

Desert Storm—Protecting the Israeli Civilian Population

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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 the Israeli civilian population in the event of an outbreak of hostility. This threat generated a response, based mainly on prior preparations and coupled with short term innovations, directed towards the protection and functioning of the civilian sector under chemical attack conditions.

Introduction

Events and public statements in the Middle East during the summer of 1990 aggravated the chemical warfare threat on the civilian population centers in 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 newspaper 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 on civilian targets in aerial bombs and even by chemical warheads on Scud missiles. Recent UN inspections in Iraq have shown that these intelligence reports were both true and understated.

Threat Assessment and Policy

Although chemical munitions do not cause any permanent damage to equipment, it has been found that chemical munitions can be especially effective against large and densely populated areas. Their effectiveness depends on whether the population has been warned of an imminent attack, and has taken various protective measures, including the use of personal protective equipment. Adequate alarm systems, sufficient protective equipment and proper

training of both the civilian population and dedicated emergency response teams can lead to negligible casualties and allow the civilian sector to continue its functions without any significant decrease in activity. The above assessment has guided the Civil Defense Community in developing the doctrines and equipment necessary to combat the threat of chemical munitions.



The Civil Defense Organization has recognized the reality of the chemical warfare threats. By negating the effects of the chemical warfare, a good CW defense posture in the civilian sector acts as the best deterrent to potential aggressors and serves best the interest of the civilian population. If, however, deterrence fails, the civilian sector should be capable of surviving the minimal casualties both during and after the attack. Accordingly, Civil Defense units and emergency response organizations (Police, Fire Department, Paramedics) must be equipped and trained to continue operations in the face of chemical contamination and the accompanying casualties.

This policy has resulted in a comprehensive long-range research and development effort and in the establishment and growth of relevant industrial infrastructures. These industries have not only answered the needs of the civilian sector but have also exported a number of CW defense products. Several generations of each product have been developed and procured. In addition, there is a continuing program of product improvement and evaluation, including comparison with appropriate foreign equipment.

Doctrine

The integrated CW defense doctrine is based on two principles: **Survivability** of the civilian population, and continuance of mission of the relevant civil defense and emergency response personnel.

Survivability of the individual is the basic answer to the threat. This personal protection includes:

- **Respiratory protection**—The omnipresent CW mask has "evolved" into a better protec-

tive package which includes the "sealed room" as the basic family shelter coupled with the CW hood for adults, protective cribs and protective cribs and hood/blower systems for infants and children.

- Simple effective detection systems which determine both the existence of the threat and when it has abated.
- Personal medical treatment—a "first aid" concept based on the individual auto-injector

which allows the individual to save himself until professional medical personnel arrive on the scene.

The **survivability** concept resulted in the Personal Protective Kit which was stockpiled and subsequently distributed to over five million civilians of all ages prior to Operation Desert Storm.

Continuance of mission is the second element of the integrated civil CW defense doctrine. All relevant civil defense and emergency response personnel should be able to continue to fulfill their tasks and missions while under chemical attack and in the ensuing post attack environment. Its implementation imposes a number of additional "Protective layers" on the personal and unit levels.

- Warning, detection and identification systems.
- Improved functional personal protection.
- Collective Protection Systems.
- Decontamination systems.
- Medical treatment in hospitals.

The above capabilities, when fully integrated into the operational doctrine unique to each unit will result in minimal casualties under CW conditions. In addition, deployment and utilization of other specialized units (reconnaissance, bomb disposal, decontamination) complement these elements and provide greater flexibility in coping with novel situations which may be encountered during hostilities. This integrated and comprehensive defense doctrine has, over a number of years, resulted in the definition of operational and technical concepts



necessary for the research and development of CW defense systems and equipment.

These concepts are defined with the participation of the R & D community, the relevant industries and the civil community. It is an interaction, resulting in the continual evolution of both concepts and equipment, providing a firm basis for rapid, short-term tailored responses in case of new threats. As a result, the present equipment deployed and the equipment procured for civil defense is several generations better than the original issue in the 1960s.

Research and Development—Operational Concepts and Requirements

The operational concepts and requirements which guided the civil defense community prior to Desert Storm resulted in a **research-and-development** program and the subsequent procurement and distribution of equipment for the entire civilian population. Such an unprecedented, large-scale distribution and use of civilian protection equipment during the Iraqi Scud Missile attacks in the Winter of 1991, resulted in a number of additional concepts and requirements. The R & D community addressed these requirements prior to and during Desert Storm. As a **result**, a number of new items are in the

production stage and will be fielded within the coming year, which are showcased in the following pages.

The protective "package" for each civilian consisted of:

- The "sealed room" as the basic family shelter.
- Improved functional individual respiratory protection and medical first aid.
- A large Civil Defense and emergency response organization (Police, Fire Department, medical evacuation and ambulance service, hospitals).

This package was integrated into the operational **doctrine**, which decreed that any imminent attack on the civilian population should be regarded as a potential chemical attack until proven otherwise.

Thus, upon warning (several minutes prior to the arrival of the Scud missiles) and subsequent operation of the nation-wide alarm and emergency broadcast systems, all civilians entered the "sealed rooms" and donned respiratory protective equipment. The All Clear signal was broadcast over the radio and TV after dedicated reconnaissance teams equipped with suitable detectors had determined that the missile attack was not a chemical attack.

The distribution of over five million protective kits to the entire population prior to the hostilities, generated additional requirements for special equipment for certain segments:

- Civilians with medical and respiratory impairments (severe heart condition, emphysema, tracheotomies, etc.).
- Civilians with special facial features (scars, orthodox religious with beards).
- Premature infants in incubators.

This equipment had to be developed, produced and distributed in only a few months time. The

result was a round-the-clock R & D effort highly integrated with the production process.

These efforts resulted in the design, development and production of the following items:

- An adulthood/blower system for individuals with tracheotomies.
- A blower kit which could be attached to the CW mask thus compensating for poor fit or medical/respiratory impairments.
- A blower kit for infant incubators.
- A small portable infant protective crib (ages 0-6 months) equipped with a blower over pressure system.

A number of detection systems were issued to the emergency response and reconnaissance teams. These included:

- Detector tickets with a miniature blower.
- CHASE detectors.
- AP2C detectors.

These systems and their operational deployment resulted in rapid and foolproof determinations of chemical agent presence or absence and subsequent All-Clear broadcasts. As a result of previous R & D efforts and the lessons learned from this recent experience, a new generation of respiratory protection equipment is being produced. This equipment



will replace the conventional CW masks and passive infant protection cribs and is directed towards functional and efficient respiratory protection under dynamic conditions while imposing a minimal physiological and psychological burden, and allowing unimpeded normal tasks. Thus, the face seal of the conventional mask has been replaced with a neck seal and the resulting hood can be either a stand-alone system or can be integrated with a blower system.

A large variety of these systems were utilized by civilians during Desert Storm and more than fulfilled the expectations of civilians and the R & D community. It must be noted that this development effort for civilian systems has contributed towards expediting a new generation of military-oriented systems, a number of which are also included in this article.



Civilian Protection

The entire civilian population in Israel is provided with a personal protective kit which includes a respiratory protective system, an atropine autoinjector, fuller-earth decontamination powder and gauze pads.

For adults there is a fully integrated mask and filter system, including a speech membrane, a special drinking device and flexible harnesses enabling simple donning, good face sealing, comfort and reliability.



The Children Hood Blower System.

Children Hood Blower System

A special hood/blower system was designed for small children in the 3–7 year age group—“one size fits all” system shown below. This system is based on the principle of supplying filtered air to the hood which covers the head and face thus producing a personal over pressure protective system. This principle also prevents the build-up of carbon dioxide within the hood and reduces the strain on the child’s respiratory system.

The hood is constructed of semitransparent impermeable plastic laminate with a flexible transparent visor. Drinking device and outlet valve are integrated in the hood cover, and a system of straps in the forehead area allows a personal fit. The hood is sealed around the neck. A flexible rubber hose connects the hood to the air supply unit, and a colorful fabric vest is used to carry this blower unit without movement restrictions.

The air-supply unit consists of a miniature blower supplying 40 liters of filtered air per minute and operating on 3 V (4 lithium magnesium oxide batteries), a rigid plastic holder including a quick connector and an individual NBS canister.



The Chemical Infant Protective System.

Chemical Infant Protective System—CHIPS

Chemical protective for infants aged 0–3 years poses a number of unique design requirements—**ergonomic** physiological and psychological; all are equally important in the parent-infant interaction and are magnified under stressful conditions.

A specially designed Chemical Infant Protective System (**CHIPS**, shown above) which envelops the chest, arms and head and which is based on positive pressure was found to be the best solution. The child can grow into this system and at the age of three the system reaches down under the armpits. This also allows unimpeded diapering while under full protection.

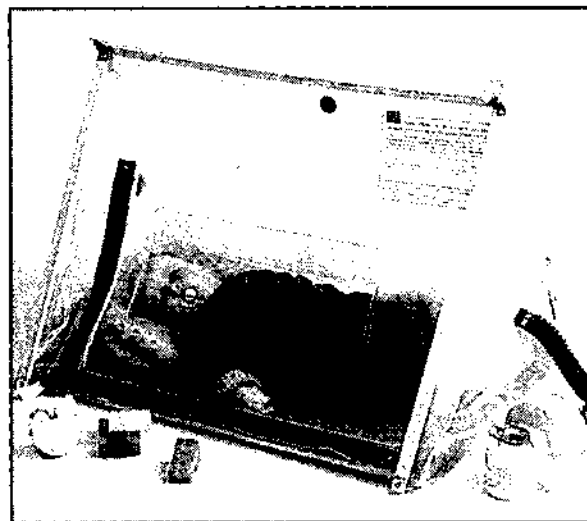
An integral filter blower unit supplies 40 liters per minute of **filtered** air and thus provides positive over pressure and **efficient** air replenishment with the removal of carbon dioxide. This **filter** blower unit can be attached to the rear of the "carrycot" or be placed adjacent to the infant.

The infant is supported while lying on the carrycot and thus can be carried by the parent (harness supplied) allowing for maximal parent-**infant** contact. At the toddler stage, the child can walk **independently**, the "carrycot" serves as a back pack for the blower unit. The infant can be fed by a nursing bottle which is attached to a nipple on the side of the hood.

In conclusion, this system provides maximal positive protection under all dynamic conditions and does not restrict the normal **parent-infant** care and interaction.

Portable Blower Infant Protective Crib

A small **infant** protective crib, shown below, was developed for new born infants aged 0–6 months. This "pup tent" shaped crib was constructed from the same laminate of the CHIPS and was equipped with the same filter-blower unit, thus achieving protection by means of positive over pressure.



The Portable Blower Infant Protective Crib.

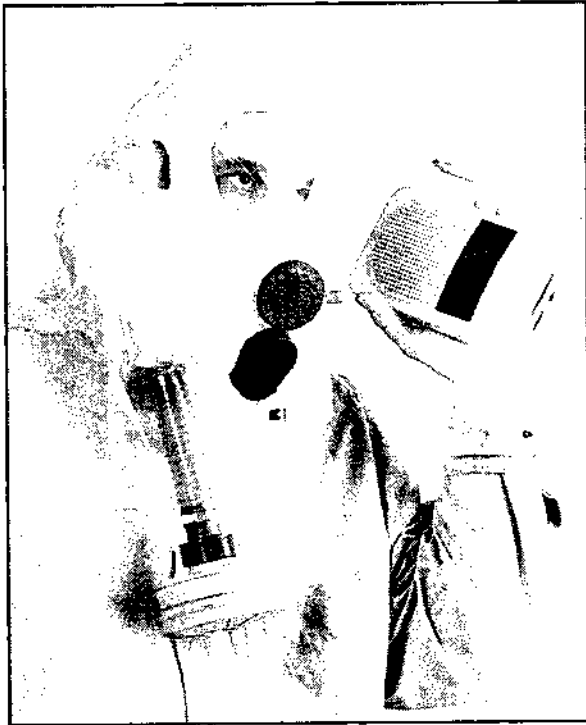
Civilian Adult Protective System—CAPS

CAPS is a new concept in adult eye and respiratory protection currently in the final stages of development. CAPS is shown on the following page.

Designed as a one-size-fits-all system for adults aged 18 and over, CAPS is based on a transparent hood enveloping the head and neck seal. A flexible transparent visor allows for maximal field of view and **identification** of wearer. The hood includes a flexible nose cup which is positioned over the nose/mouth by means of an elastic web.

Air enters through a **filter**, reaches the hood to aerate the head, and then enters the nose cup from which it is expelled. The nose cup includes a speech membrane and a drinking device.

This highly reliable system is designed to overcome all the shortcomings of the **mask**, and thus is much simpler to don and will provide better protection under all dynamic conditions. A



The Civilian Adult Protective System.

follow-on development will result in a similar system for ages 7-18.

Civilian Adult Hood Blower System—CAHBS

This system, shown at right, is intended for relevant civil defense and emergency response personnel who must function under CW conditions while performing a variety of missions.

It consists of a positive overpressure protective hood and two blower units, and can also supply functional protection for civilians with medical limitations.

CAHBS consists of the same components and materials as the *childrens'* and *infants'* hood blower systems, integrated with two blower units from the



The Civilian Adult Hood Blower System.

infants' system (CHIPS) to provide sufficient aeration and over pressure for adults.

It closes with a neck seal and includes an adjustable head harness for optimal positioning. A wide field of vision visor and drinking device are integrated into the hood.

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.