

MMM A-260C

May 10, 1984

SUPERSEDING

Fed. Spec. MMM A-260B

Dec 20, 1977

FEDERAL SPECIFICATION

ADHESIVE, WATER-RESISTANT, (FOR SEALING WATERPROOFED PAPER)

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

1 SCOPE

1.1 Scope. This specification covers water-resistant adhesive intended for application to the seams in the manufacture and in the closure of waterproofed paper bags, wrappers, and case liners.

1.2 Classification.

1.2.1 Types, grades, and classes. The adhesive covered by this specification shall be of the following types, grades, and classes as specified, (see 6.2).

- Type I - For application by machine.
- Type II - For hand application, by brushing.
- Grade A - For subsistence items.
- Grade B - For other than subsistence items.
- Class 1 - Solvent-based adhesive (see 3.10).
- Class 2 - Water-emulsion adhesive
- Class 3 - Hot melt adhesive.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. Unless otherwise specified, the following specifications, standards, and handbooks of the issue

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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.

SPECIFICATIONS

FEDERAL

- TT-E-485 - Enamel Semi-Gloss, Rust-Inhibiting.
- PPP-B-1055 - Barrier Material, Waterproofed, Flexible.
- PPP-C-96 - Cans, Metal, 28 Gage and Lighter.
- PPP-D-729 - Drums, Shipping and Storage, Steel, 55-Gallon (208 Liters).
- PPP-P-704 - Pails, Metal: (Shipping, Steel, 1 Through 12 Gallon.)

STANDARDS

FEDERAL

- Fed. Std. No. 123 - Marking for Shipment (Civilian Agencies).

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 manufactures 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 document forms 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)

- D 3951 - Standard Practice for Commercial Packaging

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

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(Industry association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

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 Fungi resistance (applicable only when specifically designated in the applicable contract or order). When specified, the adhesive shall be resistant to the growth of fungi. Test procedures and specific requirements shall be specified by the procuring activity (see 6.2).

3.2 Low temperature flexibility. The adhesive bond shall not separate from the paper nor fracture when tested as specified in 4.4.1.

3.3 Resistance to water penetration. The adhesive bond shall resist water penetration for a period of eight hours when tested as specified in 4.4.2.

3.4 Adhesion after subjection to heat. The adhesive bond shall not shear under a tension of less than 7.5 pounds (2.8 kg) when specimens are prepared from the adhesive and barrier material, conditioned at elevated temperature, and tested at room temperature in accordance with 4.4.3.

3.5 Initial tack (type II only). The adhesive shall develop sufficient adherence (tack) within 105 seconds plus 6 seconds of the time of application to sustain a suspended load of 3.5 oz (100 grams) for a period of 60 seconds when tested as specified in 4.4.4.

3.6 Resistance to flow. The dried adhesive film shall show no separation of adhesive from the barrier material or adhesive flow when tested and examined after subjection to heat as specified in 4.4.3.2.

3.7 Stability.

3.7.1 Resistance to elevated temperature degradation. The adhesive shall conform to 3.3 and 3.5 when tested as specified in 4.4.5.1.

3.7.2 Resistance to low temperature degradation. The adhesive shall conform to 3.3 and 3.5 when tested as specified in 4.4.5.2.

3.8. Consistency (classes 1 and 2).

3.8.1 Consistency, as received.

3.8.1.1 Type I. Type I adhesive shall have a consistency such that it may be applied satisfactorily by means of commercially available bag and liner sealing equipment. Adhesive so applied shall not exhibit stringiness when machine transfer surfaces are separated, shall not build up excessively on machine parts, and shall not foam. Compliance shall be determined visually, using standard available commercial sealing equipment, or as otherwise specified by the procuring activity (see 6.2).

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3.8.1.2 Type II. Type II adhesive shall have a consistency such that it may be applied easily and satisfactorily by hand brushing. Compliance shall be determined in preparing the test specimens of 4.4.3 or as otherwise specified in the contract or by the procuring activity.

3.8.2 Consistency after subjection to stability test conditions. After subjection to the procedures of 4.4.5.1 and 4.4.5.2, the adhesive shall comply with the requirements for consistency of 3.8.1, as applicable to the type under test. Compliance shall be determined in accordance with that paragraph.

3.9 Toxicity. The adhesive shall have no adverse effect on the health of personnel as applicators or consumers. The manufacturer shall furnish the contracting officer with a certificate stating that the adhesive contains no known toxic material.

3.10 Condition in container. The adhesives supplied in liquid form shall be free from lumps, skins, foreign matter, settling, separation, and all other evidence of nonuniformity. It shall be capable of being made homogeneous without mechanical stirring. The hot melt adhesive shall be solid, free from foreign matter and, when melted for application, shall be smooth and homogeneous.

3.11 Shelf storage life. When stored as specified in 4.4.6, the adhesive shall meet the requirements specified in 3.2, 3.5, 3.8.1, and 3.10.

3.12 Materials. Recycled and/or reclaimed materials shall be used to the maximum extent possible without adversely effecting the end product.

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 that supplies and services conform to prescribed requirements.

4.2 Sampling.

4.2.1 Lot. For purposes of sampling, a lot shall consist of all adhesive of one type, grade, and class, manufactured as one batch, and offered for acceptance at one time, by one contractor

4.2.2 Sampling for inspection of filled containers. A random sample of filled containers shall be taken from each lot in accordance with MIL-STD-105 at inspection level I and acceptance quality level (AQL) equal to 2.5 percent defective to verify compliance with all stipulations of the specification regarding fill, closure, marking, and other requirements not involving tests.

4.2.3 Sampling for lot acceptance tests. From each inspection lot, a half-gallon (1.9 liter) sample shall be taken at random, from each of two

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containers (or a sufficient number of randomly selected smaller containers) so as to obtain two half-gallon (1.9 liter) samples, for use in testing.

4.3 Inspection.

4.3.1 Inspection of filled containers. Each sample filled container selected in accordance with 4.2.2 shall be examined for defects of the container and the closure, for evidence of leakage, and for non-compliance with marking requirements. Each sample filled container shall also be weighed to determine the compliance with requirements for amount of contents. Any container in the sample having one or more defects, or under the required fill, shall be rejected, and if the number of defective containers exceeds the acceptance number for the appropriate sampling plan of MIL-STD-105 (see 4.2.2), the lot represented shall be rejected. Rejected lots may be submitted for acceptance, in accordance with the requirements of MIL-STD-105 for resubmission, using tightened inspection for such reinspection.

4.3.2 Lot acceptance tests. The sample specimens selected in accordance with 4.2.3 shall be subjected separately to the tests of 4.4. If specimens taken from either adhesive sample fail one or more of the tests, the lot represented shall be rejected.

4.4 Test procedures.

4.4.1 Low temperature flexibility

4.4.1.1 Material. Barrier material conforming to class L-4, of PPP-B-1055 shall be used in type I adhesive tests and type II class 1 adhesives tests for low temperature flexibility, and class L-2 material of PPP-B-1055 shall be used in type II classes 2 and 3 adhesive tests for that property. Tests made using class L-4 material shall be made by bending (flexing) the two test specimens so that the crepe direction is perpendicular to the seam length. All tests made using class L-2 material shall be made with the adhesive applied to the untreated surface, and bonded to the treated surface.

4.4.1.2 Preparation of test specimens. Barrier material samples conforming to 4.4.1.1 shall be cut into 8 by 2 1/2-inch (20.3 x 6.4 centimeter) pieces. The adhesive shall be applied in a smooth continuous film, in the thickness recommended by the manufacturer, and in a width of one inch along the 8-inch (2.0 centimeter) edge of one of the cut pieces of barrier material, and allowed to stand for approximately 30 seconds (except that class 3 - hot melt adhesives shall be allowed to stand for no longer than 5 seconds). Then an uncoated similar piece of barrier material shall be placed against the adhesive coated piece so that all edges coincide. The adhered (bonded) area of the assembly shall be immediately subjected to a uniform pressure of 0.5 p.s.i. (3.5×10^3 Pa) for 24 hours while in an atmosphere of $73^\circ \pm 2^\circ\text{F}$ ($22.7^\circ \pm 1.1^\circ\text{C}$). At the end of that time period, the pressure shall be removed and the assembly allowed to set for an additional 24 hours at the above temperature and a relative humidity of 50, plus or minus 5 percent. One inch (2.5 centimeters) shall then be cut from each end of the assembly perpendicular to the seam and discarded. The remainder shall be cut in two, so that two specimens, each 3 by 2-1/2 inches (7.6 by 6.4 centimeters) remain for testing.

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4.4.1.3 Test procedure. Specimens prepared as in 4.4.1.2 shall be conditioned at $0^{\circ} + 2^{\circ}\text{F}$ ($-17 + 1.1^{\circ}\text{C}$) for a period of 2 hours, and then bent immediately through 180 degrees over a 3/4-inch (1.9 centimeter)-diameter mandrel, previously conditioned and maintained at the same temperature. The bending (flexing) shall be performed so that the length of seam is perpendicular to the mandrel and made at the above temperature. The specimen shall then be turned over, without changing the direction of the seam and the 180 degree bending repeated with the opposite face of the specimen against the mandrel, and then the specimen returned to its original position. Each bending operation shall be performed in not less than 3 seconds nor more than 5 seconds, with a maximum time interval of 5 seconds between the two operations. The adhesive bond shall be carefully examined visually for separation from the paper and for fracture. If such is in evidence, it shall be indication of failure to meet the requirement for low temperature flexibility. If the specimens are satisfactory when so examined, they shall be conditioned for 2 hours at $73^{\circ} + 2^{\circ}\text{F}$ ($22.7^{\circ} + 1.1^{\circ}\text{C}$), and then used as specimens for the water penetration test of 4.4.2.

4.4.2 Water penetration.

4.4.2.1 Preparation of specimens. Specimens meeting the requirements and test of 4.4.1 for low temperature flexibility shall be opened to form 3- by 3-inch (7.6 x 7.6 centimeter) specimens each having a 1-inch (2.5 centimeter) fin seam. The creased material shall be inspected visually to avoid the use of pinholed or split specimens which would affect the permeability of the material. A dry indicator reagent which changes color due to the permeation of moisture (see 4.4.2.3), shall be sprinkled evenly over approximately 2-inch (5.0 centimeter) square area in the center of the 3- by 3-inch (7.6 x 7.6 centimeter) flat surface of the T-shaped specimen. Care shall be taken to apply the reagent as evenly as practicable since bunching or piling of the reagent may cause erratic results. Place a 2-inch (5.0 centimeter) watchglass over the reagent and in the approximate center of the surface of the specimen, figure 1a. Brush away the reagent outside the watchglass and seal the watchglass to the test specimen using a mixture of equal weights of beeswax and rosin. The outer 1/4 inch (.64 centimeters) of the 3-inch (7.6 centimeter) edges shall be coated, both sides with the wax mixture, but no wax applied to the cut edges of the adhesive seam, figure 1b.

4.4.2.2 Test procedure. The specimens prepared as in 4.4.2.1 shall then be floated on fresh tap water maintained at $70^{\circ} + 5^{\circ}\text{F}$ ($21.1^{\circ} + 2.8^{\circ}\text{C}$) with the fin seam down, figure 1c. The test shall be conducted using both of the PPP-B-1055 materials (L-4 and L-2). The time required to cause a definite development of color to appear in the indicator shall be noted and recorded as the penetration time.

4.4.2.3 Dry indicator. The dry indicator for use in the above test shall be composed of cane sugar, soluble starch, and methyl violet, prepared as follows:

- (a) Grind each ingredient separately until it passes through a No. 100 U.S. Standard sieve and completely dry it in a desiccator over

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calcium chloride before making the mixture. When dry, mix the following proportion by weight:

Sugar	45
Soluble starch	5
Methyl violet	1

- (b) Mix the ingredients above by sieving repeatedly through a U.S. Standard No. 60 sieve until the mixture is uniform. Keep the prepared indicator in a closed desiccator until ready for testing.

4.4.3 Adhesion after subjection to heat.

4.4.3.1 Specimen preparation. Two pieces, each 12 by 4 inches (30.5 x 10.7 centimeters) with the 4-inch (10.2 centimeter) dimension in the direction of the greater tensile strength, shall be cut from a barrier material conforming to class L-4 of PPP-B-1055. The adhesive shall be applied in a smooth continuous film, of the thickness recommended by the manufacturer, over a one-inch (2.5 centimeter) width of the untreated face along a 12-inch (30.5 centimeter) edge of each of the pieces, and shall be allowed to set for approximately 30 seconds, except that hot melt adhesives shall be allowed to set for a maximum of 5 seconds. The adhesive coated section of each piece forming an assembly measuring 7 by 12 inches (17.8 x 30.5 centimeters), with a 1 by 12-inch (2.5 x 30.5 centimeter) adhesive bonded lap joint shall be joined.

The bonded area shall immediately be subjected to a uniform pressure of 0.5 p.s.i. (3.5×10^3 Pa) for 24 hours. The pressure shall then be removed and the assembly shall be allowed to stand for an additional 24 hours. The assembly shall then be cut perpendicular to the bond into twelve 1-inch (2.5 centimeters) wide specimens, using a suitable paper cutter.

4.4.3.2 Procedure. The 12 bonded specimens prepared as specified in 4.4.3.1 shall be suspended within an air circulating oven or cabinet maintained at $140^{\circ} \pm 2^{\circ}\text{F}$ ($60^{\circ} \pm 1.1^{\circ}\text{C}$) for 240 hours, then removed and conditioned for 24 hours at $73^{\circ} \pm 2^{\circ}\text{F}$ ($22.7^{\circ} \pm 1.1^{\circ}\text{C}$). Specimens subjected to the above shall then be examined for evidence of adhesive flow and separation by visual means as required in 3.6, and if satisfactory immediately subjected to tension in a tensile testing machine. One end of each specimen shall be centered and tightened individually in the flat jaws of a suitable tension testing machine. The jaws shall be separated at a constant rate chosen to cause either the imposition of a load of 7.5 pounds (3.4 kgs.) or breakage of the specimen before that load has been reached, within 5 to 15 seconds after starting the grip motion. If tension recorded for any specimen fails to reach 7.5 pounds (3.4 kgs.) at the point of bond separation, the test shall be repeated using double the number of specimens, prepared as before. If any specimen fails to meet the 7.5 pound (3.4 kg.) requirement for adhesive bond strength on retest, the adhesive lot represented shall be rejected. If the barrier material portion of any specimen breaks at less than 7.5 pounds (3.4 kgs.) tension, and the adhesive bond is not broken, 12 additional specimens shall be prepared as above, using a suitable brand of class L-4 barrier material, as specified in PPP-B-1055, of sufficient strength that tensile failure will not occur at less than 7.5 pounds (3.4 kgs.) tension, when tested as described.

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4.4.4 Initial tack (type II only). Separate tests shall be made using class L-4 material for type II, class 1 adhesives and class L-2 material for type II, classes 2 and 3 adhesives (see 4.4.1.1) at a temperature of $73^{\circ} \pm 2^{\circ}\text{F}$ ($22.7^{\circ} \pm 1.1^{\circ}\text{C}$) and 50 ± 5 percent relative humidity. Specimens of the barrier material (bottom adherend) shall be securely placed onto the top side of a tiltable table Figure 2a.

A one inch (2.5 centimeter) wide strip of barrier material, the top adherend, shall have a 3.5 oz (100 gram) weight applied to one end so that the total length including the weight is equal to the length of the bottom adherend.

To the top and bottom adherends shall be carefully applied a film of adhesive covered by this specification in the thickness recommended by the manufacturer, in a section of each to provide a lap shear specimen having a lap 1 inch (2.5 centimeters) wide by 1 1/2 inches (5.1 centimeters) long, figure 2a. The adhesive film shall be allowed to air dry for 30 seconds (except that class 3, hot melt adhesives shall be subjected to the next operation within 10 seconds of adhesive film coating the material), the time being determined from the forming of the surface of the adhesive to be bonded, which shall be no more than 15 seconds after the start of the adhesive application operation. Simultaneous with this, the 1 inch (2.5 centimeter) wide strip, the top adherend, shall be wet in the same manner as the bottom adherend. The top adherend shall be placed onto the bottom adherend so that a lap shear specimen is formed, figure 2a, with only the specification adhesive between them. The crepe direction of the barrier material shall be in the direction of the test weight, and a pressure, recommended by the manufacturer, be applied to the setting joint. Sixty seconds after applying the adherends together (80 seconds for class 3 - hot melt adhesives) the pressure shall be removed and the tiltable table rotated into the vertical position, figure 2b. This operation shall be accomplished within 6 seconds.

A series of 10 lap shear specimens using each of the above barrier materials shall be so tested. A minimum of 9 of the 10 specimens shall be so tested without separation of the top adherend from the assembly, in order to comply with the requirement for initial tack.

4.4.5 Stability.

4.4.5.1 Resistance to elevated temperature degradation. Approximately one pint (470 cubic centimeters) of the adhesive shall be placed in a wide-mouth jar or glass container and sealed and then placed in a circulating air oven or temperature cabinet for a period of two weeks at $140 \pm 2^{\circ}\text{F}$ ($60^{\circ} \pm 1.1^{\circ}\text{C}$). After completion of that time interval, the container shall be removed, allowed to cool to $73^{\circ} \pm 2^{\circ}\text{F}$ ($22.7^{\circ} \pm 1.1^{\circ}\text{C}$), and subjected to the tests of 4.4.2 and 4.4.4. In addition the consistency of the adhesive shall conform to that required in 3.8, when tested as required in that paragraph.

4.4.5.2 Resistance to low temperature degradation. Approximately one pint (470 cubic centimeters) of the adhesive shall be placed in a wide mouth jar or glass container, sealed and then placed in a temperature cabinet maintained at $0^{\circ} \pm 2^{\circ}\text{F}$ ($-17 \pm 1.1^{\circ}\text{C}$) for a period of 16 hours. The container and contents shall then be allowed to stand for a period of 8 hours at $73^{\circ} \pm$

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20°F (22.7° + 1.1°C). The above cycle shall be repeated for a total of 3 times. Following the final 8 hours at 73° + 2°F (22.7° + 1.1°C), the adhesive sample shall be subjected to the tests of 4.4.2 and 4.4.4. In addition, the consistency of the adhesive shall conform to that required in 3.8 when tested as required in that paragraph.

4.4.6 Shelf storage life. One quart of the adhesive shall be sealed tightly in a glass or metal container, stored for eighteen (18) months at 23° + 1°C (73.5° + 2°F) and 50 percent relative humidity, and tested or examined for compliance with 3.11. The supplier may certify that his formulation meets the requirements of 3.11.

5. PACKAGING

5.1 Unit pack. Unit packing shall be level A, B, or Commercial (see 6.2).

5.1.1 Level A.

5.1.1.1 Cans. Unit quantities of 1 gallon or less shall be packaged in cans conforming to type V, class 2 of PPP-C-96. Cans for class 1 and class 3 adhesives shall be of tinsplate construction in accordance with PPP-C-96. Cans for class 2 adhesive shall be of blackplate construction in accordance with that specification. Exterior plan B coating and side seam stripping shall be required. Cans of 1/2 gallon, and above capacity shall be provided with wire handles having a galvanized or other protective coating to resist corrosion.

5.1.1.2 Pails. Unit quantities of five gallons shall be packaged in pails conforming to type II or type III of PPP-P-704. Pails shall be exterior coated to conform to TT-E-485. Pails for class 2 adhesive shall be blackplate (baked organic coating) construction. Wire handles or bails shall be required. Wire handles or bails shall be provided with a galvanized or other protective coating to resist corrosion.

5.1.1.3 Drums. Unit quantities of 55 gallons shall be packaged in metal drums conforming to PPP-D-729, type III. Drums shall have an exterior coating conforming to TT-E-485. Interiors of drums for class 2 adhesive shall be coated with water-resistant baked organic coating.

5.1.2 Level B.

5.1.2.1 Cans. Unit quantities of 1 gallon or less shall be packaged as specified in 5.1.1.1 except that Plan A coating shall be required.

5.1.2.2 Pails and drums. Unit quantities of 5 gallons and 55 gallons shall be packaged in pails and drums as specified in 5.1.1.2 and 5.1.1.3 respectively.

5.1.3 Commercial. Commercial packaging shall be in accordance with ASTM D 3951.

5.2 Packing. Packing shall be level A, B, or commercial as specified (see 6.2).

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5.2.1 Level A.

5.2.1.1 Cans. Adhesive packaged in cans in accordance with 5.1.1.1 shall be packed in accordance with the appendix to PPP-C-96, as specified in overseas shipment.

5.2.1.2 Pails and drums. Adhesive furnished in pails and drums as required in 5.1.1 shall require no additional packing.

5.2.2 Level B.

5.2.2.1 Cans. Adhesive furnished in quantities of one gallon or less, packaged in accordance with 5.1.2.1, shall be packed in accordance with the requirements for domestic shipment as specified in the appendix to PPP-C-96.

5.2.2.2 Pails and drums. Adhesive furnished in 5 gallon pails and 55 gallon drums as specified in 5.1.2 shall require no additional packing.

5.2.3 Commercial. Commercial packaging shall be in accordance with ASTM D 3951.

5.3 Marking.

5.3.1 Civil agencies. In addition to any special marking required by the contract or order, marking of shipping containers shall be in accordance with Fed. Std. No. 123. In addition, the following shall appear on each container.

- (a) Date of manufacture.
- (b) Type, grade, and class furnished.
- (c) Manufacturer's batch number or code.
- (d) Weight of adhesive and tare weight of container.
- (e) Caution Notice "STORE IN A COOL PLACE - KEEP FROM FREEZING."
- (f) Warning Notice, when adhesive does not meet the requirements for Grade A, for subsistence items, "WARNING. THIS ADHESIVE IS NOT TO BE USED ON CASE LINERS FOR SUBSISTENCE ITEMS."
- (g) Federal stock number.
- (h) Date of first reinspection (Insert date eighteen months after date of manufacture for liquid adhesives, and 36 months after date of manufacture for hot melt adhesives.

5.3.2 Military activities. In addition to marking required by the contract or order, marking of shipping containers shall be in accordance with the requirements of MIL-STD-129. In addition, the information required under (a), (b), (c), (e), and (f), in paragraph 5.3.1 above shall appear on each container.

6. NOTES

6.1 Intended use The adhesive is intended primarily for use in seam bonding and closure of waterproof paper bags, wraps, and case liners. It may however be used in other applications where its properties are desired and are applicable.

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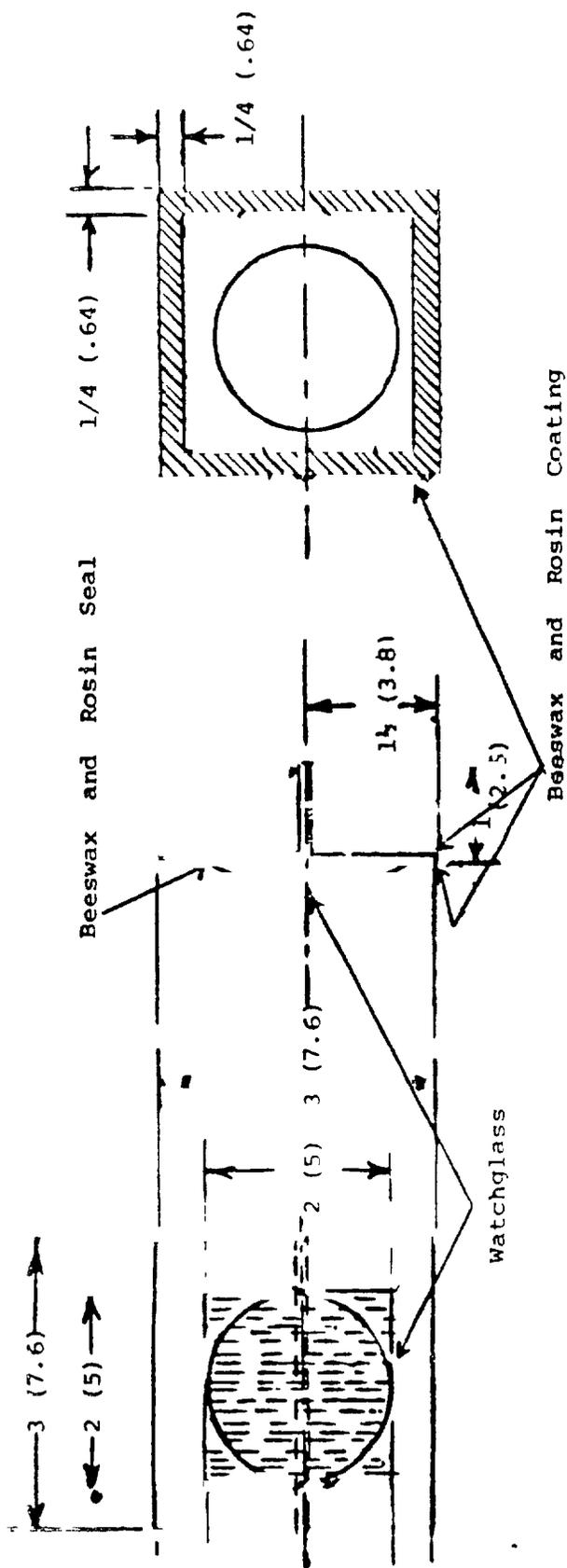
6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

- (a) Title, number, and date of this specification.
- (b) Type, grade, and class of adhesive required (see 1.2).
- (c) Unit quantities of adhesive required. The adhesive should be purchased by volume, the standard being one U.S. Gallon (231 cubic inches (3.8 liters) at 60°F (15.5°C), or parts thereof.
- (d) Levels of packaging and packing required (see 5.1 and 5.2).
- (e) Requirements for fungi resistance and tests (if applicable) (see 3.1).
- (f) Any additional marking or other requirements.

Level B packaging is intended to provide economical but limited protection, and should be specified when it is determined that the adhesive will be kept in covered storage for a period not exceeding one year from the date of initial packaging

6.3 Supersession data. This specification includes the requirements of Military Specification MIL-A-140A, dated November 23, 1951, and those of Federal Specification O-A-166 (GSA-FSS), dated January 18, 1962.

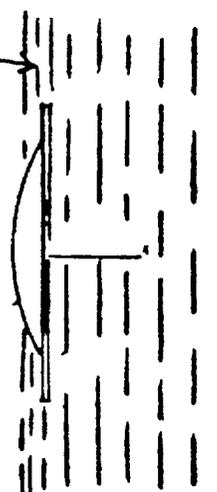
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a. PREPARATION OF SPECIMEN

b. APPLICATION OF SEALANT

Fresh Water $70^{\circ} \pm 5^{\circ}\text{F}$
 $(21.1^{\circ} \pm 2.8^{\circ}\text{C})$



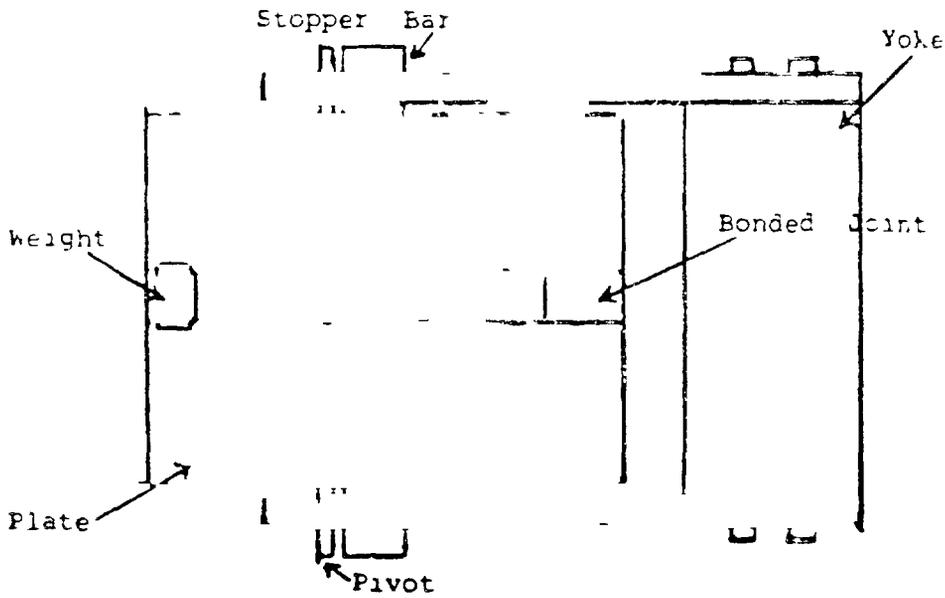
c. FLOATING OF SPECIMEN

FIGURE 1. WATER PENETRATION TEST

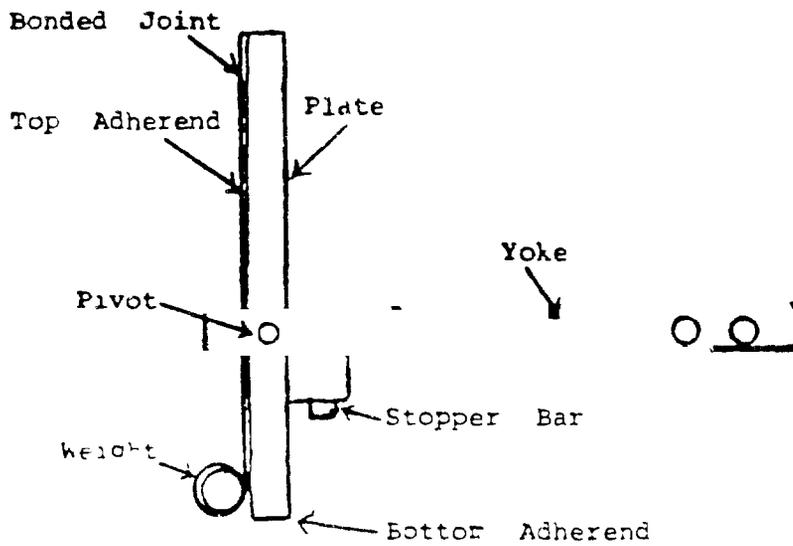
Note:

Number in inches
Bracketed numbers in centimeters

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a. TOP VIEW-PLATE HORIZONTAL



b. SIDE VIEW-PLATE ROTATED INTO VERTICAL

FIGURE 2. TILTABLE TABLE

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MILITARY CUSTODIANS:

Army - MR
Navy - AS
Air Force - 20

Review activities:

Army - AL, AR, ME, EA
Navy - OS
Air Force - 99
DLA - IS
Misc - NS

User activities:

Navy - MC, SH, OS
Army - GL, AL

Civil Agency Coordinating Activity

GSA-FSS

Preparing activity:

Army - MR

Project No. 8040-0409

(KBWP# ID-0261A/DISK 0107A. FOR AMNRC USE ONLY