask fits snugly under hood of CW protective clothing.

Optimum vision
The shatterproof polycarbonate lenses with anti-scratch coating of the NBC C-4 mask are uniquely shaped and positioned to allow the wearer optimum forward and side vision. The lenses are compatible with combat spectacles and optical equipment and provide distortion-free vision across their entire surfaces. The design of the nosecup valve system ensures air circulation to prevent lens fogging.



The C4 mask has a soft silicone nosecup and unique harness design.

Clear communication
The primary speech transmitter of the NBC C-4 mask is designed to ensure maximum intelligibility. The side transmitter is compatible with telecommunications equipment. Both transmitters use a one-ply kapton diaphragm.

Unique comfort and flexibility
The NBC C-4 mask features a unique harness design and soft silicone nosecup for fast donning and comfortable wear. The drinking device, compatible with NATO systems, is available in four sizes ranging from extra small to large. The canister may be worn optionally on the right or left hand side. The entire mask is streamlined for easy decontamination.

DEW Engineering and Development Limited

3429 Hawthorne Road
Ottawa, Ontario
Canada K1G 4G2
Tel: (613) 523-8150
Fax: (613) 523-3228
Telex: 053-3167

A defence contractor for both manufacturing and engineering services ranging from product design, development and prototyping to evaluation and technical support, DEW operates under the NATO AQAP4 Inspection Standards for Industry.

DEW is widely recognized for its expertise in decontamination systems. The company offers design, testing and manufacturing services for the full range of C1 (DS2) and C8 decontamination related equipment and training services. All products are specifically designed for field use by the military and are logistically supported with spare parts, on-site training and instruction manuals.

Three Litre Decontamination Device
The rugged, portable self-contained DEW Three Litre Decontamination Device disseminates C1 (DS2) decontaminant in a controlled spray to remove chemical agents from the surface of military equipment. Easily cleaned and purged, the device is reusable. Other important features are:

- tank holds 3 L of usable decontaminant and once pressurized, disseminates a nozzle-controllable stream in a fan spray pattern directable between 1 to 3 m;
- fast and easy to fill, charge and operate even in full environmental and NBC protective clothing;
- integral hand pump and quick filler valve for external air sources such as vehicle air compressors ensure easy pressurization;
- pressure relief valve, vehicle mounting bracket and pump handle, which functions as carrying handle, enhance safety and convenience;
- excellent corrosion resistance to C1; adaptable to other decontaminating chemicals;
- effective in extreme temperatures from −45°C to +50°C;
- attached operating instruction plate;
- no special tools are required for disassembly and an optional spare part kit is available.

Three Litre Decontamination Device for C1 chemicals.

Twenty Litre Decontamination Device
The DEW Twenty Litre Decontamination Device dispenses C8 decontaminant from standard plastic or steel jerry cans. This rugged, portable device is supplied in a fabric bag as a kit that contains an integral pump, a quick fill valve, pressure gauge, safety relief valve, quick disconnect hose, wand extension, scrapper pole, scrubbing brushes, basic tools and spares package. The entire kit weighs about 8 kg and fits into an 18 × 18 × 60 cm storage area on any vehicle. Easily cleaned and purged, the device is reusable. Some of its main features are:

- usable capacity of 18.5 L;
- fully charged, tank can initially be pressurized within one minute using hand pump; then disperses the decontaminant over an eight minute period with two repressurizations;
- controllable spray within a distance of 1 to 3 m;
- excellent corrosion resistance to C8;
- easy to fill, pressurize and operate in full NBC protective clothing;
- handy operating instruction plate and full documentation.

Twenty Litre Decontamination Device kit.

R-Metrics Ltd.

295 Alliance Road, Unit 10
Milton, Ontario
Canada L9T 4W8
Tel: (416) 875-2030
Fax: (416) 878-1076

R-Metrics is a wholly owned subsidiary of Kodiak Quality Control, a major Canadian supplier of non-destructive testing equipment. R-Metrics manufactures radiation detection and measurement equipment and provides repair and calibration services for all makes of such products.

The R-Metrics Radiacmeter RD-5016/PD is a hand-portable instrument for the measurement of low- and medium-range gamma radiation of mixed energy spectra from 80 keV to 3 MeV. The instrument uses two Geiger-Mueller counters and is powered by two 9 V batteries. Radiation readings are displayed on logarithmic scales covering two decades each: 0-100 mr/h in low range and 0.1 – 10 r/h in high range. Scales in other units are available on special order.

The Radiacmeter RD-5016/PD is 23 cm long, 12 cm wide, 12 cm high and weighs 1.6 kg with batteries. It operates from –40°C to +52°C and is immersion proof and floats. The rugged housing of the Radiacmeter RD-5016/PD is made of die-cast aluminum. The instrument handle is conveniently located to allow one-hand operation of the range control/on-off switch. Operating instructions are printed in both English and French on the identification plate.

The Radiacmeter RD-5016/PD.

Racal Filter Technologies, Ltd.

1175 California Avenue
P.O. Box 665
Brockville, Ontario
Canada K6V 5V8
Tel: (613) 345-0111
Fax: (613) 345-2639
Telex: 0636-700-851

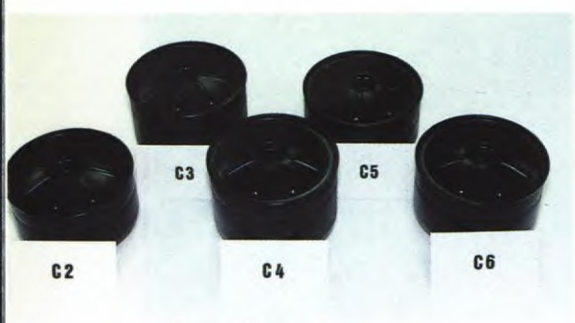
Racal Filter Technologies, Ltd., is dedicated exclusively to the development and manufacture of standard and custom-designed canisters for military, police and industrial applications. The company specializes in the production of NBC canisters that meet or exceed NATO quality requirements.

The NBC canisters

The well-known Racal C2 family of NBC canisters consists of a variety of models designed for use with facemasks for individual protection or with blower units for collective protection in vehicles, aircraft or ships. The C2, C3, C4, C5 and C6 canisters use a Racal-developed paper particulate filter and a bed of activated charcoal to protect personnel against chemicals, biological toxic agents and radioactive dust particles. The C2, C4 and C6 designs incorporate the NATO standard thread but vary in canister weight and size of charcoal bed. Of these three models, the C4 provides the longest protection. The C3 is designed for collective protection in a marine environment. The C5 model is intended for use with older face masks that do not incorporate the NATO standard thread.

All Racal NBC canisters offer the following features:

- high CT and protection factor values;
- excellent resistance to microbiological, particulate and liquid aerosol penetration;
- optimum resistance to fouling under camouflage smoke or dusty combat conditions;
- built-in ruggedness and resistance to rough handling;
- low carbon dust emission;
- low resistance to air flow (in facemask canisters this advantage minimizes stress on respiratory functions of wearer).



Full range of NBC canisters.

Canister specifications					
Canister type:	C2	C3	C4	C5	C6
Height (mm)	77	92	96	72	84
Width (mm)	109	109	109	109	109
Weight (g)	265	350	350	265	299
Charcoal (cm^3)	170	295	295	170	220
Charcoal type	ASC or TEDA	TEDA	TEDA	ASC or TEDA	ASC or TEDA
Thread type	NATO	2.335 in.	NATO	2.335 in.	NATO
Thread size (mm)	40 x 3.63	x 8TPI	40 x 3.63	x 8TPI	40 x 3.63
Finish	Anodized black or custom colour				

Facemask with C2 canister.

Sheldon M. Kasman Limited

8 Milner Avenue
Scarborough, Ontario
Canada M1S 3P8
Tel: (416) 292-7717
Fax: (416) 292-9588
Telex: 065-26231

Decontamination mitt for the application of natural bentonite clay.

Canada's leading manufacturer of military dress, badges and regalia, Sheldon M. Kasman produces decontamination mitts for NBC conditions.

Decontamination mitt
The Kasman decontamination mitt is designed to serve as a ready means of individual decontamination and is used for the fast, efficient removal of liquid agents from skin or other surfaces. A pouch-type mitt, it encloses the whole hand and wrist, has a thumb opening on each side and is large enough to be worn over protective gloves.

The mitt is made of a carefully controlled open-weave material with Velcro™ fastener at the wrist. Pockets on both faces of the mitt contain a decontaminating powder of natural clay similar to Fuller's Earth. In use the powder is dusted onto the contaminated surface through the material of the mitt.

The Kasman mitt is expendable and is packaged in a sealed barrier bag made of laminated material.

Spectrum Engineering Corporation Limited

544 McDonnel Street
P.O. Box 687
Peterborough, Ontario
Canada K9J 6Z8
Tel: (705) 743-7520
Fax: (705) 743-9878

With the locket in place, the reader provides accurate dose readouts on its LCD display.

A specialist in the design of instrumentation, robotics and nuclear systems, Spectrum manufactures the Individual Dosimetry System (IDS) to precisely determine the neutron and gamma dose to which individual armed forces personnel have been exposed. The IDS measures radiation exposure states quickly, efficiently and accurately. Designed for field conditions, the compact system is rugged and easily portable.

The Individual Dosimetry System
IDS consists of a lightweight dosimeter locket that records gamma and neutron doses and a hand-held precision reader that displays the gamma, neutron and total (gamma + neutron) doses.

Dosimeter locket
The locket is designed to be worn on individual ID tag chains. Housed in the moulded plastic case of the locket is a printed circuit board that contains the radiation sensing components.

The neutron dose is recorded by a PIN diode neutron dosimeter. The forward voltage drop across the diode at constant current is proportional to the absorbed neutron dose.

The gamma dose is recorded by a balanced pair of MOSFETs. The gate of one is biased while the other is unbiased. The characteristics of the biased and unbiased gates are affected differently by gamma radiation. Differential output of the dual MOSFET provides a measure of the gamma dose.

Neutron and gamma dose measurements are retained by the lockets after reading to permit multiple readings as well as the determination of the cumulative dose after subsequent exposure.

Dosimeter reader
The locket is inserted into the reader which automatically expresses total dose in cGy (1 cGy is equal to 1 Rad) on its LCD display. Gamma dose and neutron dose can each be read by pressing the pushbutton. MOSFET bias voltage and reader battery voltage can also be displayed. Low voltages are signalled by flashing of the corresponding legends on the display. The reader is powered by two replaceable standard 9 V batteries which generate more than 50 000 readouts.

Scintrex Limited

222 Snidercroft Road
Concord, Ontario
Canada L4K 1B5
Tel: (416) 669-2280
Fax: (416) 669-5132
Telex: 06-964570

Scintrex is a diversified high-technology company engaged in the development and manufacture of geophysical and geochemical exploration instrumentation, medical diagnostic instruments and sensing devices for use in the defence and security fields.

Radiation monitor and automatic alarm system AN/GDQ-3

The Scintrex AN/GDQ-3 system continuously detects and measures the gamma radiation rate from fallout produced by nuclear explosions and automatically initiates alarms based on these measurements. The equipment is installed at fixed or semi-fixed locations and provides in-place radiation monitoring from remote detectors distributed over a large area.

The Scintrex system consists of 10 remote detectors, an interconnecting box and an operating console containing an interface module, a control module and a desk. Auxiliary equipment to be used with the AN/GDQ-3 system (a United States Army configuration) includes a field telephone, an alarm unit and a teletype.

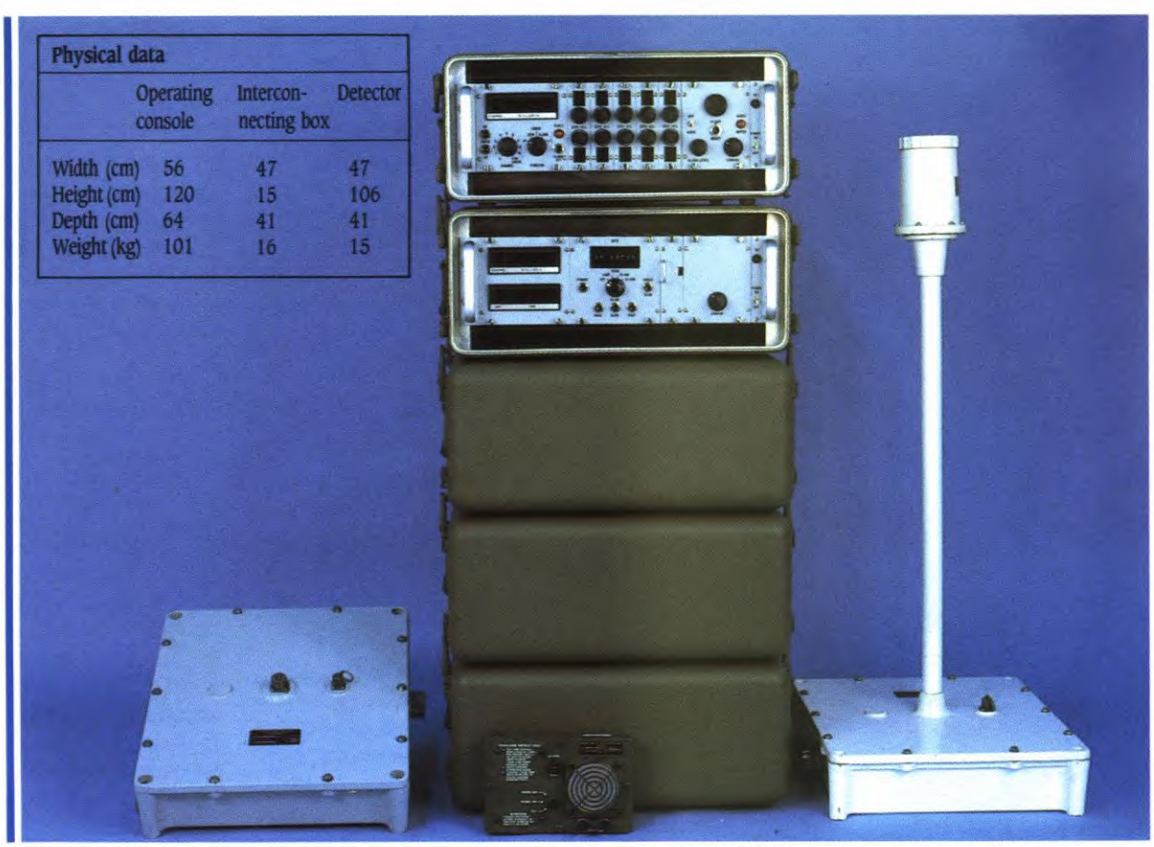
Technical data

The equipment is built in accordance with MIL-R-49358(ER) and is protected against deleterious action caused by vibration, shock, sand and dust, salt, fog, fungus, nuclear survivability and EMI.

- Power source: 110/220 V AC, 50/60 Hz, 300 W or 24 V DC (battery) 5 A, with automatic switchover to DC power in case of AC power failure when both power sources are available
- Range: 0.1 to 5 000 rad/h with automatic range switching
- Accuracy: +/– 10% of reading +/– significant digit
- Response time: 10 s to reach 90% of final value
- Alarm level: adjustable from 0 to 99 rad/h
- Teletypewriter output signal: ASCII or Baudot encoded 20 mA current loop or RS-232 standard Xtal-controlled, switch-selectable baud rates
- System area coverage: 31 km^2 (approximate)
- Cabling length: maximum distance from detector to control group is 3.05 km
- Temperature: sensor –45° to +52°C; control group: –18° to +52°C
- Storage temperature range: –62° to 71°C
- Humidity: 0 to 94% relative humidity
- Altitude: operational up to 3 048 m above sea level

Physical data

	Operating console	Interconnecting box	Detector
Width (cm)	56	47	47
Height (cm)	120	15	106
Depth (cm)	64	41	41
Weight (kg)	101	16	15



Radiation monitor and automatic alarm system AN/GDQ-3.

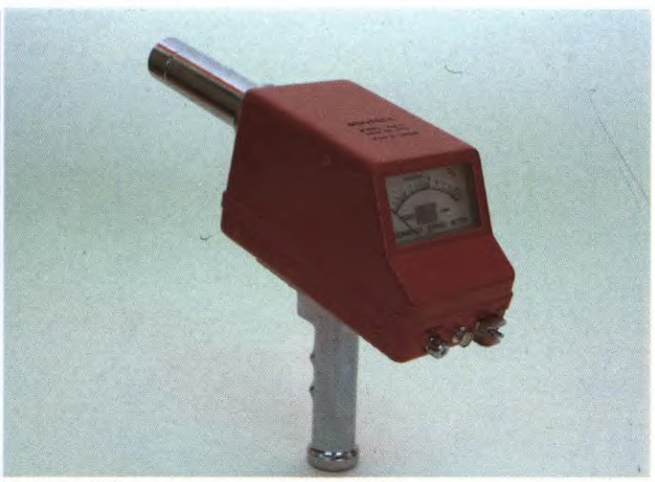
Gamma survey meter Model 189
The hand-portable Scintrex Model 189 gamma survey meter is designed for the measurement of exposure rates from X and gamma ray radiation. The instrument is available in a choice of models as follows:

The gamma survey meter consists of an all metal two-part housing. All external push-buttons and single on/off switch are to military standards (MIL-202). A connector (MIL-C-5015) permits mating of the sensor probe to the main instrument housing. This probe can either be coupled directly, or via a 1.45 m extension tube, to the main body. A shock-mounted chassis within the housing supports all necessary electronics. Off-shelf replacement circuit boards and probes can be plugged in directly without the need for recalibration. Dead-time compensation and dose-rate overexposure protection are featured in the electronic design.

Model 189C also incorporates a resettable dose integrator that provides dose accumulation on a digital display. All models are equipped with carrying strap and case.

Technical data
- Power source: four C-cells (1.5 V each)
- Sensor type: Geiger tube, energy compensated
- Operational temperature range: −35° to +60°C
- Operational humidity: up to 100% relative humidity

Gamma survey meter (general configuration Model 189A and Model 189B).



Emergency high range gamma survey meter and dose integrator, Model 189C.

Physical data			
	Model 189A	Model 189B	Model 189C
Weight (kg) (with batteries)	1.95	1.95	1.97
Width (cm)	10.8	10.8	10.8
Height (cm)	26.5	26.5	26.5
Depth (cm)	36.4	36.4	36.4

Model	Range
Medium range Model 189A	1 mrem/h to 50 rem/h
High range Model 189B	10 to 10 000 rem/h
Emergency high range Model 189C (gamma survey meter and dose integrator)	0.2 to 200 rem/min

Thomson & Nielsen Electronics Ltd.

4019 Carling Avenue
Kanata, Ontario
Canada K2K 2A3
Tel: (613) 592-3019
Fax: (613) 592-2877
Telex: 053-4741

Thomson & Nielsen Electronics is internationally recognized for its application of semiconductor technology to new methods of radiation detection. The company's personal dosimetry and alarm system is among the most advanced on the market.

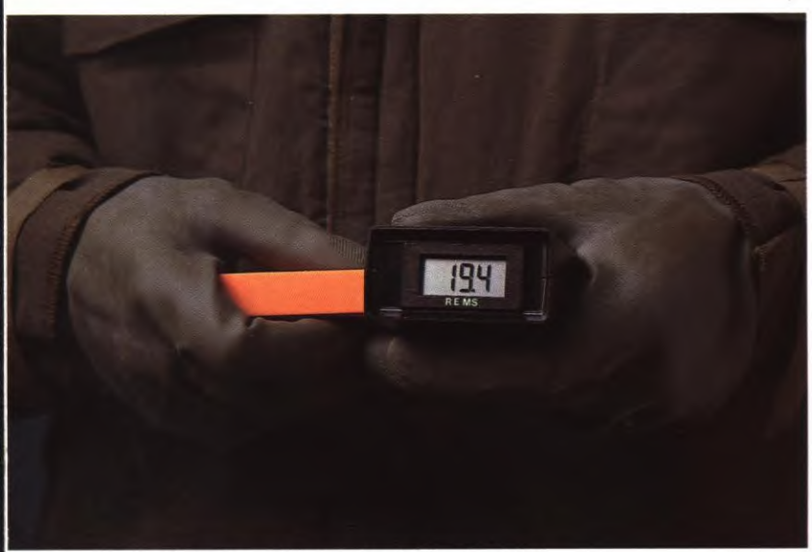
Personal dosimetry system

Thomson & Nielsen designed its versatile dosimetry system to record both the instantaneous and residual gamma radiation received by an individual in combat or nuclear emergency situations. An electronic dosimeter device in the system that permanently stores the total dose the individual received operates independently of orientation and can be read directly. Available in a choice of two models, the Pocket Dosimeter/Reader and the Badge, this device meets or exceeds the radiological requirements of NATO.

The Pocket Dosimeter/Reader functions as a dosimeter and displays total dose readings at all times. It has optional alarm settings to alert the wearer to dangerous radiation levels.

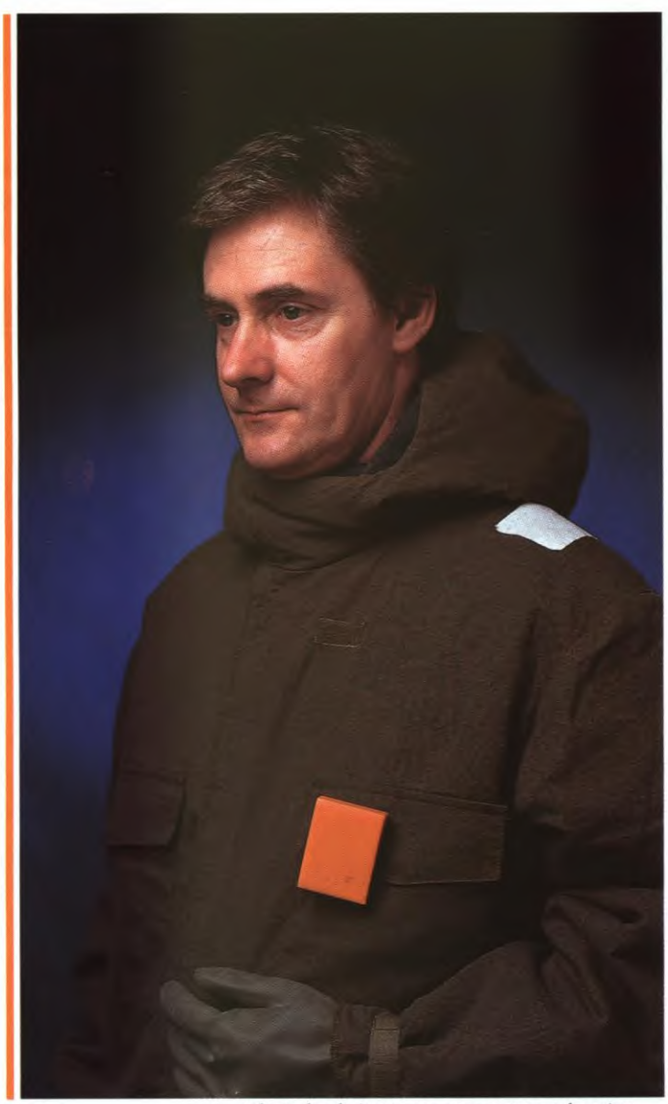
The Badge measures the gamma radiation dose and optionally the neutron dose level without providing a readout. To determine the wearer's exposure, the Badge is inserted into the side of the Reader of the Pocket Dosimeter/Reader which then temporarily displays the Badge reading. Both Badge and Reader may be rezeroed if desired.

Thomson & Nielsen produces its personal dosimetry system in a choice of colours and a variety of models, including neck badge, wrist badge and systems with simulated readings and alarms for field exercises.



The Reader reads its own dose level or that of the Badge.

Specifications		
	Badge	Pocket Dosimeter
Weight (g)	50	200 (with 9 V battery)
Size (cm)	6.5 x 5 x 1.5	11 x 6.5 x 3
Total dose range	1 to 2000 rems (1 to 200 rems shown)	
Calibration accuracy	+/– 10%	
Rate independence	10E10 R/s	
Energy response	+/– 20% from 80 keV to 3 MeV	
Neutron response	independence to 20 MeV	



The Badge dosimeter measures gamma and, optionally, neutron doses.

NATO Stock Numbers

Coverall, CW Protective, General Service
NSN 8415-21-860-7985

Coverall, Aircrew, CW Protective
NSN 8415-21-888-7219

Liner, Coverall, Aircrew, CW Protective
NSN 8415-21-888-7213

Gloves, Chemical Protective, Aircrew
NSN 8415-21-893-5210

Overshoes, Chemical Protective
NSN 8430-21-893-2798

Gloves, Chemical Warfare Protective, CF, GA
NSN 8415-21-870-4103

Mask, Chml Bio, C3
NSN 4240-21-882-8010 (Natural Rubber)
and 4240-21-896-5848 (Bromobutyl Rubber)

Canister, Chemical-Biological Mask. C2, Cylindrical Shape, 4.368 In. Dia, 3.000 In. Lg, Black, Direct to Facepiece Attachment Method, W/Particulate Filter; NATO STD THD Canister Mount; ASC Impregnated, Activated Charcoal and Fines Filters
NSN 4240-21-871-7842

Canister, Chemical-Biological. C3, Special Purpose, Cylindrical Shape, 4.368 In. Dia, Black, 2.335 In. Dia Attachment Screw THD
NSN 4240-21-894-3710

Canister, Chemical-Biological Mask. Cylindrical Shape, 4.368 In. Dia, 3.000 In. Lg, Black, Direct to Facepiece Attachment Method; W/Particulate Filter; NATO STD THD Canister Mount; Contains TEDA Charcoal and Fines Filters
NSN 4240-21-900-4744

Canister, Chemical-Biological Mask. C5, Cyl Shape, 4.200 In. Dia, 2.800 In. Lg, Black Colour; Direct to Facepiece Attachment Method; W/Particulate Filter; Contains TEDA/ASC Charcoal and Fines Filters
NSN 4240-21-902-3767

Mitt, Decontaminating, Chemical Warfare Agent
NSN 4230-21-845-6696

Paper, Chemical Agent Detector, Three-Way
NSN 6665-21-858-8494

Detector, Chemical Agent, Nerve Vapour
NSN 6665-21-846-4563

Detector Kit, Chemical Agent (C2)
NSN 6665-21-870-6740

Protective Kit, Chemical-Biological
NSN 4240-21-878-3497

Simulator, Ground Burst, Chemical GBCS Type C8
NSN 1365-21-875-4488

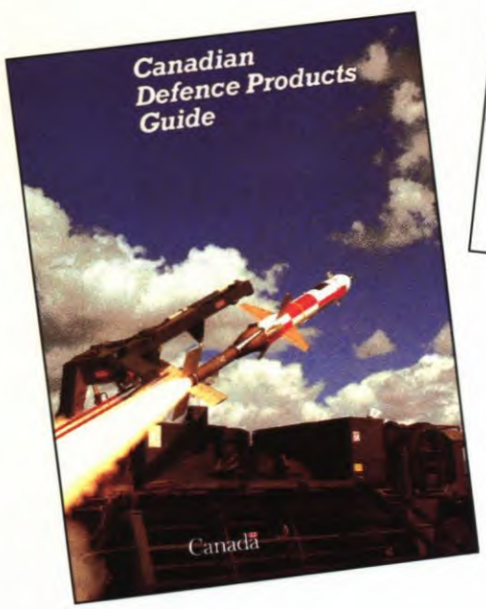
Dispenser, Chemical, Airburst ABCS Type SC 310
NSN 1365-21-885-5284

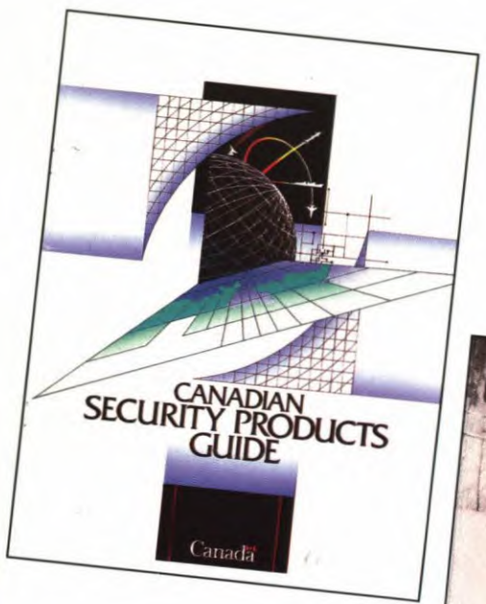
80025 75540

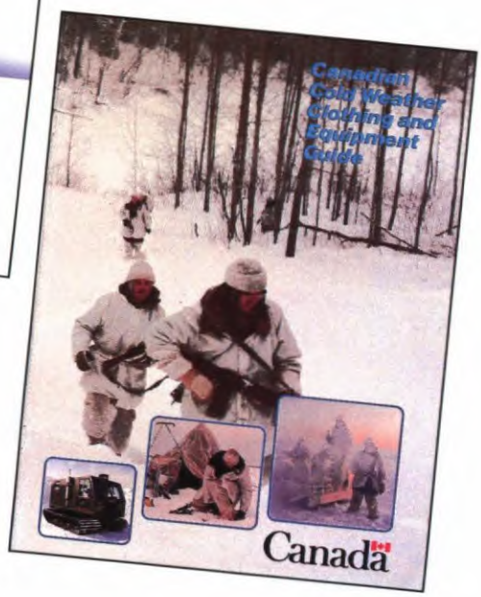
Defence Publications Available

The following publications are available from your nearest Canadian Trade Office:

- *Canadian Defence Products Guide*
- *Canadian Security Products Guide*
- *Canadian Cold Weather Clothing and Equipment Guide*







For further information please contact:

Defence Programs and Advanced
Technology Bureau
Department of External Affairs
L.B. Pearson Building
125 Sussex Drive
Ottawa, Ontario
Canada K1A 0G2

or the Trade Office at the Canadian
Embassy, High Commission or Consulate
nearest you.

External Affairs Canada
Affaires extérieures Canada