

Desert Storm—Protecting the Israeli Military

Israeli Ministry of Defense

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Abstract

The increased scope of chemical warfare capability in the Middle East, coupled with its proliferation and use during the Iraq-Iran war and Iraqi deployments and threats in the summer of 1990, caused concern for the well-being of members of the Israeli military. In our previous article, we discussed the impact of this threat on the civilian population. This companion paper discusses similar preparations and innovations, directed towards the protection and functioning of the Israeli military under chemical attack conditions.

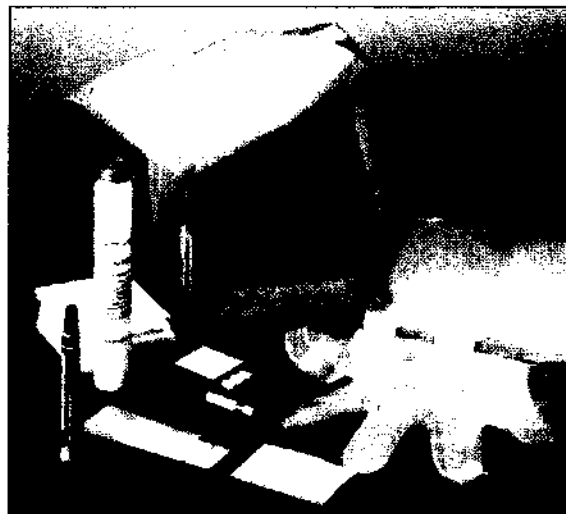
Introduction

Events and public statements in the Middle East during the summer of 1990 aggravated the chemical warfare threat against Israel. The development, stockpiling and use of chemical ammunitions by Arab countries had reached alarming proportions. Iraq, in its war against Iran, has employed a variety of chemical agents disseminated from aerial bombs and artillery shells. Intelligence reports and news-paper articles portrayed a production capability encompassing a wide range of chemical warfare agents, from relatively innocuous tear gases, through persistent mustard gases, and up to the most hazardous nerve agents such as Tabun and Sarin. These agents were weaponized and could be delivered against military targets in aerial bombs and even by chemical warheads on Scud missiles. The Israeli response and preparations to protect the military are discussed below.

For a more detailed background on preparations to protect the Israeli civilian population, please see our article in the Spring 1996 issue of the *Journal of the International Society for Respiratory Protection*, "Desert Storm—Protecting the Israeli Civilian Population."

Personal Protective Kit

The personal protective kit is supplied to every soldier in the IDF, and carried on the hip during



The Personal Protective Kit.

pre-, under-, and post-attack postures. The kit is constructed of a light plastic fabric and includes, in addition to the individual mask and filter, the following items:

1. Mask fitting and tightness test kit—"Banana kit" (Amyl Acetate).
2. Fuller earth decontamination tube.
3. Gauze pads.
4. Pyridostigmine pre treatment tablets.
5. Improved TAB antidote auto injector.
6. Liquid agent detector paper.



The Protective Ensemble for Soldier.

7. Disposable protective cape.
8. Disposable plastic laminate gloves.

Protective Ensemble for Soldier

The NBC protective ensemble for soldier includes an individual rubber NBS mask for eye and respiratory protection, an impregnated charcoal garment for body protection, butyl rubber gloves and PVC overboots. This gear is integrated with the standard individual combat equipment and enables the soldier to accomplish his mission under chemical attack condition.

The semi-permeable chemical resistant garments are manufactured according to IDF specifications. The suit is composed of two pieces: a jacket with hood and a pair of pants, and is worn as the personal combat fatigue under conditions of imminent chemical attack.

The impregnated, flame retardant outer layer of this garment spreads the agent droplets and charcoal layer underneath absorbs the agents, preventing them from reaching the skin. These garments have been tested extensively by both the Infantry and Armored Corps while performing their missions in pre- and post-attack postures under high heat stresses. Other features include high tensile strength, flame resistance, insensitivity to lubricants and a ten year shelf life.

The NBC overboots are made from a special PVC compound which provides the required chemical resistance and a very long shelf life (ten years at least). The NBC overboots are available in four sizes.

Advanced Crew-Member Blower System—ACBS

A fully integrated protective system allowing an armored vehicle crewmember to perform all of the required tasks on the modern battlefield (electro-optics, night-vision, communications). It is based on an under-the-helmet protective hood and blower unit.

The hood is fabricated from a dedicated laminate which provides both excellent liquid agent and fire protection. A pair of small spherical goggles provide a superior field of vision and interphase with all



The Advanced Crew-Member Blower System—ACBS.

military optical systems which necessitate small distances from the eye pupil. A nose cup is integrated into the hood and provides a platform for the necessary valves, speech membrane, communications and drinking device. A neck seal serves as the required closure.

This system is designed as "one size fits all" and provides efficient dynamic protection with or without operation of the blower unit.

The highly efficient blower unit is constructed of reliable components to meet military standards. Its

housing is air tight. The blower filters air through two standard filters and supplies the hood with 90 liters of air per minute. Lithium-Sulfur dioxide batteries supply 20 hours of uninterrupted operation. The blower can be carried by the crew-member or connected to the standard central filtration system of the armored vehicle.

Protective Ensemble for the Dedicated Soldier

The dedicated soldiers in the specialized CW units—reconnaissance, decontamination, bomb disposal and medical, are exposed to high concentrations of chemical agents. These types of activities require special protective gear.

The system includes an individual NBC mask, a disposable impermeable overgarment, a cotton evaporative—cooling outer suit, rubber gloves and rubber boots.

The disposable NBC protective overgarment is a one-size-fits-all suit and consists of a shirt and trousers. The shirt has a hood that fits over any mask and a quick fastener for easy closing. The suit is constructed of a three layer laminate of polyethylene/polyamide/polyethylene with continuous heat-seal welding.

A cotton evaporative cooling suit is worn over the impermeable overgarment. Continuous wetting of this suit enables the soldier to work under high stress conditions.

Advanced Israeli Air Crew Protective System

This system consists of a specially designed hood and blower unit providing air crew with eye and respiratory protection against chemical agent hazards. It was designed primarily for fighter pilots and is fully compatible with their helmets and oxygen masks. This protective hood is placed over the helmet, obviating the need for extensive helmet modifications or other preparations prior to its utilization. The system interfaces the HGU-22/P helmet and/or HGU-55/P helmet and the MBU-12/P or MBU-5/P oxygen masks.

The blower unit supplies 90 liters of filtered air per minute directly into the hood. One portion of



The Protective Ensemble for the Dedicated Soldier.

this air is channeled directly toward the visor to prevent its fogging, the other portion is directed toward the nape of the neck, cooling this area and improving protection during head movement. The hood visor is identical to the helmet visor allowing optimal visual acuity while performing missions. A



The Advanced Israeli Air Crew Protective System.

dark visor is used against sun glare. The system's center of gravity was designed to complement the helmet's weight distribution thus preventing neck muscle fatigue. The hood is manufactured from a fire retardant NOMEX/PVF laminate and is resistant to chemical agent penetration.

The hood has a safety rip cord which, when pulled, rips the system in two, thus permitting

unencumbered emergency ejection from the cockpit. To complete the protective ensemble, the pilot wears a charcoal impregnated coverall, PVC overboots and thin butyl rubber gloves.

This ensemble is unique in that it permits air crew to operate in the post attack environment—leave a collective shelter, take off, perform all missions, land and return to the shelter—while wearing their personal flight equipment. Thus, there is no need for the previous generation of specialized protective masks which imposed considerable restrictions on mission performance.

CHASE

CHASE is a continuous chemical agent sensor, operating on the flame photometry principle. It offers high sensitivity, a rapid response, and self-cleaning features. This ruggedized, portable unit is designed for detection and alarm in the presence of nerve and alarm in the presence of nerve (G & V) and blister (HD) agents. Its visual meter indicates agent

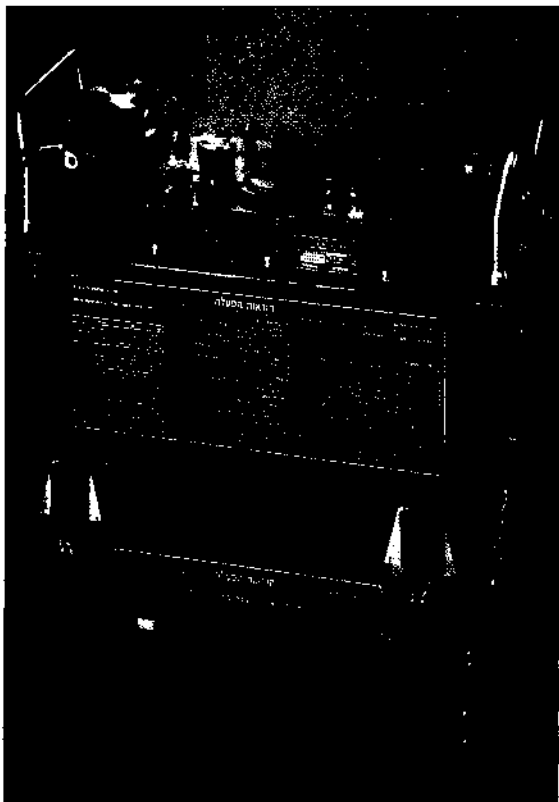
concentrations ranging from fully safe to high levels of contamination.

CHASE assures effective early warning of an impending chemical hazard, allows for the identification of the type of hazard and can be operated in reconnaissance and surface monitoring modes.

CHASE can be employed as an integral part of the CW defense doctrine in all three basic postures—pre-attack, under attack and post-attack, by means of the following features:

- Response to very low concentration (threshold is in the range of 10^{-3} mg/cubic meter) within few seconds—allowing for rapid initiation of defense measures.
- Fast cleansing after the CW attack—quick readiness for the next alarm (quick reset).
- No saturation—continuous operation at all contamination levels under extended exposures to CW agents.
- High reliability—low false alarm rate, immunity to possible interfering substances and high reproducibility over-consecutive exposures.
- Multi agent detections—detects efficiently: nerve (G&V) and blister (HD) agents, volatile and persistent, in vapor or aerosol phase.
- Concentration indicator—indicates the agent level from fully safe to high levels of contamination. This enables performance of all required tasks in a contaminated area: donning protective gear on time, reconnaissance, decontamination control and demasking. This permits appropriate hazard and risk evaluation
- Alarming and monitoring modes—enable selection of pre- and post-attack operation modes.
- Surface monitoring—via a versatile probe for monitoring contaminated ground vehicle, aircraft and various surfaces.
- Static or vehicle mounted operation—using remote control unit and external alarm (up to 500 meters).
- Collective shelters protection control—enabling long-term contamination control in the shelter, efficient entry-exit procedure, alarm of collective filter system failure, output signal to central computerized control system.

This allows for efficient and effective shelter operation over long periods.



Continuous Chemical Agent Sensor (CHASE).

- Computerized automatic operation and control—with built-in test program and field simulator check out, for long-term stability.
- Meets requirements of MIL STD 810C.

References

For details on specific products or for further information, the following lists the major manufacturers of Israel N.C.C. Protection equipment:

1. Eagle Military Gear, P.O. Box 744, Ashkelon 78107, Israel.
2. Elbit, P.O. Box 5390, Advanced Technology Center, Haifa 31053, Israel.
3. Israel Military Industries Ltd., P.O. Box 1044, Ramat-Hasharon 47100, Israel.
4. Rabintex Industries Ltd., 3 Baruch Hirsh St., B'nei Brak 51201, Israel.
5. Shalon Chemical Industries Ltd., 25 Nachmani St., Tel Aviv 65794, Israel.