

MIL-C-3301C

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SUPERSEDING
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MILITARY SPECIFICATION

COMPOUND, ASPHALTIC, HOT-MELT (CAVITY LINING)

This specification is mandatory for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1. This specification covers a hot-melt asphaltic compound for coating the inner walls of metal cases prior to filling with explosives.

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONS

Federal

SS-R-406 Road and Paving Materials; Methods of Sampling and Testing

PPP-D-723 Drum, Fiber

Military

MIL-T-248 Trinitrotoluene (TNT)

MIL-A-512 Aluminum Powder, Flake, Grained, and Atomized

FSC 8030

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SPECIFICATIONS

Military (Continued)

MIL-M-14745 Minol-2 Composition
MIL-E-22267 Explosive Compositions, HBX Type

STANDARDS

Military

MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129 Marking for Shipment and Storage
MIL-STD-147 Palletized Unit Loads (40 In. x 48 In., 4-Way Partial and
 4-Way Pallets)
MIL-STD-286 Propellants, Solid: Sampling, Examination and Testing

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

3. REQUIREMENTS

3.1 Qualification - The asphaltic compound furnished under this specification shall be a product which is qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.3 and 6.3). A change in formulation shall require requalification of the product.

3.2 Materials - The materials used in the manufacture of the asphaltic compound shall be of acceptable quality, suitable for the purpose intended, and shall be such as to produce a compound which shall be easily heat liquefiable but which does not flow at temperatures below the softening point. The compound shall contain no volatile solvents.

3.3 Heat resistance - When tested as specified in 4.5.2, a dried film of the compound on a metal panel shall not sag or flow when heated by immersion in a glycerin bath maintained at $109 \pm 1^{\circ} \text{C}$ ($228 \pm 2^{\circ} \text{F}$) for 1 hour.

3.4 Acid resistance - When tested as specified in 4.5.3, a dried film of the compound on a metal panel shall withstand the action of picric, sulfuric, nitric, and hydrochloric acids for 6 hours without disintegration, browning, or dulling. There shall be no etching of the metal underneath the compound.

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3.5 Water resistance - When tested as specified in 4.5.4, a dried film of the compound on a metal panel shall withstand immersion in distilled water for 18 hours without blistering, whitening, and not more than a slight dulling.

3.6 Flexibility - A dried film of the compound on a metal panel shall show no chipping, scaling, or cracking when tested as specified in 4.5.5.

3.7 Chemical requirements - The asphaltic compound shall conform to the chemical requirements of Table I when tested as specified therein.

TABLE I

CHEMICAL REQUIREMENTS

	Percent maximum	Test paragraph
Acidity, as H ₂ SO ₄	.01	4.5.6
Alkalinity, as NaOH	.01	4.5.6
Insoluble matter in CCl ₄	1.00	4.5.7
Ash	1.00 <u>1/</u>	4.5.8
Manganese	0.10 <u>1/</u>	4.5.9
Lead	.04 <u>1/</u>	4.5.10

1/ Quality conformance tests for manganese and lead shall not be required when the ash content is less than 0.04 percent.

3.8 Softening point - The softening point of the asphaltic compound shall be not less than 113° C (235° F) when tested as specified in 4.5.11.

3.9 Penetration - The asphaltic compound shall conform to the following penetration values when tested as specified in 4.5.12:

200gm/60 sec./0° C (32° F)	15 min.
100gm/ 5 sec./25° C (77° F)	25 min.
50gm/ 5 sec./46° C (115° F)	80 max.

3.10 Viscosity - The viscosity of the asphaltic compound shall be not more than 700 centipoises at 149° C (300° F) when tested as specified in 4.5.13.

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3.11 Flash point - The flash point of the asphaltic compound shall be not less than 260° C (500° F) when tested as specified in 4.5.14.

*3.12 Reactivity - When subjected to the vacuum stability test as specified in 4.5.15, the reactivity of the asphaltic compound with TNT, HBX-1, HBX-3, H-6, and tritonal explosives shall not exceed 3.0 milliliters of gas over and above that generated by the controls when the test is conducted at 100±0.5 C for 40 hours. The reactivity of the asphaltic compound with Minol-2 explosive shall not exceed 3.5 milliliters of gas over and above that generated by the controls when the test is conducted at 90±0.5 C for 40 hours. The explosives tested with the asphaltic compound in the vacuum stability test shall be in accordance with the following: TNT shall conform to MIL-T-248, Type I; HBX-1, HBX-3, and H-6 shall conform to MIL-E-22267; Minol-2 shall conform to MIL-M-14745; Tritonal shall consist of 80±3 percent by weight TNT, MIL-T-248, Type I and 20±3 percent by weight aluminum powder, MIL-A-512, Type 3, Class 7.

3.13 Workmanship - The asphaltic compound ingredients shall be processed in a manner that will produce the high quality material necessary to meet the requirements of this specification. The finished product shall be homogeneous, free from a foamlike texture on its surface, or other defects that could adversely affect its intended use.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection - Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier 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 Classification of inspection - The inspection of the asphaltic compound shall be classified as follows:

(a) Qualification Inspection (see 4.3)

(b) Quality Conformance Inspection (see 4.4)

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4.3 Qualification inspection - The qualification inspection shall consist of a review for approval of the submitted manufacturer's reports and subjecting the qualification sample (4.3.1) to examination and testing to determine conformance to the requirements of this specification.

4.3.1 Qualification samples - A test report from the manufacturer or a commercial laboratory showing the formula number of the compound, formulation and composition of the asphaltic compound including the identification of ingredient samples by specific chemical name in addition to trade name, and laboratory data showing complete test results required by this specification except reactivity shall be forwarded to the activity responsible for the Qualified Products List before qualification samples are supplied (see 6.3). The qualification samples shall consist of 10 pounds of compound and 1 pound of each ingredient used. The samples shall be forwarded to the agency responsible for qualification as designated in a letter of authorization from the activity responsible for the Qualified Products List (see 6.3). The samples shall be plainly identified by securely attached durable tags or labels marked with the following information:

- (a) Sample for qualification inspection
- (b) COMPOUND, ASPHALTIC, HOT-MELT (CAVITY LINING)
- (c) Name and address of manufacturer
- (d) Location and identity of the plant which produced the samples
- (e) Manufacturer's identification
- (f) Date of manufacture
- (g) Submitted by (name) (date) for qualification inspection in accordance with the requirements of Specification MIL-C-3301C under authorization of (reference authorizing letter) (see 6.3).

*4.3.2 Retention of qualification - The supplier shall retain test data accumulated from performance of quality conformance inspections. Data collected during a 12-month interval shall be forwarded to the qualifying activity at the end of such 12-month interval. The purpose of the collection and submittal of test data is to show continuing

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conformance of the product with the requirements of this specification. Failure to submit this periodic feedback of test data shall result in loss of qualification for that product. In addition, the supplier shall immediately notify the qualifying activity at any time during the 12-month period when his product no longer meets the qualification requirements or when production of the suppliers product has been terminated.

*4.4 Quality conformance inspection - For each inspection lot of material submitted for acceptance, quality conformance inspection shall consist of all the examinations and tests except reactivity (4.5.15); and except 4.5.7 and 4.5.8 when the ash content (4.5.6) is less than 0.04 percent (see Table I).

*4.4.1 Inspection lot - An inspection lot shall consist of the asphaltic compound produced by one manufacturer, at one plant, from the same materials, and under essentially the same manufacturing conditions provided the operation is continuous. In the event the process is a batch operation, each batch shall constitute a lot (see 6.4).

*4.4.2 Sampling -

*4.4.2.1 For examination of preparation for delivery - Sampling for examination of preparation for delivery shall be conducted in accordance with MIL-STD-105.

*4.4.2.2 For tests - A 10 pound sample shall be taken at random from each lot in accordance with Method 101.11 of SS-R-406.

4.4.3 Inspection procedure -

4.4.3.1 For tests - The method of withdrawal and preparation of test samples shall be in accordance with Method 101.11 of SS-R-406. Failure of any test sample to meet any test requirement shall be cause for rejection of the lot represented. Containers which have samples removed shall be shipped as part of the lot if the lot is accepted.

4.4.3.2 For examination of preparation for delivery - Using the sample of filled containers selected in 4.4.2.2, adjust the sample to conform to MIL-STD-105, Inspection Level I, Acceptable Quality Level 2.5 percent defective. The sample unit shall be one filled and closed shipping container. Sample containers shall be examined for compliance with all requirements of this specification in regard to contents, closure, damaged or leaking container, improper container, and marking.

4.4.3.3 Examination of product - The asphaltic compound shall be examined for conformance with the requirements of this specification with respect to material and workmanship.

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4.5 Test methods -

4.5.1 Unless otherwise specified, the values specified in Section 3 apply to the average of the results obtained from duplicate determinations for each particular test.

4.5.2 Heat resistance -

4.5.2.1 Preparation of test panels - Solvent-cleaned, mechanically-polished plain carbon steel panels, 6 by 4 inches, by approximately 1/8 inch thick shall be used. Coat the panels by dipping them into the molten compound which shall be maintained at 150 to 160° C (302 to 320° F). Leave the top 1 inch of the panel uncoated. The film thickness should be approximately 1/16 inch on each side of the panel. Suspend the panel with the uncoated portion up and allow to cool to room temperature. Trim the excess compound from the bottom edge of the panel with a hot sharp knife.

4.5.2.2 Procedure - Suspend a panel, prepared as described in 4.5.2.1, in a bath of reagent-grade glycerine at $109 \pm 1^\circ \text{C}$ ($228 \pm 2^\circ \text{F}$) for 1 hour so that the uncoated end of the panel is uppermost and one half of coated portion is submerged. Remove the panel and cool by immersion in cold water. Examine the film for sag or flow. A slight surface displacement at the glycerine line is permissible.

4.5.3 Acid resistance - Place a panel, prepared as described in 4.5.2.1, on a flat horizontal surface. Place on the coating at different places drops of the following solutions:

Saturated picric acid

Sulfuric acid, sp. gr. 1.30

Nitric acid, sp. gr. 1.22

Hydrochloric acid, sp. gr. 1.09

Allow the acids to remain in contact with the coating for 6 hours while the temperature is maintained at approximately 21° C (70° F), covering the drops with small watch glasses in order to prevent evaporation. Remove the acids by washing with cold water and dry the film at room temperature for 1 hour. Examine the areas previously in contact with the acids and note if the compound is resistant to each of these acids as indicated by absence of disintegration, browning, or dulling of the coating. Do not consider a slight bloom around the area of a spot exposed to acid as an indication of failure to resist the acid. Remove the coating with benzene and examine the metal. Note if the coating has resisted the action of each acid as indicated by the absence of any corrosion of the metal.

4.5.4 Water resistance - Suspend a panel, prepared as described in 4.5.2.1 in a beaker of cold distilled water for 18 hours so that the uncoated end of the panel is uppermost and one half of the coated portion is submerged. Examine the panel for blistering, whitening, softening, or other visible defects.

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4.5.5 Flexibility - A strip of No. 30 gage cold rolled steel sheet, 2 by 8 inches, shall be cleaned by washing with benzene and thoroughly dried. It shall be coated on one side to a thickness of 1/16 inch by flowing on the molten compound and then cooled at room temperature for a period of 48 hours. With the coating on the outside, bend the test panel rapidly 180 degrees over a mandrel 1 inch in diameter. No cracking of any kind shall be visible after the bending test.

4.5.6 Acidity or alkalinity - Dissolve 5 gm sample of the compound in 10 ml. of toluene which is neutral to phenolphthalein. Shake the solution with 100 ml. of distilled water in a 250 ml. separatory funnel for at least 5 minutes. Filter and titrate with N/100 H₂SO₄ or N/100 NaOH as necessary using phenolphthalein as indicator. A blank shall be run on an equal volume of the water used. Calculate the acidity or alkalinity of the sample as follows:

$$\text{Acidity as sulfuric acid, percent by weight} = \frac{4.9 (C-B) N}{W}$$

$$\text{Alkalinity as sodium hydroxide, percent by weight} = \frac{4.0 (A-B) N}{W}$$

Where: A = milliliters of H₂SO₄ solution required for the titration of sample
 B = milliliters of standard solution required for the blank
 C = milliliters of NaOH solution required for the titration of sample
 N = normality of the standard H₂SO₄ or NaOH
 W = weight of sample in grams

4.5.7 Insoluble matter in CCl₄ -

4.5.7.1 Apparatus - The extraction apparatus shall consist of a heat resistant glass assay flask, a block tin condensing coil with a nickel, copper or tin-plated metal cap which fits securely around the rim of the flask, and a glass siphon cup which is suspended under the condenser. This apparatus shall be suitable for use with an electric hot plate or steam bath.

4.5.7.2 Procedure - An ordinary Whatman, or equal, paper filter thimble shall be dried and weighed. Transfer a weighed portion of approximately 6 gm of the sample to the paper thimble. The paper thimble and its contents are placed into the glass siphon cup which is then suspended under the condenser by a fine wire bail. Add approximately 60 ml. of CCl₄ to the paper thimble, allowing the excess solvent to flow over into the flask. The flask shall be cautiously heated on a steam bath or electric hot plate just enough to vaporize the solvent. Cold water shall be circulated through the condenser. The extraction shall be discontinued when the CCl₄ drops colorless from the siphon cup. The extraction may be complete in 1 to 5 hours. When the solvent comes through clear, the paper filter shall be removed and washed

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with a fine jet of CCl_4 from a washing bottle to wash out any bitumen that may be retained at the top of the paper and to break up any channels that may have been formed by the CCl_4 passing through. If the washings show any color, the thimble shall be put back into the siphon cup and the extraction continued until the solvent again becomes colorless. The paper thimble shall then be removed, dried carefully to constant weight at approximately 100°C (212°F) cooled and weighed. The solution in the flask shall be rinsed into a weighed porcelain or silica evaporating dish and the solvent evaporated under a hood. The residue shall be ignited over a flame or a muffle, the ash weighed, and the weight added to that of insoluble matter in the filter thimbles. Calculate the corrected loss in weight of the original sample to percent insoluble in CCl_4 .

4.5.8 Ash - Transfer a weighed portion of approximately 1 gm. of the sample to a tared porcelain or platinum crucible and place in a cold muffle furnace having a good air circulation and capable of having its temperature regulated between 700 and 750°C (1292 - 1382°F). Gradually raise the temperature of the furnace to a red heat. Finish the ignition to constant weight at a temperature between 700 and 750°C (1292 - 1382°F). Cool in a desiccator and weigh. Calculate the weight of residue as percent ash in the sample.

4.5.9 Manganese - Transfer approximately 10 grams of the compound to a tared crucible, weigh accurately to 1 mg. and ignite at dull red heat until residue is free from carbon. Cool and dissolve in 10 ml. of concentrated nitric acid, and filter if necessary. Dilute to 100 ml. with distilled water and transfer a 20 ml. aliquot of the solution to a 250 ml. beaker. Add 1 gm. of lead peroxide and boil. Note if manganese is present as indicated by the development of a red coloration in the solution. If the presence of manganese is indicated, filter through asbestos and titrate the clean filtrate with N/10 oxalic acid until the red coloration disappears. Calculate the percent manganese in the sample as follows:

$$\text{percent manganese} = \frac{5.495 V N}{W}$$

Where: V = ml. of N/10 oxalic acid used
 N = normality of oxalic acid
 W = weight of original sample, gm.

Note: See 4.5.10.1 for alternate procedure for the analysis of Manganese.

4.5.10 Lead - Transfer the remaining 80 ml. portion of the solution obtained as described in paragraph 4.5.9 to a beaker and evaporate to 5 ml. Make the solution slightly alkaline with ammonium hydroxide. Acidify with acetic acid and add an excess. Bring to the boiling point and add 10 to 15 ml. of a 10 percent solution of sodium or potassium dichromate. Boil the solution and allow to stand for 16 hours. Note if lead is present as indicated by a yellow precipitate. If lead is

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present, filter the solution through a tared Gooch crucible (or equivalent) and wash the precipitate with water and alcohol. Dry the crucible and contents at approximately 110° C (230° F) for 1 hour, cool and weigh. Calculate the increase in weight of the crucible as lead in the sample as follows:

$$\text{percent lead} = \frac{80.1 A}{W}$$

Where: A = weight of residue, gm.

W = weight of original sample, gm.

4.5.10.1 Alternate procedure for the determination of lead and manganese by the atomic absorption spectrophotometric method -

4.5.10.1.1 Specimen - The specimen shall consist of approximately 0.5 gm of the asphaltic compound weighed to within 0.2 mg. in a 125 ml. flat bottom flask. Two specimens shall be prepared and determined in duplicate.

4.5.10.1.2 Apparatus -

- (a) Atomic absorption spectrophotometer
- (b) Volumetric flasks, 50, 100 and 500 ml.
- (c) Flat bottom flask, 125 ml with ground glass neck
- (d) Condensers with ground glass fitting (suitable with 125 ml. flat bottom flasks)
- (e) Ventilated steam bath
- (f) Hot plate in ventilated hood
- (g) Pipettes, 1, 3, 5 and 8 ml.

4.5.10.1.3 Materials -

- (a) Nitric acid, 70 percent
- (b) Perchloric acid, 70 percent
- (c) Hydrochloric acid, 37 percent
- (d) A stock solution of lead perchlorate is prepared by dissolving (with heating as needed) 50 mgs of lead in 5 ml. 70 percent perchloric acid in a 500 ml. volumetric flask. Cool the resulting solution thoroughly and dilute to the mark with distilled water.

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- (e) A stock solution of manganese is prepared by dissolving 100 mgs of lead metal in 5 ml. 37 percent hydrochloric acid in a 500 ml. volumetric flask. Boil the solution for a few minutes and then cool the solution thoroughly. Add 5 ml. 70 percent perchloric acid and dilute to volume with distilled water.

4.5.10.1.4 Procedure -

- (a) Add 20 ml. of 70 percent nitric acid to the sample contained in the 125 ml. flat bottom flask.
- (b) Heat the sample on a steam bath under a reflux condenser for about 4-6 hours.
- (c) Remove the sample solution to a hot plate and again under a reflux condenser heat until the solution boils gently. Reflux over night. Note: Do not heat too vigorously in the beginning or sample solution may foam into the condenser.
- (d) After sample solution has refluxed over night, remove the condenser and boil the solution so that vapors escape. Continue to boil until the sample solution begins to foam.
- (e) Remove the sample from the heat and cool slightly. Add 5 ml. of 70 percent perchloric acid.
- (f) Return the flask to the heat. Heat slowly and carefully never allowing the reaction to proceed rapidly enough to remove all the liquid from the bottom of the flask. Note: Do not allow samples being heated with perchloric acid to go to dryness.
- (g) When the reaction has subsided continue heating until white fumes of perchloric acid are seen.
- (h) Remove from the hot plate and cool thoroughly. Transfer the solution to a 50 ml. volumetric flask, dilute to the mark with distilled water and mix well.
- (i) Prepare working standards by pipetting successively 1, 3, 5 and 8 ml. of the stock lead perchlorate into a series of four 100 ml. volumetric flasks. In the same order, pipette 1, 3, 5 and 8 ml. aliquots of the stock manganese perchlorate solution into the flasks. Add to each flask 8 ml. of 70 percent perchloric acid. Dilute to mark with distilled water and mix. These standards give lead concentrations of 1, 3, 5 and 8 ppm and manganese concentrations of 2, 6, 10, and 16 ppm.
Note - Procedure can also be shortened using "pass or no pass" criteria in the specification. Only one standard solution then need be prepared.
- (j) Prepare a blank solution in 100 ml. volumetric flask. Add 8 ml. 70 percent perchloric acid and dilute to the mark with distilled water.

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- (k) The sample (in duplicate), standards and blank are then analyzed by atomic absorption (following instrument instruction manual and standard safety procedures). For lead use 2833A analytical wavelength and for manganese the 2795 A wavelength. Use air as the oxidizer and hydrogen as the fuel. Note: It is recommended that an inert platinum or glass aspiration capillary be used. If the concentrations of either lead or manganese should prove to be outside the range of concentrations covered by the standards, other standards of different concentrations can be prepared.
- (l) Obtain the absorbance of the sample and standard solutions as follows:
- (1) Convert absorption to absorbance
 - (2) Subtract any absorbance due to the blank from each of the standards and sample solution absorbances.
- (m) On linear graph paper, plot absorbance versus concentration (ppm) for the lead standards. From the resulting curve, determine the concentration of lead in the sample solution. Similarly, plot absorbance versus concentration for the manganese standards and determine the concentration of manganese.
- (n) Calculate the percent lead and percent manganese using the following formulas:

$$\text{Percent Lead} = \frac{A \times 5.0}{1000 \times W}$$

Where: A = Lead content of the sample solution in parts per million
W = Weight of the sample in grams

$$\text{Percent Manganese} = \frac{B \times 5.0}{1000 \times W}$$

Where: B = Manganese content of the sample solution in parts per million
W = Weight of the sample in grams

4.5.11 Softening point - The softening point shall be determined in accordance with Method 216.0 of SS-R-406, except that a shouldered ring shall be employed. The shouldered ring shall be heated to at least 177° C (350° F) before the molten compound is poured.

4.5.12 Penetration - The penetration values shall be determined in accordance with Method 214.01 of SS-R-406.

4.5.13 Viscosity -

4.5.13.1 Apparatus -

Brookfield Viscometer - Model No. LVF, Spindle No. 2, Speed - 12 rpm.

Sample container - Stainless steel beaker - 10cm diameter by 11cm high, straight sides, no pouring lip.

Bath - Silicone oil bath - 11 inch diameter by 10 inches high.

4.5.13.2 Procedure - The sample (800 ±50ml.) shall be contained in the stainless steel sample beaker and heated with occasional stirring in an oil bath (approximately 2 hours) until the temperature of the sample shall be stabilized at $149 \pm 0.6^{\circ} \text{C}$ ($300 \pm 1^{\circ} \text{F}$). A bath temperature of approximately 155°C (311°F) is needed to maintain this sample temperature. The spindle shall be lowered into the sample until the immersion mark on the spindle shaft is at the surface of the liquid. The spindle shall be allowed 15 minutes to reach equilibrium temperature and then the drive motor shall be activated. Readings shall be taken as described in the Brookfield Model LVF instruction manual. Five readings shall be taken and the viscosity calculated from the average of the five runs.

4.5.14 Flash point - The flash point shall be determined in accordance with Method 217.01 of SS-R-406.

4.5.15 Reactivity - Determine the reactivity of the compound in contact with TNT, HBX-1, HBX-3, H-6, Minol-2, and Tritonal explosives using the vacuum stability test. Prepare the samples as specified in 4.5.15.1.

4.5.15.1 Preparation of samples - Heat the compound until pourable, then deposit on glass plates a sufficient amount of the compound to provide 2.5 (N+2) grams of dried film (where N equals the number of explosives involved). Air dry the films under ambient conditions for 48 hours, then peel off with a sharp edged tool in strips approximately 1/2 inch wide. Suspend the strips on glass rods in an oven or cabinet with circulating air at approximately 30°C (86°F) for another 48 hours. The strips are then removed and cut into approximately 1/4 inch squares. (If an air circulating oven is not available, it will be satisfactory to place the suspended strips before a fan in a warm room for 48 hours.) It is important that the room in which this operation is conducted is free from acid, alkaline or other contaminating fumes. Reduce the explosive materials to 12 mesh or finer by remote grinding or rasping and dry for at least 24 hours in a desiccator over a desiccating agent. Keep both the compound film and the ground explosives dry in stoppered containers until ready for testing.

4.5.15.2 Calibration of apparatus - Calibrate the necessary number of vacuum stability test assemblies, in accordance with Figure 1, Method 401.1.2 of MIL-STD-286.

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4.5.15.3 Testing procedure - Use $2N + 2$ (where N equals the number of explosives used) tubes similar to the heating tube portion of the apparatus shown in Figure 1, Method 403.1.2 of MIL-STD-286. For controls add 2.5 grams of the dried compound to each of two tubes and 2.5 grams of each explosive to additional individual tubes. Place uniform mixtures of 2.5/2.5 grams of the asphaltic compound and each of the explosives specified in the test in single separate tubes. Uniform distribution or mixing is obtained by carefully layering alternate portions of the dried compound with the explosive. After the addition of each portion lightly tamp the mixture with a glass or metal rod to insure intimate contact of the materials. After all the samples have been prepared connect the respective heating tubes with the capillary tubes as prescribed and conduct the vacuum stability test according to Method 403.1.2 of MIL-STD-286 at 100 ± 0.5 C (212 ± 1 ° F) for 40 hours for TNT, HBX-1, HBX-3, H-6, and Tritonal. For Minol-2 explosive, the test shall be conducted at 90 ± 0.5 ° C (194 ± 1 ° F) for 40 hours. Make all readings at room temperature with the samples removed from the bath. Correct the readings of both the controls and the test samples to standard conditions of temperature and pressure.

4.5.15.4 Calculation of reactivity - Calculate the reactivity of each of the explosive materials with the coating compound for compliance with 3.12 as follows:

Reactivity in ml. gas = $X - (Y + \frac{Z}{2})$

Where: X = ml. of gas produced by the mixture of explosive material and asphaltic compound

Y = ml. of gas produced by the explosive material alone.

Z = ml. of gas produced by the asphaltic compound alone.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging - Not applicable.

5.2 Packing -

5.2.1 Level A - Not applicable.

5.2.2 Level B - The material shall be packed in Type I, Grade C fiber drums conforming to PPP-D-723. The inside of the container shall be treated with a suitable release agent which will not contaminate the contents and which will promote ready removal of content. Each drum shall be furnished with a top heading. Drums shall be palletized in conformance with MIL-STD-147.

5.2.3 Level C - The material shall be packed in fiber drums conforming to Rule 51 or in Package No. 1060 of the Uniform Freight Classification. The inside of the container shall be treated with a suitable release agent which will not contaminate the contents and which will promote ready removal of content. A uniform quantity of

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drums shall be securely fastened to a disposable pallet of sufficient strength to assure safe loading, delivery to and unloading by first consignee.

5.3 Marking - Unless otherwise specified in the contract or order, marking shall be in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use - Hot melt asphaltic compound covered by this specification is intended for use as a protective lining for fabricated metal cases in applications where charges of high explosives are poured into the cases, particularly where crevices exist in the case walls.

6.2 Ordering data - Procurement documents should specify the following:

- (a) Title, number, and date of this specification
- (b) Quantity in pounds (Avoirdupois)
- (c) Whether Level B or C packing is required (see 5.2.2 and 5.2.3)

6.3 Qualification - With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the applicable Qualified Products List whether or not such products have actually been so listed by that date. The attention of the suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Naval Ordnance Systems Command, Department of the Navy, Washington, D.C. 20360; however, information pertaining to qualification of the asphaltic compound may be obtained from the Commanding Officer, Naval Ordnance Station, Indian Head, Maryland 20640, Attention: Chemical Analysis Branch.

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

6.5 Changes from previous issue - The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

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Custodians:

Army - MU
Navy - OS
Air Force - 84

Preparing Activity:

Navy - OS
Project No. 8030-0358

Review Activities:

Army - MR, MU
Navy - OS
Air Force - 84

User Activities:

Navy - AS