INCH-POUND

A-A-54734
11 September 1992

COMMERCIAL ITEM DESCRIPTION

FILTER UNIT, CONTAMINATION ANALYSIS, GRAVIMETRIC

The General Services Administration has authorized the use of this Commercial Item Description as a replacement for Military Specification MIL-F-37706 which is cancelled.

This Commercial Item Description covers a filter assembly for the gravimetric determination of contaminant levels in automotive and aviation fuels, by the matched weight method.

Salient characteristics:

The filter assembly shall consist of a transparent plastic filter holder, preassembled with two superimposed filters matched in weight to within 0.1 milligrams (mg) for gravimetric analysis of fluid samples by pressure filtration. The filters shall be sealed between the holder sections with a cellulose pad under the filters to distribute sample flow evenly over the filter surface. The filter assembly shall meet the requirements specified herein and shall conform to the dimensions and shape specified in figure 1.

The top and bottom sections of the filter holder shall be molded of transparent cellulose acetate-butyrate to insure compatibility in fuel testing applications.

AMSC N/A FSC 6630

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

The filter membrane shall be fabricated of pure, mixtures of cellulose acetate and cellulose nitrate. The filter disk shall have a thickness of 140 to 160 micrometers (um) and shall have a diameter of 37 ± 1/2 millimeter (mm). Shall have a maximum pore size of 0.80 µm as defined by a minimum bubble point of 15 psi (1.0 kg/cm^2). Shall have a minimum porosity of 80 percent. The refractive index of the filter disk shall be 1.51 ± 0.01 when tested herein.

Water extractables of the filter disk shall not exceed 1.5 percent. The water flowrate shall be as a minimum 150 milliliters/minutes/cm^2 of filtration area with a differential pressure of 52 centimeters of mercury (20.5" Hg). Water shall uniformly diffuse through the filter disk in 15 seconds, and there shall be no dry spots. The bubble point of the filter disk shall be 19 ± 4 psi (1.3 ± 0.3 kg/cm^2) when tested herein.

Workmanship. The filter assembly shall be free from defects which detract from its appearance or impair its serviceability.

Unit. Package (PG). One package containing forty-eight filter units, as specified, constitutes one unit.

QUALITY ASSURANCE PROVISIONS.

Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any facilities suitable 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

Records. Records of examinations and tests performed by or for the contractor shall be maintained by the contractor and made available to the Government upon request, at any time, or from time to time, during the performance of the contract and for a period of three years after delivery of the supplies to which such records relate.

Inspection. Inspection, as used herein, is defined as both examination (such as visual or auditory investigation without the use of special laboratory appliances or procedures) and testing (determination by technical means of physical and chemical properties) of the item.

Sampling for examination. Sampling for examination shall be conducted in accordance with MIL-STD-105, with an AQL of 2.5 (percent defective) and an inspection level of S-I. The unit of product for examination purposes shall be one filter assembly.

Sampling for tests. Sampling for tests (dimensional) shall be conducted in accordance with MIL-STD-105, with an AQL of 4.0 (percent defective) and an inspection level of S-1. The unit of product for test purposes shall be one filter assembly.

Tests. Tests shall be conducted to determine compliance with specification requirements. Where feasible, the same sample shall be used for the determination of two or more test characteristics. Tests shall include, but shall not be limited to the following:

Thickness. Thickness shall be determined by readings taken with a dial test indicator having a flat circular contact area mated to a flat anvil. The diameter of the contact surface shall be 3/8 to 5/8 inch (9.53 to 15.87 mm). The dial shall read accurately to 1 um (micrometer). The contact and anvil must be at "0" setting before and after each thickness reading. The contact shall not exert a pressure of more than 25 pounds per square inch (1.75 kg/cm^2) or less than 1 psi (0.070 kg/cm^2). The filter shall be measured at the approximate four corner positions assuming an enclosed square, near, but not including the edge. One additional measurement shall be made at the center.

Pore size. The maximum pore size shall be determined in accordance with ASTM F316 (Part 1).

Porosity. Porosity shall be determined by one of the following methods:

a. Calculate the theoretical weight of a solid filter by multiplying the volume by the density of the filter material. Determine the actual weight of the filter. Calculate the percent porosity by the following formula:

$$\text{Percent porosity} = \frac{\text{Theoretical weight of a solid filter} - \text{Actual weight of filter}}{\text{Theoretical weight of a solid filter}} \times 100$$

b. Calculate the volume of the sample filter. Introduce mercury into the pores of the filter. Calculate the percent porosity by the following formula:

$$\text{Percent porosity} = \frac{\text{Volume of mercury introduced}}{\text{Theoretical volume of filter}} \times 100$$

The volume of mercury introduced into the pores of the filter shall be measured with an American Instrument Corp., Mercury Intrusion Tester or equal.

Refractive index. The refractive index of the filter disk shall be determined as follows.

Cut a 1 mm by 5 mm strip from a filter disk. Dimensions shall be approximate, and cutting shall be done with a sharp instrument so that smooth edges are obtained. Place the strip on a glass microscope slide. Add a drop of oil of known refractive index to the strip and cover the strip with a cover glass. Place the prepared slide on the stage of a microscope, having a magnification of 100X, and position so that the microscope is focused on an edge of the strip at the interface of the oil and the strip. If the refractive indices of the oil and the strip are different, a line called a "Becke" line will appear at the interface. Move the objective lens up or down so that the Becke line is moving from the strip to the oil. Upward movement of the lens indicates that the refractive index of the oil is greater than that of the strip. Downward movement of the lens indicates that the refractive index of the strip is greater than that of the oil. If the strip and Becke line cannot be brought into focus, the refractive index of the strip and the oil are the same. All oils used shall be within the tolerance and each test shall be performed with at least two oils, one of greater and one of lesser refractive index than the filter. (Theory of the refractive index test is given in the handbook of Chemical Microscopy.)

Water extractables. Weigh a filter disc to ± 0.0001 gram (gr) and record the weight . Heat the filter disk in an oven at 52°C (125.6°F) for 15 minutes. Remove the filter disk from the oven and place in a desiccator for one hour at room temperature. At the end of this period, weigh the filter disc to ± 0.0001 gram (gr). Heat 100 milliliters (ml) of distilled water in a beaker to boiling, drop the filter disk into the water and continue to boil for 30 minutes. Remove the filter disk from the water and dry in an oven at 52°C (125.6°F) for two hours. Desiccate for one hour at room temperature. Remove filter from desiccator and weigh to ± 0.0001 gr. Calculate percent extractables using the following formula:

$$\text{Percent extractables} = \frac{\text{Initial weight - final weight}}{\text{initial weight}} \times 100$$

Filter flow rate. Assemble apparatus capable of providing a 1000 ml fluid reservoir with a 3-way stopcock, at the input side of the filter assembly and a pressure capability of 14 psi (70 centimeters of mercury). Calculate the effective filtration area of the test filter in square centimeters (cm^2). Assemble the test filter into the filter assembly and connect to test apparatus ensuring that the inlet of filter assembly is connected downstream of 3-way stopcock. Fill precleaned fluid reservoir with 1000 ml ASTM Type 1 Reagent Grade Water and rinse. Discard this water and refill with 25°C (77°F) Type 1 Reagent Grade Water, filtering prior to filling fluid reservoir. Pressurize fluid reservoir and flush connection by turning 3-way stopcock to "by pass". Allow approximately 100 ml to flush and discard. Turn 3-way stopcock to pass water through filter assembly and filter. Adjust immediately, the fluid pressure to 10 psi. Maintain this pressure throughout test. When pressure is constant, accurately time 500 ml of water exiting the filter assembly with a graduated beaker. Record the time, within ± 0.2 seconds for the 500 ml test fluid.

Calculate the flow rate as follows:

$$\text{Flow Rate (ml/min/cm)} = \frac{60}{t \text{ (sec)}} \times \frac{500 \text{ (ml)}}{\text{filtration area } (cm^2)}$$

Diffusibility. A dry filter should be dropped flat onto the surface of distilled water and diffusion through the filter timed with a stopwatch. Wet areas will become darker while dry areas will not change in color intensity.

Bubble point. The bubble point test shall be conducted in accordance with ASTM F316 (Part 1).

Metric products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch-pound units, providing they fall within the tolerances specified using conversion tables contained in the latest revision of Federal Standard No. 376, and all other requirements of this document are met.

If a product is manufactured to metric dimensions and those dimensions exceed the tolerances specified in the inch/pound units, a request should be made to the contracting officer to determine if the product is acceptable.

The contracting officer has the option of accepting or rejecting the product.

Contractor Certification. The contractor shall certify and maintain substantiating evidence that the product offered meets the salient characteristics of this Commercial Item Description, and that the product conforms to the producers' own drawings, specifications, standards, and quality assurance practices. The government reserves the right to require proof of such conformance prior to first delivery and thereafter as may be otherwise provided for under the provisions of the contract.

Regulatory requirements.

Federal Food, Drug, and Cosmetic Act. If the product covered by this document has been determined by the U.S. Food and Drug Administration to be under its jurisdiction , the offeror/contractor shall comply, and be responsible for compliance by its subcontractors/suppliers, with the requirements of the Federal Food, Drug, and Cosmetic Act, as amended, and regulations promulgated thereunder. In addition, the offeror/contractor shall comply, and be responsible for compliance by its subcontractors/suppliers, with the requirements of all other applicable Federal, State, and local statutes, ordinances, and regulations.

Recovered material. The offeror/contractor is encouraged to use recovered material in accordance with Federal Acquisition Regulation Subpart 23.4 to the maximum extent practical.

Preservation, packaging, packing, labeling, and marking. Unless otherwise specified, preservation, packaging, and packing shall be to a degree of protection to preclude damage to containers and/or contents thereof under normal shipping conditions, handling, etc., involving shipment from the supply source to the receiving activity, plus reshipment from receiving activity, and shall conform to applicable carrier's rules and regulations. Intermediate and exterior package quantities and labeling and marking shall be as specified in the contract and/or order.

Ordering data. Intermediate/exterior package quantities, labeling and marking must be specified in the contract and/or order.

NOTE: The following National Stock Number is covered by this document:

NSN	Item Identification
6630-00-764-5761	FILTER UNIT, CONTAMINATION ANALYSIS, GRAVIMETRIC.

MILITARY INTERESTS:

Custodians:

Army-MD
Navy-MS
Air Force-03

PREPARING ACTIVITY:

DoD-MB

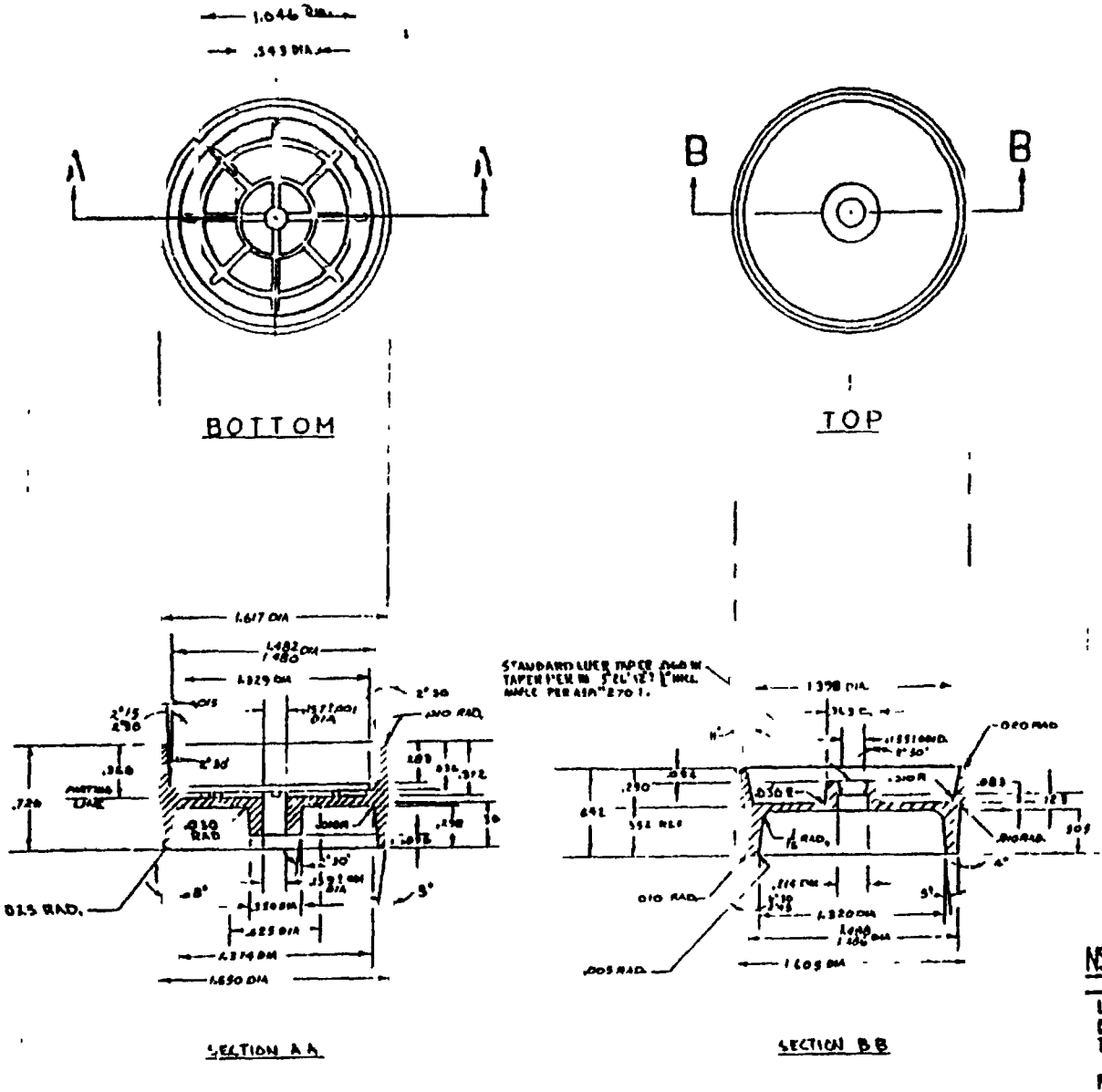
Agent:

DLA-DM

CIVIL AGENCY COORDINATING ACTIVITIES:

VA-OSS
USPHS
FDA-MPQAS

Project No. 6630-0527



NSN 6630-00-764-5761

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON:

FRACTIONS	DECIMALS	ANGLES
±	± .005	± .1°

CONCENTRICITY T.I.R. .010

FIGURE 1 FILTER HOLDER

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER	2. DOCUMENT DATE (YYMMDD)
A-A-54734	11 SEPTEMBER 1992

3. DOCUMENT TITLE

FILTER UNIT, CONTAMINATION ANAYLSIS, GRAVIMETRIC

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)

b. ORGANIZATION

c. ADDRESS (Include Zip Code)

d. TELEPHONE (Include Area Code)
(1) Commercial
(2) AUTOVON

7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

a. NAME

b. TELEPHONE (Include Area Code)
(1) Commercial (2) AUTOVON

c. ADDRESS (Include Zip Code)

IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:
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