AMC G1

SECTION C

TDPL: 5-19-6262 DATE: N/A END ITEM: M98, 200 CFM Filter

NSN: 4240-01-066-3266 PART: 5-19-6262

NOMEN: 200 CFM Particulate Filter START NO: C13CAQ03

Unless otherwise specified herein or annotated as for reference only thereon, all documents cited are for mandatory for use in the manufacture of the item(s) on this procurement. The following documents and specified exceptions also apply:

THE FOLLOWING DOCUMENTS ARE REQUIRED:

MIL-PRF-51526
SPI 5-19-6262

Only the Type II Particulate Filter is to be manufactured and delivered per MIL-PRF-51526.

Packaging of the Particulate Filter will be in accordance to Level A Pack requirements per SPI 5-19-6262.

In SPI 5-19-6262, any reference of MIL-F-51526 shall be MIL-PRF-51526 instead.

Shelf Life markings on the exterior of the packaging shall be as follows: "Shelf Life expires: MM/YY". "MM/YY" shall be the date (Month/Year) the final assembly was manufactured plus (+) 60 months.

Attachment 005

METRIC

MIL-PRF-51526A(EA)
13 March 2000
SUPERSEDING
MIL-F-51526(EA)
25 September 1992

PERFORMANCE SPECIFICATION

FILTER, PARTICULATE, 340 CMH (200 CFM)

Reactivated for New Design after 13 March 2000

This specification is approved for use by the U.S. Army Soldier & Biological Chemical Command (SBCCOM), 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 specification covers 2 types of High Efficiency Particulate Air (HEPA) filters rated at 340 cubic meters per hour (cmh) (200 cubic feet per minute (cfm)) for use in collective protection configurations (see 6.1):

- Type I - Filter, particulate, 340 cmh (200 cfm) for Advanced Integrated Collective Protection Systems (AICPS)
- Type II - Filter, particulate, 340 cmh (200 cfm) for land based Collective Protection Equipment (CPE), shipboard Collective Protection Systems (CPS) and the transportable CPS.

Each particulate filter is part of a gas-particulate filter system.

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

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 Chemical Biological Center, ATTN: AMSSB-REN-SS, Aberdeen Proving Ground, MD 21010-5424 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

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. The latest document revision shall be used.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following Government documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

SPECIFICATIONS

DEPARMENT OF DEFENSE

MIL–S–901 – Shock Test, High–Impact Shipboard Machinery, Equipment, and Systems, Requirements for

STANDARDS

DEPARTMENT OF DEFENSE

MIL–STD–167–1 – Mechanical Vibrations of Shipboard Equipment

MIL–STD–282 – Military Standard, Filter Units, Protective Clothing, Gas–Mask Components and Related Products: Performance Test Methods

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

2.2.2 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.

NAVAL SEA COMMAND

53711–6573660 – Filter, Gas

53711–6263500 – Filter System, CPS

53711–6573697 – Filter System, Navy Shipboard Selected Area Collective Protection System (SACPS)

SS200–AG–MMM–010 – Technical Manual for Navy Shipboard Collective Protection System (CPS) Chemical Biological Radiological (CBR) Filter System Operation and Maintenance

SS200–AL–MMM–010 – Technical Manual for Navy Shipboard Selected Area Collective Protection System (SACPS) System Description, Operation, and Maintenance

(Copies are available from Naval Surface Warfare Center Dahlgren Division, 17320 Dahlgren Road, Code G52, Dahlgren, VA 22448–5100.)

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 that 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 issues of the documents cited in the solicitation. (see 6.2).

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS

Publication 0099 – Threshold Limit Values and Biological Exposure Indices (See 6.2)

(Application for copy should be addressed to 1330 Kemper Meadow Dr., Suite 600, Cincinnati, OH 45240.) (http://www.acgih.org/)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B209 – Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 12103–1 – Road Vehicles – Test Dust for Filter Evaluation – Part 1

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE J726 – Air Cleaner Test Code

UNDERWRITERS LABORATORY, INC (UL)

UL900 – Air Filter Units – Standard for Safety

(Application for copies should be addressed to Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112-5704. http://global.ihs.com)

2.4 Order of precedence. In the event of 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 filter shall be constructed so that it conforms to the requirements of this specification. The materials of construction shall not be capable of having any adverse effects on human health during normal use. The filter shall not give off any toxic, noxious, or offensive emissions when operated within the required environmental conditions. The contractor shall select materials which pose no potential inhalation hazard to the user, materials whose normal use will not exceed the 8–hour time weighted average threshold limit values

published by the American Conference of Governmental Industrial Hygienists (ACGIH). At the time of disposal, unused and uncontaminated filters shall not be a Resource Conservation Recovery Act hazardous waste according to characteristics cited in 40 CFR 261.21–261.24 and shall not be listed as specific hazardous waste chemicals in 40 CFR 261.33(e) and (f).

3.1.1 Filter media. Filter media shall have a tensile strength of at least 866 gm/cm (4.85 lb/in) in the machine direction and at least 433 gm/cm (2.42 lb/in) in the cross direction.

3.1.2 Liners. Liners shall be used on the inner and outer diameters of the filter media to carry axial loads and protect the media from damage.

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

3.3 Interface requirements.

3.3.1 Compatibility with gas filter and housing. Each particulate filter shall be cylindrical in form and configured so that air shall flow through the filter radially outward for compatibility with the surrounding gas filter and filter housing.

3.3.1.1 Type I filters. The particulate filter shall easily fit inside the gas filter and be removed without damage to itself or the gas filter. The filter must meet the interface dimensions in Figure 1. Each end of the filter or end cover shall contain one groove for gasket location. The gasket shall be grade number 2C1 of ASTM D1056, seamless, have a thickness of 0.787 cm (0.31 in) and be made of a material which has fuel and chemical agent permeation rates no higher than those of neoprene. The gasket shall be permanently attached to the filter with an adhesive.

3.3.1.2 Type II filters. The particulate filter shall easily fit inside the gas filter and be removed without damage to itself or the gas filter. The filter must meet the interface dimensions in Figure 1. Each end of the filter or end cover shall contain one groove for gasket location. The gasket shall be grade number 2C1 of ASTM D1056, seamless, have a thickness of 0.787 cm (0.31 in) and be made of a material which has fuel and chemical agent permeation rates no higher than those of neoprene. The gasket shall be permanently attached to the filter with an adhesive.

3.3.2 Interchangeability. Each particulate filter and any associated gasket shall be individually interchangeable (replaceable) by one of similar form, fit and function without modification of the gas filter or filter housing.

3.3.3 Weight. Each particulate filter shall weigh no more than 6 kilograms (13 pounds).

3.4 Operating requirements.

3.4.1 Airflow resistance (pressure drop). When the particulate filter is clean, the airflow resistance at the 340 cmh (200 cfm) rated flow shall not exceed 1.8 centimeters (0.7 inches) of water gage.

3.4.2 Filtration efficiency. The particulate collection efficiency shall be at least 99.97 percent when the filter is challenged, at the rated airflow, by aerosol particles having a mean particle diameter of 0.3 microns.

3.5 Environmental requirements.

3.5.1 Resistance to hot/cold temperature. Each particulate filter shall show no ignition or structural damage as a result of temperature conditioning between –51 to 71 °C (–60 to 160 °F) and be capable of meeting operating requirements in 3.4.1 and 3.4.2 thereafter.

3.5.2 Resistance to high humidity. The particulate filter must be capable of meeting the operating requirements in 3.4.1 and 3.4.2 after the filter is conditioned at least 80% relative humidity and 45 °C (113 °F) for 7 days.

3.5.3 Structural integrity.

3.5.3.1 Resistance to structural deformation. The particulate filter shall be capable of withstanding repeated applications of a quasi–static mechanical load of 12900 newtons (2900 pounds) in the axial direction. Each gasket shall not become dislodged from the filter by the process of loading a filter into a housing and removing it. After testing, the filter shall meet the filtration requirements in 3.4.2.

3.5.3.2 Resistance to shock. After shock treatment, the particulate filter shall meet the filtration efficiency requirement in 3.4.2.

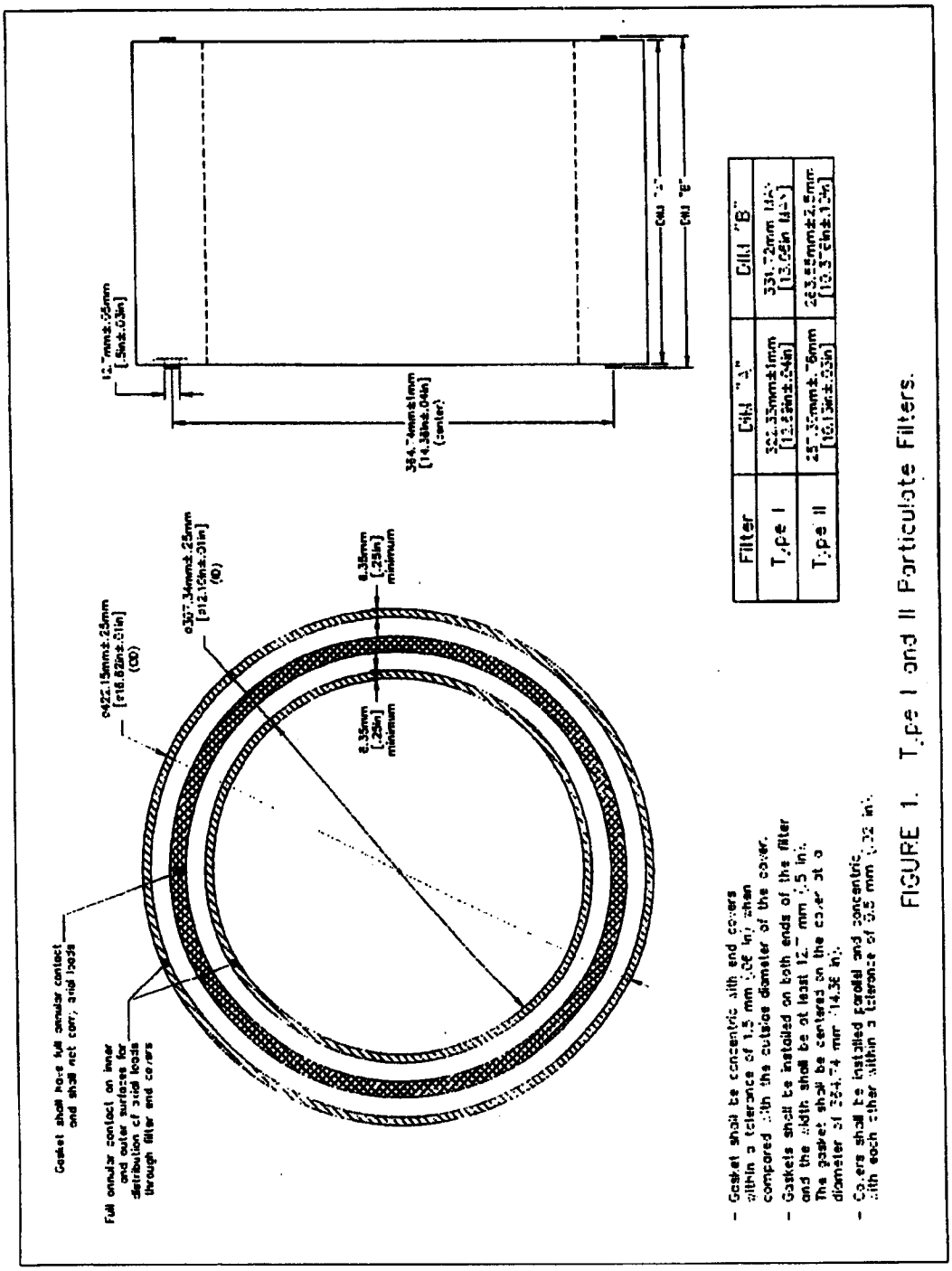

FIGURE 1. Type I and II Particulate Filters.

3.5.3.3 Resistance to vibration. After vibration treatment, the particulate filter shall meet the filtration efficiency requirement in 3.4.2.

3.5.3.4 Resistance to rough handling. After rough handling, consisting of two hundred 19–millimeter drops per minute for 15 minutes, the particulate filter shall meet the filtration efficiency requirement in 3.4.2.

3.5.4 Dust capacity. The particulate filter shall deliver the rated airflow at a resistance of no greater than 14.5 cm (5.7 in) of water when uniformly loaded with 2 kilograms (4.4 pounds) of dust per Class A2 of ISO 12103–1.

3.5.5 Resistance to fungus and mildew. The materials of construction shall not support fungus and mildew growth beyond trace levels.

3.5.6 Resistance to corrosion. Any metallic construction material shall resist salt fog corrosion to an extent equal or greater than anodized aluminum when the aluminum alloy number is in the 3000 to 5000 series of ASTM B209.

3.5.7 Resistance to overpressure. The particulate filter shall satisfy the minimum efficiency requirement of 3.4.2 after being subjected to a repeated overpressure that is produced by an airflow of 1700 cmh (1000 cfm)±10% at 21°C (70°F).

3.5.8 Flammability. The particulate filter, when clean, shall not produce flame, sparks or smoke in quantities greater than that allowed for a Class 2 air filter unit per UL 900.

3.6 Ownership and support

3.6.1 Identification markings. Each particulate filter shall contain identification markings. Markings shall be legible using contrasting ink and ½ inch high bold font. The ink shall retain its color and legibility after being exposed to water for 4 hours. Markings shall include the name of the item, lot number, part number and any other information required by the acquisition document (see 6.2). Unless otherwise specified, the marking name shall be "FILTER, PARTICULATE, 340 CMH (200 CFM)."

3.6.2 Workmanship

3.6.2.1 Safety. Filters shall be free from burrs and sharp edges that might injure personnel, damage filter media, or damage Mission Oriented Protective Posture (MOPP) IV gloves during handling.

3.6.2.2 Finish. The filters shall be free from foreign matter (dirt, oil, or viscous materials).

3.6.2.3 Appearance. The filter units shall be free from cracked, bent, or dented metal sections, and abraded gaskets.

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 (FA) sample shall consist of 20 particulate filters that are of the type specified in the contract. The FA sample shall be produced using the same methods, materials, equipment, and processes as will be used during regular production.

4.2.2 Inspections to be performed. Unless otherwise specified by the terms of the contract, the sample first article items shall be subjected to all of the examinations and tests specified in this specification. Verification of requirements shall be by visual inspection, commercial inspection equipment, demonstration, test data, or by Certificate of Compliance (COC) with supporting evidence or analysis. The Government reserves the right to accept or reject each COC with supporting evidence or analysis.

4.2.2.1 For examination. Sample filters shall first be examined for interface and other characteristics in Table I and Figure 2 that may be verified by visual inspection, commercial inspection equipment, or simple demonstrations.

4.2.2.2 For test. First article samples shall be tested in accordance with Table I and Figure 2. Following interface checks, airflow resistance, and filtration efficiency testing of particulate filters, sample filters shall be packaged using the same methods, materials, equipment, and processes as will be used during regular production. Packaged filters shall then be forwarded to the Government for environmental testing as depicted in Figure 2.

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.

TABLE I. First Article Tests and Inspection

Test Description	Requirement Paragraph	Verification Paragraph
Materials	3.1	Certificate of compliance
Interface requirements	3.3	
Compatibility with gas filter and Housing	3.3.1	4.3.6.1
Interchangeability	3.3.2	4.3.6.1
Weight	3.3.3	4.3.6.1
Operating requirements	3.4	
Airflow resistance	3.4.1	4.3.6.2
Filtration efficiency*	3.4.2	4.3.6.3
Environmental requirements	3.5	
Resistance to hot/cold temperature	3.5.1	4.3.6.4
Resistance to high humidity	3.5.2	4.3.6.5
Structural integrity	3.5.3	4.3.6.6
Resistance to structural deformation	3.5.3.1	4.3.6.6.1
Resistance to shock	3.5.3.2	4.3.6.6.2
Resistance to vibration	3.5.3.3	4.3.6.6.3
Resistance to rough handling	3.5.3.4	4.3.6.6.4
Dust capacity	3.5.4	4.3.6.7
Resistance to fungus and mildew	3.5.5	4.3.6.8
Resistance to corrosion	3.5.6	4.3.6.9
Resistance to overpressure	3.5.7	4.3.6.10
Flammability	3.5.8	4.3.6.11
Ownership and support	3.6	
Identification markings	3.6.1	VI
Workmanship		
Safety	3.6.2.1	VI & demo
Finish	3.6.2.2	VI
Appearance	3.6.2.3	VI

*After environmental tests

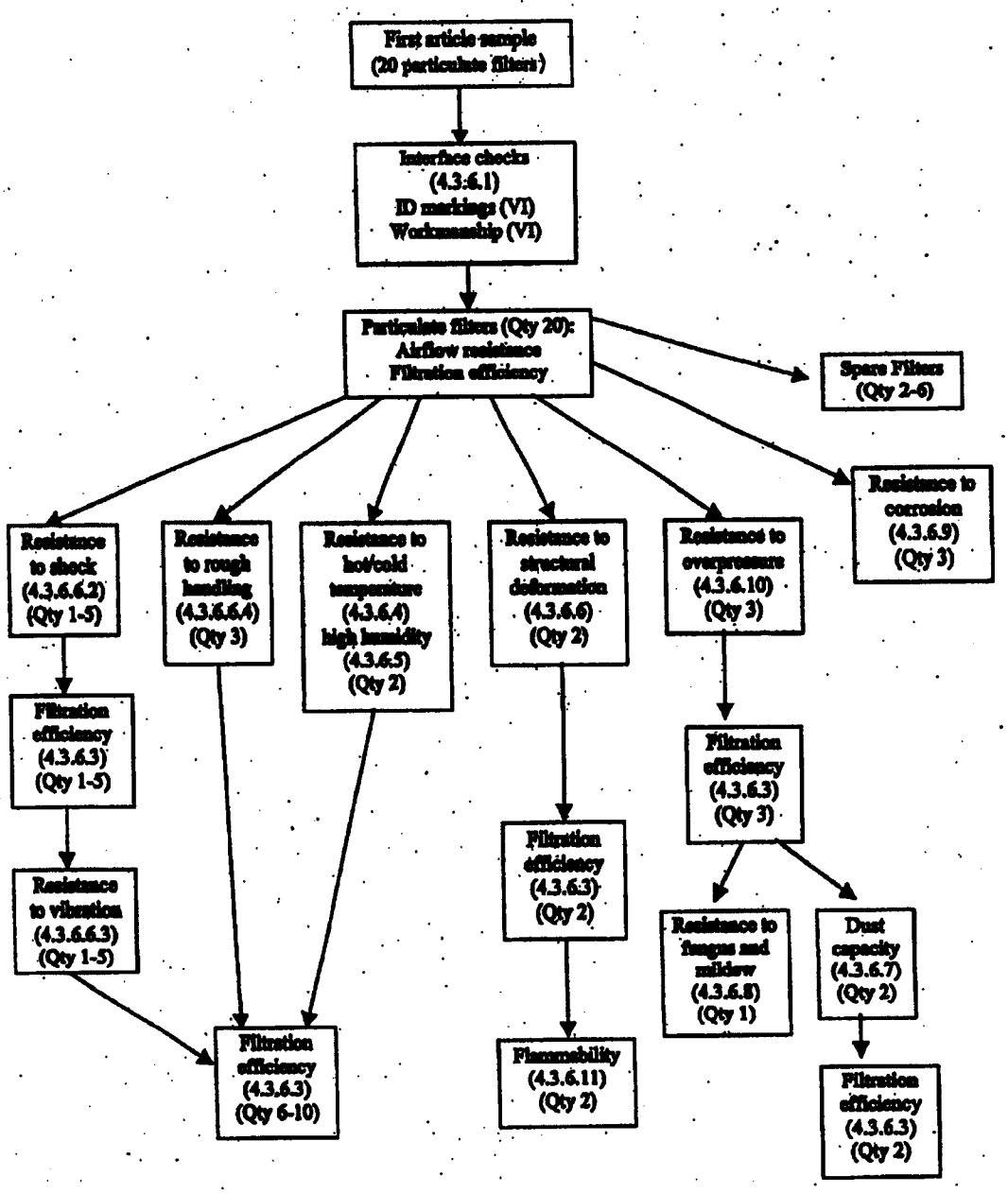

FIGURE 2. Sequence of first article tests.

4.3 Conformance inspection.

4.3.1 Lotting. A lot shall consist of particulate filters produced by one manufacturer, at one plant, from the same materials, under the same manufacturing and process conditions and without a break in production of more than 10 calendar days. Each lot shall be identified by an alphanumeric lot number. The lot number shall include a manufacturer's identification symbol consisting of 3 alpha characters, a numeric code identifying the year of production, a code or abbreviation that signifies the month of production, and an interfix–serial number. The interfix–serial number shall change if there is a change in the design, manufacturing process, materials, suppliers, production run, or if a new contract is used.

4.3.2 Sampling. Inspection and test of random samples shall be conducted in accordance with the classification of characteristics in 4.3.5, and when specified in Table II.

4.3.3 Inspection procedure. 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. Failure of any sample to conform to any characteristic in the classification of characteristics based on the sampling and acceptance criteria specified therein shall be cause for rejection of the lot represented (see footnote, Table II). Any filter samples forwarded to the Government for testing shall be packaged such they will be protected from moisture in the air. One or more environmental tests shall also be conducted if there is a materials change that increases the risk of failure for a particular environment.

4.3.4 Inspection characteristics. Critical characteristics are those whose nonconformance to specified requirements is likely to result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the product. Also those characteristics whose nonconformance to specified requirements is likely to prevent performance of the tactical function of a major end item. Major characteristics are those 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 those 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 Table III. 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 II for selection of sample sizes.

TABLE II. Sampling

	Inspection level and samples sizes										
Lot 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
26 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	*	*	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

* Asterisk means 100% inspection of lot. Accept the lot if there are zero non-conforming characteristics and reject the lot if there are one or more non-conforming characteristics for all inspection levels.

TABLE III. Classification of characteristics

PARAGRAPH 4.3.5	TITLE Filter, Particulate		Sheet 1 of 1	DRWG NO.
CATEGORY	CHARACTERISTIC	SAMPLING	REQUIREMENT PARAGRAPH	INSPECTION METHOD
Critical	Filtration Efficiency	100%	3.4.2	4.3.6.3
Major				
101	Airflow resistance	100%	3.4.1	4.3.6.2
102	Resistance to over-pressure and filtration efficiency*	Table II, level IX	3.5.7 3.4.2	4.3.6.10 4.3.6.3
103	Safety	Table II, level IX	3.6.2.1	VI & D
Minor				
201	Identification markings	Table II, level IX	3.6.1	VI
202	Finish	Table II, level IX	3.6.2.2	VI
203	Appearance	Table II, level IX	3.6.2.3	VI

NOTES:

CE – Commercial inspection equipment
COC – Certificate of Compliance
VI – Visual inspection
D - Demonstration

*Filtration efficiency is categorized as a critical defect

4.3.6 Test

4.3.6.1 Interface checks. Determine whether the particulate filter complies with interface requirements in 3.3 by inspection of dimensions using commercial inspection equipment. Perform fit demonstrations of sample filters with surrounding parts (e.g. gas filter and housing) if such parts are Government furnished (see 6.2).

4.3.6.2 Airflow resistance (pressure drop). The airflow resistance shall be determined at the rated airflow of 340 cmh (200 cfm). The measured pressure drop across the particulate filter, when corrected to standard conditions of 21°C (70°F) and 1 atm (1013 mbar), shall be

no greater than that specified in 3.4.1. The up–stream 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 airflow resistance as follows:

(a) Connect the filter to a source of forced air.
(b) Set the radially outward flow of air through the filter to 340 cmh.
(c) Record the barometric pressure.
(d) Measure and record the air stream temperature. This temperature should be no higher than 52°C (125°F).
(e) Determine and record the difference between up-stream and downstream static pressure.

If the recorded air stream temperature and barometric pressure is different than 21°C (70°F) and 1 atm, calculate and record the air flow resistance (ΔP (cal)) using the equation below to correct the measured airflow resistance to airflow resistance at standard conditions:

$$\Delta P\ (cal) = \Delta P\ (measured) \times P\ (test) \times 86.21 \div [(492 + 1.8T)^{1.768}]$$

where:

Δ P (cal) – air flow resistance corrected to standard conditions in millimeters of water gage (mm wg).
P (test) – barometric pressure at time of test in millimeters of mercury (mm Hg).
Δ P (measured) – air flow resistance from test measurement in millimeters of water.
T – temperature of air stream flowing through the filter in degrees C.

Note: Correction for nonstandard conditions is not required when it is clear that the passage or failure of the filter is not in doubt.

4.3.6.3 Filtration efficiency. The test apparatus used to measure the particulate filtration efficiency shall be capable of (1) maintaining a stable concentration of aerosol (see 6.4) with a mean particle size of 0.3 microns with a steady flow through the filter of 340 cubic meters per hour, (2) accurately determining the aerosol penetration percent within ± 0.005%, and (3) producing no adverse effects on human health. The aerosol selected should not react with any of the construction materials. The downstream sample point shall be located such that changing of its location across the ductwork does not cause a significant change in the measured concentrations. This shall be verified using a filter with a known measurable leak. The filter shall be placed in the test apparatus conditioned at room temperature. Maintain the airflow within 10% of its intended use airflow and flowing radially outward. That airflow shall be maintained for 1 to 2 minutes while filtration efficiency is recorded. Filtration efficiency is calculated as from the concentrations or particle counts as follows:

Penetration % = (concentration downstream of the filter/concentration upstream) x 100, or-
Penetration % = (no. particles counted downstream/ no. of particles counted upstream) x 100
Filtration efficiency % = 1 – penetration %

If filter is re-used for subsequent tests, it may be necessary to clean filter in some non-destructive manner.

4.3.6.4 Resistance to hot/cold temperature. Condition each particulate filter at ambient, 21±2°C (70±3.5°F); high, 71±2°C (160±3.5°F); and low, –51±2°C (–60±3.5°F) temper-

ature for 4 hours at each temperature setting. After removal from the environmental chamber, inspect filter for temperature related damage such as ignition, charring and discoloration and perform efficiency testing in accordance with 4.3.6.3.

4.3.6.5 Resistance to high humidity. Expose the particulate filter to 80% relative humidity at 45°C (84°F) for 7 days. After removing filter from environmental chamber, perform efficiency testing in accordance with 4.3.6.3.

4.3.6.6 Structural integrity.

4.3.6.6.1 Resistance to structural deformation. The particulate filter shall be subjected to a quasi-static mechanical load as specified in 3.5.3.1 in the axial direction for 3 cycles of one minute per cycle. Retest filters for filtration efficiency in accordance with 4.3.6.3.

4.3.6.6.2 Resistance to shock.

4.3.6.6.2.1 Type I filters. The particulate filter shall be subjected to simulated bench handling in accordance with Method 516.4, Procedure VI of MIL-STD-810. After shock testing, retest for filtration efficiency in accordance with 4.3.6.3.

4.3.6.6.2.2 Type II filters. Shock testing shall be performed on particulate filters when fully loaded as gas-particulate filter sets in either the U.S. Navy CPS Filter System (53711-6263500), or the U.S. Navy SACPS Filter System (53711-6573697). The CPS system has a flow capacity of 1,020 cmh (600 ft^3/min), and the SACPS system has a flow capacity ranging from 340 cmh (200 cfm) to 1700 cmh (1000 cfm). Filters shall be installed per the operation and maintenance manual for the tested system: SS200-AG-MMM-010 for the CPS system and SS200-AL-MMM-010 for the SACPS system. The filter housing shall be filled to capacity. The filter system (housing with particulate and gas filters) shall be shock tested per MIL-S-901 using an approved mounting fixture. After shock testing, particulate filters shall be removed from the housing and individually retested for filtration efficiency in accordance with 4.3.6.3.

4.3.6.6.3 Resistance to vibration.

4.3.6.6.3.1 Type I filters. The particulate filter shall be subjected to vibration testing per MIL-STD-810, Method 514.4, category 8 using the levels and frequencies in Table 514.4-AII. After vibration testing, retest for filtration efficiency in accordance with 4.3.6.3.

4.3.6.6.3.2 Type II filters. Vibration testing shall be performed on particulate filters when fully loaded as gas-particulate sets in either the U.S. Navy CPS Filter System (53711-6263500), or the U.S. Navy SACPS Filter System (53711-6573697). The CPS system has a flow capacity of 1,020 cmh (600 cfm), and the SACPS system has a flow capacity ranging from 340 cmh (200 cfm) to 1700 cmh (1000 cfm). Filters shall be installed per the operation and maintenance manual for the tested system: SS200-AG-MMM-010 for the CPS system and SS200-AL-MMM-010 for the SACPS system. The filter housing shall be filled to capacity. The filter system (housing with particulate and gas filters) shall be vibration tested per MIL-STD-167-1 using an approved mounting fixture. After vibration testing, particulate

filters shall be removed from the housing and individually tested for filtration efficiency in accordance with 4.3.6.3.

4.3.6.6.4 Resistance to rough handling. Perform rough handling testing on particulate filters that have not undergone previous shock and vibration testing. Clamp each filter to a steel plate such that the cylindrical axis of the filter will be parallel to the direction of movement. Perform rough handling in accordance with procedures in Method 105.11 of MIL–STD–282. After 200 drops per minute for 15 minutes, perform particulate efficiency testing in accordance with 4.3.6.3.

4.3.6.7 Dust capacity. Prior to conducting the dust capacity test, the filter shall be conditioned for a period of at least 24 hr at ambient laboratory temperature and not more than 50% relative humidity. The dust capacity test apparatus shall conform to SAE J726. The apparatus shall be capable of dispersing a dust per grade A2 of ISO 12103–1. Provisions shall be made to determine the total weight of dust injected and for measuring the filter inlet pressure head. The preconditioned filter shall be placed in the test apparatus so that air flows radially outward through the filter during testing. The test shall consist of an initialization phase and a dust injection phase. During the initialization phase, flow through the filter will be adjusted to the rated flow without dust injection. During the dust injection phase, dust will be injected into the inlet air stream at the rate required to establish a dust concentration 1.0 ± 0.1 gm/m^3 at the rated airflow under ambient laboratory conditions. Record the inlet head values every 15 minutes after the initiation of the dust injection. The test shall be run until the inlet head reaches or exceeds the resistance value stated in 3.5.4, or for 6 hours, or until a mechanical failure is indicated, whichever occurs first. Upon completion of the required dust injection phase, record the total weight of dust injected, and test the filter for filtration efficiency in accordance with 4.3.6.3. Any mechanical failure of the filter, such as a sudden surge of flow and/or drop in the inlet head pressure during the dust capacity test phase, or failure of the subsequent efficiency test shall be cause for rejection.

4.3.6.8 Resistance to fungus and mildew. The manufacturer shall provide objective evidence and certify that the materials of construction will not support fungus growth beyond trace level for at least 28 days. Objective evidence includes historical data on similar construction materials, test data on filter construction materials, or test data on the entire filter system. If testing is conducted, the fungus resistance test shall be performed in accordance with Method 508.4 of MIL–STD–810 and the fungus exposure period shall be 28 days.

4.3.6.9 Resistance to corrosion. The manufacturer shall provide objective evidence and certify that any metallic construction materials will resist corrosion to an extent equal or greater than the material specified in 3.5.6. Objective evidence includes test data entire filter set. If objective evidence does not exist or is disapproved by the Government, perform salt fog testing in accordance with Method 509.3 of MIL–STD–810 except the total duration shall be 20 days corresponding to five 96–hour exposure cycles. Each 96–hour exposure cycle is defined as 48 hours of salt fog challenge followed by 48 hours of storage at ambient laboratory conditions with no salt fog challenge. After the five 96–hour exposure cycles, rinse the external surfaces with clear water if desired, dry, install/remove the filter in its housing, and then inspect filter for evidence of damage and corrosion.

4.3.6.10 Resistance to overpressure. Subject the filter to a differential pressure produced by the airflow rate stated in 3.5.7. After the filter inlet is subjected to this overpressure for 5 minutes, the flow shall be stopped for one minute. This test cycle shall be repeated 4 times. After completion of the 5 overpressure cycles, perform efficiency testing in accordance with 4.3.6.3.

4.3.6.11 Flammability. The combustibility and smoke generating potential of the filter shall be determined by using the apparatus and procedures specified in section 5 and 6 of UL 900. The quantity of flame, sparks and smoke should be evaluated in accordance with procedures in UL 900 and must meet the classification requirements stated in 3.5.8.

5. PACKAGING

5.1 Packaging. For acquisition purposes, packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of material 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 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 filter, particulate, 340 cmh (200 cfm) is intended for use as part of a Nuclear Biological Chemical (NBC) air handling system of a collective protection system. The Type I filter is intended for use in the AICPS at a rated airflow of 340 cmh. The Type II filter may be used in the shipboard CPS, in land–based CPE such as the Modular CPE and Simplified CPE, and in the transportable CPS.

6.2 Acquisition requirements.

(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
(c) 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.
(d) Packaging requirements.
(e) Additional identification and marking requirements such as manufacturer's name, serial number, date of manufacture, and contract number must be in the contract and cite the responsibility for the items affected.

(f) Whether the item of acquisition is a Type I or Type II particulate filter.
(g) Whether any Government Furnished Equipment is supplied.
(h) Whether publication number 0099 from the American Conference of Government Industrial Hygienists is the latest number for defining Threshold Limit Values.

6.3 Design notes. An example of a Type I particulate filter is shown in Drawing 5–19–11700 (Army). An example of a Type II particulate filter is shown in Drawing 6573651 (Navy) and Drawing 5–19–6262 (Army). Filter cover with groove is shown in subsidiary Drawing 6573654. Desirable characteristics of the sealant for securing filtration media to covers are as follows:

(a) Tensile strength of at least 91 kg/cm^2
(b) Tear strength of at least 28 kg/cmc.
(c) Adhesion within 5 minutes at 176°C (350°F)

6.4 Aerosol information. Candidate replacements aerosol materials for potentially hazardous Dioctyl Phthalate in penetrometer test machines are identified in report CRDEC–TR–271 which is available from Edgewood Chemical Biological Center, AMSSB–REN–SN, Bldg. E5165, Aberdeen Proving Ground, Maryland 21010–5424. The current type of aerosol used by Edgewood Chemical Biological Center is Durasyn® 164 polyalphaolefin available from Amoco Chemicals, 801 Warrenville Rd, MC 6018, P.O. Box 5206, Lisle, Illinois 60532.

6.5 Life. The desired filter useful life is at least four years. The useful life is the maximum period of time an unpackaged item can remain fit for use. The desired shelf life is at least five years. The shelf life is the maximum time limit an item may be in sheltered storage within its packaging and still remain fit for use.

6.6 Subject term (key word) listing.

AICPS
Collective protection
SACPS
Filtered air
HEPA filter
MCPE
Particulate filter
SCPE

Custodian:
Army - EA

Preparing activity:
Army - EA

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