

Chapter 11

INDIVIDUAL PROTECTIVE EQUIPMENT

This chapter is divided into four sections: (1) individual protection, (2) individual decontamination, (3) detection and alarms, and (4) patient protective equipment. For further information on items in this chapter, see the current technical manual for each piece of equipment as applicable.

Individual Protection

Standard “A” individual protective equipment (IPE) is issued to each soldier depending on their military occupational specialty. IPE consists of the following items:

- M40A1 Chemical Biological Field Protective Mask
- M42A2 Chemical Biological Combat Vehicle Protective Mask
- M45 Air Crew/Land Warrior Chem-Bio Mask System
- MCU-2A/P Protective Mask
- M50 Field Protective Joint Service General Purpose Mask (JSGPM)
- M51 Combat Vehicle JSGPM
- M53 Chemical-Biological Protective Mask
- Joint Service Lightweight Integrated Suit Technology (JSLIST)
- Chemical/Biological/Radiological/Nuclear Lightweight Overboots Alternative Footwear Solution (AFS)
- JSLIST Block 2 Glove Upgrade (JB2GU)

M40A1, M42A2, and M45 Masks

The M40A1, M42A2, and M45 masks (serial numbers TM 3-4240-346-10 and TM 3-4240-348-10) share many of the same design characteristics, capabilities, and features, but each was designed

for specific mission requirements such as aircraft or combat vehicle operation. These masks provide users with respiratory, eye, and face protection against chemical and biological agents and radioactive fallout particles. If a mask is properly fitted and worn correctly, it provides a gas-tight face seal, which prevents contaminated air from reaching the wearer's respiratory, ocular, and dermal systems.

These masks were not designed for use in toxic industrial chemical (TIC) environments and are known to be ineffective against some of these chemicals, such as ammonia and carbon monoxide. With these agents, the masks should be considered an escape device only, and personnel exposed to unidentified TICs should leave the contaminated area as rapidly as possible. The masks are also not suitable for confined spaces where oxygen is insufficient to support life.

Each mask is constructed of silicone rubber with an in-turned sealing surface so that it can form a comfortable seal on the wearer's face, providing an external "second skin" for additional protection. A key design feature is the use of a standard C2A1 NATO threaded filter canister. The canister is externally mounted and may be mounted on the left or right side of the face piece, depending on user preference. The C2A1 canister must be disposed of in accordance with state and local environmental laws.

A binocular eye lens system is used for improved vision, and clear and tinted outserts provide eye protection against laser and low speed fragmentation. Optical inserts may be used if the user requires corrective lenses. An elastic head harness secures the mask to the user's face. Other common features include front and side voicemitters to allow for face-to-face and phone communications. Each of the masks is furnished with drinking tubes to allow for hydration.

MCU-2A/P Protective Mask

The MCU-2A/P mask (Air Force Technical Order 14P4-15-1) is designed to protect the face, eyes, and respiratory tract from tactical concentrations of chemical and biological agents, toxins, and radioactive fallout particles. The mask has a unimolded silicone rubber face piece, and a single flexible lens bonded onto the face piece. The large lens gives the user a wide field of

vision. The mask has two voicemitters, one on the front of the mask for speaking directly into a telephone or radio handset and one at the side to allow communication with nearby personnel. The mask has a single filter. A nose cup with two inlet valves fits over the nose and mouth. It directs incoming air across the inside of the lens to reduce fogging. The mask has a drinking tube that connects to a canteen with an M1 cap. The mask is not authorized for use during TIC spills and is not effective against chemicals such as ammonia, chlorine, or carbon monoxide fumes. The mask is not effective in confined spaces where oxygen levels are insufficient to sustain life.

M50 and M51 Joint Service General Purpose Masks

The JSGPM (TM 3-4240-542-13&P) is the first joint service protective mask designed to replace the M40/M42 series of masks for the US Army and Marine Corps ground and combat vehicle operations, and the MCU-2/P series of masks for the Air Force and Navy shore-based and shipboard applications. The two models of this mask support major operational modes: the M50 for field use and the M51 for use in combat vehicles.

The M50 and M51 face-piece assemblies are built on a butyl/silicone rubber face blank with an inverted peripheral face seal and an integrated chin cup. The face-piece assembly forms a comfortable seal on the wearer's face and protects the face, eyes, and respiratory tract from chemical and biological agents, designated TICs, and radiological particulates. The face-piece assembly incorporates a flexible, single, polyurethane eye lens that provides an overall field of vision greater than 80%. A front module assembly provides a direct speech capability and integrates the exhalation disk valve, drinking system components, and communications interface. Filtration is provided by two filter mount assemblies (left and right) that integrate the air inlet disk valves and self-sealing disk valves, and a nose cup that controls the flow of air throughout the mask and keeps the wearer's breath from fogging the eye lens.

Both masks use twin M61 filters, positioned on either side of the face piece to provide protection against nuclear, biological, and chemical threats. The filters are attached to the filter mount using a twist-and-lock mechanism. The M51 uses the combat

vehicle hose assembly to connect the mask to the vehicle collective protection system. Additionally, a protective hood is provided for JSLIST type VII users to protect the head and neck from exposure to agents, because these suits lack a hood.

M53 Chemical-Biological Protective Mask

The M53 mask (TM 3-4240-541-12&P) is specially designed to meet US Special Operations requirements; it is not a standard mask issued to other service members. The M53 face-piece assembly is built on a butyl/silicone rubber face blank with an inverted peripheral face seal and an integrated chin cup. The face-piece assembly forms a comfortable seal on the wearer's face and protects the face, eyes, and respiratory tract from chemical and biological agents, certain TICs, and radiological particulates. The face-piece assembly includes the following elements:

- a single, flexible, polyurethane eye lens;
- a variable-resistance exhalation unit that allows for operations in various modes (negative pressure, powered air purifying respirator, self-contained breathing apparatus, and closed circuit breathing apparatus);
- drinking system components;
- a communications interface; and
- single-filter mount assemblies with a 40-mm NATO thread that integrate the inlet disk valve and air deflector.

The mask uses a single general purpose filter, positioned on the side of the face, to provide protection against nuclear, biological, and chemical threats and certain TICs. A particulate filter is also available as an additional authorization list item. A protective hood is provided for JSLIST type VII users.

Joint Service Lightweight Integrated Suit Technology

The JSLIST (TM 10-8415-220-10) consists of a two-piece garment system that provides protection from radiological, biological, toxin, and chemical contaminants. The system provides multiple improvements over legacy protective garments, including

reduced thermal burden, reduced weight, and increased wear time. The garment is assembled with a rip-stop outer shell of 50% nylon and 50% cotton poplin, and an interior liner of filter fabric that uses carbon sphere beads to reduce chemical and biological contamination. The garment is manufactured in two distinct designs: type II and type VII. Type II has a hood and is used for most applications; type VII has a stand-up collar and is used by Special Operations personnel. The JSLIST is currently available in desert, woodland, and universal camouflage.

JSLIST suits consist of a coat and trousers. Each component is separately packaged in a factory-sealed vacuum bag containing the ensemble item and a resealable bag. Once the garment has been removed from the vacuum-sealed packaging, it provides 45 days of wear time and 120 days of service life. Within the maximum wear time, the JSLIST provides up to 24 hours of protection against chemical and biological agents in solid, liquid, or vapor form. The garment will also protect against alpha and beta radioactive particles. To properly maintain and store the JSLIST when not in use, the garment should be placed in the resealable bag furnished with each component of the ensemble.

The JSLIST ensemble must be worn in all environments under threat of an imminent nuclear, biological, or chemical attack, or after chemical operations have been initiated. The garment can be laundered up to six times by field methods. However, once the garment has been contaminated, the soldier must replace it as soon as mission permits by using mission-oriented protective posture (MOPP) gear exchange procedures.

The JSLIST adds weight to the soldier's workload. In addition, the garment reduces heat exchange with the environment and may add, depending on the level of exertion, 10° to 15°F to the wearer's ambient temperature and heat burden. When wearing the JSLIST at MOPP 1 or MOPP 2 and complete encapsulation is not required, certain modifications to the uniform are authorized:

- Trouser leg Velcro (Velcro Industries, Manchester, NH) closures may be opened.
- Waist tabs may be loosened.
- Jacket may be unzipped.
- Sleeve Velcro closures may be opened.

This overall loosening of the JSLIST will allow heat to escape because walking and other movements induce a bellows action of the suit against underlying clothing and skin.

Alternative Footwear Solution

The AFS, issued with the JSLIST, is a chemical-biological protective overboot worn over normal combat footwear. The AFS provides 24 hours of protection in a chemically or biologically contaminated environment. The overboots can be worn for up to 376 hours of wear time over 45 days in an uncontaminated environment. The overboots have an antislip ridge tread pattern for improved traction, an antistatic surface, fully sealed and vulcanized seams, and three sets of buttons with a butyl rubber securing strap for each set. The adjustable securing strap is symmetrical and can be released from either side of the overboot. If the overboots are contaminated with petroleum, oil, or lubricants, they should be wiped off within 2 minutes and air dried. If contaminants remain on the overboots for more than 2 minutes, their protection may be degraded. In such instances, the overboots must be replaced as soon as possible.

Joint Service Lightweight Integrated Suit Technology Block 2 Glove Upgrade

The JB2GU provides 24 hours of protection from battlefield concentrations of all known chemical and biological agents for up to 30 days of wear. The glove provides enhanced tactility, dexterity, durability, and comfort over legacy systems and can be worn in all climates. These qualities satisfy a broader spectrum of ground, shipboard, and aviation requirements. The JB2GU comes in two variants: flame-resistant (FR) and non-flame-resistant (nFR). The FR variant combines a leather and Nomex (DuPont, Wilmington, DE) outer glove with an inner chemical protective liner, for use by aviators and combat vehicle crews. The nFR variant is a molded glove made from compounded butyl rubber and comes with a removable protective liner for sweat management. The nFR glove is primarily for ground forces.

Individual Decontamination

The preceding section provided an overview of the primary IPE items, which, when used correctly, will prevent contact with agent in typical battlefield concentrations. The problem of decontamination arises when soldiers become exposed to liquid agent despite the availability of protective masks and clothing. This section addresses two decontamination kits currently in the inventory: the Joint Service Personnel/Skin Decontamination System, also known as Reactive Skin Decontamination Lotion (RSDL), and the M295 Individual Equipment Decontamination Kit. The kits are fairly simple in design and function, and instructions for their use are easily committed to memory. Because of the potency of liquid nerve agents and the rapidly occurring tissue damage caused by vesicants, every soldier must be able to conduct an effective decontamination of all exposed skin without referring to the instructions printed on the kits.

Joint Service Personnel/Skin Decontamination System (Reactive Skin Decontamination Lotion)

The Joint Service Personnel/Skin Decontamination System, or RSDL (NSN 6505-01-507-5074 TM 3-6505-001-10), which is approved by the US Food and Drug Administration, is an individually carried skin decontamination kit. RSDL provides soldiers the ability to decontaminate the skin after exposure to chemical or biological warfare agents, in support of immediate and thorough personnel decontamination operations. The kit consists of decontaminants and applicators required to immediately reduce morbidity and mortality resulting from chemical (and some types of biological) warfare agent contamination. The applicators are preimpregnated with RSDL, a potassium solution dissolved in a special solvent and water that facilitates the reaction of decontamination between the potassium salt and the chemical agent. The lotion decontaminates the warfare agents HD, soman (GD), and VX as well as T-2 mycotoxins on skin to a level that eliminates toxic effects better than the previous M291 kit. It should be used on unbroken skin

only. Each packet will decontaminate an area of 1,300 cm². The system can be used in temperatures ranging from -25°F (-32°C) to 130°F (54°C). In addition to skin, it can be used to decontaminate individual equipment and weapons.

M295 Individual Equipment Decontamination Kit

The M295 (NSN 4230-01-357-8456; TM 3-4230-235-10) is a handheld kit used to apply decontaminant to an individual's personal equipment. Each kit consists of a carrying pouch that contains four sealed packets (enough to do two complete individual equipment decontamination operations). The packet is designed to fit comfortably within a pocket of the JSLIST overgarment trousers. Each individual M295 contains one mitt comprised of 22 g of decontaminating powder contained within a pad material and a polyethylene film backing. In use, powder from the mitt is allowed to flow freely through the pad material. Decontamination is accomplished through sorption of contamination by both the pad and the decontaminating powder. The M295 is issued in boxes of 20. The kits should be stored at the squad level in a box capable of being decontaminated.

Detection and Alarms

This section describes the equipment issued for detection and identification of chemical agent liquid and vapor in the environment. For both the individual soldier and the unit, these items (listed below) are the primary means of detecting the presence and identifying type of chemicals on the battlefield, and determining when a safe condition exists:

- M9 Chemical Agent Detector Paper
- M8 Chemical Agent Detector Paper
- M256A1 Chemical Agent Detector Kit
- Improved Chemical Agent Monitor (ICAM)
- M4A1 Joint Chemical Agent Detector (JCAD)
- M272 Chemical Agent Water Testing Kit
- M22 Automatic Chemical Agent Detection Alarm (ACADA)

M9 Chemical Agent Detector Paper

M9 detector paper (NSN 6665010498982; TM 3-6665-311-10) is placed on personnel and equipment to detect and identify the presence of liquid nerve or blister agents in exposures as small as 100 μ in diameter. The paper contains an indicator chemical dye that turns pink, red, reddish brown, or red purple when exposed to liquid agents. It is capable of detecting chemical agents but cannot identify specific agents. M9 paper is manufactured in 30 ft \times 2 in. adhesive-backed rolls of matte cream-colored paper. The rolls are packaged with a reusable plastic storage bag in a vacuum-sealed vapor-barrier package. The paper's dye is a potential carcinogen, so chemical protective gloves should be worn when handling it. Placement of M9 paper is dictated by the user's dominant hand: if the user is right-handed, the paper should be placed around the right upper arm, left wrist, and right ankle. Left-handed users should place the paper around the left upper arm, right wrist, and left ankle. If a color change occurs, proper masking, decontamination, and MOPP procedures must be followed.

Many substances are known to cause false positive responses on M9 paper, including antifreeze, liquid insecticide, and petroleum products (but this does not relieve service members from the obligation to mask and take other appropriate measures). Attention to possible substances that might affect the paper on the battlefield can help in the later interpretation of a color change in the absence of confirmation tests for agents.

M8 Chemical Agent Detector Paper

M8 paper (NSN 6665000508529) is used to detect the presence of liquid V-type nerve, G-type nerve, and H-type blister agents. M8 paper is issued in staple-bound booklets containing 25 tan-colored sheets of chemically treated, dye-impregnated paper. Each page is perforated for easy removal. If M8 paper is exposed to chemical agents, its color will convert from tan to an agent-specific color, depending on the agent. The reverse side of the front cover contains a bar chart for color comparison agent recognition. The following agents will cause the dye to change to one of three colors:

- G (nonpersistent nerve agent): yellow
- H (blister agent): red
- V (persistent nerve agent): olive green or black

If the M8 paper reacts, or a liquid is suspected of being a chemical agent, service members must follow proper masking, decontamination, and MOPP procedures. To prepare M8 paper to conduct agent identification, tear one half sheet from the booklet, and affix it to a stick or other object. Using the stick as a handle, blot the paper onto the unknown liquid, and wait 30 seconds. Once this time has elapsed, compare the tested M8 paper to the color comparison bar chart inside the booklet's front cover.

The following are common causes of false positive indicators: antifreeze, liquid insecticide, and petroleum products. Attention to such substances on the battlefield can help in the later interpretation of a color change on the M8 paper.

M256A1 Chemical Agent Detector Kit

The M256A1 kit (NSN 6665011334964; TM 3666530710), designed to detect and identify chemical agents in liquid or vapor form, consists of the following:

- a booklet of M8 paper (described above) to detect agents in liquid form, and
- twelve foil-wrapped detector tickets containing eel enzymes as reagents to detect very low concentrations of chemical vapors.

Instructions for the use of the detector tickets appear on the outside of each of the foil packets and in a separate instruction booklet in the kit. Table 11-1 shows the agents detected by the M256A1 kit.

By following the directions on the foil packets or in the instruction booklet, service members can conduct a complete test with the liquid-sensitive M8 paper and the vapor-sensitive detector ticket in approximately 20 minutes. During the test, the sampler must be kept out of direct sunlight, which speeds

Table 11-1. Agents Detected by the M256A1 Chemical Agent Detector Kit

Agent	Symbol	Class
Hydrogen cyanide	AC	blood (cyanide)
Cyanogen chloride	CK	blood (cyanide)
Mustard	H	blister
Nitrogen mustard	HN	blister
Distilled mustard	HD	blister
Phosgene oxime	CX	blister
Lewisite	L	blister
Nerve agents	V and G series	nerve

evaporation of the reagents. Waving the detector sampler in the air also accelerates evaporation, so the sampler should be held stationary during all parts of the test.

Improved Chemical Agent Monitor

The ICAM (NSN 6665-01-357-8502; TM 36665343-10; Figure 11-1), which is used to detect nerve and blister agents as vapors only, uses a 10-mCi nickel 63 β -particle radiation source to ionize airborne agent molecules that have been drawn into the unit by a pump. The resulting ion clusters vary in mass and charge and thus also travel at different rates in an applied electrical field. Comparing the mobility of the different ionic species to electronically stored standards allows an on-board microcomputer to determine the type of agent and its relative concentration. A liquid crystal display presents these data as a series of concentration-dependent bars in a G mode for G agents and VX, and in an H mode for blister agents.

The ICAM detects agent vapor in the volume of air drawn by the pump into the sampling chamber. Therefore the inlet port must not come into contact with a suspected area of evaporating agent on a surface, but must be placed within a few inches of the suspected contamination site. Because of the variation in agent concentration from one spot to another, depending upon wind

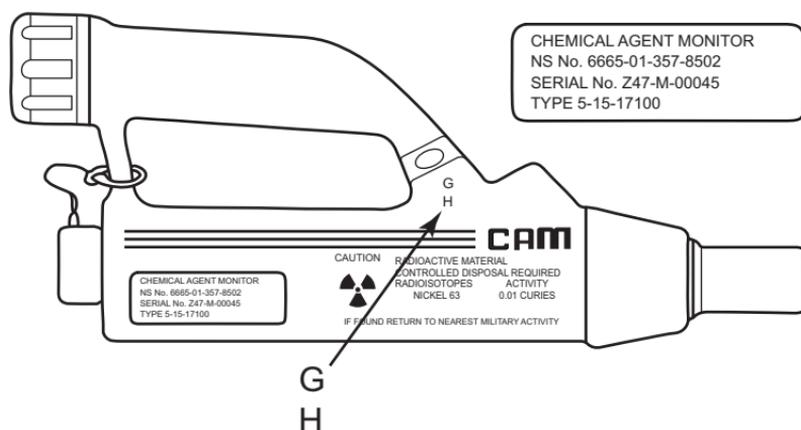


Figure 11-1. Improved Chemical Agent Monitor (ICAM). Used to detect nerve and blister agents as vapors only, the ICAM uses a 10-mCi nickel 63 β -particle radiation source to ionize airborne agent molecules that have been drawn into the unit by a pump. The resulting ion clusters vary in mass and charge and thus also travel at different rates in an applied electrical field. Comparison of the mobility of the different ionic species to electronically stored standards allows an on-board microcomputer to determine the type of agent and its relative concentration. A liquid crystal display presents these data as a series of concentration-dependent bars in a G mode for G agents and VX, and in an H mode for blister agents.

velocity and other environmental factors, numerical displays of agent concentration in typical units would be impractical and unreliable. Accordingly, the display warns of a low vapor hazard (1 to 3 bars visible), a high vapor hazard (4 to 6 bars visible), or a very high vapor hazard (7 to 8 bars visible).

M4A1 Joint Chemical Agent Detector

The JCAD (NSN 6665-01-586-8286; TM 3-6665-456-10) is a stand-alone, hand-held device that automatically detects, identifies, and alerts operators to the presence of agent vapors, including:

- the nerve agents tabun (GA), sarin (GB), soman (GD), GF, and VX;

- the blister agents mustard (H), nitrogen mustard (HN3), and lewisite (L);
- the blood agent hydrogen cyanide (AC); and
- the TIC cyanogen chloride (CK).

The JCAD is modified from a commercially available device. The JCAD is capable of supporting the mission requirements of all four services, including:

- interior detection in both tracked and wheeled vehicles;
- interior detection in fixed- and rotary-wing aircraft during both ground and airborne operations;
- interior and exterior shipboard detection;
- fixed-site chemical agent detection;
- personal detection, carried by an individual soldier or used for advanced perimeter warning; and
- surveys of personnel, equipment, and cargo.

The JCAD is carried by personnel and placed onto various platforms, including ground vehicles, fixed-site installations, and collective protection shelters. The JCAD can also interface with the Joint Warning and Reporting Network (a computer-based application that integrates sensor information into intelligence systems), allowing it to be used as a networked fixed-site detector without direct operator contact. Up to ten JCADs can be connected at distances up to 400 m apart. The base unit functions as a control unit providing chemical alerts and malfunction signals for the other nine units. Operating the JCAD in enclosed spaces or when sampling near strong vapor sources of the following will sound a false alarm:

- aromatic vapors (aftershave, perfume, food flavorings, peppermint);
- cleaning compounds (disinfectant, menthol, methyl salicylate);
- smoke and fumes;
- gun oil;
- diesel exhaust, JP-8 (jet fuel) vapor;
- small arms lubricant;

- cigarette smoke;
- paint fumes; and
- chemical-agent-resistant compound.

M22 Alarm

The M22 ACADA (NSN 6665-01-438-6963; TM 3-6665-321-12&P; Figure 11-2) is an automatic agent alarm system capable of detecting and identifying standard blister and nerve agents. The system is portable (can be carried by one person), operates independently after system start-up, produces an audible and visual alarm, and provides an automatic battlefield warning. The system consists of the M88 detector, as many as five M42 alarm units, a confidence sample, protective caps, a square inlet, rain caps, a carrying case, and various power supplies.

The M22 ACADA samples the air for the presence of nerve agent vapors (GA, GB, GD) and blister agent vapors (HD, L), and provides simultaneous detection and warning of these agents. It operates in cold and hot climates (-30°F to 125°F). The M88 detectors normally are placed facing into the wind no more than 150 m outside of the unit perimeter, with no more than 300 m between detectors. They are connected to the alarm units with WD-1/TT telephone wire. Whenever possible, the distance between the detector units and the alarm units should not exceed 400 m.

The following items can interfere with the normal operation of the M22 ACADA and will sound a false alarm:

- CS tear gas,
- JP-8 jet fuel,
- brake fluid,
- aqueous fire fighting foam, and
- M18 marking grenades (red and violet).

M272 Water Testing Kit

The M272 kit (NSN 6665011340885; TM 3666531910) was designed and fielded to answer the need for a test to detect water contamination by nerve agent, blister agent, cyanide (a blood agent), or lewisite. The kit operates at temperatures between 32°F and 125°F. An enclosed instruction card enables a soldier

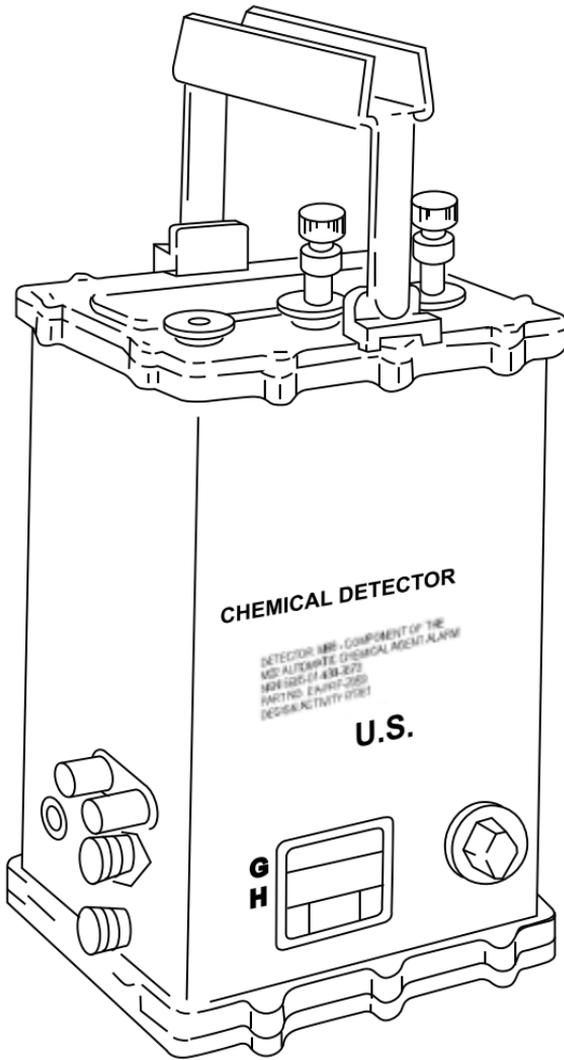


Figure 11-2. The M22 Automatic Chemical Agent Alarm (ACADA), which is capable of detecting and identifying standard blister and nerve agents. The system can be carried by a soldier, operates independently after system start-up, and provides an audible and visual alarm. It also provides communications interface for automatic battlefield warning. The system consists of the M88 detector, as many as five M42 alarm units, a confidence sample, protective caps, square inlet, rain caps, a carrying case, and various power supplies.

Table 11-2. Concentrations of Chemical Agents Detectable by the M272 Chemical Agent Water Testing Kit

Agent	Symbol	Concentration (mg/L)*
Cyanide	AC	20.0 as CN-
Mustard	HD	2.0
Lewisite	L	2.0 as As+++
Nerve agents	G, V	0.02

*Concentration reliably detected by kit tests. CN- is the liquid form of cyanide measurable in water.

As+++ is a form of arsenic, the positive elemental ion arsenous, which is measurable in water.

to conduct all the tests required to identify the threat agents. The kit will detect chemical agents at the concentrations listed in Table 11-2. Water containing agents in concentrations less than those detectable by the kit is permissible for short-term use (up to 7 days) in both cold and warm regions, as long as the daily consumption per person does not exceed 5 quarts.

Each kit contains enough reagents for tests on 25 separate water samples. The operator can easily conduct the full range of tests in 20 minutes when the temperature is between 50°F and 105°F; at lower temperatures, the water samples and the nerve agent ticket should both be warmed for 10 minutes before testing begins. At higher temperatures, between 105°F and 125°F, water should be cooled for at least 5 minutes to reduce its temperature to 105°F or cooler, because water that is too hot may cause foaming in the detector tubes for lewisite, mustard, and cyanide.

Patient Protective Equipment

This section discusses the patient protective wrap, decontaminable litters, and the Resuscitation Device, Individual Chemical (RDIC).

Patient Protective Wrap Kit

The patient protective wrap (NSN 6545-01-577-1047) was developed because decontamination and medical treatment of chemical casualties often requires removing clothing and

precludes donning replacement JSLIST garments. The wrap is used to protect patients from exposure to harmful chemical and biological materials for up to 6 continuous hours (patients should not be left in the wrap longer than this). When used in conjunction with the consumable items listed below, it prevents uncontaminated patients from potential contamination during evacuation. The patient protective wrap kit consists of the following consumable items:

- lightweight motor blower tester for the M48 mask (NSN 4240-01-497-5068)
- M96 Chemical-Biological Air Filter Cartridge (NSN 4240-01-574-9568)
- nonmetallic hose (NSN 4720-01-577-5616)
- protective dust cap (NSN 5340-01-577-5631)
- battery charger (NSN 6130-01-577-5620)
- rechargeable battery (NSN 6140-01-500-9672)
- patient wrap blower (NSN 6530-01-543-7916)
- patient litter wrap (NSN 6530-01-577-1091)
- airflow indicator (NSN 6640-01-500-7721)

The wrap resembles a lightweight sleeping bag; it measures 107 cm wide by 249 cm long and weighs 2.7 kg. It is constructed of a permeable sheet of carbon-impregnated fabric and an impermeable bottom sheet. The top sheet has an impermeable, transparent window to permit observation of the patient during transit. A port to provide a protective entryway for the insertion of intravenous tubing is located at each side of the window. The blower is a small, lightweight unit providing a continuous flow of clean, filtered air for breathing. Using the blower considerably reduces the danger of heat stress on the casualty, and increases the wrap's operational effectiveness in hot climates.

Decontaminable Litter

Contaminated casualties arriving at a medical treatment location will in most cases require decontamination prior to definitive treatment. The decontamination process requires the use of equipment organic to the treatment unit. Ideally, equipment in

limited supply should be capable of complete decontamination using methods available in the field.

The decontaminable litter (NSN 6530-01-290-9964) is made from a monofilament polypropylene with high tensile strength and low elasticity. The fabric does not absorb liquid chemical agents and is not degraded by decontaminating solutions. The fabric is flame retardant, highly rip resistant, and treated to withstand exposure to weather and sunlight. The fabric has a honeycomb weave, which results in a rough, non-slip surface, and liquids easily pass through the open 40% of the surface area. The carrying handles retract into the metal pole frame for a closed total length of 83.5 in. (212.1 cm) to allow for loading the litter onto the UH60 helicopter. The handles have two open positions, at 90.0 in. (228.1 cm) and 91.6 in. (232.7 cm). The first position is a NATO standard. The second position is provided to allow increased gripping comfort. The aluminum poles have been also designed to provide direct gripping surfaces for litter stanchions. All metal parts have been painted with chemical-agent-resistant coating paint.

NOTE: *Canvas litters exposed to liquid blister agents and then decontaminated still desorb vapors for 72 hours.*

Resuscitation Device, Individual Chemical

The RDIC (NSN 6515-01-338-6602) is used in a contaminated environment to ventilate casualties. It consists of a compressible butyl rubber bag, a NATO standard C2A1 canister filter, a non-rebreathing valve, a cricothyroid cannula adapter, and a flexible hose connected to an oropharyngeal mask. The mask is removable from the distal end of the flexible hose for connection of the hose to the cannula adapter. The butyl rubber bag resists penetration by liquid chemical agent that may be on the chemical protective gloves of the operator, and is easily decontaminated. The elasticity of the outer cover limits airway pressure to a maximal value of 70 cm H₂O. The device can deliver up to 600 mL of filtered air per cycle at a rate of 30 cycles per minute. At a patient decontamination station, the RDIC is commonly used in the emergency medical treatment area.