

INCH-POUND

MIL-PRF-51483A(EA)

8 June 2011

SUPERSEDING

MIL-E-51483(EA)

29 June 1981

PERFORMANCE SPECIFICATION

EDGESEAL MATERIAL, SELF-ADHERING

Reinstated after 7 Jun 2011 and may be used for new and existing designs and acquisitions.

This specification is approved for use by the U.S. Army Edgewood Chemical Biological Center and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers one type of self-adhering, heat-fusing plastisol material for edgesealing laminated filter media to metal surfaces (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 or 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 insure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 or 4 of this specification, whether or not they are listed.

Comments, suggestions, or questions on this document should be addressed to: U.S. Army Edgewood Chemical Biological Center, ATTN: RDCB-DEA-S, 5183 Blackhawk Road, Aberdeen Proving Ground, MD 21010-5424 or emailed to APGR-ECBCSpecsTeam@conus.army.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.daps.dla.mil>.

AMSC N/A

FSC 4240

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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 cited in the solicitation or contract.

FEDERAL STANDARDS

- FED–STD–595/36081 – Gray, Flat or Lusterless
- FED–STD–601 – Rubber: Sampling and Testing

(Copies of these documents are available online at <https://assist.daps.dla.mil/quicksearch/> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111–5094.)

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 these documents are those cited in the solicitation or contract.

ASTM INTERNATIONAL

- ASTM D412 – Vulcanized Rubber and Thermoplastic Elastomers–Tension
- ASTM D624 – Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
- ASTM D1203 – Volatile Loss From Plastics Using Activated Carbon Methods
- ASTM D1823 – Apparent Viscosity of Plastisols and Organosols at High Shear Rates by Extrusion Viscometer
- ASTM D1824 – Apparent Viscosity of Plastisols and Organosols at Low Shear Rates
- ASTM D2137 – Rubber Property – Brittleness Point of Flexible Polymers and Coated Fabrics
- ASTM D2240 – Rubber Property – Durometer Hardness

(Copies of this document are available from www.astm.org or ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428–2959.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, 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.

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3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2. Any change in ingredients, or ingredient quantities exceeding the allowed tolerances shall constitute cause for submission of a new first article sample.

3.2 Material.

(a) The plastisol edgeseal material shall consist of polyvinyl chloride dispersed in suitable liquid plasticizers, with sufficient stabilizers, and with pigments and fillers yielding a gray color similar to No. 36081 of FED–STD–595.

(b) The material shall be of the generic epoxy resin classification (structural adhesives or engineering adhesives).

(c) The material shall not be hazardous to health and shall not represent a hazardous waste.

3.3 Performance.

3.3.1 Edgeseal–in–filter performance.

(a) Filters sealed with this edgeseal material shall meet the dimethylmethylphosphonate (DMMP) gas life requirement of an appropriate gas–particulate filter specification specified in the contract (see 4.4.2.1(a) and 6.2(f)).

(b) Filters sealed with this edgeseal material shall meet the filtration efficiency requirements of an appropriate gas–particulate filter specification specified in the contract (see 4.4.2.1(b) and 6.2(f)).

3.3.2 Edgeseal physical properties. Standard specimens fabricated from the edgeseal material (see 4.4.2.2.1) shall conform to the requirements of Table I.

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TABLE I. Physical properties

Property	Requirement		Test Paragraph
	Unaged	Aged*	
a. Hardness (Durometer A)	65±5	65±5	4.4.2.2.3
b. Tensile strength (lb/in ²)	1250 min avg	1250 min avg	4.4.2.2.4
c. Tear strength (lb/in)	100 min avg	100 min avg	4.4.2.2.5
d. Brittleness	No cracks, fissures, crazing, or ruptures		4.4.2.2.6
e. Volatile loss	Loss in weight ≤ 1.0% due to volatiles		4.4.2.2.7
f. Viscosity (centipoises)	2500±1000		4.4.2.2.8

*Aging conditions are defined in 4.4.2.2.2.

3.4 Instruction sheet. The first article lot shall be accompanied by an instruction sheet containing the following information:

- (a) Title, number, and date of this specification
- (b) Materials designation
- (c) Recommended storage conditions
- (d) Estimated shelf life under recommended storage conditions to maintain required viscosity
- (e) Other information considered useful by the manufacturer or specified by the procuring activity

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)

General methods used to accomplish verification include examination, analysis with certification, demonstration, and test. The manufacturer may submit alternative methods, techniques,

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or equipment to the Government for review and approval prior to use. Requirements and verification methods are cross referenced in Table II.

TABLE II. Requirement/verification cross–reference matrix.

<u>METHOD OF VERIFICATION</u> N/A–Not Applicable A–Analysis D–Demonstration E–Examination T–Test			<u>CLASS OF VERIFICATION</u> FA–First Article C–Conformance						
Requirement Paragraph	Title	Verification Paragraph	Verification Methods					Verification Class	
			N/A	A	D	E	T	FA	C
3.2	Material	4.4.1		X		X		X	
3.3	Performance	4.4.2					X	X	X
3.3.1	Edgeseal–in–filter performance	4.4.2.1					X	X	
3.3.2	Edgeseal physical properties	4.4.2.2	X						
3.3.2.a	Hardness	4.4.2.2.3					X	X	X
3.3.2.b	Tensile strength	4.4.2.2.4					X	X	X
3.3.2.c	Tear strength	4.4.2.2.5					X	X	X
3.3.2.d	Brittleness	4.4.2.2.6					X	X	X
3.3.2.e	Volatile loss	4.4.2.2.7					X	X	X
3.3.2.f	Viscosity	4.4.2.2.8					X	X	X
3.4	Instruction sheet	4.4.3				X		X	X

4.2 First article inspection.

4.2.1 Sample. The first article sample shall be submitted for inspection and approval in accordance with the terms of the contract.

4.2.1.1 Edgeseal material. The first article sample shall consist of 30 gallons of edgeseal material manufactured using the same methods, materials, equipment, and processes as will be used during regular production.

4.2.1.2 Inspection procedure. The first article edgeseal material shall be subjected to the inspection procedures specified in Table II. A 1–quart (or more) specimen shall be taken from the 30 gallon first article sample. From the one–quart specimen, test slabs (small test specimens) shall be prepared per 4.4.2.2.1. Those test slabs shall be tested in accordance with 4.4.2.2.3 through 4.4.2.2.7. In addition, a portion of the 1–quart specimen shall be taken for viscosity test (4.4.2.2.8).

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4.2.1.3 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 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 edgeseal material produced by one manufacturer, at one plant, from the same materials, under essentially the same manufacturing conditions, and at essentially the same time. In the event that the process is a batch operation, each batch shall constitute a lot (see 6.4).

4.3.1.1 Sampling. In the case of a continuous process, the unit of product shall be 5 gallons. A sample of five units of product shall be taken at random from each lot. From each container in the sample, a 1–quart (or more) specimen shall be removed and placed in a clean, dry container labeled to identify the specimen with lot and sample container represented. In the case of batch processing, a 5–gallon sample shall be taken from each batch while the material is stored in the final mixing tank. From the 5–gallon sample, a 1–quart specimen shall be removed and placed in a clean, dry container labeled to identify the specimen with batch represented.

4.3.1.2 Inspection procedure. Test slabs (small test specimens) shall be prepared from each 1–quart specimen as specified in 4.4.2.2.1. The slabs shall be tested in accordance with 4.4.2.2.3 through 4.4.2.2.7. In addition, a portion each 1–quart specimen shall be taken for viscosity test (4.4.2.2.8).

4.4 Verification methods and procedures.**4.4.1 Material.**

(a) Verify 3.2(a) by providing information on the types and quantities of ingredients in the edgeseal product. Categorize ingredients as plastisol, stabilizer, pigment, filler, etc.

(b) Verify 3.2(b) by providing a CoC with analysis.

(c) Verify 3.2(c) by providing a CoC with analysis.

4.4.2 Performance.**4.4.2.1 Edgeseal–in–filter performance.**

(a) Verify 3.3.1(a) by supplying DMMP gas life data obtained on M48A1 filters or other appropriate gas–particulate filters specified in the contract (see 6.2(f)). The gas life data shall consist of DMMP gas life data obtained on first article gas–particulate filters prior to produc-

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tion. If any data point fails to comply with the applicable requirement in 3.3.1(a), the Government reserves the right to require a failure analysis and/or require supplemental testing.

(b) Verify 3.3.1(b) by supplying filtration efficiency data obtained on M48A1 filters or other appropriate gas-particulate filters specified in the contract (see 6.2(f)). The filtration efficiency data shall consist of filtration efficiency data obtained on first article gas-particulate filters prior to production. If any data point fails to comply with the applicable requirement in 3.3.1(b), the Government reserves the right to require a failure analysis and/or require supplemental testing.

4.4.2.2 Edgeseal physical properties.

4.4.2.2.1 Preparation of test specimens. Specimens for testing the fused edgeseal material in 4.4.2.2.3 through 4.4.2.2.7 shall be made in open aluminum molds 6-1/2 inches by 6-1/2 inches by not more than 1/2-inch thick, with a cavity size 6 inches by 6 inches and of sufficient depth to produce a sheet 0.075 ± 0.005 inch in thickness. The mold cavity shall be filled with fully dispersed edgeseal material and placed in a mechanical, convection, recirculation type oven at a temperature of $425 \pm 2^\circ\text{F}$ so that the mold is essentially level. The edgeseal material shall be fused at 400°F as indicated by a thermocouple placed in the center of the sample. (A calibrated thermocouple shall be used to determine the internal temperature of the material; care should be exercised to insure that the thermocouple does not bottom on the mold cavity.) Once 400°F is indicated by the thermocouple, hold specimen in oven for $3(+1-0)$ minutes, remove the mold from the oven, and cool it at room temperature for 8.0 ± 1.0 minutes followed by forced air cooling to room temperature within 10.0 ± 1.0 minutes of removal from oven. Conditioning of specimens shall commence within 48 hours of molding the fused sheets. The conditioning shall be in accordance with the applicable test method.

4.4.2.2.2 Aged test specimens. Test specimens to be aged shall be prepared as in 4.4.2.2.1 and subjected to an exposure cycle of 24 hours at $175 \pm 2^\circ\text{F}$ and 24 hours at $-40 \pm 2^\circ\text{F}$. The specimens shall be held at $73.5 \pm 2^\circ\text{F}$ and 50 ± 2 percent humidity for a minimum of 48 hours before testing.

4.4.2.2.3 Hardness. Three specimens prepared as specified in 4.4.2.2.1 shall be tested in accordance with ASTM D2240. Repeat hardness test on aged test specimens (4.4.2.2.2).

4.4.2.2.4 Tensile strength. Six specimens prepared as specified in 4.4.2.2.1 may be tested in accordance with Method 4111 of FED-STD-601. The specimens may be cut with die number III of figure 4111. Per Change Notice 7 of FED-STD-601, the preferred test method is the following: Five specimens shall be tested in accordance with ASTM D412, Method A. Determine average tensile strength. Repeat tensile strength test on aged test specimens (4.4.2.2.2).

4.4.2.2.5 Tear strength. Three specimens prepared as specified in 4.4.2.2.1 shall be tested in accordance with ASTM D624 using die C. Determine average Type C tear strength. Repeat tear strength test on aged test specimens (4.4.2.2.2).

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4.4.2.2.6 Brittleness. Five specimens prepared as specified in 4.4.2.2.1 may be tested at $-10\pm 2^{\circ}\text{F}$ in an air heat transfer medium in accordance with Method 5311 of FED-STD-601. The specimen shall extend $1\pm 1/4$ inch beyond the edge of the clamp. Per Change Notice 7 of FED-STD-601, the preferred test method is the following: Five specimens conditioned at $-10\pm 2^{\circ}\text{F}$ in an air heat transfer medium shall be tested in accordance with ASTM D2137, Method C.

4.4.2.2.7 Volatile loss. Three specimens prepared as specified in 4.4.2.2.1 shall be tested in accordance with ASTM D1203, Method A or B.

4.4.2.2.8 Viscosity. The edgeseal material shall be thoroughly mixed by stirring for at least one minute immediately prior to drawing the specimen and performing the viscosity test. Conduct a viscosity test in accordance with ASTM D1823 (extrusion through orifice) or ASTM D1824 (viscometer), except that edgeseal temperature shall be maintained at $77\pm 2^{\circ}\text{F}$. Material shall be at least 7 days old as measured from date of manufacture.

4.4.3 Instruction sheet. Verify contents of instruction sheet by examination.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. 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 plastisol edgeseal material covered by this specification is intended as an adhesive sealant to be used during the manufacture of particulate filters. The edgeseal material requirements, physical property requirements, and edgeseal-in-filter DMMP gas life requirements in this specification were extracted from MIL-E-51483(EA). The edgeseal material is military unique because it is intended to have some resistance to vaporous chemical agent penetration.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- (a) Title, number, and date of this specification.

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- (b) 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.
- (c) Packaging requirements (see 5.1 and 6.5).
- (d) Responsibility of inspection
- (e) Data requirements for edgeseal ingredients (see 6.3)
- (f) The nomenclature and specification identification number of an appropriate gas–particulate filter which uses the edgeseal material.

6.3 Data. The contractor should submit the following information which he may designate as “company confidential” in which case it will be so treated by the Government:

(a) Chemical and trade names of all ingredients in the edgeseal material. If the chemical name can not be obtained, the trade name should be sufficient.

(b) The purity and quantity, with allowable tolerance for each ingredient as required to fully define the edgeseal material. Quantity of each ingredient should be expressed in percent by weight or in parts by weight.

6.4 Batch. A batch is defined as the quantity of material which has been manufactured by some unit chemical process or subjected to some physical mixing operation intended to make the final product substantially uniform.

6.5 Packaging. Packaging should be in accordance with ASTM D3951.

6.5.1 Shipping containers. The material should originally be in a liquid form and be packaged in containers whose nominal capacity is not greater than 5 gallons (US).

6.5.2 Marking. Marking should include contract number, lot number, and date produced.

6.6 Subject term (key word) listing.

- (a) Plastisol
- (b) Seal
- (c) DMMP

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

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Preparing activity:

Army - EA

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