

M18A1 Gas Particulate Filter, NSN: 4240-01-365-0982

Ordering Period 1 With First Article					Ordering Period 1 Without First Article				
Evaluation	Proposed Unit	Weight	Wtd U/P		Evaluation	Proposed	Weight	Wtd U/P	
Shipping Destinations: Range	Price				Shipping Destinations: Range	Unit Price			
500-1000	<input type="text"/>	10%	\$0		500-1000	<input type="text"/>	10%	\$0	
1001-1500	<input type="text"/>	20%	\$0		1001-1500	<input type="text"/>	20%	\$0	
1501-2000	<input type="text"/>	70%	\$0		1501-2000	<input type="text"/>	70%	\$0	
Weighted Unit Price			\$0		Weighted Unit Price			\$0	
Wtd U/P x Est Qty	1731				Wtd U/P x Est Qty	1731			
Evaluated Production Price OP1w/FA			\$0		Evaluated Production Price OP1w/o FA			\$0	

Ordering Period 2				
Evaluation	Proposed Unit	Weight	Wtd U/P	
Shipping Destinations: Range	Price			
500-1000	<input type="text"/>	10%	\$0	
1001-1500	<input type="text"/>	20%	\$0	
1501-2000	<input type="text"/>	70%	\$0	
Weighted Unit Price			\$0	
Wtd U/P x Est Qty	1236			
Evaluated Production Price OP2			\$0	

Offerors must submit their Proposed Unit Price in the bold outlined spaces

The Government will multiply the Proposed Unit Price times its corresponding weight (the "weight" is the most current assessment of the likelihood, expressed as a percentage, that the actual order quantity will fall within that range.

Ordering Period 3				
Evaluation	Proposed Unit	Weight	Wtd U/P	
Shipping Destinations: Range	Price			
500-1000	<input type="text"/>	10%	\$0	
1001-1500	<input type="text"/>	20%	\$0	
1501-2000	<input type="text"/>	70%	\$0	
Weighted Unit Price			\$0	
Wtd U/P x Est Qty	1236			
Evaluated Production Price OP3			\$0	

The weighted prices for each range will be added together resulting in a single Weighted Unit Price which is then multiplied by the Estimated Quantity to determine the Evaluated Production Price for that Ordering Period (OP).

Ordering Period 4				
Evaluation	Proposed Unit	Weight	Wtd U/P	
Shipping Destinations: Range	Price			
500-1000	<input type="text"/>	10%	\$0	
1001-1500	<input type="text"/>	20%	\$0	
1501-2000	<input type="text"/>	70%	\$0	
Weighted Unit Price			\$0	
Wtd U/P x Est Qty	1046			
Evaluated Production Price OP4			\$0	

The Evaluated Prices for each Ordering Period will be added together to arrive at the Total Evaluated Production Price.

Ordering Period 5				
Evaluation	Proposed Unit	Weight	Wtd U/P	
Shipping Destinations: Range	Price			
500-1000	<input type="text"/>	10%	\$0	
1001-1500	<input type="text"/>	20%	\$0	
1501-2000	<input type="text"/>	70%	\$0	
Weighted Unit Price			\$0	
Wtd U/P x Est Qty	1025			
Evaluated Production Price OP5			\$0	

Evaluated Production Price OP1w/FA*	\$0
Evaluated Production Price OP1w/o FA*	\$0
Evaluated Production Price OP2	\$0
Evaluated Production Price OP3	\$0
Evaluated Production Price OP4	\$0
Evaluated Production Price OP5	\$0
TOTAL EVALUATED PRODUCTION PRICE	\$0

*OP1 - EITHER w/FA or w/o FA price will be used

SECTION C

DISTRIBUTION STATEMENT A

Page 1 of 4

START NO: C29CABXX

AMC/AMSC: 1G

TDP: 5-19-2300

TDPL DATE: 23 Mar 99

NSN: 4240-01-365-0982

NOMENCLATURE: M18A1 Gas Filter

Unless otherwise specified herein or annotated as for reference only thereon, all documents cited on TDPL 5-19-2300 dated 23 Mar 99 are mandatory for use in the manufacture of the item(s) on this procurement. The following specific exceptions also apply:

Scope of Work: The contractor shall provide filters that meet the requirements of specification MIL-PRF-51193E. Any other technical data is provided for information purposes only.

(A copy of the former detailed design TDP is provided for information purposes only, and that design has been known to meet the requirements of MIL-PRF-51193E, but is not mandatory for use on this procurement.)

- A. Unless otherwise specified, the issues of the specifications and standards which are DOD adopted shall be those listed in the issue of the DODISS which is current on date of contract solicitation. Unless otherwise specified, the issues of specifications and standards not listed in the DODISS shall be the issue of the nongovernment specifications and standards which is current on date of contract solicitation.
- B. The TDP for this procurement has been screened (tiered) to identify where possible, Non-Government (commercial) Specifications and/or Standards (NSG), Commercial Item Descriptions (CID) as alternatives in lieu of cited Military Specifications and Standards, Federal Specifications and Standards and/or Purchase Descriptions. This screening has identified NGSs and/or CIDs that may be used in lieu of the cited Federal Specifications and Standards, Military Specifications and Standards, and Purchase Descriptions as indicated below:

CITED
MILITARY OR FEDERAL
SPECIFICATION/STANDARD
OR PURCHASE DESCRIPTION

SUBSTITUTE
COMMERCIAL
SPECIFICATION/STANDARD
OR CID

N/A

N/A

1. Bidders are advised that the manufacturer of this item is responsible for the development of and control of the critical processes for charcoal (carbon) handling, filling and closure of the charcoal filters to meet the airflow resistance and gas life performance requirements contained in the specification in addition to meeting all components and assembly drawing dimensional requirements. The meeting of these airflow and gaslife requirements depends on process control rather than simply building to print. Charcoal beds must be uniform in density and particle size distribution as possible and as dense as possible, without exceeding airflow resistance limits, to withstand rough handling and meet gas life requirements.

2. Description of Critical Processes for Filter, Gas, 10CFM, M18A1
 - a. The contractor and subcontractors shall make available to the Government Quality Assurance Representative a complete written description of the selected production processes used to fabricate the components and/or assemblies identified below:

Filter, Gas, 10CFM, M18A1 (reference performance spec MIL-PRF-51193E)

 - b. These descriptions will be approved by the contractor's Quality Control department and made available to the on-site government Quality Assurance Representative, for reference purposes only by the Representative, during surveillance of production. Descriptions will be made available concurrent with submission of the first article sample, or prior to start of production in instances where first article submission is not required or has been waived by the government. Contractor agrees that production processes utilized during performance of the contract will conform to said descriptions. Changes to identified production processes will require changes to the written descriptions. Written notification of a change will be provided to the government Quality Assurance Representative prior to the change, if practicable, or within 5 working days after implementation of the change and will state the production process affected, the nature of the change to the production process affected, the effect of the change on production units and the exact production units affected.

Upon receipt of such notification, the government Quality Assurance Representative will promptly notify the procuring office.

c. If the government Quality Assurance Representative deems that a production process does not conform to a written description, he shall notify the contractor. Such notification shall be deemed advisory only and shall not be considered as directing any change in the production process or the contract within the purview of the changes article of the contract. The contractor shall promptly notify the government Quality Assurance Representative of his disagreement or agreement with the Representative's advice. If the contractor agrees that a nonconformance exists, he shall inform the Representative whether or not he proposes to change the production process or written description or both. Notification of a change to the production process shall accord with paragraph 2 above. If the contractor disagrees that a nonconformance exists, he shall inform the government Quality Assurance Representative who will record his observations and the contractor's disagreement and promptly notify the procuring office of the same. Such disagreement shall not be a dispute subject to the "disputes" clause of the contract.

d. These written descriptions shall identify the following as a minimum:

1. All fabrication processes used in manufacturing the Filter, Gas, 10 CFM, M18A1 (spec MIL-PRF-51193E). This includes the process to remove carbon fines, if any. The fabrication process should include all monitored process variables such as the amount of carbon, times, feed rates, pressures, drop height of carbon, and levelness of carbon bed. The nominal level of each monitored process variable should be stated along with the permissible amount each variable is allowed to deviate from this nominal value.

2. All material handling from the time the carbon is removed from the drum until closure of the Filter, Gas, 10 CFM, M18A1(spec MIL-PRF-51193E).

3. All carbon fill and fabrication equipment including but not limited to type, model number and manufacturer.

e. The production processes data provided in accordance with this provision will not be disclosed outside of the Government and will not be duplicated, used or disclosed in whole or in part for any purpose other than to ascertain that the stated production processes are being utilized. This restriction does not limit the Government's right to use information contained in the data if it obtained from another source without restriction.

- f. Government surveillance of the contractor's production processes and use of the contractor's descriptions of these processes shall not be construed as constituting Government approval of the contractor's manufacturing processes or descriptions of processes or as relieving the contractor from the responsibility for compliance with all other contract requirements.
- g. The contractor shall produce his own test equipment/adapters and obtain approval from the government for its use in this buy. Government design test equipment drawings/TDP(s) identified in the TDP may be obtained upon request from the Procuring Contracting Officer (PCO). The government design test equipment TDP provided will be for information only.

OZONE DEPLETING CHEMICALS: See Statement of Work - Ozone Depleting Chemicals

STATEMENT OF WORK - OZONE DEPLETING CHEMICALS

1a. The following specifications and standards may be listed and included as part of this Technical Data Package (TDP)/Scope of Work (SOW):

N/A

b. Other specifications and standards, which identify ODCs among alternative substances for use, are part of this TDP/SOW as follows:

N/A

c. The above specifications and standards allow optional use of Ozone Depleting Substances (ODS) or Ozone Depleting Chemicals (ODC). Preference should be given to the Non-ODS/ODC choices in compliance with Executive Order 12843, dated April 21, 1993, Procurement Requirements and Policies for Federal Agencies for Ozone Depleting Substances.

NOTICE: All shipments, except for interplant shipments, shall be packaged equivalent to the requirements of SPI P5-19-2300 as delineated in Section D of the contract.

TECHNICAL DATA PACKAGE LIST

REQUEST/PROM ID: 9900289
 DOCUMENT NUMBER: 5-19-2388
 DOCUMENT CAGE: 81361
 SPECIFICATION:
 NOMENCLATURE: FILTER, GAS, 10 CFM, M18A1 (ASZM-TEDA)

CAGE	CODE	SZE	NUMBER	PREFIX DWG DRAWING/DOCUMENT	-SHEET-	REV	DOCUMENT	NO	OF	SYM	DATE	DOCUMENT NOMENCLATURE	NOTE	STMT	DIST
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PRODUCT DRAWINGS AND ASSOCIATED LISTS

81361	DP	D	5-19-2300	001	001	A	29-APR-97	FILTER, GAS, 10 CFM, M18A1 (ASZM-TEDA)					REF	X	
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PREFIX DWG DRAWING/DOCUMENT -SHEET- REV DOCUMENT DIST
CAGE CODE SZE NUMBER NO OF SYM DATE DOCUMENT NOMENCLATURE NOTE START

PACKAGING DRAWINGS AND DOCUMENTS

PREFIX DWG DRAWING/DOCUMENT
CAGE CODE SIZE NUMBER

-SHEET- REV DOCUMENT
NO OF SYM DATE

DOCUMENT NOMENCLATURE

DIST
NOTE STNNT

INSPECTION DRAWINGS AND DOCUMENTS

DIST
NOTE STMT

DOCUMENT NOMENCLATURE

REV DOCUMENT
SYM DATE

QPL NO. NO. NO.
NO. NO. NO.

DRAWING NUMBER

SPECIFICATIONS AND STANDARDS

MIL-PRF-51193
PD-EA-C-1704
MIL-STD-191
MIL-STD-810

E -

DOCUMENT NUMBER CAGE ECP/REF/RFW NUMBER NDR ID DOCUMENT DATE CONFIGURATION ITEM NOMENCLATURE

OUTSTANDING ENGINEERING CHANGES

TDPL LEGEND

DESCRIPTION OF SYMBOLS IN THE NOTE COLUMN

G = GO TO PREFIX CODE

IF THE PREFIX CODE IS DE, DRAWING IS PROVIDED FOR INFORMATION ONLY. CONTRACTOR IS RESPONSIBLE FOR DEVELOPING AND PROVIDING HIS OWN INSPECTION AND TEST EQUIPMENT.

ALL OTHER PREFIX CODES, EQUIPMENT TO BE FURNISHED AS GFE/GFM. DRAWING/DOCUMENT SUPPLIED ONLY FOR SPECIFIC PART OR ASSEMBLY DRAWING.

REF = REFERENCE DRAWING/DOCUMENT

* = IF LISTED AS A SPECIFICATION IN THE HEADER OF THE TDPL, IGNORE THE * IN THE NOTE COLUMN, DOCUMENT IS SUPPLIED OTHERWISE, DOCUMENT NOT FURNISHED - TO BE OBTAINED FROM:
STANDARDIZATION DOCUMENT ORDER DESK
700 ROBBINS AVENUE
BUILDING 4, SECTION D
PHILADELPHIA, PA. 19111-5894

IF NOT AVAILABLE, IMMEDIATELY ADVISE THE PROCURING CONTRACTING OFFICER.

** = NOT FURNISHED. COMMERCIAL SPECIFICATIONS AND STANDARDS MAY BE OBTAINED FROM THE PUBLISHERS. THEY ARE NOT AVAILABLE FROM GOVERNMENT SOURCES.

= Specifications and standards containing OZONE depleting substances (ODSS) and/or CHLOROFLUOROCARBONS (CFCs). Additional information on these substances is available from the contracting officer (This is in accordance with P.L. 102-484).

OTHER SPECIAL NOTATIONS

A LETTER 'Y' UNDER THE QPL COLUMN OF THE SPECIFICATIONS AND STANDARDS SECTION INDICATES THAT A QUALIFIED PRODUCTS LIST (QPL) IS REQUIRED. THE NUMBER OF THE QPL IS THE SAME AS THE SPECIFICATION NUMBER

A 'DX' UNDER THE PREFIX CODE COLUMN OF THE PRODUCT DRAWINGS AND ASSOCIATED LISTS SECTION INDICATES THE DOCUMENT IS A SOURCE CONTROL DRAWING.

* END OF TDPL *

METRIC

MIL-PRF-51193E(EA)

SUPERSEDING
MIL-DTL-51193D(EA)
30 December 1996

PERFORMANCE SPECIFICATION

FILTER, GAS, 283 L/M, M18A1

This specification is approved for use by the U.S. Army Edgewood Research, Development and Engineering Center, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This performance specification covers a 283 liters per minute (l/m) gas filter which filters out airborne toxic chemical agents as part of a Nuclear, Biological and Chemical (NBC) filtration system in armored weapons systems.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Technical Director, U.S. Army Edgewood Research Development and Engineering Center, ATTN: SCBRD-ENE-S, Aberdeen Proving Ground, MD 21010-5423 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 4240

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited

2.2 Government documents.

2.2.1 Specifications, standards and handbooks. The following specifications, standards and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

STANDARDS

FEDERAL

FED-STD-191 - Textile Test Methods

DEPARTMENT OF DEFENSE

MIL-STD-810 - Environmental Test Methods and Engineering Guidelines

(Unless otherwise indicated, copies of the above specifications, standards and handbooks are available from the Standardization Document Ordering Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents. The following other documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

U.S. ARMY EDGEWOOD RESEARCH, DEVELOPMENT AND ENGINEERING CENTER

PURCHASE DESCRIPTIONS

EA-C-1704 - Carbon, Activated, Impregnated, Copper-Silver-Zinc-Molybdenum-Triethylenediamine (ASZM-TEDA)

DRAWINGS

136-41-1755 - Tester, Filter Life, 12 CFM, Q223, Assembly

(Copies are available from Technical Director, U.S. Army Edgewood Research, Development and Engineering Center, ATTN: SCBRD-ENE-S, Aberdeen Proving Ground, MD 21010-5423.)

CODE OF FEDERAL REGULATIONS

40 CFR Part 261 - Hazardous Waste Management

(The Code of Federal Regulations is for sale on a subscription basis from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. When indicated, reprints of certain regulations may be obtained from the federal agency responsible for issuance thereof.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issue of the documents cited in the solicitation (see 6.2).

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS

ACGIH publication - Threshold Limit Values and Biological Exposure Indices
(see 6.2)

(Application for copies should be addressed to American Conference of Governmental Industrial Hygienists, 1330 Kemper Meadows Drive, Cincinnati, OH 45240)

ASTM STANDARDS

D2867 - Standard Test Methods for Moisture in Activated Carbon

(Application for copies should be addressed to ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

AIR-CONDITIONING AND REFRIGERATION INSTITUTE

ARI STANDARD 700 - Standard for Specification for Fluorocarbons and Other Refrigerants

(Application for copies should be addressed to ARI, 4903 North Fairfax Drive, Arlington, VA 22203)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Materials and Components.

3.1.1 Materials. The filter shall be constructed so that it conforms to the requirements of this specification. The contractor shall select materials which pose no potential inhalation hazard to the user in excess of the limits as recommended by the American Conference of Governmental Industrial Hygienists (ACGIH publication). Unused or uncontaminated filters and packaging materials at the time of disposal shall not be a Resource Conservation Recovery Act (RCRA) hazardous waste as defined in 40 CFR 261.21 - 261.24 or 40 CFR 261.33 (e) and (f).

3.1.2 Adsorbent Media. The adsorbent media shall fully meet all of the requirements of EA-C-1704 if ASZM-TEDA carbon is used, or the adsorbent media shall meet the hardness requirement of EA-C-1704 and performance requirements of 3.5.7 of this specification if ASZM-TEDA carbon is not used. In any case, the adsorbent shall be chromium free and pose no health hazards or potential environmental problems. For adsorbent other than ASZM-TEDA carbon, the lotting shall be equivalent to those requirements found in EA-C-1704.

3.2 First article. When specified (see 6.2), a sample shall be subjected to the first article inspection in accordance with 4.2.

3.3 Physical characteristics.

3.3.1 Filter body. The filter body shall be of a design strong enough to withstand all tests delineated in 4.3.6 of this specification without any visible damage and/or degradation, except for finish.

3.3.2 Filter weight. The weight of the complete unpackaged filter shall not be greater than 1.8 kilograms.

3.3.3 Color. The exterior surface of the filter shall be white, except for markings.

3.4 Interface.

3.4.1 Filter shape and size. The filter body shall be cylindrical in shape with ports on both ends of the filter that are concentric with the long axis of the filter. The body of the assembled filter shall be 12.65 - 13.15 cm outside diameter at any point except for the ports and any circular shoulders on each end. The outer diameter of each port shall be 2.87 +/- .03 cm and the external length of each port shall be 1.30 - 1.90 cm. The filter ends shall be so constructed as to have a flat circular area concentric with the port on each end. Each flat circular area shall be capable of mating with a 3.2 mm thick rubber gasket with a 3.0 cm inner diameter and an 8.9 cm outer diameter. The distance between these two flat circular surfaces shall be 24.28 +/- .10 cm. The ends of the outer diameter of the assembled filter body shall not project beyond the parallel planes of these two flat circular areas.

3.5 Performance characteristics.

3.5.1 Air flow resistance. The air flow resistance of the filter shall not exceed 43 millimeters of water at a 283 standard liters per minute airflow with an air stream temperature of 21°C and a barometric pressure of 760 millimeters (mm) Hg when tested as specified in 4.3.6.1.

3.5.2 Filter leakage. The filter shall not leak when a concentration of 1000 parts per million (ppm) of R-134a (1,1,1,2 tetrafluoroethane) refrigerant is introduced at the inlet of the filter at a flow rate of 57 standard liters per minute when tested in accordance with 4.3.6.2. The refrigerant (R-134a) shall conform to the characteristics of ARI STANDARD 700 and shall be dispersed in air at 24 +/- 5°C and 50 percent maximum relative humidity (RH). A filter leak shall be defined as the presence of 1 ppm or more of R-134a in the effluent air within two minutes after the introduction of the refrigerant at the inlet of the filter.

3.5.3 Moisture content of adsorbent. The moisture content of the adsorbent taken immediately before packaging shall not exceed 3.0 percent when tested as specified in 4.3.6.3

3.5.4 Structural Integrity. The filter shall withstand testing as specified in 4.3.6.4. Sample filters shall show no evidence of cracks, dents or structural damage upon visual inspection after completion of testing.

3.5.5 DMMP Gas life (destructive). After meeting the requirements of 3.5.4, the filter shall have a DMMP gas life of not less than 100 minutes at rated flow (283 l/m) when subjected to a DMMP challenge of 3.0 +/- 0.2 milligrams per liter with an air stream temperature of 30 +/- 3°C and a maximum of 25% humidity. Break concentration shall be 0.04 micrograms per liter. This requirement shall be met when tested in accordance with 4.3.6.5.

3.5.6 CK gas life (destructive). The filter shall have a CK gas life of no less than 30 minutes at rated flow (283 l/m) when subjected to a CK challenge concentration of 4.0 +/- 0.2 milligrams per liter, with an air stream relative humidity of 80 +/- 3 percent and air stream temperature of 24 +/- 3°C. Break concentration shall be 8 micrograms per liter. Filters shall be equilibrated to 80 percent R.H. prior to test. This requirement shall be met when tested in accordance with 4.3.6.6.

3.5.7 Adsorbent media gas life capacity. If a material other than ASZM-TEDA carbon is proposed as the adsorbent media, the material must be pre-qualified in a gas life test program in advance of First Article inspection. The qualification test program shall demonstrate to the Government that gas life before and after environmental open-air exposure is equal or greater than that of ASZM-TEDA carbon for agents hydrogen cyanide (AC), CK, phosgene (CG) and DMMP as listed in EA-C-1704 and any additional chemical agents or simulants that may be specified by the Government (see 6.6). For those agents or simulants not listed in this paragraph, the Government reserves the right to establish the gas life requirements for those agents or simulants.

3.5.8 Fines retention. Internal fines media shall retain the adsorbent in the adsorbent bed, so that the adsorbent emission from any individual filter shall not exceed 50 milligrams when tested as specified in 4.3.6.8.

3.5.9 Fines Media. The fines media material, if made from natural cloth or any other organic material, shall resist dampness and mildew when tested as specified in 4.3.6.9. The material shall have a minimum spray rating of 50.0 and no visible growth of mildew on the material shall be evident after testing.

3.6 Marking. The exterior filter body shall be marked with the filter nomenclature: "FILTER, GAS, 283 LITERS/MINUTE, M18A1", the National Stock Number, the lot number and the mfg. date in a nominal 9.5 mm high lettering on the circumference perpendicular to the long axis of the filter. The distance between the lines of lettering shall be a nominal 6 mm. The marking shall be black paint or ink. A 5 cm long arrow shall be marked on the outside of the filter body parallel with the axis of the filter and pointing in the direction of the air outlet port. A nominal 9.5 mm high marking below and centered on the arrow shall read "AIR FLOW". The outlet end of the filter shall have the marking "OUTLET" in a nominal 9.5 mm high marking.

3.7 Workmanship. Filters shall be free from sharp edges, all foreign matter and damage such as chipped or bent sections, cracks, punctures, pitting, tears, burrs or scratches.

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- (a) First article inspection (see 4.2)
- (b) Conformance inspection (see 4.3)

4.2 First article inspection.

4.2.1 Sample. The first article sample shall consist of 20 consecutively produced filters which pass airflow resistance and leakage requirements (3.5.1 and 3.5.2). The first article sample shall be manufactured using the same design, methods, materials, equipment, and processes as will be used during regular production. The first article sample shall be submitted for inspection and approval in accordance with the terms of the contract.

4.2.2 Inspection Procedure. Unless otherwise specified by the terms of the contract the sample first article items shall be subjected to any or all of the examinations and tests specified in this specification and shall be inspected for compliance with all of the requirements of the applicable packaging requirements. All nondestructive tests shall be performed before destructive tests.

4.2.2.1 For examination. The sample filters shall be examined for all required visual and measurable characteristics in this specification.

4.2.2.2 For test. Samples of at least 100 grams each of adsorbent shall be taken during the filling of the first, tenth and twentieth filters and placed in separate open containers. Those samples of adsorbent shall be exposed to the same conditions of temperature and humidity as their associated filters. Each filter shall be tested for air flow resistance (4.3.6.1) and leakage (4.3.6.2). Six of these filters shall then be tested in accordance with the fines retention test (4.3.6.8), the dampness and mildew resistance tests (4.3.6.9) after being visually examined for workmanship. Following leakage testing, the 14 remaining acceptable filters shall be packaged using the same methods, materials, equipment, and processes as will be used during regular production. Concurrent with or immediately following the packaging of the filters corresponding to each adsorbent sample, a 10 gram portion of each mixed adsorbent sample shall be tested for moisture content in accordance with 4.3.6.3. The packaged sample filters shall then be forwarded to the Government, and seven of them subjected to structural integrity testing in accordance with 4.3.6.4. These seven filters shall be tested by the Government in accordance with the DMMP gas life test (4.3.6.5) and the other seven filters shall be tested in accordance with the CK value test (4.3.6.6). If any sample filter from the lot fails to meet the requirements for structural integrity, fines retention, dampness and mildew resistance, DMMP gas life, CK gas life, dimensions or workmanship, the first article lot shall be rejected.

4.2.3 Acceptance criteria. If any first article sample item fails to comply with any of the applicable requirements, the first article sample shall be rejected. The Government reserves the right to terminate inspection upon any failure to comply with any of the of the requirements. The contractor shall obtain written approval from the contracting activity prior to proceeding with regular production.

4.3 Conformance inspection.

4.3.1 Lotting. A lot shall consist of the filters produced by one manufacturer on one production line, from the same materials, with the same process, and without a break in production of more than 10 calendar days. However, any one lot of filters shall contain no more than one lot of adsorbent, and a new lot shall be started whenever any adsorbent filling or final assembly process equipment change is made. Each lot shall be identified and controlled in accordance with normal industry practice.

4.3.2 Sampling.

4.3.2.1 For examination. Sampling of packaged filters shall be conducted in accordance with the classification of characteristics in 4.3.5. Samples shall be selected at random.

4.3.2.2 For tests. Sample sizes for DMMP and CK gas life testing shall be as follows:

TABLE I. Sampling Plan for Filter Gas Life

Lot size	DMMP and Structural Integrity sample size	CK sample size
30 to 150	5	5
151 to 500	8	8
501 to 5000	13	13

4.3.3 Inspection procedure.

4.3.3.1 For examination. Every item in the lot shall be inspected for critical characteristics. Sample filters shall be examined and tested in accordance with the classification of characteristics in 4.3.5. If a filter is found that does not conform to leakage or air flow resistance requirements, the non-conforming filter shall be rejected and removed from the lot. For major characteristics other than air flow resistance, failure of samples to conform to any characteristic based on sampling and acceptance criteria specified therein shall be cause for rejection of the lot. Failure of any sample filter to conform to any minor characteristic based on the sampling and acceptance criteria specified therein may be cause for rejection of the lot represented.

4.3.3.2 For test A 100 gram sample of adsorbent shall be taken during the filling of the first and last filter manufactured each day and placed in separate open containers. Those samples of adsorbent shall be exposed to the same conditions of temperature and humidity as their associated filters. Each filter shall be tested for air flow resistance (4.3.6.1) and leakage (4.3.6.2). Following leakage testing, filters shall be packaged. Concurrent with or immediately following the packaging of the filters corresponding to each adsorbent sample, a 10 gram portion of each mixed adsorbent sample shall be tested for moisture content in accordance with 4.3.6.3. Packaged sample filters shall then be forwarded to the Government and half of them subjected to structural integrity testing in accordance with 4.3.6.4. Following structural integrity testing (see Table I), the Government shall conduct gas life tests on sample filters in accordance with 4.3.6.5, and shall conduct gas life tests on the other half of the filters in accordance with 4.3.6.6. Any filter failing leakage or air flow resistance requirements shall be rejected and removed from the lot. If any sample filter from the lot fails to meet the requirements for structural integrity, DMMP value, CK value, dimensions or workmanship, the lot represented shall be rejected.

4.3.4 Inspection characteristics. Critical characteristics are characteristics whose nonconformance to specified requirements is likely to result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the product or whose nonconformance to specified requirements is likely to prevent performance of the tactical function of a major end item. Major characteristics are characteristics whose nonconformance to specified requirements is likely to result in failure or to reduce materially the usability of the item for its intended purpose. Minor characteristics are characteristics whose nonconformance to specified requirements is not likely to reduce materially the operation or usability of the item for its intended purpose.

4.3.5 Classification of characteristics. Conformance examinations and tests shall be as specified in the following classification of characteristics paragraphs. When specified herein, accept on 0 and reject on 1 attributes sampling inspection shall be performed on the designated characteristics using the stated levels in table I or table II for selection of sample sizes.

TABLE II. Sampling

Lot size	Inspection levels and sample size										
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
2 to 8	*	*	*	*	*	*	*	*	5	3	2
9 to 15	*	*	*	*	*	*	13	8	5	3	2
16 to 25	*	*	*	*	*	20	13	8	5	3	3
25 to 50	*	*	*	*	32	20	13	8	5	5	5
51 to 90	*	*	*	50	32	20	13	8	7	6	5
91 to 150	*	*	125	50	32	20	13	12	11	7	6
151 to 280	*	315	125	50	32	20	20	19	13	10	7
281 to 500	*	315	125	50	48	47	29	21	16	11	9
501 to 1200	*	315	125	75	73	47	34	27	19	15	11
1201 to 3200	1250	315	125	116	73	53	42	35	23	18	13
3201 to 10000	1250	315	192	116	86	68	50	38	29	22	15

* Indicates one hundred percent inspection. If sample size exceeds lot size, perform one hundred percent inspection.
 Accept the lot represented on zero nonconforming characteristics and reject the lot represented on one or more nonconforming characteristics for all inspection levels.

CLASSIFICATION OF CHARACTERISTICS

PARAGRAPH	TITLE				
4.3.5	Filter, Gas, 10 CFM, M18A1			sheet 1 of 1	
CATEGORY	CHARACTERISTICS	SAMPLING AND ACCEPTANCE CRITERIA	REQUIREMENTS PARAGRAPH	INSPECTION METHOD	
Critical					
1	Leakage	100 percent inspection	3.5.2	4.3.6.2	
Major					
101	Air flow resistance	100 percent inspection	3.5.1	4.3.6.1	
102	Moisture content		3.5.3	4.3.6.3	
103	Inlet and outlet ports correct	Table II, level IX	3.4.1	CE	
104	Structural integrity	Table I	3.5.4	4.3.6.4	
105	DMMP gas life	Table I	3.5.5	4.3.6.5	
106	CK gas life	Table I	3.5.6	4.3.6.6	
107	Overall dimensions	Table II, level IX	3.4.1	CE	
108	Workmanship	Table II, level IX	3.7	VI	
Minor					
201	Marking correct and legible	Table II, level XI	3.6	VI	
202	Weight	Table II, level XI	3.3.2	CE	
203	Color correct	Table II, level XI	3.3.3	VI	
Notes:					
CE -- Commercial inspection equipment					
VI -- Visual inspection					

4.3.6 Tests.

4.3.6.1 Air flow resistance. The pressure drop across the filter shall be in accordance with 3.5.1 and shall be determined at the rated air flow. The up-and down-stream static pressure measuring tubes shall be as close as possible to the filter and shall not be on a section of duct that has a changing cross sectional area. Test for air flow resistance as follows:

- (a) Connect the filter to a source of forced air.
- (b) Set the flow of air through the filter to 283 standard liters per minute
- (c) Record the barometric pressure.
- (d) Measure and record the air stream temperature.
- (e) Determine and record the difference in static pressure head up-stream of the filter to that down-stream of the filter. NOTE: If using test parameters different than those stated in 3.5.1, calculate and record the air flow resistance $\Delta P(\text{cal})$ using the equation below to correct test measurements to standard conditions.

$$\Delta P(\text{cal}) = \frac{P(\text{test}) \times \Delta P(\text{measured}) \times 86.2}{(492 + 1.8T)^{1.768}}$$

$\Delta P(\text{cal})$ - Air flow resistance corrected to standard conditions in millimeters of water

$P(\text{test})$ - Barometric pressure at time of test in mm Hg

$\Delta P(\text{measured})$ - Value recorded from test measurement in millimeters of water

T - Temperature of air stream flowing through filter in degrees C

If $\Delta P(\text{cal})$ is more than the air flow resistance stated in 3.5.1, the filter shall be rejected.

4.3.6.2 Leakage. Position the filter to be tested rigidly with the long axis in the vertical position. Connect the filter to a source of forced air and place a mixing chamber at the influent side of the filter. Regulate the air flow from the blower to 57 standard liters per minute. Introduce R-134a into the intake of the blower; monitor and maintain a concentration of 1000 ppm by volume of R-134a in air at an air flow of 57 standard liters per minute on the influent side of the filter at the proper temperature and relative humidity for the specified period of time (see 3.5.2). Leakage shall be in accordance with 3.5.2 and shall be determined using a suitable leak detector (see 6.5) for sampling and detecting R-134a at the effluent side of the filter. Purge the filter by passing fresh air in the reverse direction of that indicated above through the filter at 283 standard liters per minute for 1 minute. Keep the exposure of the filter to air to a minimum. The air flow time for leakage should not exceed 3 minutes.

4.3.6.3 Moisture content of filter. The filters shall meet the moisture content specified in 3.5.3 when the moisture content of the adsorbent is determined in accordance with ASTM D 2867, *Oven-Drying Test Method*, except that the oven temperature shall be 103°-107°C and the drying time shall be 3 hours. The moisture content may also be determined through the use of moisture teller devices. If the moisture content of the adsorbent exceeds the requirement, the filters represented by the samples shall be considered unacceptable.

4.3.6.4 Structural integrity. Each sample unpackaged filter shall be positioned vertically with inlet end down and clamped on a steel movable plate. The plate shall measure 76.2 by 76.2 cm and have a total weight of 109 +/-9 kilograms including the holding clamps. When the filter is securely clamped in place, there shall be no distortion of the frame or body of the filter. The steel movable plate and filter shall be raised and let fall (free) 19 +/-3 mm onto a steel base plate at the rate of 200 drops per minute for 15 +/- 0.1 minutes. The steel base plate shall be part of the apparatus and shall be firmly anchored to a concrete floor capable of absorbing the impact of the vertical vibrations. The test shall be performed at a room temperature of 21 +/-11C. Throughout the test the filter shall remain in a firm position. Filters may be padded or blocked where clamps press against the side or top of the frame, but not the bottom, to prevent distortion of the filter. The movable steel plate must be parallel to the base plate at all times to eliminate any horizontal movement and/or force. The filter shall meet the requirements of 3.5.4 after rough handling.

4.3.6.5 DMMP gas life (destructive). The DMMP gas life shall be determined by the Government laboratory in accordance with 3.5.5 using the Q223 tester (Drawing 136-41-1755) or an approved equivalent tester.

4.3.6.6 CK gas life (destructive). The CK gas life shall be determined by the Government laboratory in accordance with 3.5.6 using the Q223 tester or an approved equivalent tester.

4.3.6.7 Adsorbent Media. For adsorbent other than ASZM-TEDA carbon, all supporting test data shall be based on test paragraphs, conditions and methods described in EA-C-1704. Supporting test data will also be needed for any required test falling outside of the scope of EA-C-1704 (see 6.6).

4.3.6.8 Fines retention test. The filter shall be rigidly mounted with the inlet port in the upper vertical position and subjected to the test of MIL-STD-810, Method 516.4, Procedure I. A total of three half sine wave shock pulses shall be applied in both directions along each of three mutually perpendicular axes. Peak amplitude shall be 30 +/- 3 g, 11 +/- 0.2 milliseconds (ms). At the conclusion of the test, examine the filter for adsorbent fines emission and record the total amount of emission through the fines filters. The filter shall meet the adsorbent emission limits of 3.5.8.

4.3.6.9 Dampness and mildew resistance tests. The dampness resistance test shall be in accordance with Test Method 5526 of FED-STD-191 and the mildew resistance test shall be in accordance with Test Method 5750 of FED-STD-191. A minimum of two samples of fines media from filters shall be subjected to each test. The dampness resistance and mildew resistance shall meet the requirements of 3.5.9.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). The packaging should help preserve the integrity of the filter over time and exclude moisture from degrading the adsorbent. When actual packaging of materiel is to be performed by DOD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The gas filter covered by this performance specification is intended to be used as a component of NBC filtration systems in military armored vehicles such as the M1 series tanks. This filtration system (M13A1 GPFU) normally provides purified air to four crew members inside a closed armored vehicle in a chemical agent contaminated environment, with the M18A1 gas filter being the part of this system which purifies the air from chemical agents. The M18A1 Gas Filter is military unique with no known commercial application.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2.1).
- (c) The American Conference of Governmental Industrial Hygienists (ACGIH) ordering number or designation for their publication listing threshold limit values to be applicable for the solicitation.
- (d) First article:
 - (1) Time allowed for contractor submission of samples for Government test and evaluation after award of contract when testing is performed by the Government.

(2) Name and address of test facility and shipping instructions when testing is performed by the Government.

(3) Time required for the Government to notify the contractor whether or not to proceed with production.

(e) Packaging requirements.

(f) Additional identification or marking requirements, if required must be in the contract and cite the identification method and responsibility for the items affected, such as test units, components, serial numbers, Julian date, lot numbers, etc

6.3 DMMP gas life and CK gas life tests. Samples for these tests should be forwarded by the contractor, together with DD Form 1222, to Director, U.S. Army Edgewood, Research, Development and Engineering Center, ATTN: SCBRD-ENM-N, Building E5165, Aberdeen Proving Ground, MD 21010-5423.

6.4 Submission of alternative inspection provisions. Proposed alternative inspection provisions should be submitted by the contractor to the procuring contracting officer for evaluation and approval by the technical activity responsible for preparation of this specification.

6.5 Leakage detector. The halide leak detector, model F1000, manufactured by Nuclear Consulting Services, Inc. has been found suitable for this purpose. When using this detector, the presence of high vapor pressure halogenated contaminants in the refrigerant could interfere with the filter leak test, resulting in false indications of filter leakage. Should false leakage indications be suspected, the refrigerant should be checked for the presence of such contaminants.

6.6 Adsorbent Media. Although manufacturers may consider using alternate adsorbent media, development tests comparable to or beyond those done on ASZM-TEDA carbon specified by EA-C-1704 must first be performed by the contractor, and then approved for use by the Government. Contractors are forewarned that such testing, which includes gas life capacity testing using a variety of chemical agents before and after open-air environmental exposure, may be lengthy and costly. All such costs will probably be borne by the contractor, including costs for Government testing.

6.7 Lot numbering. MIL-STD-1168 outlines a lot numbering procedure that has been used successfully in the past.

6.8 Drying of filters. Filters not meeting the moisture requirement may be dried by passing contaminant free air at a temperature not to exceed 100°C through the filters. After drying, two filters shall be chosen at random and disassembled. The moisture content of the adsorbent from these filters shall be redetermined in accordance with ASTM D 2867, Oven-Drying Test Method, except that the oven temperature shall be 103°-107°C and the drying time shall be 3 hours. The moisture content of the adsorbent may also be determined through the use of moisture teller devices.

6.9 Subject term (key word) listing.

CK (cyanogen chloride)
DMMP (dimethylmethylphosphonate)
Filtered air
Gas filter
R-134a (1,1,1,2 tetrafluoroethane)
Toxic gas filter

6.10 Other. The filter depicted on drawing 5-19-2300 (Filter, Gas, 10 CFM, M18A1) is known to be capable of meeting the requirements of this performance specification but is not mandatory for use in manufacture as the drawing is for information purposes only.

6.11 Changes from previous issues. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodian:

Army - EA

Preparing activity:

Army - EA

Project No. 4240-

EA-C-1704
24 January 1942

**CHEMICAL RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
PURCHASE DESCRIPTION**

**CARBON, ACTIVATED, IMPREGNATED, COPPER-SILVER-ZINC-MOLYBDENUM-
TRIETHYLENEDIAMINE (AS2M-TEDA)**

1. SCOPE

1.1. Scope. This specification covers activated carbon impregnated with copper, silver, zinc and molybdenum salts and triethylenediamine (TEDA) for use as a sorbent of toxic agents.

2. APPLICABLE DOCUMENTS

2.1. Government documents.

2.1.1. Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

- PPP-D-723 - Drums, Fiber
- PPP-P-420 - Plugs and Flanges (For Drum Closures)

FSC 6610

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

MILITARY

- ML-P-15011 - Pallets, Material Handling, Wood Post Construction, 4-Way Entry

STANDARDS

FEDERAL

- FED-TEST METHOD STD. NO. 101 - Test Procedures for Packaging Materials
- FED-STD-495 - Colors

MILITARY

- ML-STD-129 - Marking for Shipment and Storage
- ML-STD-147 - Palletized Unit Loads
- ML-STD-171 - Finishing of Metal and Wood Surfaces

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2. Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

U.S. ARMY CHEMICAL RESEARCH, DEVELOPMENT AND ENGINEERING CENTER

DRAWINGS

- 136-41-332 - Inspection Equipment Apparatus, Agent Testing, Ammonia Content in Charcoal, Q3 Assembly

PUBLICATIONS

INSTRUCTION MANUALS

- IM 136-300-34 - Instruction Manual for Installation, Operation, and Maintenance of Apparatus, Agent Testing, Ammonia Content in Charcoal, Q3

(Copies are available from Commander, U.S. Army Chemical Research, Development and Engineering Center, ATTN: SMOCC-197-O, Aberdeen Proving Ground, MD 21010-5422.)

2.2. Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents

which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issue of the documents cited in the solicitation (see 6.2).

UNIFORM FREIGHT CLASSIFICATION RULES

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 223 South Riverside Plaza, Chicago, IL 60606.)

ASTM STANDARDS

- D 1193 - Reagent Water
- D 2854 - Apparent Density of Activated Carbon
- D 2863 - Particle Size Distribution of Granular Activated Carbon
- D 2867 - Moisture in Activated Carbon
- D 3902 - Ball-Pan Hardness of Activated Carbon
- D 3931 - Commercial Packaging

(Application for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3. Order of precedents. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1. Materials. The active materials on the carbon shall be composed of and limited to copper, silver, zinc and molybdenum salts and TEDA. The base carbon shall be limited to steam activated carbon produced from bituminous coal (see 4.1.3).

3.2. Chemical and physical characteristics. The carbon shall conform to the chemical and physical characteristics specified in table I when tested as specified therein.

3.2.1. Particle size distribution. The carbon shall conform to the particle size distribution of table II when tested as specified in 4.2.4.1.

TABLE I. Chemical and physical characteristics

Characteristic	Requirement		Test
	Minimum	Maximum	
Molature content, percent by weight	—	2.5	42.4.2
Apparent (bulk) density, g/ml	—	0.65	42.4.3
Hardness	85	—	42.4.4
Arsenic, mg/L of 100 ml carbon	—	0.0010	42.4.5
Copper content, percent by weight	—	6.0	42.4.6
Silver content, percent by weight	0.030	0.1	42.4.6
Zinc content, percent by weight	—	6.0	42.4.6
Molybdenum content, percent by weight	—	2.5	42.4.6
TEDA content, percent by weight	—	2.5	42.4.7

TABLE II. Particle size distribution

Particle size	Percent by weight of original sample
Passing a 1.36 mm (No. 12) sieve	100
Retained on a 1.18 mm (No. 16) sieve	0 - 2
Retained on a 850µm (No. 20) sieve	10 - 30
Retained on a 600µm (No. 25) sieve	40 - 65
Retained on a 212µm (No. 70) sieve	10 - 35
Retained on a 212µm (No. 70) sieve	2.5 (maximum)
Passing a 212µm (No. 70) sieve	0.30 (maximum)

3.2.2 Gas samples. The carbon shall conform to the gas sorption requirements of table III when tested as specified in 4.2.4.3.

TABLE III. Gas sorption requirements in minutes (minimum)

Agent	Urged (Average)	Accepted (Average)
Hydrogen chloride (HCl)	28	—
Oxygen chloride (O ₂)	55	45
Phosgene (CO)	25	—
Dimethylmethylphosphonate (DMMP)	175	—

* Age carbon is specified in 4.2.4.8.1

4. QUALITY ASSURANCE PROVISIONS

4.1. Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities available for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1. Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of meeting all product or supplier standards submitted to the Government for acceptance control with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to assure conformance to requirements; however, this does not constitute consideration of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2. Government's responsibility. The Government will be responsible for conducting the metal content (4.2.4.6), TEDA content (4.2.4.7) and gas sorption tests (4.2.4.8) (see 5.9).

4.1.3. Certification. The contractor shall certify that the requirements of 3.1 have been met.

4.1.4. Contractor assurance of compliance. The contractor's quality program or detailed inspection system shall provide assurance of compliance of all characteristics with the applicable drawing, special packaging instruction, and specification requirements using, as a minimum, the conformance criteria specified herein.

4.1.5. Alternative inspection provisions. Alternative inspection procedures, methods, or equipment, such as statistical process control, lot control, and other types of sampling procedures may be used by the contractor when they provide, as a minimum, the level of quality assurance required by the inspection provisions specified herein. Prior to applying such alternative procedures, methods, or equipment, the contractor shall describe them in a written proposal submitted to the Government for evaluation and approval. (See 6.4.) When required, the contractor shall demonstrate that the effectiveness of each proposed alternative is equal to or better than the quality assurance provisions specified herein. In cases of dispute as to whether the contractor's proposed alternative provides equal quality assurance, the provisions of this specification shall apply. All approved alternative inspection provisions shall be specifically incorporated into the contractor's quality program or detailed inspection system, as applicable.

4.2. Quality conformance inspection.

4.2.1. Testing. A lot shall consist of not more than 9 metric tons and not less than 4 drums of carbon, produced without change in materials by one manufacturer by one continuous process or in successive increments by the same intermittent process.

4.2.2. Sampling.

4.2.2.1. For examination and test of military packaging. The sample unit shall be one filled packing container (drum), ready for shipment. Sampling for examination and test of military packaging shall be conducted in accordance with table IV. Samples shall be selected at random.

TABLE IV. Sampling for examination and test of military packaging

Number of drums in lot	Number of sample drums
4 to 20	2
21 to 30	3
31 to 40	4
41 to 50	5
51 to 60	6
61 to 70	7
71 to 80	8
Over 80	9

4.2.2.2. For test of carbon. Four drums shall be selected at random from the lot. A representative 3 kilogram (6lb) specimen shall be obtained for each drum and placed in

separate clean, dry containers in such a way as to minimize the exposure of the carbon to the atmosphere. The containers shall then be sealed with an airtight closure and labeled to identify the drum and lot represented.

4.2.3 Impediment procedure.

4.2.3.1 Permeation and test of military packaging. Sample drums shall be examined and tested for the characteristics listed below. Failure of any sample drum to conform to all characteristics shall be cause for rejection of the lot represented.

- (a) Contents per part as specified
- (b) Positive container and closure as specified
- (c) Positive container surface cleaning, treatment, finish and color as specified
- (d) Positive container cover jacket as specified
- (e) Marking correct and legible
- (f) Positive container leakage (see 4.2.5) (applicable to level A only)

4.2.3.2 Per test of carbon. One sample from each specimen taken in 4.2.2 shall be used for each test specified in 4.2.4.6, 4.2.4.7 and 4.2.4.8. Two samples from each specimen shall be taken for each test specified in 4.2.4.1, 4.2.4.2, 4.2.4.3, 4.2.4.4 and 4.2.4.5.

4.2.3.3 Acceptance criteria for carbon. Should any specimen tested in accordance with 4.2.4.1 through 4.2.4.7 fail to comply with the requirements in tables I and II, the lot shall be rejected. Should the averaged gas sorption result for any agent tested in accordance with 4.2.4.8 fail to comply with the requirements in table III, the lot shall be rejected.

4.2.4 Tests. Water in accordance with ASTM D 1193, type II and reagent grade chemicals shall be used throughout the tests. Where applicable, blank determinations shall be run and corrections applied where significant. Tests shall be conducted as follows:

4.2.4.1 Particle size. Using the screen specified in table II, determine particle size distribution of two samples from each specimen in accordance with ASTM D 2862. Calculate the average grain size for each drum.

4.2.4.2 Moisture content. Determine the moisture content of two samples from each specimen in accordance with ASTM D 2867, oven-drying test method, except the oven temperature shall be 105° to 107°C and the drying time shall be 3 hours. Calculate the average for each drum.

4.2.4.3 Apparent (bulk) density. Determine the apparent (bulk) density of two samples from each specimen in accordance with ASTM D 2894. Calculate the average for each drum.

4.2.4.4 Hardness. Determine the hardness of two samples from each specimen in accordance with ASTM D 3802, except that a shaking period of 3 minutes \pm 5 seconds shall be

used in lieu of the specified period of 10 minutes \pm 10 seconds. Calculate the average for each drum.

4.2.4.5 Ammonia content. Determine the ammonia content of two samples from each specimen using the 03 Ammonia Content in Carbon Testing Apparatus (Drawing 76-41-522 and IM 136-300-36) or using an equivalent method approved by the Government. Calculate the average for each drum.

4.2.4.6 Total oxygen, silver, zinc and molybdenum content. Determine the total content of each metal on the carbon as follows:

4.2.4.6.1 Extraction. Extract the metals from the carbon sample by one of the following procedures:

- (a) By acid reflux. Obtain a 3 to 10 g representative sample of carbon using blending and riffing techniques. Dry the sample in an oven at 105° \pm 2°C for not less than 3 hours and cool in a desiccator to room temperature. Grind the sample until 95 percent or more will pass through a 25-mesh screen. Weigh 1.0000 \pm 0.0001 g of carbon into a 250 milliliter (mL) flask. To the flask add 100 mL of reagent water and 65 mL of 20 percent nitric acid solution. Attach the flask to a reflux condenser and boil for 1 hour. Remove the flask from the water and condenser. Filter the hot solution by vacuum through an 8 to 15 microner filter membrane. Rinse the flask with several portions of reagent water. Rinse the carbon on the filter with three 5 mL portions of 20 percent nitric acid solution. Quantitatively transfer the filtrate to a 500 mL volumetric flask and allow to cool to room temperature. Dilute to the mark with reagent water and mix thoroughly. The extract solution may require further dilution depending on the instrumentation used in the analysis (4.2.4.6.2).

- (b) By microwave treatment. Obtain a representative 3 sample of carbon using blending and riffing techniques. Dry the sample in an oven at 105° \pm 2°C for not less than 3 hours and cool in a desiccator to room temperature. Weigh 0.2000 \pm 0.0001 g and place in a fused alumina digestion vessel. Add 10 mL of 20 percent nitric acid and seal the vessel. Place the vessel in a holder in the microwave oven and attach vent tube to the collection condenser. Open the lid 4 minutes in the microwave oven and attach vent tube to digestion. Open the digestion vessel and quantitatively transfer the solution into a 100 mL volumetric flask, dilute to the mark with reagent water, and mix thoroughly. The extract solution may require further dilution depending on the instrumentation used in the analysis (4.2.4.6.2).

4.2.4.6.2 Analysis. Analyze the extract solution for the concentration of each of the four metals by atomic absorption spectrophotometry. Inductively coupled plasma or by any other method approved by the Government. Note that the acid content of the extracts used in following the analysis, calculate the weight percent of each of the four metal impurities on the carbon.

4.2.4.7 TEDA content. Determine TEDA content of the carbon using the following method or equivalent method approved by the Government.

4.2.4.7.1 TEDA solution. Weigh 1.000 \pm 0.010 g of carbon directly into a 15 mL, flat-bottomed flask. Add 10 mL acetone from a measuring cylinder and fit the flask with a reflux condenser. Support the flask and condenser above a hot plate and reflux for 15 to 20 minutes. Remove from the source of heat and allow to cool to room temperature. Remove the reflux condenser and carefully transfer the extract by decanting into a 50 mL volumetric flask. Report the extraction process first zinc zinc adding the methanol extracts to the volumetric flask. Finally rinse the carbon with 5 mL methanol adding the washing to the volumetric flask.

4.2.4.7.2 Preparation of solutions.

- (a) Preparation of tetramethylamethylenediamine (TMEDA) internal standard solution. Using a dropper pipette, weigh to the nearest 0.001 g, 0.150 to 0.200 g (X) of TMEDA into a 50 mL volumetric flask. Make up to the mark with methanol and mix thoroughly.

- (b) Preparation of standard test solutions. Prepare three standard solutions by weighing into three 50 mL volumetric flasks 0.015 \pm 0.001 g, 0.030 \pm 0.001 g and 0.045 \pm 0.001 g TEDA, respectively. Add, by means of a volumetric pipette, 5 mL of TMEDA internal standard solution to each flask and make up to the mark with methanol. Mix thoroughly.

- (c) Preparation of sample test solutions. To the flasks containing the extracts and washing from the carbon samples (4.2.4.7.1(a)), add, by means of a volumetric pipette, 5 mL of TMEDA internal standard solution. Make up to the mark with methanol and mix thoroughly.

4.2.4.7.3 Gas chromatographic analysis. Analysis of the sample and standard test solutions shall be made using a gas chromatograph (see 6.3).

4.2.4.7.4 Calculations. Measure the areas of TEDA and TMEDA peaks for sample and standard test solutions, as they appear. Determine the ratio of areas, TEDA/TMEDA for each solution. Repeat sample injection twice more ensuring that the area ratio do not vary by more than 1 percent. Determine the average area ratio for each solution. Determine the concentration ratio of TEDA/TMEDA in each standard. (Note that TMEDA concentration in all solutions is X/10 grams per 50 mL). Plot concentration ratios versus area ratios for the three standard solutions using the origin as a fourth data point for calibration. Using linear regression, calculate the slope, K_1 , of the calibration graph. From the area ratio measured for the sample solution, determine the concentration ratio, TEDA/TMEDA, as follows:

Concentration ratio = Area ratio x M

$$\text{Weight of TEDA determined} = \text{Concentration ratio} \times \frac{X}{10} \text{ grams}$$

$$\text{Percent TEDA on carbon} = \frac{\text{Weight of TEDA determined}}{\text{original weight of carbon}} \times 100$$

4.2.4.8 Standard gas sorption tests. One liter shall be determined using test apparatus approved by the Government and shall be turned under the conditions specified in table V. The tests shall be performed in identical containers using the conditions given in table V. Fill the test container with the test sample using a procedure such that the packing density is equivalent to that obtained using ASTM D 2854. In addition, the filling procedure used shall be such that segregation of the carbon particles by size does not occur.

Rank the data from the lowest to the highest as X_1, X_2, X_3 and X_4 . Calculate:

$$\frac{X_1 - X_2}{X_1 - X_3} \quad \text{and} \quad \frac{X_1 - X_3}{X_1 - X_4}$$

If either result exceeds 0.755, the group is said to have an outlier. Discard the test results, prepare a new group of four test containers and repeat the test once. Calculate the average of the four specimens for each agent tested.

4.2.4.9.1 Analytical aging. Prior to aging, the carbon shall be equilibrated for 18 hours at a relative humidity (RH) of 80 ± 3 percent, temperature of 24 ± 3°C, and a flow rate approximating the test flow rate. After equilibration, place the carbon in open containers and age for 7 days in air at 80 ± 3 percent RH and a temperature of 45 ± 1°C. After aging, the carbon shall be re-equilibrated at 80 ± 3 percent RH at room temperature before testing with CK as specified in table V.

Rank the data from the lowest to the highest as X_1, X_2, X_3 and X_4 . Calculate:

$$\frac{X_1 - X_2}{X_1 - X_3} \quad \text{and} \quad \frac{X_1 - X_3}{X_1 - X_4}$$

If either result exceeds 0.755, the group is said to have an outlier. Discard the test results, prepare a new group of four test containers and repeat the test once.

TABLE V. Standard gas sorption test conditions.

Gas	Concentration* (mg/m ³)	Endpoint (mg/m ³)	Relative Humidity (percent)	Temperature (°C)
AC	4000 ± 400	5**	80 ± 3 ***	24 ± 3°C
CK	4000 ± 400	5	80 ± 3 ***	24 ± 3°C
CO	20000 ± 1000	8	50 ± 5 ****	24 ± 3°C
DMMP	3000 ± 400	0.04	<15 ****	24 ± 3°C

* The variations to the nominal concentrations as indicated above will be allowed in conducting the test; however, the gas flow rate contained for the test shall be corrected to the nominal values using the following equation:

$$\text{Corrected gas flow} = (\text{Measured gas flow}) \left(\frac{\text{Measured test concentration}}{\text{Nominal concentration}} \right)$$

** The endpoint time is the time when the effluent concentration of the earlier breakthrough of either AC or cyanogen reaches 5 mg/m³.

*** Carbon shall be equilibrated at 80 ± 3 percent relative humidity, 24 ± 3°C for 16 hours at approximately test flow rate.

**** As measured carbon will be used for these tests.

TABLE VI. Test parameters for gas sorption measurements

Diameter of container, minimum, centimeters	3.0
Linear flow, centimeters per second	5.90 ± 0.05
Bed depth, centimeters	2.0 ± 0.1

4.2.5.1 Leak (dram) leakage test. The level A dram selected for test shall be examined for leakage when loaded and closed as specified in 5.2.1.1, except that the 3/4-inch vent plug shall be removed and an air connection provided (see plug for reinstallation). The prepared drum shall be tested in accordance with method 509.3 of FED 71257 MB710D STD. NO. 101, using the pneumatic technique, except that the pneumatic pressure shall be 6 pounds per square inch gage and the time duration shall be 18 minutes.

5. PACKAGING (see 6.5)

5.1 Interseptal Alignment. When packaging is for interseptal shipment (see 6.6), the AS2M-TEDA carbon covered by this specification shall be bulk packaged and marked in accordance

with the applicable provisions of ASTM D 3951 unless a nominal 55-gallon drum. The net quantity of each drum shall be 113 (±2.0) kg (250 (±4.5) pounds) [less 5 kg (11 pounds) when removed for carbon testing (see 4.2.2.2)].

5.2 Military packaging:

5.2.1 Packing. Packing shall be level A or C as specified (see 6.2).

5.2.1.1 Level A (see 6.7). A quantity of 113 (±2.0) kg (250 (±4.5) pounds) [less 5 kg when specimen is removed for carbon testing] of AS2M-TEDA carbon shall be packaged in a nominal 55-gallon, full-removable-head (cone), steel drum conforming to the Uniform Freight Classification Rule 40, 20718, for single top drum applications. The drum shall be clean, dry, free of corrosion and shall not have been coated with preservative oils. Drum manufacturer tolerances shall apply to the drum and drum accessories not covered by military or Federal specification. The inspector and exterior surfaces of the drum, including the cover and locking ring, shall be cleaned. The exterior surface of the drum shall be treated, primed and painted in accordance with Finish No. 5.2 for surface treatment, and Finish No. 20.9 for top coat (primer and painting) of MIL-STD-171. The color shall be black conforming to color No. 37038 of FED-STD-595. The removable cover of the drum shall be provided with a synthetic or sponge-type tubular rubber gasket uniformly distributed about the circumference of the removable cover. The gasket material shall be of sufficient thickness and resiliency to provide a leak-tight seal (see 5.2.1.1.1). The drum head shall be equipped with a 3/4-inch vent flange and plug conforming to type 1, class B (flange) and type 1, class D (plug) of PPP-P-420. The flange installation onto the drum head and torque marking shall be in accordance with PPP-P-420. The drum opening shall be securely closed with a minimum 16 gauge phenylated locking nut and a conical 5/8-inch hex-headed bolt and locking (jam) type nut. The bolt shall be of sufficient length to provide adequate engagement to ensure that the cover is sealed. While tightening the closure nut, the locking ring shall be supported repeatedly to eliminate slack, preventing left and right from a point opposite the locking bolt and nut assembly, toward this assembly until no slack is evident. The vent plug shall not be installed until after the required quantity of the AS2M-TEDA carbon is in place and the carbon temperature is stabilized. The installation of the plug nut, the flange and torque center shall be in accordance with PPP-P-420. If the plug gasket is damaged during the torque test, new gaskets shall be supplied.

5.2.1.1.1 Packing container (dram) leakage. Drums, assembled as specified in 5.2.1.1, shall not leak when tested as specified in 4.2.5. A leak is defined as a loss of gaseous pressure within the time frame specified. Immediately after testing, drums shall have their vent plugs reinstalled, except that a new vent plug gasket shall be used and the vent plugs shall be re-torqued as specified in 5.2.1.1.

5.2.1.2 Level C (see 6.3). A quantity of 113 (±2.0) kg (250 (±4.5) pounds) [less 5 kg when specimen is removed for carbon testing] of AS2M-TEDA carbon shall be packed in a drum, as specified in 5.2.1.1, except that the drum shall be a nominal 55-gallon fiber drum conforming to type 1, grade A, class 2 of PPP-D-721. Drum manufacturer tolerances shall

apply to the drum and drum accessories not covered by military or federal specifications. The drum cover shall be fabricated from hot dipped galvanized steel and the cover gasket shall be a vulcanized neoprene gasket as specified in 799-D-723. While dispensing the lever actuated loading band, the band shall be ripped repeatedly to eliminate slack, progressing left and right from a point opposite the loading clamping ring safety lock, toward the assembly until no slack is evident. The clamping ring safety lock shall then be secured with the wire or lead seal provided.

5.2 Embossments

5.2.1 Level A. The level A packs (drums) of ASD24-TEDA carbon shall be palletized, three drums per pallet, in accordance with load type 724 or XDS or MIL-STD-147. The bonding method and storage area, which correspond in the load type, shall be utilized in accordance with appendix A, paragraph 30.1 of MIL-STD-147, as appropriate. The pallet shall conform to type I type special, size A, class I preservative treatment of MIL-P-15011.

5.2.2 Level C. The level C packs (drums) of ASD24-TEDA carbon shall be palletized to conform to the Uniform Freight Classification Rules, National Motor Freight Classification Rules, and rules and regulations applicable to any other modes of transportation. The pallet loads shall be constructed to ensure stability in stacking to a minimum height of 18 feet. When the quantity of drums is insufficient to constitute a full pallet load, the drums shall not be palletized.

5.4 Marking. In addition to any special marking required by the contract or order, drums shall be marked with identification, contract data and shipping markings in accordance with MIL-STD-129. Each drum shall be marked with the lot number, date of manufacture of the carbon, and the sequential filling number. In addition, drums that are selected for carbon testing shall be marked with "5 kg removed for carbon test" located below identification marking. The special markings specified herein shall be in accordance with MIL-STD-129.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The carbon covered by this specification is intended for use in military Nuclear-Biological-Chemical filters.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- (a) Title, number, and date of this specification
- (b) Issue of DODSSS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2)
- (c) Whether interplant shipment or military packing is required (see section 5)
- (d) Level of packing required (see 4.2.1)
- (e) Utilization for level A or C packing (see 5.2)

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6.3 Gas chromatography. The column description and parameters provided below have been found to achieve good gas chromatographic separations for the TEDA carbon test:

25 meter, 0.32 mm id BP 10 capillary column
 Split-splitless injector, at 150°C, operated in splitless mode
 Flame ionization detector, detector temperature 200°C
 Inlet pressure 6 psi
 Carrier gas - helium
 OC oven: 65°C for 1 minute
 65°C-170°C at 30°C/minute
 170°C for 2 minutes
 Injection volume: 1 microliter

6.4 Identification of alternative inspection procedures. Proposed alternative inspection procedures should be submitted by the contractor to the procuring contracting officer for evaluation and approval by the technical authority responsible for preparation of this specification.

6.5 Storage of drums of carbon. The closed and sealed drums of carbon should be stored either indoors or in covered storage. After the drums are opened and the seal broken, the drums should be stored in a controlled storage area with a relative humidity of 40 percent or less.

6.6 Interplant shipment (see 5.1). Packaging and marking for interplant shipment is for supplies and materials that do not directly enter the military supply system. Typical interplant shipments are shipments from a vendor to a subcontractor or a prime contractor, or between contractor and subcontractor, or from a vendor or contractor to a military arsenal, plant, or other activity for evaluation, immediate use, or further processing as specified in the applicable contract.

6.7 Storage conditions for use of level A packing. Level A packing should be applied to both domestic and overseas shipments where the environmental storage conditions are unknown and it is anticipated that the length of storage will be more than 9 months.

6.8 Storage conditions for use of level C packing. Level C packing should be applied only to domestic shipments where the environmental storage conditions are known to be favorable and the length of storage will be 9 months or less.

6.9 Metal content, TEDA content, and gas sorption. Samples for metal content, TEDA content and gas sorption test shall be forwarded by the contractor, together with DD Form 1222, to Commander, U.S. Army Chemical Research, Development and Engineering Center, ATTN: SMCGR-QAO-C, Building E3100, Aberdeen Proving Ground, MD 21010-5423.

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Preparing activity:

Commander
 U.S. Army Chemical Research, Development
 and Engineering Center
 ATTN: SMCGR/PET-5
 Aberdeen Proving Ground, MD 21010-5423

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