MIL-C-13783C(MR)
17 February 1983
SUPERSEDING
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8 August 1969

MILITARY SPECIFICATION

COMPOUND WATERPROOFING (FOR SMALL ARMS AMMUNITION)

This specification is approved for use by the Army Materials and Mechanics Research 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 specification covers asphaltic waterproofing compounds for use in waterproofing of small arms ammunition. The specification provides for an additional type of material suitable for use under Air Pollution Regulations (see 6.1.1).

1.2 Classification. The waterproofing compound covered by this specification shall be of the following compositions as specified:

Composition G - General use.
Composition L - Limited use (see 6.1.1)

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified (see 6.1), the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation, form a part of this specification to the extent specified herein.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Director, US Army Materials and Mechanics Research Center, ATTN: DRXMR-SMS, Watertown, MA 02172 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

/ FSC 8030/

SPECIFICATIONS

FEDERAL
O-T-634 - Trichloroethylene, Technical
PPP-C-96 - Cans, Metal, 28 Gage and Lighter

STANDARDS

MILITARY
MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129 - Marking for Shipment and Storage

(Copies of specifications, standards, handbooks, drawings, and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 56 - Flash Point by Tag Closed Tester, Test For
ASTM D 129 - Sulfur in Petroleum Products General Bomb Method, Test For
ASTM D 2267 - Aromatics in Light Naphthas, Reformates, and Gasolines by Gas Chromatography, Test For

(Applications for copies of ASTM publications should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Performance requirements. At the discretion of the procuring activity (6.1), performance tests shall be made to determine whether the compound is satisfactory for use under actual working conditions (see 4.6). Approval of the performance sample by the procuring activity shall not relieve the contractor of his obligation to supply waterproofing compound that shall conform to the requirements of this specification. Any change or deviation from the performance sample shall be subject to the approval of the procuring activity.

3.2 Material. Waterproofing compound shall be composed of high-grade asphalts fluxed and blended, plasticized with suitable compounds and thinned with volatile solvents. The compound shall be free of coal tar, coal tar pitch, wood tar pitch, or any other impurities which may affect the serviceability of the material.

3.3 Non-volatile matter. When tested as specified in 4.7.1, the non-volatile matter of the compound shall be not less than 30 percent by weight.

3.4 Non-photochemically reactive solvents (composition L only). When tested as specified in 4.7.2, the solvent content of composition L of the waterproofing compound shall be non-photochemically reactive.

3.5 Adhesion. When tested as specified in 4.7.3.1, the film of the compound shall show good adhesion and shall not flake or chip.

3.6 Knife test. When tested as specified in 4.7.3.2, the film of the compound shall come off in continuous strips.

3.7 Flexibility. When tested as specified in 4.7.3.3, the film of the compound shall withstand bending without cracking or flaking.

3.8 Corrosion. When tested as specified in 4.7.3.4, the compound shall not cause more than a slight etching effect and without degradation of the brass.

3.9 Drying time. When tested as specified in 4.7.3.5, the compound shall set to touch in not more than 2 minutes, and shall be free from tack in not more than 5 minutes.

3.10 Dilution. When tested as specified in 4.7.4, the thinned compound shall show no precipitation, nor separation of any ingredient and the quality of the deposited film after air-drying shall not be affected.

3.11 Viscosity. When tested as specified in 4.7.5, the viscosity of the compound shall be not less than 40 and not more than 55 centipoises.

3.12 Flammability. When tested as specified in 4.7.6, the compound shall show no tendency to burn freely. Upon removal of the flame, if at all ignited, the compound shall extinguish itself immediately of its own accord.

3.13 Appearance and pourability. When tested as specified in 4.7.7, the compound shall be smooth and homogeneous and shall show no livering and stringiness. Any deviation from a smooth flow as shown by jumps or discontinuities shall be considered unsatisfactory.

3.14 Sulfur content.

3.14.1 Free sulfur. Free sulfur shall not be present in more than a trace quantity when determined in accordance with 4.7.8.

3.14.2 Total sulfur. Total sulfur shall not exceed 1.0 percent on an as received basis when determined in accordance with 4.7.9.

3.15 Flash point (composition L only). Flash point shall be 100°F minimum when tested in accordance with 4.7.10.

3.16 Workmanship. The component ingredients shall be assembled and processed in accordance with the best workmanship practices to produce a high-quality waterproofing compound.

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 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Lot. A lot of waterproofing compound shall consist of that quantity of material produced in one continuous operation from one batch of raw materials at one place by one manufacturer and offered for delivery at one time.

4.3 Sampling.

4.3.1 Sampling for examination of packaging, packing and marking. Unless otherwise specified, a random sample of unit containers shall be selected from each lot in accordance with MIL-STD-105 at inspection level I to verify compliance with the requirements of section 5.

4.3.2 Sampling for performance test. When required (see 6.1), a representative 1 gallon can of waterproofing compound shall be forwarded as directed by the procuring activity for the performance tests.

4.3.3 Sampling for acceptance tests. Two cans of waterproofing compound representative of the lot shall be selected at random for tests. The contents of each can shall be stirred and approximately 1 pint of the compound shall be taken from each can and the 2 pints mixed to form a composite sample. All acceptance tests shall be performed on the composite sample.

4.4 Examination.

4.4.1 Packaging, packing and marking. Examination shall be for defects and at the acceptable quality levels shown in table I.

4.5 Classification of tests. The inspection and testing of waterproofing compound shall be classified as follows:

(a) Performance tests (see 4.6).
(b) Acceptance tests (acceptance tests shall consist of all tests of this specification except the performance test (see 4.7).

4.6 Performance tests. Performance tests shall be run on waterproofing, gaging and loading machines of the establishment to which the material is consigned. The assembled cartridges shall be subject to a waterproofing test and the average velocity of the cartridges which have been submerged in water shall not vary from the average velocity of the same lot by more than 75 percent of the specified limit permitted in the applicable cartridge specification.

4.7 Acceptance tests. If the composite sample fails any of the following tests, the lot represented shall be rejected.

4.7.1 Nonvolatile matter. Place a portion of a thoroughly mixed sample of the compound in a tared, stoppered bottle. Weigh the container and sample. Transfer 1.5 to 2.5 grams of the material to a tared, flat-bottom dish about 8 centimeters in diameter (a friction-top can plug). Spread the material over the bottom of the dish (by tilting it). Weigh the bottle with the sample again, and by difference compute the exact weight of the portion transferred to the weighed dish. Heat the dish and the contents in a laboratory oven maintained at 105° plus or minus 2°C (221° plus or minus 4°F) for 3 hours. Cool and weigh. Compute the percent of nonvolatile matter.

TABLE I. Classification of defects.

Item	AQL percent	Classification of defect	Defect	Method of inspection
Unit container (see 4.3.1 and 5.1)	4.0	Major 101	Improper type	Visual
		Major 102	Improper size	Visual
		Major 103	Improper fill[1]	Approved scale[2]
		Major 104	Improper closure	Visual
Box open (see 4.3.1 and 5.2)	4.0	Major 105	Improper type of box	Visual
		Major 106	Improper size of box	Visual
		Major 107	Lack of, or improper strapping	Visual
Box closed (see 4.3.1, 5.2, and 5.3)	4.0	Major 108	Gross weight, max.	Approved scale[2]
		Major 109	Improper marking	Visual
		Major 110	Improperly closed	Visual

[1] The actual weight of a container filled with the minimum required quantity of compound shall be the basis for determining the acceptable weight of subsequent containers.
[2] Approved by procuring agency.

4.7.2 Non-photochemically reactive solvents (composition L only). The non-photochemically reactive solvent composition shall be determined using a gas chromatograph or other suitable device in accordance with ASTM D 2267. A non-photochemically reactive solvent is any solvent with an aggregate of less than 20 percent of its total volume composed of the chemical compounds classified below or which does not exceed any of the following individual percentage composition limitations, referred to the total volume of solvent:

(a) A combination of hydrocarbons, alcohols, aldehydres, esters, ethers, or ketones having an olefinic or cycloolefinic type of unsaturation: 5 percent;

(b) A combination of aromatic compounds with eight or more carbon atoms to the molecule except ethylbenzene: 8 percent;

(c) A combination of ethylbenzene, ketones having branched hydrocarbon structures, trichloroethylene or toluene: 20 percent.

4.7.3 Preparation of test specimens. Prepare 5 clean, smooth-surface strips of hard-tempered brass, 125 mm by 25 mm, and approximately 0.5 mm thick. Finish the strips with emery polishing paper No. 0 so that they shall be free from burrs and surface imperfections. Designate the strips A, B, C, D, and E. Dip strips A, B, C, and D into the waterproofing compound to a depth of 60 to 70 mm, withdraw and remove to a location free from drafts and fumes. Air-dry the strips for 24 hours in a vertical position at 20 to 32°C (68° to 89.6°F) and at a relative humidity of not more than 65 percent.

4.7.3.1 Adhesion. Strip "A" prepared as specified in 4.7.3 shall be heated in air for 1 hour at 100° plus or minus 2°C (212° plus or minus 3.6°F) and then allowed to cool for 1 hour at 20° to 32°C (68° to 89.6°F) and a relative humidity of not over 65 percent. Scratch the strip with a sharp pointed instrument and examine for compliance with 3.5.

4.7.3.2 Knife test. Select strip "B" prepared as specified in 4.7.3 and cut the film on the strip with a knife blade held at an angle of 45 degrees to the surface. Examine the film for compliance with 3.6.

4.7.3.3 Flexibility. Strip "C" prepared as specified in 4.7.3 shall be bent rapidly (in about 1 second) coated side out, through an angle of 180 degrees back upon itself over a 3 mm mandrel. The line of flexure shall be across the film surface not less than 1/2 inch from the top or bottom of the film. Examine the film for compliance with 3.7.

4.7.3.4 Corrosion. The film on strip "D" prepared as specified in 4.7.3 shall be carefully removed by means of a suitable solvent and the surface of the brass shall be examined for compliance with 3.8.

4.7.3.5 Drying time. Strip "E" shall be dipped into the compound to a depth of 60 to 70 mm, withdrawn and the time measurement begun. The strip shall be allowed to drain and then removed to a location free from drafts and fumes. The strip shall be allowed to dry for the times specified in 3.9 in a vertical position in air at a temperature of 20° to 32°C (68° to 89.6°F) and a relative humidity of not over 65 percent. The film shall be considered set to touch when a light finger pressure on the film produces at most only the slightest imprint but does not break the surface by adhering to the finger. It shall be considered free from tack when firm finger pressure leaves no print on the film. That part of the film which is less than 1/2 inch from the top or bottom of the strip shall not be used for the test (see 3.9).

4.7.4 Dilution. Thin a specimen of the compound with an equal volume of trichloroethylene conforming to O-T-634. If no precipitation or separation is noticed, proceed with pouring out of the thinned compound on a panel and air dry for 1 hour. For compliance, see 3.10.

4.7.5 Viscosity. The viscosity of the compound shall be determined by means of any suitable calibrated viscosimeter on a specimen controlled at a constant temperature of 25° plus or minus 0.5°C (77° plus or minus 1.0°F). For compliance, see 3.11.

4.7.6 Flammability. Pour about 25 ml of the compound into a 100 mm watch glass and test at a constant temperature of 20 to 30°C (68 to 89.6°F). Apply a flame to the surface of the compound for 5 seconds. The flame shall be approximately 25 mm long by 2 1/2 to 3 mm in diameter (the test flame burner of the Cleveland flash point apparatus is a convenient source for the flame). If there exists any tendency toward the formation of a surface film, the material shall be stirred by means of a glass rod. For compliance, see 3.12.

4.7.7 Appearance and pour test. Fifty (50) ml of the compound shall be measured into a glass cylinder. The cylinder shall be equipped with a spout and the inside dimensions of the cylinder shall be approximately 7 inches high by 7/8 inch in diameter. By tilting the cylinder, the compound shall be poured from the spout at a uniform rate of about 100 ml per minute. For compliance, see 3.13.

4.7.8 Free sulfur. A sample of the nonvolatile portion of the material (see 4.7.1) shall be restored to an approximately 50 percent solution with thiophene free benzene. Free sulfur content of this solution shall be determined in accordance with ASTM D 129. For compliance, see 3.14.1.

4.7.9 Total sulfur. Total sulfur content of the material shall be determined in accordance with ASTM D 129. For compliance, see 3.14.2.

4.7.10 Flash point. Flash point of waterproofing compound shall be tested in accordance with ASTM D 56.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Packaging shall be level A or C as specified (see 6.1).

5.1.1 Level A. Unless otherwise specified, the waterproofing compound shall be furnished in round 5 gallon containers conforming to type V, class 2 of PPP-C-96.

5.1.2 Level C. Unless otherwise specified, the waterproofing compound shall be furnished in 5 gallon containers in accordance with the manufacturer's commercial practice.

5.2 Packing. Packing shall be level A, B, or C, as specified (see 6.1).

5.2.1 Level A. Waterproofing compound packaged as specified in 5.1 shall be packed in accordance with overseas shipment requirements of the appendix to PPP-C-96.

5.2.2 Level B. Waterproofing compound packaged as specified in 5.1 shall be packed in accordance with the domestic shipment requirements of the appendix to PPP-C-96.

5.2.3 Level C. Packing shall be in accordance with commercial practice adequate to insure acceptance by common carrier at lowest rates and safe delivery at destination.

5.3 Marking. In addition to any special marking required, in the contract or order (see 6.1), all containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Ordering data. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Composition required (see 6.1.1).
c. Quantity desired.
d. Whether a performance sample is required, and if so, address to which it is to be sent (see 3.1).
e. Capacity of unit container, if other than 5 gallons (see 5.1).
f. Selections of levels of packaging and packing (see 5.1 and 5.2).
g. Special marking, if required (see 5.3).

6.1.1 Composition L waterproofing compound should be specified for use in areas with regulations controlling the emission of solvents into the atmosphere.

6.2 Information pertaining to the use of waterproofing compounds on small arms ammunition may be obtained from The Small Caliber Weapons Laboratory located at the following address:

Commander
ARRADCOM
FG and SCWSL
ATTN: DRDAR-SCM
Dover, NJ 07801

Custodian:
Army - MR

Review activities:
Army - AL, AR

User activities:
Army - MI

Preparing activity:
Army - MR
Project No. 8030-A102

(WP ID #3174A/DISC-0029A, FOR AMMRC USE ONLY)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER

2. DOCUMENT TITLE

3a. NAME OF SUBMITTING ORGANIZATION

4. TYPE OF ORGANIZATION *(Mark one)*

- ☐ VENDOR
- ☐ USER
- ☐ MANUFACTURER
- ☐ OTHER *(Specify)*: _____

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

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)*

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NOTE: This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification 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.

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