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MIL-S-11388D
1 February 1991
SUPERSEDING
MIL-S-11388C
14 December 1983

MILITARY SPECIFICATION

SEALING MATERIAL FOR METAL CONTAINER SEAMS

This specification is approved for use by the Army Materials Technology Laboratory, 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 a material used for sealing seams in the manufacture of hermetically sealed metal containers for packaging dry materials.

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-P-1892 - Paint, Varnish, Lacquer, & Related Materials, Packing, & Marking of

STANDARDS

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Director, U.S. Army Laboratory Command, Materials Technology Laboratory, ATTN: SLCMT-MEE, Watertown, MA 02172-0001 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 8030

FEDERAL

FED-STD-141 - Paint, Varnish, Lacquer and Related Materials; Methods of Inspection, Sampling, and Testing

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

2.2 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.

REQUIREMENTS

3.1 Material. The sealing material shall consist essentially of a stabilized dispersion of an elastomer and mineral filler prepared in such a manner as to comply with the requirements of this specification.

3.2 Quantitative requirements. The sealing material shall comply with the quantitative requirements specified in table I.

TABLE I. Quantitative requirements.

Characteristics	Requirements Minimum	Maximum
Non-volatile matter, percent by weight of material	20	--
Ash, percent by weight of non-volatile matter	20	45

3.3 Qualitative requirements.

3.3.1 Aging test at 150°C (302°F). A film of the sealing material prepared and tested as specified in 4.4.4, shall withstand bending without cracking.

3.3.2 Toughness of film. A film of the sealing material, prepared and tested as specified in 4.4.5, shall not chip or scale and shall be removed from the panel in the form of ribbons.

3.3.3 Resistance to low temperature. A film of the sealing material, prepared and tested as specified in 4.4.6, shall show no cracking or checking and shall show no separation of ingredients nor beome markedly more tacky than the original film.

3.3.4 Additional requirements. The sealing material supplied under this specification shall be suitable for use with the type of lining and drying equipment specified by the procuring activity (see 6.2). When specified by

the procuring activity, a sample of sealing compound shall be furnished for preproduction tests with the applicable lining and drying equipment.

3.4 Corrosion. When listed as in 4.5, the sealing compound shall not induce or accelerate corrosion of the container construction material. There shall be no visible evidence of corrosion at the metal-sealant interface.

3.5 Toxicity. The sealing material shall contain no compounds or any combination of materials which might be deemed toxicologically hazardous under normal conditions of usage. A statement to this effect shall be furnished by the manufacturer to the procuring activity. The Government may conduct such tests as are deemed necessary to verify compliance with this requirement. The material shall have no adverse effect on the health of personnel when used for its intended purpose. Questions pertinent to this effect shall be referred by the contracting activity to the appropriate departmental medical service who will act as an advisor to the contracting agency (see 4.6).

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 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 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 ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.2 Sampling. Sampling shall be performed in accordance with method 1021 of FED-STD-141.

4.3 Inspection. Inspection shall be performed in accordance with method 1031 of FED-STD-141.

4.4 Test Methods.

4.4.1 Determination of nonvolatile matter. Place a portion of the thoroughly mixed sample in a stoppered weighing bottle, or suitable alternate, and from this, weigh by difference, about 2.5 grams of sample into a tared flat-bottomed metal or glass dish, 80 to 100 mm. in diameter and 5 to 10 mm.

in depth, such as friction-top can covers, ointment boxes, or petri dishes. By gentle tilting, spread the sample over the bottom of the dish and heat for 3 hours in a ventilated oven maintained at 105 ± 2°C (221 ± 4°F). If necessary, a piece of stout wire can be included in the tare of the dish and used at intervals to break up skins by stirring during the heating period. Cool and weigh the dish. Calculate the nonvolatile matter as follows:

$$\text{Nonvolatile matter, percent} = \frac{C-A}{B} \times 100$$

Where:

A = Weight of dish
B = Weight of sample used
C = Weight of dish and contents after heating

4.4.2 Determination of ash in nonvolatile matter. Place a portion of the thoroughly mixed sample in a stoppered weighing bottle, or suitable alternate, and from this, weigh by difference, about 5 grams of sample into a tared procelain crucible. Place the crucible in a steam bath until the material is dry, and then carefully ignite the crucible under a hood until the residue is completely carbonized. Then ignite the crucible in a muffle furnace at about 800°C, (1472°F), until all the carbonaceous matter is removed. Cool in a desiccator and weigh. Calculate the ash on the nonvolatile as follows:

$$\text{Ash in nonvolatile matter, percent} = \frac{C-A}{N \times B} \times 10{,}000$$

Where:

A = Weight of dish
B = Weight of sample used
C = Weight of dish and contents after ignition
N = Percent nonvolatile (see 4.4.1)

4.4.3 Preparation of test panels. Apply a film of sealing material to six panels, U.S. Standard 22 guage SAE 1020 cold rolled steel, 3 by 6 inches. The panels shall be previously cleaned by buffing with fine, (approximately 240 grit) sandpaper or emery cloth. Rinse the panels with acetone and then with toluene. Apply a 0.003 inch (3 mil) wet film of the sealing material to each of the clean dry panels using a drawdown applicator or a doctor blade, (approximately 0.006 inch gap clearance). Place the panels in a well ventilated room or chamber having a relative humidity of 65 ± 3 percent and temperature of 23° ± 1°C (73° ± 1°F) for 16 to 18 hours. Use panels for tests in 4.4.4, 4.4.5, and 4.4.6.

4.4.4 Aging test at 105°C (221°F). Two of the panels prepared in 4.4.3 shall be placed in an oven maintained at 100° to 105°C (212° to 221°F) for two weeks. Remove the panels from the oven and allow them to stand at 23° ± 1°C (73° ± 1°F) for 1 hour and then bend each of the panels through an arc of 180° over a mandrel 1/4 inch in diameter taking about 2 seconds to complete the bending. Examine the film for cracks in the bent area of the panels, using a magnifying glass having a magnification of approximately 3 diameters. Consider the sample to be satisfactory with respect to the aging test at 100° to 105°C (212° to 221°F) if no cracks are detected in the bent area.

4.4.5 Determination of toughness of film. Place two of the panels prepared as directed in 4.4.3 in an oven maintained at 100° to 105°C (212° to 221°F) for 1 hour. Remove the panels form the oven, allow them to remain at 23° ± 1°C (73° ± 1°F) for 1 hour and then scrape the film from the panels using a sharp knife blade held in such a position that when the point of the blade is in contact with the panels it makes an angle of about 30° with the surface of the film. The toughness of the film shall be considered satisfactory if the film comes off the panels in the form of ribbons, and does not chip or scale.

4.4.6 Determination of resistance to low temperature. Place two of the panels prepared as directed in 4.4.3 in a chamber maintained at a temperature of -54° ± 3°C (-65°F) for 16 hours. Examine the film for cracking or checking immediately upon removal of the panel from the cold chamber. Allow the panel to warm to room temperature and examine for evidence of separation of the ingredients as indicated by visual examination. Determine by touch whether there is any marked increase in tackiness over the original film. Consider the sample to be satisfactory with respect to low temperature resistance if no checking or cracking is observed immediately upon removal from the low temperature test chamber and if there is no evidence of separation of the ingredients or marked increase in tackiness over the original film when warmed to room temperature.

4.4.7 Packaging, packing, and marking. The sealing compond shall be examined for compliance with the packaging, packing, and marking requirements of section 5 in accordance with PPP-P-1892. Any container in the sample having one or more defects, or under required fill, shall be rejected, and if the number of defective containers in any sample exceeds the acceptance number of the appropriate sampling plan of MIL-STD-105, the lot represented by the sample shall be rejected.

4.5 Corrosion. Corrosion testing shall consist of placing five (5) open metal containers in a test chamber maintained at 90°F (32°C) and 80% relative humidity (R.H.) for 30 days. Visually inspect inside and outside of test containers. Reject any lot of sealant used on test containers that exhibit corrosion adjacent to sealed seams.

4.6 Toxicity. The contract shall have the toxicological product formulations and associated information available for review by the contracting activity to evaluate the safety of the material for proposed use. (see 3.5).

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with PPP-P-1892. The sealing compound shall be packaged, packed and marked in accordance with PPP-P-1892. The level of packaging shall be A, B, or C and the level of packing shall be A, B, or C as specified (see 6.2). The sealing compound shall be furnished in 1-gallon containers, in 5-gallon steel pails or in 55-gallon steel drums, as specified (see 6.2).

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 sealing material covered by this specification is intended for use in seams of metal containers.

6.2 Aquisition requirements. Aquisition documents must specify the following:

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

(b) Size of container required (see 5.1).

(c) Level of packaging and packing required (see 5.1)

(d) Type of lining and drying equipment with which the lining compound is to be used in the fabrication of metal containers (see 3.3.4).

6.3 Key word listing.

Sealing material

Custodians:
Army - MR
Navy - OS
Air Force - 99

Review activities:
Air Force - 84

User activities:
Navy - MC

Preparing activity:
Army - MR

Project 8030-0634

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER: MIL-S-11388D

2. DOCUMENT TITLE: SEALING MATERIAL FOR METAL CONTAINER SEAMS

3a. NAME OF SUBMITTING ORGANIZATION

b. ADDRESS (Street, City, State, ZIP Code)

4. TYPE OF ORGANIZATION (Mark one)

- [ ] VENDOR
- [ ] USER
- [ ] MANUFACTURER
- [ ] OTHER (Specify): _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER (Last, First, MI) – Optional

b. WORK TELEPHONE NUMBER (Include Area Code) – Optional

c. MAILING ADDRESS (Street, City, State, ZIP Code) – Optional

8. DATE OF SUBMISSION (YYMMDD)