MMM-A-122C
October 30, 1978
SUPERSEDING
Fed. Spec. MMM-A-122B
May 6, 1974

FEDERAL SPECIFICATION

ADHESIVE, BUTADIENE-ACRYLONITRILE BASE, GENERAL PURPOSE

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE

1.1 This specification covers a high-strength general-purpose adhesive specifically for use where resistance to oil, gasoline, and aromatic fuel is essential.

2. APPLICABLE DOCUMENTS

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

Federal Specifications:

QQ-A-250/5 - Aluminum Alloy Alclad 2024, Plate and Sheet.
PPP-B-636 - Boxes, Shipping, Fiberboard.
PPP-C-96 - Cans, Metal, 28 Gage and Lighter.

Federal Standard:

Fed. Test Method Std. No. 141 - Paint, Varnish, Lacquer, and Related Materials; Methods of Inspection, Sampling, and Testing.

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston, New York, Philadelphia, Washington, DC, Atlanta, Chicago, Kansas City, MO, Forth Worth, Houston, Denver, San Francisco, Los Angeles, and Seattle, WA.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Standard:

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

(Copies of Military Specifications and Standards required by contractor in connection with specific procurement functions should be obtained from the procuring 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. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

American Society for Testing and Materials (ASTM) Standard:

D 1084 - Viscosity of Adhesives.

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

Uniform Classification Committee, Agent:

Uniform Freight Classification.

(Application for copies should be addressed to the Uniform Classification Committee Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

National Motor Freight Traffic Association, Incorporated, Agent:

National Motor Freight Classification.

(Application for copies should be addressed to the American Trucking Association, Inc., Traffic Department, 1616 P Street, N.W., Washington, D.C. 20036.)

3. REQUIREMENTS

3.1 Material. The adhesive shall be a butadiene acrylonitrile base material, modified to the extent that the requirements of this specification are met.

3.1.1 Solvent. When tested as specified in 4.4.1, the solvent shall conform to the following requirements by volume:

(a) The total of solvents with olefinic unsaturation shall not exceed 5 percent.

(b) The total of aromatic compounds with 8 or more carbon atoms in the molecule, except ethylbenzene, methyl benzoate, and phenyl acetate, shall not exceed 8 percent.

(c) The total of ethylbenzene, toluene, and branched-chain ketones shall not exceed 20 percent.

(d) A solvent which may be classified into more than one of the above groups shall be considered a member of the group having the lowest allowable concentration.

(e) The total of (a), (b), and (c) shall not exceed 20 percent.

(f) Halogenated solvents shall not be present.

3.2 Appearance. When examined as specified in 4.4.2, the adhesive shall be clear amber in color.

3.3 Condition in container. When examined as specified in 4.4.3, the adhesive shall be uniform and free of skins, lumps, coarse or gelled particles, grit, and sediment.

3.4 Nonvolatile content. When tested as specified in 4.4.4, the nonvolatile content of the adhesive shall be not less than 22 percent nor more than 26 percent.

3.5 Ash content of nonvolatile matter. When tested as specified in 4.4.5, the ash content of the nonvolatile matter in the adhesive shall be not more than 18 percent.

3.6 Viscosity. When tested as specified in 4.4.6, the viscosity of the adhesive shall be not less than 1000 nor more than 2200 cps.

3.7 Accelerated aging. After being subjected to the conditions specified in 4.4.7, the adhesive shall change in viscosity not more than 10 percent plus or minus from the originally specified value (see 3.6), and there shall be no evidence of gelling or separation.

e flexibility (cold brittleness). When tested as specified in 4.4.8,
c crack or chip.

sive strength. When the adhesive is tested as specified in 4.4.9, no
ess than 30 pounds.

istance. When the adhesive is tested as specified in 4.4.10, no reading
22.5 pounds.

tance. When the adhesive is tested as specified in 4.4.11, no reading shall
pounds.

stance. When the adhesive is tested as specified in 4.4.12, no reading shall
pounds.

s. The adhesive shall be furnished in quantities of 2 ounces, 1 pint,
lon.

URANCE PROVISIONS

lity for inspection. Unless otherwise specified in the contract or purchase
tor is responsible for the performance of all inspection requirements as

of preparation for delivery. An inspection shall be made to determine
e requirements of section 5. The sample unit shall be one shipping container
delivery. Sampling shall be in accordance with MIL-STD-105. The inspection
with an AQL of 4.0 expressed in terms of percent defective.

the end item. The methods of testing specified in 4.4 shall be followed.
in accordance with MIL-STD-105. The lot shall be expressed in units of
le unit for testing shall be one gallon. The inspection level shall be S-2
be 1.5 defects per hundred units. Unless otherwise specified, all test
pared and tested at a temperature of 23° ± 1° C and a relative humidity of

dures.

analysis. The solvent shall be distilled from 100 ml of the adhesive.
the extracted solvent shall be determined in accordance with method 7360
d Std. No. 141. The percent by weight for each component of the solvent
to the percent by volume to determine compliance with the requirement of

ce. A test tube, 15 cm in length, shall be filled with the thoroughly mixed
ered with a clean cork. Examine the adhesive visually to determine
e requirement of 3.2. The filled tube shall be saved for use in 4.4.3.

n in container. The adhesive from 4.4.2 shall be examined visually for
in 3.3 to determine compliance with the requirement of 3.3.

ile content. A weighing bottle (5.7 cm inside diameter and 3.2 cm deep)
r 1 hour at 100° ± 5° C, then cooled in a desiccator, and weighed. All
to the nearest hundredth of a gram. Twenty g of the sample shall be
ared weighing bottle; the bottle shall be immediately covered and weighed.
removed, and the weighing bottle placed on a steam bath until the solvent
The weighing bottle and contents along with the cover shall then be placed
± 5° C and heated for 5 hours. The weighing bottle, contents, and cover
ed in a desiccator and weighed. The heating and weighing procedure shall
eating for periods of 1/2 hour at 100° ± 5° C until the loss in weight is less
percentage of nonvolatile matter shall be calculated and evaluated
liance with the requirement in 3.4.

4.4.5 Ash content of nonvolatile matter. Twenty g of the sample shall be placed in a tared, 150-ml capacity, high-form porcelain crucible. The crucible and contents shall be placed on a steam bath until the solvent has evaporated. Then the crucible and contents shall be placed in an oven at 100° to 105° C for 5 hours, cooled in a desiccator, and weighed. The weight of the nonvolatile matter in this sample shall be calculated by subtracting the tared weight of the crucible from the combined weight of the nonvolatile matter and the crucible. A 25-ml portion of concentrated nitric acid shall be added to the crucible containing the dried material. The crucible shall be covered with a watchglass to prevent loss by spattering, and heated on an open steam bath until the vigorous reaction which first ensues has subsided. The addition of 25 ml of concentrated nitric acid and heating on the steam bath shall be repeated until no solid material remains in the crucible. The watchglass shall be removed, and the crucible and contents continued to be heated on the open steam bath until the nitric acid has been removed. The crucible and contents shall then be placed on a hotplate and heated until all volatile matter has been driven off and the contents of the crucible have been charred. The crucible and contents shall be ignited to constant weight in a muffle furnace at 600° ± 25° C. The ash content of the nonvolatile matter shall be calculated and evaluated to determine compliance with the requirement of 3.5.

4.4.6 Viscosity. The viscosity shall be determined in accordance with method B of ASTM D 1084 to determine compliance with the requirement of 3.6. A Brookfield Viscosimeter model series RV equipped with a No. 3 spindle and operated at 20 rpm shall be used.

4.4.7 Accelerated aging. A wide-mouth, 1-pint container of aluminum, steel or glass shall be filled with the adhesive. The container shall be closed securely and stored for 14 days at 49° ± 1° C. The container of adhesive shall then be stored at standard conditions (see 4.3) for 24 hours. The viscosity shall be determined in accordance with 4.4.6 to determine compliance with the requirement of 3.7. The test specimen shall be examined for separation and gelling.

4.4.8 Low-temperature flexibility (cold brittleness). Four strips 2.5 cm by 7.5 cm shall be cut from aluminum sheet 1.6 mm thick. The aluminum strips shall be cleaned by wiping successively with a cloth soaked in toluene and a cloth soaked in methyl ethyl ketone and then dried. A coat of adhesive 0.025 mm thick shall be applied to one entire side of each aluminum strip and allowed to dry for 3 hours. Two of the strips shall be subjected to a temperature of -25° C for 30 minutes, and the other two strips shall be subjected to a temperature of -40° C for the same time period. The strips shall then be bent, while still being maintained at these temperatures, 180° over a mandrel 10 mm in diameter with the adhesive side out. The strips shall be removed from the cold, and the adhesive coating shall be examined to determine compliance with the requirement of 3.8.

4.4.9 Strip adhesive strength.

4.4.9.1 Test specimens. Twenty strips 3.8 cm by 30.5 cm shall be prepared from No. 10 cotton duck. Twenty strips 2.5 cm by 20.3 cm shall be cut from aluminum conforming to QQ-A-250/5 (1.6 mm thick). The aluminum strips shall be cleaned by rubbing the surface with scouring powder until a continuous film of water is achieved after rinsing with distilled water and then dried. Two coats of the adhesive shall be applied to the metal panels and four coats to the cotton fabric, leaving one end of each strip uncoated for 2.5 cm and allowing a dry time of 30 minutes between coats. The specimen shall be assembled fabric to metal within 5 minutes of the last coat in such manner that the two ends that are free of adhesive will be adjacent. The bonded specimens shall be rolled together with a roller with a mass of 9 kg to obtain intimate contact. The bonds shall be conditioned for 4 hours at standard conditions as specified in 4.3 and then for 44 hours at 71° C. The cotton fabric shall be cut to 2.5 cm width by removing the outside edges of the 3.8 cm strips.

4.4.9.2 Procedure. The free ends of the cotton fabric specimens shall be pulled apart by a machine with a recording device at jaw separation rate of 5 cm per minute. The value of the first 2.5 cm of travel shall be ignored. Readings are then taken at every 2.5 cm for five readings, and tests shall be performed on five strips to determine compliance with the requirement of 3.9.

istance. Five specimens prepared as specified in 4.4.9.1 shall, within conditioning periods, be immersed for 22 hours in distilled water maintained litions (see 4.3). Within 5 minutes after removal from the water, all specimens for strip adhesive strength as specified in 4.4.9.2 to determine compliance ment of 3.10.

esistance. Five specimens prepared as specified in 4.4.9.1 shall, within the conditioning periods, be immersed for 22 hours at 71° ± 1° C in a petroleum minimum flash point of 243° C, a Saybolt viscosity of 98 ± 5 seconds at iline point of 124° ± 1° C. All specimens shall be cooled for 30 minutes in f oil maintained at standard conditions (see 4.3). Within 5 minutes after cooling oil, all specimens shall be tested for strip adhesive strength as .9.2 to determine compliance with the requirement of 3.11.

resistance. Five specimens prepared as specified in 4.4.9.1 shall, within the conditioning periods, be immersed for 22 hours at standard conditions matic fuel composed of iso-octane, 70 percent by volume, and toluene, 30 e. Within 5 minutes after removal from the fuel, all specimens shall be adhesive strength as specified in 4.4.9.2 to determine compliance with the .12.

ON FOR DELIVERY

g. Packaging shall be level A or commercial, as specified (see 6.2).

A. The 1-pint, 1-quart, and 1-gallon quantities of adhesive shall be packaged nforming to PPP-C-96, type V, class 2. Exterior Plan A coating shall be -ounce quantities of adhesive shall be packaged in tubes, as specified in

cial. The 2-ounce, 1-pint, 1-quart, and 1-gallon quantities of adhesive d in accordance with normal commercial practice. The complete package shall rotect the adhesive against damage during shipment, handling, and storage.

king shall be level A or commercial, as specified (see 6.2).

A. Seventy-two 2-ounce tubes, or twelve 1-pint cans, or twelve 1-quart allon cans of adhesive, packaged as specified in 5.1, shall be packed in xes conforming to PPP-B-636, grades V3c, V3s, or V2s. The boxes shall be ofed, and reinforced in accordance with the appendix of PPP-B-636. Alter- und, cleated plywood, or nailed wood boxes shall be acceptable shipping lined with a waterproof barrier material. The barrier material shall be lges with waterproof tape or adhesive.

cial. The adhesive shall be packed in a manner that will assure acceptance r and provide product protection against loss and damage during multiple ing and storage. The shipping containers shall be in compliance with the reight Classification and Uniform Freight Classification.

Marking shall be as specified in the contract or order.

l marking. In addition to markings specified in 5.3, information shall nit container and shipping container as follows:

anufacturers instructions for use (to include thinning directions if applicable).
ate of manufacture (by month and year, not by code).
ate of first reinspection (date one year from date of manufacture).
lash point in degrees centigrade and degrees Fahrenheit.
ny special directions for storage or use of the adhesive.

n addition to the above the following instructions shall appear on each container:

DANGER! FLAMMABLE
KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAME
STORE AT 60°F to 80°F

6. NOTES

6.1 Intended use. The adhesive is intended for high strength bonding of a wide variety of materials including metal, glass, plastics and synthetic rubber, particularly the nitrile types. It may be used also as a primer for other adhesives.

6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

(a) Title, number, and date of this specification.
(b) Size and type of container required (see 5.1).
(c) Quantity required.
(d) Level of packaging and packing required (see 5.1 and 5.2).

MILITARY CUSTODIANS:

Army-MR
Navy-AS
Air Force-99

Review activities:

Army-MD, MI

User activities:

Army-ME
Navy -MC, YD

Preparing activity:

GSA-FSS

CIVIL AGENCY COORDINATING ACTIVITIES:

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