

MIL-I-3064B
20 July 1982
SUPERSEDING
MIL-I-3064A
20 June 1962
(See 6.8)

MILITARY SPECIFICATION

INSULATION, ELECTRICAL, PLASTIC-SEALER

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

1. SCOPE

1.1 Scope. This specification covers the electrical and physical requirements of the plastic-sealer compound used for sealing electrical cable penetrations, end sealing cables, and fire stop applications requiring good electrical insulation and heat resistant properties.

1.2 Classification. The plastic-sealer compound shall be of the following types, as specified (see 6.2.1).

Type H - Heat- and flame-resistant

Type HF - Heat- and flame-resistant for fire stop applications

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified, 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.

SPECIFICATIONS

FEDERAL

VV-I-530	-	Insulating Oil, Electrical (for Transformers, Switches and Circuit Breakers).
PPP-C-96	-	Cans, Metal, 28 Gage and Lighter.
PPP-P-704	-	Pails, Metal: (Shipping, Steel, 1 through 12 gallons).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document shall be addressed to: Commander, Naval Sea Systems Command, SEA 3242, Department of the Navy, Washington, DC 20362 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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- MIL-C-17 - Cables, Radio Frequency, Flexible and Semirigid, General Specification for.
- MIL-C-91B - Cable and Cord Electrical, for Shipboard Use General Specifications for.

STANDARDS

FEDERAL

- FED-STD-313 - Material Safety Data Sheets Preparation and the Submission of.
- FED-STD-406 - Plastics: Methods of Testing.

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- MIL-STD-129 - Marking for Shipment and Storage.
- MIL-STD-147 - Palletized Unit Loads.
- MIL-STD-45662 - Calibration Systems Requirements.

(Copies of specifications and standards required by contractors 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.

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC. AGENT

National Motor Freight Classification

(Application for copies should be addressed to the National Motor Freight Traffic Association, Inc. ATA TRAFFIC Dept., 1616 "P" Street, NW, Washington, DC 20036.)

UNIFORM CLASSIFICATION COMMITTEE AGENT

Uniform Freight Classification Ratings, Rules and Regulations

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- D 5 - Penetration of Bituminous Materials, Test Method for. (DoD adopted)
- D 257 - D.C. Resistance or Conductance of Insulating Materials, Test Methods for. (DoD adopted)
- D 412 - Rubber Properties in Tension, Test Methods for. (DoD adopted)
- D 1371 - Cleaning Plastic Specimens for Insulation Resistance, Surface Resistance, and Volume Resistivity Testing, Recommended Practice for.

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D 2240 - Rubber Property - Durometer Hardness, Test Method for. (DoD adopted)

E 28 - Softening Point by Ring-and-Ball Apparatus, Test Method for. (DoD adopted)

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

AMERICAN IRON AND STEEL INSTITUTE (AISI)

Steel Product Manual-Stainless and Heat-Resistant Steels.

(Application for copies should be addressed to American Iron and Steel Institute, 1000-16th St., NW, Washington, DC 20036.)

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 Qualification. The plastic sealer insulation furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.4 and 6.3).

3.2 Materials. The materials used shall have the physical and electrical properties as specified herein. The materials shall not, either in the state of their original application or as a result of aging, have any deleterious effect on insulation materials to which they are applied.

3.2.1 Recovered materials. Unless otherwise specified herein, all equipment, material, and articles incorporated in the products covered by this specification shall be new and shall be fabricated using materials produced from recovered materials to the maximum extent practicable without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically specified.

3.2.2 Toxicity. The material shall have no adverse effects on the health of personnel when used for its intended purpose. At the time of request for tests, the manufacturer shall furnish satisfactory evidence that the compound is non-toxic to humans during application, provided that the manufacturer's precautions are taken (see 4.1.3). These precautions shall be clearly stated on the label. Failure to furnish satisfactory evidence of nontoxicity of the material will be cause for non-authorization of tests.

3.2.3 Prohibited material. Asbestos shall not be used.

3.2.4 Changes in material. If the manufacturer desires to change the process or the composition of the material, after qualification (see 6.3), a statement to that effect shall be submitted to the qualifying activity. The

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statement shall describe the proposed change, together with evidence to substantiate his claim that such change is feasible. At the discretion of the Naval Sea Systems Command (NAVSEA), test specimens may be required to prove the suitability of the proposed changes.

3.3 Application characteristics. The plastic-sealer insulation compound, in the condition in which delivered, shall be suitable and effective without the addition of other ingredients. The consistency at ambient room temperature shall be such that it can be readily applied by means of the fingers or with a knife, and shall be capable of being drawn or kneaded into long thin rolls. The temperature required for application of the compound shall not exceed 86 degrees Fahrenheit (°F) (see 4.6.2).

3.4 Hardening properties. When measured by the method specified in 4.6.3, the penetration to .004 inch, shall be as follows:

Minimum penetration at 32°F	Maximum penetration at 77°F
5	100

3.5 Aging. After aging, the compound shall have a minimum penetration of 25 (.004 inch) when tested as specified in 4.6.4.

3.6 Softening point. The softening point of the compound, after it is fully hardened, shall be not less than 212°F when tested as specified in 4.6.5.

3.7 Adhesiveness. The compound, when applied to the surfaces of two flat steel discs as specified in 4.6.6, shall have an adhesiveness which requires not less than 100 pounds for separation of the plates.

3.8 Oilproofness. The oilproofness of the compound shall be such that the change in weight of a sample shall be not more than 10 percent, when tested as specified in 4.6.7.

3.9 Waterproofness. The waterproofness of the compound shall be such that the increase in weight of a sample shall be not greater than 0.5 percent, when tested as specified in 4.6.8.

3.10 Insulation resistance. The compound shall have an insulation resistance of not less than 50 megohms when measured as specified in 4.6.9.

3.11 Dielectric strength. A test specimen prepared as specified in 4.6.9, shall show no evidence of breakdown when tested as specified in 4.6.10.

3.12 Compatibility. The compound shall not cause any significant deterioration in the characteristics of the cable electrical jackets and conductor insulations listed in table I, when tested as specified in 4.6.11. In order to minimize the number of cable test specimens for compatibility tests, only the cable materials as designated for tests in table I need be tested. The compound being tested shall be considered incompatible if one or more of the following is evident in the heat-aged, treated specimens when they are compared to the heat-aged, untreated specimens as specified in 4.6.11.2:

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- (a) The heat-aged, treated specimens exhibit signs of swelling, softening, hardening, cracking, or other visible deterioration which is not evident in the heat-aged, untreated specimens.
- (b) The shore A hardness results vary by more than plus or minus 10 percent.
- (c) The elongation results vary by more than plus or minus 15 percent.
- (d) The reduction in tensile strength of the heat-aged, treated specimens is greater than 15 percent.
- (e) The reduction in insulation resistance of the heat-aged treated specimens is greater than 10 percent.
- (f) There is reduction in the dielectric strength of the heat-aged, treated specimens.

TABLE I. Cable jacket and conductor insulation materials.

Military specification	Material
MIL-C-915 (see 6.6)	Polyvinyl chloride <u>1/</u> <u>2/</u> Silicone rubber <u>1/</u> <u>2/</u> or <u>3/</u> Synthetic rubber Butyl rubber Natural rubber Chlorosulfonated polyethylene Polychloroprene <u>1/</u> <u>2/</u> Neoprene Polyethylene thermoplastic <u>1/</u> <u>3/</u> Polyethylene (cross-linked) Polypropylene Ethylene propylene rubber Polyamide
MIL-C-17 (see 6.6)	Type I, Vinyl-acetate copolymer Type IIA, Polyvinyl chloride-acetate <u>1/</u> <u>2/</u> <u>5/</u> Polyvinyl chloride Fluorinated ethylene propylene Polyethylene, solid core type A <u>1/</u> <u>4/</u> Polytetrafluoroethylene

1/ Test required.2/ Jacket material.3/ Conductor insulation material.4/ Core material.

5/ MIL-C-17 specifies that type IIA jacket material designated for tests may be either polyvinyl chloride or polyvinyl chloride-acetate. Therefore, a cable acquired with a type IIA jacket for testing shall be certified as having a polyvinylchloride-acetate jacket (see 6.6).

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3.13 Flammability. Type H and HF materials shall not burn when tested, as specified in 4.6.12.

3.14 Fire stop. Type HF material when tested as specified in 4.6.13, shall prevent the propagation of fire to the unexposed side of the penetration.

3.15 Expansion. Type HF material when tested as specified in 4.6.14, shall have an expansion volume of 5 percent minimum.

3.16 Marking.

3.16.1 Instructions for use. Each can or pail shall have attached thereto a label describing the method of application.

3.16.2 Warnings. Each can or pail shall have attached thereto appropriate warning labels (see 3.2.2 and 5.3.1).

3.17 Workmanship. All compounds of the same brand, from one manufacturer, shall be the same color and uniform in texture and shall be homogeneous. Filled containers shall be free of defects and shall show no evidence of leakage or corrosion.

3.18 Material safety data sheet. The contracting activity shall be provided a Material Safety Data Sheet (MSDS) at the time of contract award. The MSDS is form OSHA-20 and found as part of FED-STD-313. The MSDS shall be included with each shipment of the material covered by this specification.

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.

4.1.1 Test equipment and inspection facilities. Test measuring equipment and inspection facilities of sufficient accuracy, quality, and quantity to permit performance of the required inspection shall be established and maintained by the contractor. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment, shall be in accordance with MIL-STD-45662.

4.1.2 Test report. Two copies of the test report covering the inspection and tests for qualification shall be furnished to NAVSEA (see 6.2.2).

4.1.3 Contractor's data. Together with the qualification test sample, the contractor shall furnish the toxicological data and formulations required to evaluate the safety of the material for the proposed use (see 3.2.2 and 6.2.2).

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4.2 Classification of inspections. The inspections specified herein are classified as follows:

- (a) Qualification inspection (see 4.4).
- (b) Quality conformance inspection (see 4.5).

4.3 Inspection conditions. Unless otherwise specified herein, all inspections shall be conducted at a temperature of $73.4 \pm 5^\circ\text{F}$ and a relative humidity of 50 ± 5 percent. The temperature of the material as stored in the open container shall be at room temperature for a period of 24 hours before being tested. Material for test shall not be removed from the open container by hand, but by a suitable instrument.

4.4 Qualification inspection. Qualification inspection shall be conducted at a laboratory satisfactory to NAVSEA. Qualification inspection shall consist of the examination and tests specified in table II.

TABLE II. Qualification inspection.

Inspection	Requirement paragraph	Test method paragraph
Visual examination	3.2.2, 3.17	4.6.1
Application properties	3.3	4.6.2
Hardening properties	3.4	4.6.3
Aging	3.5	4.6.4
Softening point	3.6	4.6.5
Adhesiveness	3.7	4.6.6
Oilproofness	3.8	4.6.7
Waterproofness	3.9	4.6.8
Insulation resistance	3.10	4.6.9
Dielectric strength	3.11	4.6.10
Compatibility	3.12	4.6.11 thru 4.6.11.2.7
Flammability	3.13	4.6.12
Fire stop	3.14	4.6.13
Expansion	3.15	4.6.14

4.4.1 Sample size. The contractor shall supply 5 gallons (gal) of plastic-sealer insulation compound to complete all required inspections and tests. The sample shall be supplied in the same type containers as specified in the acquisition document.

4.4.2 Failures. One or more failures shall be cause for refusal to grant qualification.

4.4.3 Retention of qualification. In order to retain qualification, the contractor shall forward via the Government inspector, at 5-year intervals, to the qualifying activity a report consisting of a summary of the inspections specified in table II. The inspection shall be performed on one sample of each type of compound, produced during the period.

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4.5 Quality conformance inspection.

4.5.1 Inspection of product for delivery. Inspection of product for delivery shall consist of the inspections specified in table III.

TABLE III. Quality conformance inspection.

Inspection	Requirement	Test
Visual examination	3.2.2, 3.17	4.6.1
Application properties	3.3	4.6.2
Hardening properties	3.4	4.6.3
Aging	3.5	4.6.4
Waterproofness	3.9	4.6.8
Insulation resistance	3.10	4.6.9
Dielectric strength	3.11	4.6.10
Flammability	3.13	4.6.12

4.5.1.1 Inspection batch. An inspection batch (see 6.5.1) shall consist of all plastic-sealer insulation compound of the same type designation, produced under essentially the same conditions, and offered for inspection at one time.

4.5.1.2 Sampling plan. A 1-pound sample selected from each batch of compound shall be subjected to the quality conformance examination and tests in table III, to determine conformance to this specification. Failure to conform to the requirements of this specification for any test shall be counted as a defect and the batch shall be rejected.

4.5.1.3 Rejected batches. If an inspection batch is rejected, the contractor may rework it to correct the defects and resubmit for reinspection. Resubmitted batches shall be separate from new batches and shall be clearly identified as reinspected batches. Acceptance criteria of 4.5.1.2 shall apply.

4.6 Methods of inspection.

4.6.1 Visual examination. The sample plastic-sealer compound shall be examined to verify compliance with the workmanship requirements of 3.17.

4.6.2 Application properties. The compound, when applied in accordance with the manufacturer's instructions (see 3.16.1), shall meet the requirements of 3.3.

4.6.3 Hardening properties. The hardening properties of the compound shall be within the values specified in 3.4, when tested in accordance with ASTM D 5. The following details shall apply:

- (a) Preparation of sample - maintained at room temperature for 72 hours after packing into the container.
- (b) Water bath temperature - 32°F or 77°F.
- (c) Needle - loaded with 50 grams (g).
- (d) Time interval - 5 seconds.
- (e) Number of readings - not less than three, whose values differ not more than .016 inch.

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4.6.4 Aging. The compound, after aging for 96 hours at 158°F, shall be subjected to the test in 4.6.3 at a temperature of 77°F. The minimum penetration shall be specified in 3.5.

4.6.5 Softening point. The softening properties of the compound shall be as specified in 3.6, when tested in accordance with ASTM E 28. The following details and exceptions shall apply:

- (a) Preparation of sample - allowed to harden at room temperature for 72 hours prior to the test.
- (b) Distilled water cooling - not less than 81°F below subtracting point of material under test.
- (c) Stirrer - use optional. If not used, uniform heating may be achieved by placing the burner midway between the center and edge of the beaker, away from the specimen.

4.6.6 Adhesiveness. The compound shall be applied to the surface of two flat steel disks 4 inches in diameter. The surfaces of the steel disks shall be finished to a standard surface roughness of 8 ± 1 micro-inches, root mean square (rms). The disks shall be pressed together in a vise until the thickness of the sample is 1/16 inch. All excess material shall be removed and the compound allowed to harden for 72 hours, after which the pull-apart stress shall be determined in a tensile testing machine. A strain rate of 1 inch per minute shall be used for the stress test. The material shall meet the adhesiveness requirements specified in 3.7.

4.6.7 Oilproofness. Corrosion-resistant steel AISI type 302/304 cylindrical tubes, 1 inch in diameter and 3/4-inch long, shall be cleaned with a solvent to remove all traces of dirt and grease. The clean tubes shall then be weighed on an analytical balance to the nearest 0.0001 g. A spatula shall be used to pack the tubes full of sealer compound, to ensure the absence of air pockets. The compound shall be leveled flush with the ends of the tube and all excess compound removed from the outer surface of the tube. The filled tubes shall be weighed on an analytical balance and then immersed in transformer oil, conforming to VV-I-530, which shall be held at a temperature of 104°F for 48 hours. Both surfaces of the compound shall be exposed to the oil by laying the tubes on their sides. After removal from the oil bath, the excess oil on the surface of the compound shall be blown off with a soft stream of air, and the metal surfaces dried by means of a paper towel. The filled tubes shall be reweighed on an analytical balance. The average percent increase or decrease in net weight shall then be calculated from readings obtained on three specimens. If the change in weight is greater than 10 percent, the sample shall be considered as having failed the test (see 3.8).

4.6.8 Waterproofness. The compound shall be packed in corrosion-resistant steel cylindrical tubes and weighed as specified in 4.6.7. The filled tubes shall be immersed in distilled water at room temperature for 24 hours. After removal from the water, the excess water shall be removed as specified in 4.6.7, and the tubes shall be reweighed. The average percent increase in net weight shall then be calculated from readings obtained on three specimens. If the increase in weight is greater than 0.5 percent, the sample shall be considered as having failed the test (see 3.9).

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4.6.9 Insulation resistance. Insulation resistance shall be measured with a 1,000-volt (V) insulation resistance indicating instrument using a 1-1/4-inch diameter electrode, placed centrally on the top side of a 2-inch diameter by 1/2-inch thick disk of the compound. The test material shall be held in place by insulating tubing. The assembly shall rest on a 3-inch square brass plate. Failure to meet the requirements of 3.10 shall be cause for rejection.

4.6.10 Dielectric strength. The test specimen, prepared in accordance with 4.6.9, shall successfully withstand an alternating current (a.c.) potential of 1,500 Vrms, applied instantaneously and maintained for not less than 1 minute, using a 3/4-inch diameter electrode located externally at the top of the specimen. The test voltage shall approximate a true sine wave, and shall be of a frequency not exceeding 100 hertz. Failure to meet the requirements of 3.11 shall be cause for rejection.

4.6.11 Compatibility. The compatibility of the compound with each type of cable jacket and conductor insulation material shall be determined as specified in table I (see 3.12).

4.6.11.1 Specimens. Nine 6-inch specimens of each type material in table I are required for the compatibility tests. Each group of nine specimens shall be taken from a single length of cable.

4.6.11.1.1 Preparation of specimens. The specimens shall be stripped from the cable or conductor and shall be cleaned, as specified in ASTM D 1371. Three of the nine specimens in each group shall be either packed with or compressed between layers of the sealer compound. The remaining six specimens in each group shall be left untreated.

4.6.11.2 Procedure. The three specimens treated with the compound and three of the untreated specimens shall be heat-aged; the remaining three untreated specimens of the group shall be kept in the "as received" condition. After heat-aging, testing shall be performed on the three treated and six untreated specimens in each group at the same time. The sealing compound shall be stripped from the treated specimens before tests are performed. The average mean of the results of each test shall be calculated for the specimens in each set of three, then the mean of the treated specimens shall be compared with the mean of each set of the untreated specimens. The compound shall be considered as failing the test if any of the observations specified in 3.12 are evident.

4.6.11.2.1 Heat-aging. The six prepared specimens (see 4.6.11.1.1) in each group shall be subjected to heat-aging for 168 hours at a temperature of 160°F. The aging apparatus shall consist of a heat chamber, a means of controlling the temperature, a thermometer or thermocouple for measuring temperature, and racks or other means of supporting the specimens within the chamber. The temperature control shall be capable of maintaining the chamber temperature at 160 ± 5°F.

4.6.11.2.2 Visual examination. The heat-aged specimens shall be subjected to a thorough examination for signs of deterioration as specified in 3.12.

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4.6.11.2.3 Dielectric strength. Each group of specimens shall be subjected to dielectric strength testing in accordance with method 4031 of FED-SID-406 to the average dielectric strength of the heat-aged, untreated specimens, as specified in 3.12. The following details and exceptions shall apply:

- (a) The test medium shall be the normal laboratory atmospheric conditions.
- (b) The electrodes shall be 1/4-inch diameter.
- (c) The applied voltage shall be 500 V a.c. (Vrms).
- (d) Using a suitable measuring device, the leakage current shall be measured after 1 minute of electrification.

4.6.11.2.4 Insulation resistance. Each group of specimens shall be subjected to resistance testing in accordance with ASTM D 257. The average insulation resistance of the treated specimens when compared to the average insulation resistance of the heat-aged, untreated specimens shall be as specified in 3.12. The following details and exceptions shall apply:

- (a) The test medium shall be normal laboratory atmospheric conditions.
- (b) The applied voltage shall be 100 V direct current.
- (c) The measured resistance shall be specified in ohms.

4.6.11.2.5 Indentation hardness. Each group of specimens shall be subject to shore A hardness determination in accordance with ASTM D 2240. The average indentation hardness of the treated specimens when compared to the average indentation hardness of the heat-aged, untreated specimens shall be as specified in 3.12.

4.6.11.2.6 Tensile strength. Each group of specimens shall be subject to tensile strength tests in accordance with ASTM D 412. The average tensile strength of the treated specimens when compared to the average tensile strength of the heat-aged, untreated specimens shall be as specified in 3.12.

4.6.11.2.7 Elongation. Each group of specimens shall be subject to elongation tests in accordance with ASTM D 412. The bench marks shall be 2 inches apart. The average ultimate elongation of the treated specimens when compared to average ultimate elongation of the heat-aged, untreated specimens shall be as specified in 3.12.

4.6.12 Flammability. A small cube of the compound, weighing approximately 10 g, shall be placed on the center of a steel plate 6-inches square by 1/8-inch thick. To protect the specimen from drafts, the steel plate and specimen shall be placed inside a metal cabinet, open at the top, and provided with a vertical sliding glass front. The vertical sliding glass front shall be open during the period of burning with the gas flame and immediately closed for the balance of the test period. The Bunsen burner shall be adjusted to produce a blue inner cone of 1.0 inch to 1.2 inches long and a total flame of 4 to 6-inches long. The burner shall be held with the barrel pointing downward at a 45 degree angle. The flame shall be directed so that the main body of the flame lies diagonally across the top surface of the cube. The flame shall be held in this position for 30 seconds and the timing of the burning period checked, beginning with the withdrawal of the flame and the closing of the glass front of the shield. Acceptability criteria shall be as specified in 3.13.

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4.6.13 Fire stop.

4.6.13.1 Test equipment. The following equipment shall be used to conduct the fire stop test:

- (a) A simulated bulkhead and penetration collar mounted in a four-sided enclosure (see figure 1).
- (b) A hexane fire pan mounted below the cables (see figures 1 and 2).
- (c) A continuous-feed fuel system (see figures 1 and 2).
- (d) Sixteen 39-inch lengths of 11 different types of cables conforming to either MIL-C-17 or MIL-C-915, as applicable (see figure 3).

4.6.13.2 Test procedure. The test shall be conducted as follows:

- (a) Mount the 39-inch lengths of the cables in the center of the collar as shown in figure 3 and support them by an angle iron bracket on the unexposed side of the bulkhead (see figure 4).
- (b) Pack the plastic-sealer compound inside the collar penetration, around the cables to a depth of approximately 3 inches.
- (c) Place a thermocouple near the compound on the fire exposed side of the collar (see figure 1).
- (d) Apply a flame such that the cables and penetration collar are totally engulfed by it for a duration of not less than 1 hour.
- (e) Adjust the airflow through the enclosure to maintain a temperature, throughout the test, of approximately 1350°F on the thermocouple.
- (f) The compound shall be considered as having failed the test if, at the end of 1 hour, the fire has spread through the penetration collar to the cables on the unexposed (nonfire) side of the bulkhead (see 3.14).

4.6.14 Expansion. The compound shall be packed inside the tube section (see figure 5) to a depth of approximately 3 inches. The tube shall then be mounted into the tube holder (see figure 6). A measuring washer shall be placed on top of the material inside the tube with the indentation pointing up. The distance from the washer indent to the top surface of the tube shall be measured with a depth gage. The total assembly shall then be placed into an oven with the temperature held at 608°F for 1 hour. After the sample has cooled to room temperature, the depth from the top surface of the tube to the washer indent shall be measured again. The change in volume can be found by:

$$\text{percent (expansion)} = \frac{D_1 - D_2}{D_1 - D_1}$$

where D_1 = depth before heating

D_2 = depth after heating

The compound shall be considered as having failed the test if the expansion in volume is less than 5 percent.

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4.6.15 Packaging inspection. Sample packages and packs and the inspection of the preservation-packaging, packing and marking for shipment and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

5. PACKAGING

(The preparation for delivery requirements specified herein apply only for direct Government acquisitions. For the extent of applicability of the preparation for delivery requirements of referenced documents listed in section 2, see 6.7.)

5.1 Preservation-packaging. Preservation-packaging shall be level A or C as specified (see 6.2.1).

5.1.1 Level A. The insulation compound, in the quantity specified, shall be furnished in 1-gal multiple friction plug type cans or in 5-gal lug cover steel pails as specified (see 6.2.1).

5.1.1.1 Cans. Cans shall conform to type V, class 2, round, of PPP-C-96. Exterior plan B coating and side seam stripping shall be required. Cans shall be provided with wire handles which shall be galvanized or protectively coated to resist corrosion.

5.1.1.2 Pails. The 5-gal pails shall conform to type II of PPP-P-704. Wire bales shall be zinc-coated or otherwise protectively coated to resist corrosion.

5.1.2 Level C. The insulation compound in the quantity specified (see 6.2.1), shall be preserved-packaged to afford protection against physical damage and deterioration during shipment from the supply source to the first receiving activity. The contractor's normal retail or wholesale preservation-packaging practices may be used when such meet the requirements of this level.

5.2 Packing. Packing shall be level A, B, or C as specified (see 6.2.1).

5.2.1 Level A.

5.2.1.1 Cans. Cans shall be arranged and packed for overseas shipment in accordance with the appendix to PPP-C-96.

5.2.1.2 Pails. The 5-gal pails will require no additional packing. When specified (see 6.2.1), pails shall be palletized in accordance with MIL-STD-147.

5.2.2 Level B.

5.2.2.1 Cans. Cans shall be arranged and packed for domestic shipment in accordance with the appendix to PPP-C-96.

5.2.2.2 Pails. The 5-gal pails will require no additional packing. When specified (see 6.2.1), pails shall be palletized in accordance with MIL-STD-147.

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5.2.3 Level C. Filled containers shall be packed in a manner to ensure acceptance by common carrier and safe delivery at destination at the lowest transportation rate for such supplies. Shipping containers or method of packing shall comply with the Uniform Freight Classification Ratings, Rules and Regulations or National Motor Freight Classification Rules, as applicable.

5.3 Marking. In addition to any special marking required by the contract or order, as specified in 3.16, or herein interior packages, exterior shipping containers and palletized unit loads shall be marked in accordance with MIL-STD-129 (see 6.2.1).

5.3.1 Hazardous chemicals. All packages containing hazardous chemicals (see 3.16) shall have securely affixed thereto such warning labels and markings, as required in accordance with MIL-STD-129 (see 6.2.1).

6. NOTES

6.1 Intended use. The compound will be used for sealing electrical cable penetrations in decks and bulkheads and entrances in electrical enclosures and will also be used for end sealing cables. The compound is also intended for use as a fire stop at cable penetrations in decks and bulkheads. The compound will be in direct contact with the exterior surfaces of both armored and unarmored cables and conductor insulation materials.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Type required (see 1.2).
- (c) Level of packaging and packing required (see 5.1 and 5.2).
- (d) Quantity of compound required (see 5.1.1 and 5.1.2).
- (e) When pails are required to be palletized (see 5.2.1.2 and 5.2.2.2).
- (f) Marking required (see 5.3 and 5.3.1).

6.2.2 Data requirements. When this specification is used in an acquisition which incorporates a DD Form 1423, Contract Data Requirements List (CDRL), the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved CDRL incorporated into the contract. When the provisions of DAR 7-104.9 (n) (2) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification is cited in the following paragraphs.

<u>Paragraph no.</u>	<u>Data requirement title</u>	<u>Applicable DID no.</u>	<u>Option</u>
4.1.2	Reports, test	DI-T-2072	10.1A
4.1.3	Certification data/report	UDI-A-23264	---

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(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5000.19L., Vol. II, AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

6.2.2.1 The data requirements of 6.2.2 and any task in section 3, 4, or 5 of the specification required to be performed to meet a data requirement may be waived by the contracting/acquisition activity upon certification by the offeror that identical data were submitted by the offeror and accepted by the Government under a previous contract for identical item acquired to this specification. This does not apply to specific data which may be required for each contract regardless of whether an identical item has been supplied previously (for example, test reports).

6.3 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 Qualified Products List QPL-3064 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, 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 Naval Sea Systems Command, SEA 3112, Department of the Navy, Washington, DC 20362, and information pertaining to qualification of products may be obtained from that activity. Application for Qualification tests shall be made in accordance with "Provisions Governing Qualification SD-6" (see 6.4).

6.4 Copies of "Provisions Governing Qualification SD-6" may be obtained upon application to Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

6.5 Definitions.

6.5.1 Batch. A batch is defined as that quantity of material which has been manufactured by some unit chemical process and subjected to some physical mixing operation intended to make the final product substantially uniform.

6.6 Cables for compatability test. The following specification sheets list cables which have cable jacket and insulating materials listed in table I for which tests are required. This information is given for the convenience of the plastic-sealed compound manufacturer in selecting cables for compatability testing of the compound. Since this list is not all inclusive, the manufacturer may select other cables listed in MIL-C-915 and MIL-C-17, provided they have the required cable jacket and insulating materials. The addresses of the manufacturers of the cables can be found in the applicable Qualified Products List.

- (a) Polyvinyl chloride jacket (MIL-C-915/29, 30, 31, 36, 37, 42, 44, 49, 64).
- (b) Silicone Rubber, jacket or insulation (MIL-C-915/29, 30, 31, 36, 38, 40).
- (c) Polychloroprene jacket (MIL-C-915/1, 10, 48).

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- (d) Polyethylene thermoplastic, insulation (MIL-C-915/42, 44, 48, 49, 64).
- (e) Polyvinylchloride - acetate, type IIA, jacket (MIL-C-17/74, 75, 77, 81).
- (f) Polyethylene, solid core, type A (MIL-C-17/74, 75, 77, 81).

6.7 Sub-contracted material and parts. The preparation for delivery requirements of referenced documents listed in section 2 do not apply when material and parts are acquired by the contractor for incorporation into the equipment and lose their separate identity when the equipment is shipped.

6.8 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Custodians:

Army - ER

Navy - SH

Air Force - 85

Review activity:

DLA - GS

User activity

Army - MI

Preparing activity:

Navy - SH

(Project 5970-0563)

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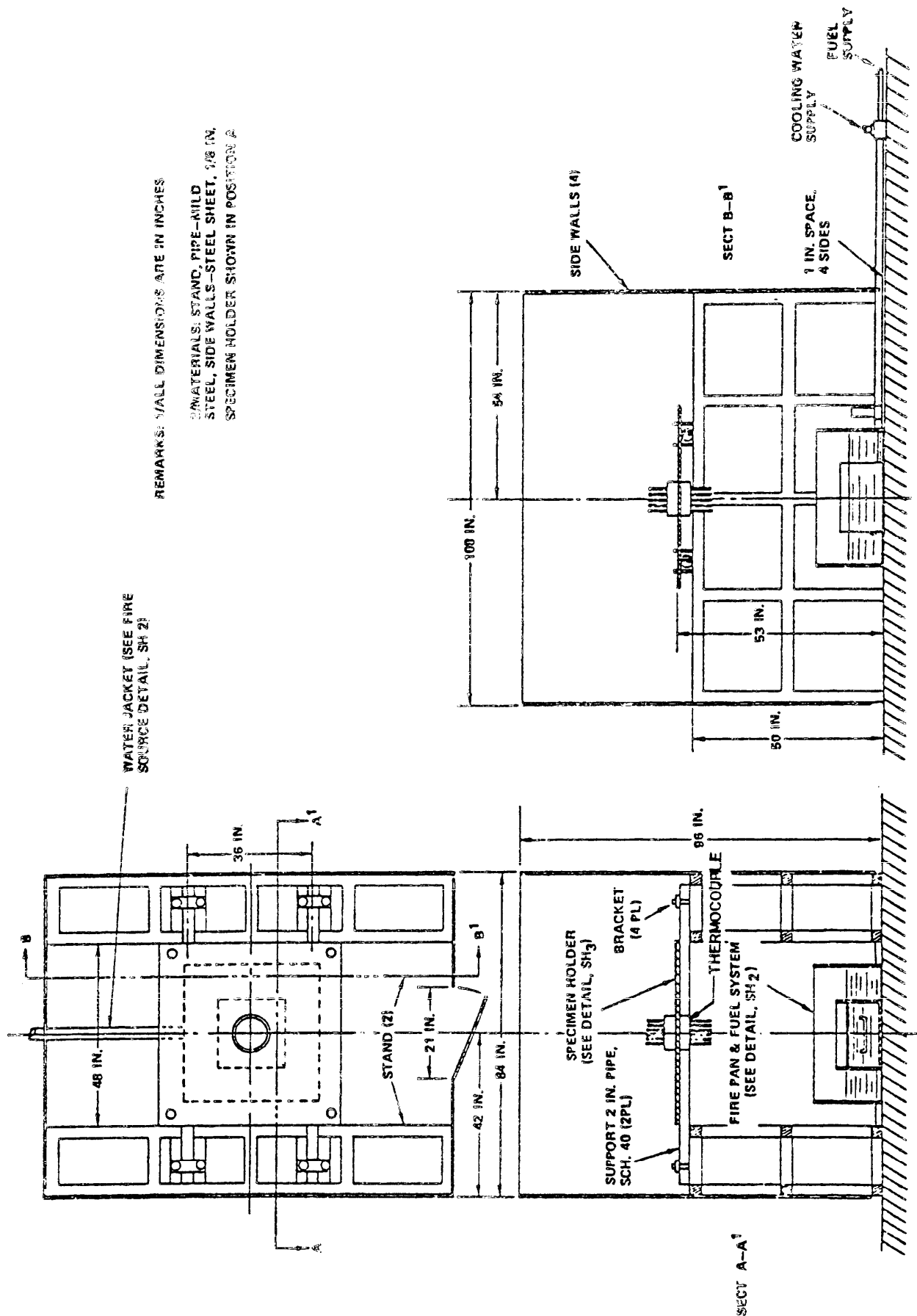


FIGURE 1. Test enclosure.

MIL-I-3064B

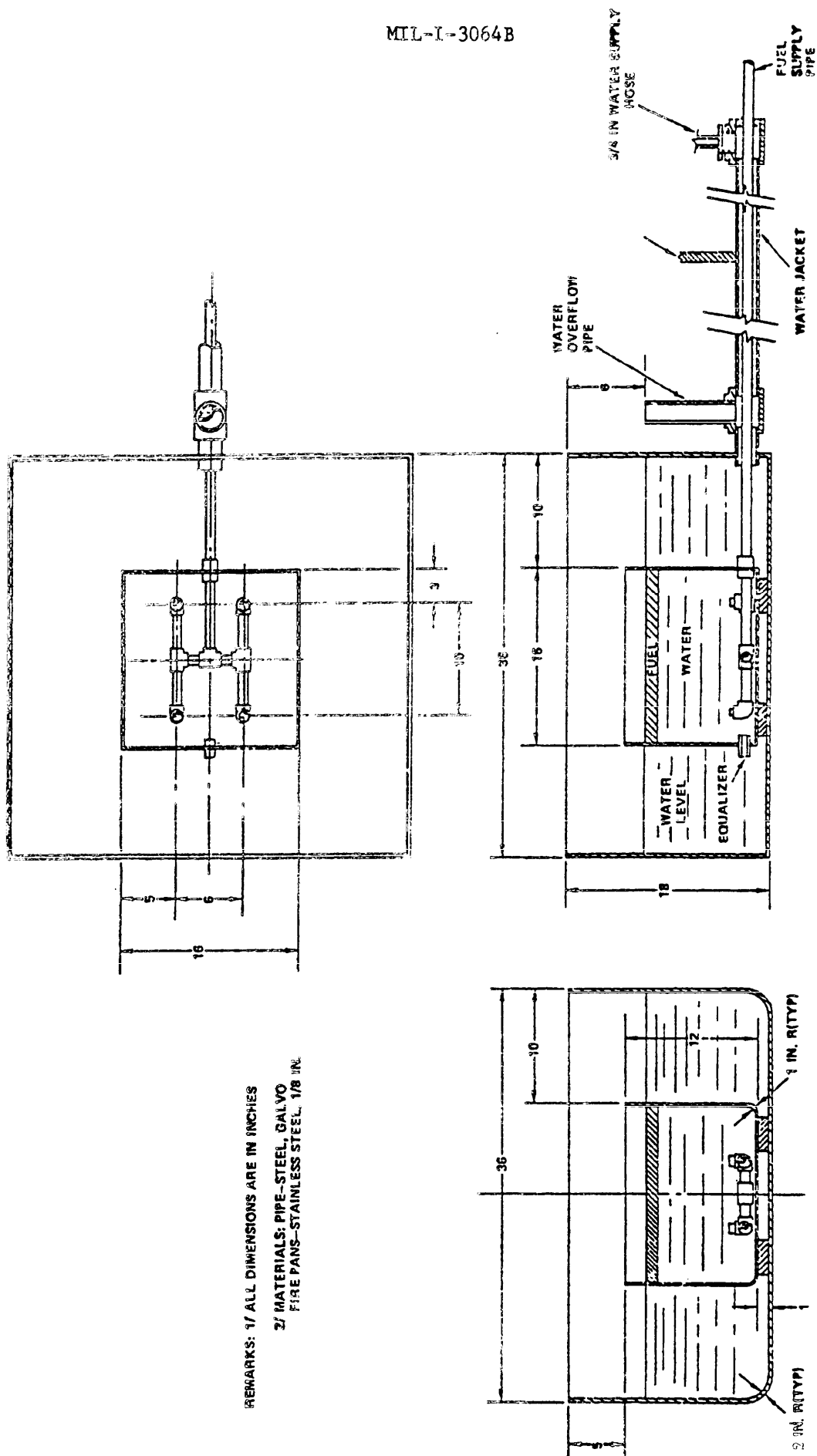


FIGURE 2. Fuel supply system.

MIL-I-30648

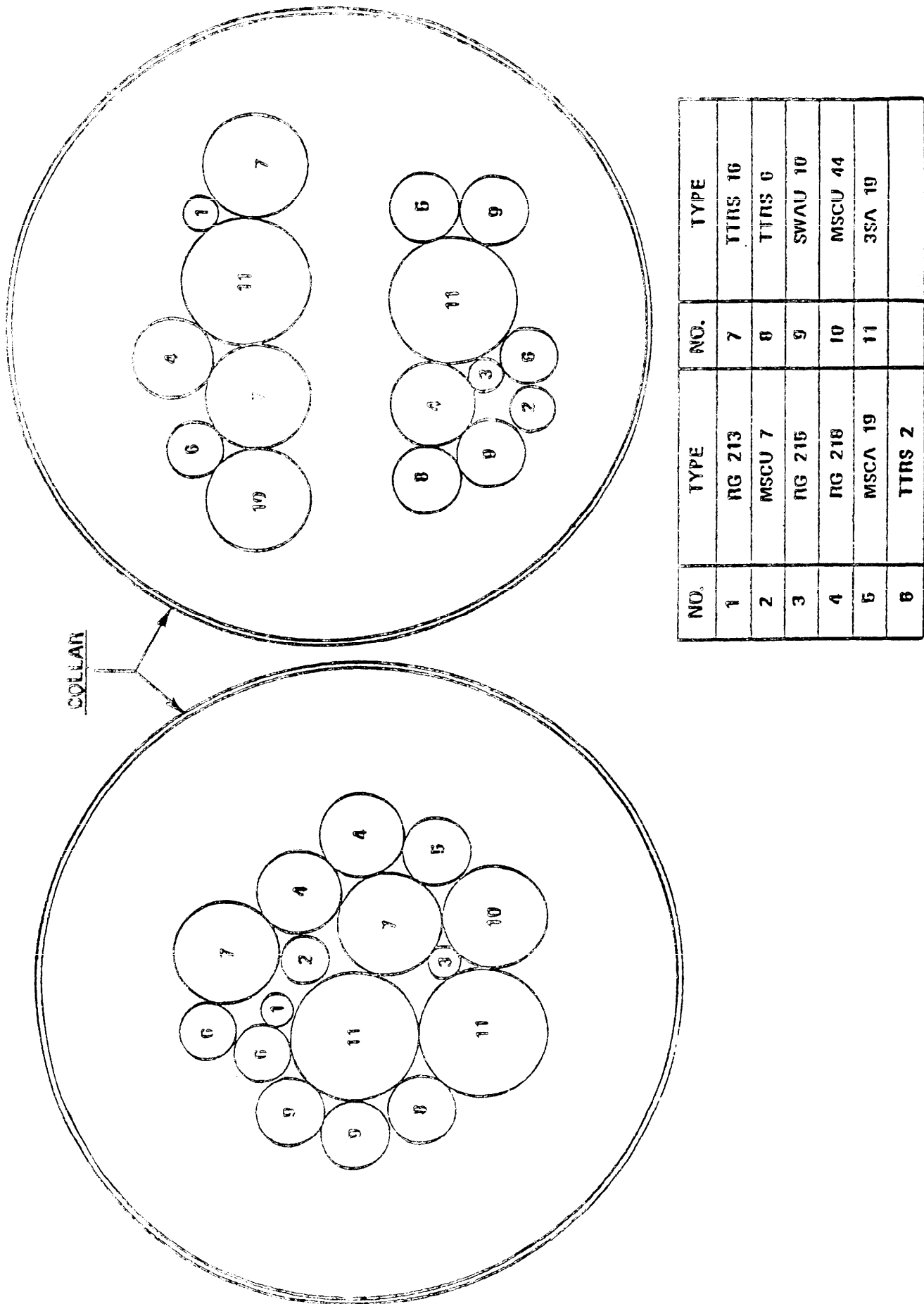


FIGURE 3. Cable types and configurations.

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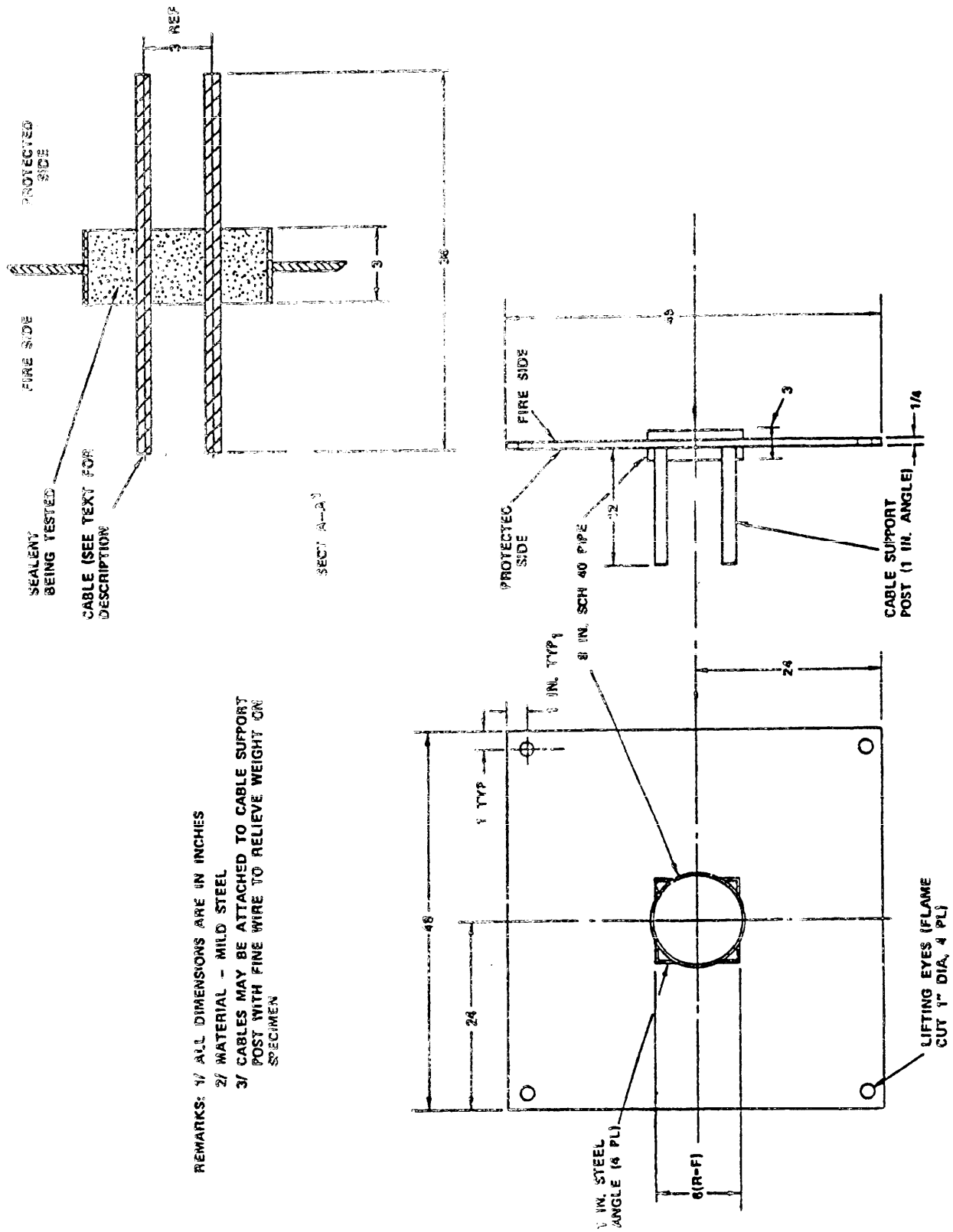
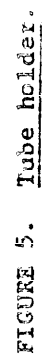


FIGURE 4. Penetration and cable supports.



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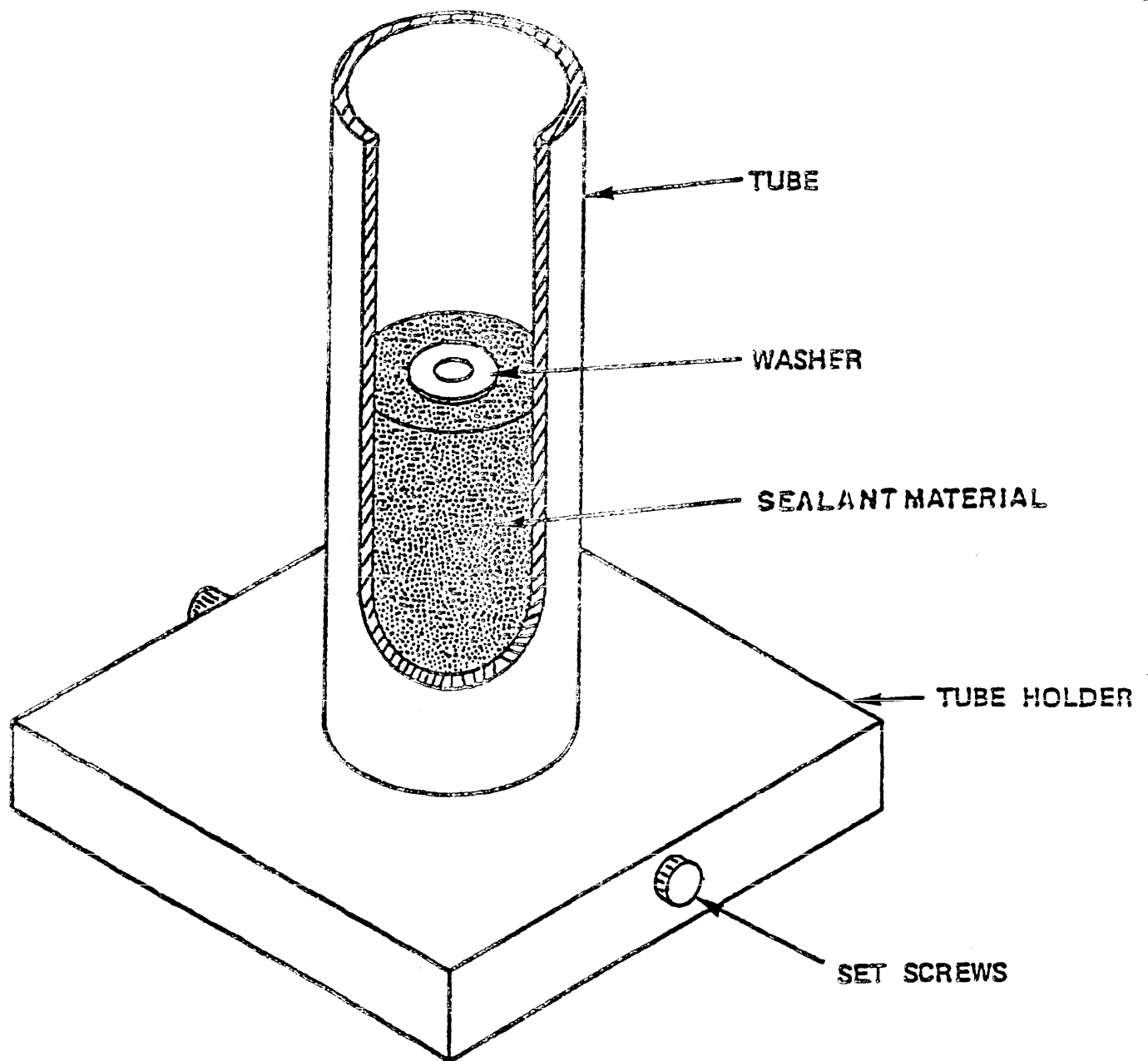


FIGURE 6. Assembly view of sample holder tube.

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