



DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY TRAINING AND DOCTRINE COMMAND
FORT MONROE, VIRGINIA 23681

LEVEL

20 June 80

ATCD-N

SUBJECT: Joint Service Operational Requirement for the Protective Mask.

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AD A 090562

1. References:

- a. DODD 5000.1.
- b. DODI 5000.2.
- c. AR 1000-1.
- d. AR 7109.

2. HQDA approved subject JSOR 10 Oct 78. The following information is applicable to this document:

- a. System Designation: Non-major.
- b. Materiel Developer: USADARCOM.
- c. Combat Developer: USATRADO (Chemical School).
- d. Logistician: USALEA.
- e. Operational Tester: TRADOC.
- f. CARDS Reference Number: 1244.

3. Subject requirement document is forwarded to major Army commands, other services and DoD agencies for harmonization.

FOR THE COMMANDER:

[Signature]
 ROBERT W. WELLS
 LTC, GS
 Asst AG

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USA Engr Sch (ATSE-CD)

USA FA Sch (ATSF-CD)

USA Inf Sch (ATSH-CD)

USA Trans Sch (ATSP-CTD)

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JOINT OPERATIONAL REQUIREMENT FOR PROTECTIVE MASK1. Description of Need:

a. This document establishes a Joint Operational Requirement for a field protective mask to provide respiratory protection against field concentrations of all chemical and biological agents in vapor or aerosol form. This mask with appropriate components shall replace the M17 and M17A1 Masks, the M9A1 Special Purpose Mask, the M24 and M25A1 Masks, and MK V Mask to meet the following needs: Improved operational capabilities and reduced logistical burden, suitability for wear under a wide range of operational conditions, and improved performance and storage characteristics.

b. Reference Numbers: CARDS No. 1244
TAF ROC 326-75
USMC

2. Time Frame: The new protective mask is required by FY 82 (IOC).

3. Operational Deficiency: The filter elements for the M17/M17A1 field protective mask must be replaced with fresh elements upon warning of an imminent chemical attack, and after each blood agent attack in order to assure adequate protective capacity. Additionally, replacement of the filter elements is not possible without removing the mask and even then replacement is somewhat difficult for the average user. The frequent replacement of the filter element causes an unsatisfactory logistical burden. Wearing the current masks inhibits the performance of high activity tasks encountered in military operations. Normal vision and the use of optical devices are hindered. Different masks are currently required to meet the special requirements for respiratory protection in tanks and aircraft. In addition, the M9A1 Special Purpose Mask is required for special applications requiring greater capacity, ease of filter replacement, and compatibility with (impermeable suits) protection.

4. Operational/Organizational Concept: US Forces will be provided with clothing and equipment (including protective masks) for protection against the effects of CB agents. To counter the high casualty-producing potential of such agents, the Mission Oriented Protective Posture (MOPP) has been adopted which allows the commander to decide the level of protection for each specific situation. When CB operations have been initiated, it is anticipated that a majority of individuals may be in CB protection for extended periods of time. The protective mask must be capable of being used whenever CB operations are encountered. The new mask will be issued as individual equipment in accordance with appropriate service regulations.

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5. Essential Characteristics:

a. Protection: The mask shall protect the face, eyes, and respiratory tract of the wearer in field concentration of chemical and biological agents, and radioactive fall-out particles. The filter system shall be capable of withstanding a minimum of 15 attacks with nerve, choking, and blister agents under combat conditions, and will provide at least a two attack capability against blood agents. A chemical attack is defined as an exposure of 20,000 mg-min per cubic meter. (Equivalent to exposure for 20 minutes in concentration of 1000 mg/M₃). Chemical, biological and radiological aerosol filtration capability shall be no less than that provided by the M17A1 Field Protective Mask. The mask and its accessories will provide the wearer the capability to perform mask-to-mouth resuscitation at least to the extent presently provided by the M17A1 protective mask. These protective characteristics are to be defined by a Joint Technical Integration Working Group (JTWIG).

b. Replacement of Filters: The replacement of the filter shall be accomplished quickly and easily without necessitating removal of the mask from the face.

c. Speech/Communication: The mask shall permit intelligible voice transmission and shall not interfere with hearing. It shall permit the adequate use of receiving and transmitting communication devices currently in use by the services and those in use at the time period of new mask availability.

d. Vision: The mask shall permit unobstructed and undistorted forward vision. Peripheral vision shall be not less than that required by aviators, and will meet the guidelines on field of vision for aircrewmen as developed by the US Army Aeromedical Research Laboratory and agreed to by the aeromedical authorities of the other services. The mask lens shall be shatter and glare resistant. The mask shall allow the wearing of corrective spectacles, or should provide a simple system of corrective optical inserts compatible with military spectacle lens in use, and shall allow the satisfactory use of common standard optical devices such as binoculars, BC scopes, night vision devices, individual weapons sights, crew served weapons, and combat vehicle weapons systems, etc.

e. Reliability, Availability, Maintainability, and Durability (RAM-D). The mask shall provide at least 95% reliability of serviceability for at least one year of operational use (stowed and carried in the carrier, worn for training and alerts, etc.) with only operator and organizational maintenance. The mask shall not have components which require frequent maintenance or replacement. Unless exposed to chemical attack, the

filter system shall retain at least a two attack protective capability against nerve, choking, and blister agents, as defined in paragraph 5a above, with 95% reliability for at least one year of operational use. For blood agents the filter shall retain at least a one attack capability under moderate environmental conditions for at least one year of operational use.

f. Wearability/Comfort: The mask be so designed that fully trained personnel not suffering from facial and head injuries shall be capable of wearing the mask for periods of 8 to 12 hours while performing their assigned military duties under conditions of a moderate work rate (250K-Cal/hr) at temperate climatic conditions (see para 5l below). The face mounted portion of the protective mask shall weigh no more than 2.0 lbs.

g. Compatibility: The mask, carrier, and accessories shall be compatible with individual combat clothing, protective headgear, loadbearing equipment, vehicle filter units, and aircraft oxygen supply systems. The total weight of the mask, carrier, and mask accessories shall not exceed 4.0 lbs.

h. Ruggedness, Accessibility, and Fit: The mask shall provide a positive fit under normal stresses of combat. When the mask is not in use, it should be protected by the carrier from most hazards likely to be encountered in operational situations. The mask will be readily accessible to the individual (whether standing, kneeling or prone) so that it can be donned within 9 seconds by properly trained personnel. The mask design shall allow the fit of the 5th percentile (female) to the 95th percentile (male) with 3 sizes. Provision will be made to permit the protective mask in its carrier to be immersed in up to 3 feet of water for periods up to 5 minutes without damaging the protective mask.

i. Decontamination: The mask will be resistant to the absorption of liquid chemical agents. The mask shall be capable of being sanitized or quickly and readily decontaminated by the individual in the field using available decontaminants without reducing the protective capability of the mask.

j. Drinking: The mask will provide the wearer with a drinking capability.

k. Storage: The packaged mask shall remain serviceable, and the protective capacity of the packaged filter shall not degrade more than 10% below the protection requirements stated in paragraph 5a for a minimum of ten (10) years of storage under conditions defined by climatic categories 1, 5 or 6 in Table 1.

l. Climatic Considerations: The mask will be operational under climatic categories as defined in appropriate service regulation. A winterizing accessory may be provided for operation in winter conditions.

6. Technical Assessment: A mask with multiple modes of protection utilizing one basic facepiece will be developed. Design of a mask configuration providing optical clarity, wide angle vision, liquid agent and field contaminant resistance and easy decontamination will be stressed. The provision of a hood that adequately interfaces with the mask will be accomplished. To this end, engineering development is currently in progress with emphasis on means of improving lens design and coating operations to achieve acceptable visual/optical performance, the ability to couple with optical instruments and ensuring ruggedness and environmental stability at temperature extremes. The design of corrective lenses/spectacles is being developed by the Office of the Surgeon General (OTSG) of the Army and will be coordinated with other Services medical representatives. The engineering development phase will complete development for this item. There are no known technological barriers to the development of the mask, and risks are assessed as low to moderate.

7. Cost Assessment:

a. Summary of estimated program acquisition costs is expressed in current FY dollars (\$M-Million):

	<u>Low</u>	<u>High</u>
Research & Development (Note 1)	19.5	23.0
Investment Non-Recurring	21.0	26.0
Investment Recurring (Note 2)	25.6	35.6

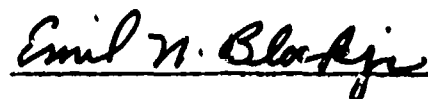
Note 1 - Cost of TECOM test program is not included. Cost of developing corrective lenses/spectacles, which is an OTSG responsibility, is not included (see para 6 above).

Note 2 - Quantity

<u>Item</u>	<u>Quantity</u>
Mask	500,000



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Table 1-1. Summary of Temperature, Solar Radiation, and Relative Humidity Diurnal Extremes*

CLIMATIC CATEGORY	OPERATIONAL CONDITIONS			STORAGE AND TRANSIT CONDITIONS	
	AMBIENT AIR TEMPERATURE °F	SOLAR RADIATION Btu/ft ² /hr	AMBIENT RELATIVE HUMIDITY %	INDUCED AIR TEMPERATURE °F	INDUCED RELATIVE HUMIDITY %
1 WET-WARM	Nearly constant 75	Negligible	95 to 100	Nearly constant 80	95 to 100
2 WET-HOT	78 to 95	0 to 360	74 to 100	90 to 160	10 to 85
3 HUMID-HOT COSTAL DESERT	85 to 100	0 to 360	63 to 90	90 to 160	10 to 85
4 HOT-DRY	90 to 125	0 to 360	5 to 20	90 to 160	2 to 50
5 INTER- MEDIATE HOT-DRY	70 to 110	0 to 360	20 to 85	70 to 145	5 to 50
6 INTER- MEDIATE COLD	-5 to -25	Negligible	Tending toward saturation	-10 to -30	Tending toward saturation
7 COLD	-35 to -50	Negligible	Tending toward saturation	-35 to -50	Tending toward saturation
8 EXTREME COLD	-60 to -70	Negligible	Tending toward saturation	-60 to -70	Tending toward saturation

*This table extracted from AR 70-38, 5 May 1969.