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MILITARY SPECIFICATION

DECK COVERING UNDERLAY MATERIALS

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy and the Air Force.

1. SCOPE

1.1 Scope. - This specification covers deck covering underlay materials to smooth up the surfaces of steel decks before applying deck covering materials.

1.2 Classification. - Deck covering underlay materials shall be of the following types, as specified (see 6.2):

Type I - For use under ceramic tile, terrazzo and other mastic deck covering materials.
Type II - For use under linoleum and plastic tile, deck tile and other similar preformed deck covering materials.

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

MILITARY
MIL-S-901 - Shockproof Equipment Class HI (High-Impact), Shipboard Application, Tests for.

STANDARDS

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

(Copies of specifications, standards, drawings, and publications required by contractors 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 document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply.

OFFICIAL CLASSIFICATION COMMITTEE
Uniform Freight Classification Rules.

(Application for copies should be addressed to the Official Classification Committee, 1 Park Avenue at 33rd Street, New York 16, N. Y.)

3. REQUIREMENTS

3.1 Qualification. - Deck covering underlay material furnished under this specification shall be a product which has been tested, and passed the qualification tests specified herein, and has been listed for approved for listing on the applicable qualified products list.

FSC 5610

3.2 Material. - The deck covering underlay materials shall consist of a compound of liquid synthetic rubber latex, underlay powder, and aggregate, suitable for application with a trowel after mixing. Mixing instructions shall be supplied by the manufacturer.

3.3 Application. - The deck covering underlay materials shall be capable of adhering to the deck or structure on which applied without the use of clips or other devices welded to the deck, or other reinforcement not a part of the compound as mixed for application. It shall be capable of being applied to clean steel surfaces. Type II underlay material, in particular shall be capable of being trowelled to a smooth feathered finish.

3.4 Odor. - The deck covering underlay materials shall be free from objectionable odors under ordinary service conditions.

3.5 Fire and toxicity hazards. - The materials in opened containers and the material laid on the deck before setting shall not constitute an undue fire hazard, nor shall fumes from volatile substances contained in the materials be more toxic than those resulting from paint approved by the bureau or agency concerned used aboard ship.

3.6 Weight. - The deck covering underlay material after drying shall be of minimum practical weight but shall not exceed the following (see 4.5.2):

Type I - 1-3/4 pounds per square foot in a thickness of 1/4 inch.
Type II - 2.5 pounds per square foot in a thickness of 1/4 inch.

3.7 Resistance to impact. - When tested as specified in 4.5.3, the deck covering underlay materials shall show no visible signs of chipping, cracking, or detachment from the steel plate (see 3.3). There shall be not more than 1/8 inch of permanent indentation for type I and not more than 1/16 inch of permanent indentation for type II.

3.8 Indentation. -

3.8.1 Initial indentation. - When tested as specified in 4.5.4, the initial indentation of the deck covering underlay material shall be as follows:

	Type I		Type II	
	minimum percent	maximum percent	minimum percent	maximum percent
Material cured 24 hours	....	40	....	20
Material cured 96 hours	1	40	1	5

3.8.2 Residual indentation (96 hour specimens only). - Residual indentation of the deck covering underlay material 2 hours after removal of the load shall be no more than 38 and 5 percent of the original thickness for types I and II, respectively, when tested as specified in 4.5.4.

3.9 Resistance to elevated temperatures. - The deck covering underlay materials shall not flow or slip or both in any part more than 1/16 inch nor soften, when tested as specified in 4.5.5.

3.10 Resistance to moisture and temperature changes. - The deck covering underlay materials shall show no signs of cracking, separation from the steel plate, or corrosion of the steel beneath the underlayment other than as caused by the liquid latex during the setting period immediately after application, when tested as specified in 4.5.6.

3.11 Moisture absorption. - The deck covering underlay material shall not have absorbed more than 5 percent of moisture, based on its weight at normal atmospheric conditions, when tested as specified in 4.5.7.

3.12 Resistance to corrosion. - The deck covering underlay material shall not soften or become detached; and the surface of the steel beneath the deck covering underlay material shall show no signs of corrosion other than as caused by the liquid latex during the setting period immediately after application when tested as specified in 4.5.8.

3.13 Fire resistance. - When tested as specified in 4.5.9, the deck covering underlay material shall have a combustion plus ignition time not greater than 4 minutes 30 seconds and an average length of char not greater than 8 inches.

3.14 Resistance to oil. - When tested as specified in 4.5.10, the deck covering underlay material shall show the following change in weight and volume:

	Percent (maximum)
Change in weight	6.5
Change in volume	2

3.15 Shock resistance. - The deck covering underlay materials shall show no signs of chipping, cracking, or detachment from the steel backing plate, when tested as specified in 4.5.11.

3.16 Adhesive strength. -

3.16.1 Initial. - The initial adhesive strength of the deck covering underlay material shall be not less than 50 pounds per square inch (p.s.i.) when tested as specified in 4.5.12.

3.16.2 After aging. - The adhesive strength of the deck covering underlay materials after aging shall be not less than 85 percent of the initial adhesive strength when tested as specified in 4.5.12.

3.16.3 After exposure. - The adhesive strength of the deck covering underlay materials after exposure to moisture and temperature shall be not less than 95 percent of the initial adhesive strength when tested as specified in 4.5.12.

3.17 Serviceability. - The deck covering underlay material shall satisfactorily perform its function when examined during and after the minimum service period specified in 4.5.13.

3.18 Workmanship. - The workmanship shall be first class in every respect.

4. QUALITY ASSURANCE PROVISIONS

4.1 Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. 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 Qualification tests[1/] - Qualification tests shall be conducted at a laboratory satisfactory to the Bureau of Ships. Qualification tests shall consist of the tests specified in 4.5.

4.3 Sampling for inspection. -

4.3.1 Lot. - All unmixed material of the same type, but not more than 5,000 pounds offered for delivery at one time, shall be considered a lot for purposes of acceptance inspection.

4.3.2 Sampling for examination of filled containers. - A random sample of filled containers shall be selected from each lot offered for examination in accordance with Standard MIL-STD-105, at inspection level I, and Acceptable Quality Level (AQL) = 2.5 percent defective to verify compliance with all stipulations of this specification regarding fill, closure, marking and other requirements not involving tests.

[1/] Application for Qualification tests shall be made in accordance with "Provisions Governing Qualification" (see 6.3 and 6.4).

4.3.3 Sampling for tests. - Two containers shall be selected from each lot of rubber latex and from each lot of underlay powder. From each of the containers, enough material to provide for the application of 9 square feet area and 1/4 inch (approx.) thickness shall be taken.

4.4 Examination. -

4.4.1 Examination of filled containers. - Each of the sample filled containers selected in accordance with 4.3.2 shall be examined for defects of the container and closure, for evidence of leakage, and for unsatisfactory marking. Each sample filled container shall also be weighed to determine the amount of the contents. Any container in the sample, having one or more defects or under required fill shall be rejected, and if the number of defective containers in any sample exceeds the acceptance number for the appropriate sampling plan of Standard MIL-STD-105, the lot represented by the sample shall be rejected.

4.4.2 Lot tests. - Each sample selected in accordance with 4.3.3 shall be subjected to the following tests:

Test	Paragraph
Weight	4.5.2
Impact	4.5.3
Indentation	4.5.4
Moisture absorption	4.5.7
Adhesive strength (initial only)	4.5.12

4.4.2.1 Rejection. - If either sample is found not to be in conformance with any of the test requirements, the entire lot shall be rejected.

4.5 Test procedures. -

4.5.1 Preparation of specimens. - Specimens of the sizes as specified in the following tests shall be made by preparing the deck covering underlay material in accordance with the manufacturer's instructions. The deck covering underlay material shall be trowelled on 1/8 inch thick clean steel plates to a thickness of approximately 1/4 inch by means of wooden templates. The specimens shall be allowed to cure for 96 hours at room temperature before conducting tests except those specimens required for the indentation tests specified in 4.5.4. Unless otherwise specified, all tests are referred to atmospheric conditions at a temperature of 70° to 75°F. and a relative humidity of 50 ± 2 percent. For specimens intended for immersion tests where corrosion of the steel may occur, areas not covered by the deck covering underlay material may be protected by a suitable anti-corrosion coating.

4.5.2 Weight. - The deck covering underlay material shall be applied to three 6 inch square, 1/8 inch thick mild steel plates which have been previously measured and weighed. When the material has dried for 96 hours, the three test specimens, including the steel plates, shall each be weighed to the nearest 0.1 gm. The length and width shall be measured to the nearest 0.1 inch, and the thickness to the nearest 0.001 inch. From the difference between the weight of the covered steel plate and the uncovered steel plate, the weight of the material shall be computed in ounces per square foot for a thickness of 1/4 inch. The final weight shall be the average of the three specimens. The thickness shall be determined by measuring the steel plates, with and without the covering, at 16 equally distributed points on the specimen, by means of a dial thickness gage and a template. The difference in thickness of the steel plate and the covered steel plate shall be averaged to determine the thickness of the material.

4.5.3 Resistance to impact. - Two specimens prepared as specified in 4.5.1, 6 inches square shall be used. Each specimen shall be tested separately after being firmly held on a solid horizontal base. A 2 pound steel ball shall be dropped vertically from a height of 8 feet on to the underlayment such that the impact will be at the center of the specimen. Each specimen shall be subjected to two impacts of the ball.

4.5.4 Indentation. -

4.5.4.1 Specimens. - Four specimens 6 inches square prepared as specified in 4.5.1 shall be used except two of the specimens shall only be allowed to cure for 24 hours at room temperature before undergoing indentation.

4.5.4.2 Procedure. -

4.5.4.2.1 Indentation. - Three indentations shall be made on the deck covering underlay material of each specimen and the results averaged. The center of each indentation shall be not less than 1-1/2 inches from the edge of the specimen and not less than 2-1/2 inches from the center of the adjoining indentation. A load of 2,000 pounds shall be applied on the underlayment for 30 minutes by means of a flat faced circular indenter. The indenter's flat face shall have an area of 1 square inch and its perimeter shall be rounded to a radius of 1/64 inch.

4.5.4.2.2 Thickness. - Thickness readings are taken before and immediately after indentation at the center of each indented area. For determination of residual indentation the thickness is measured two hours after removal of the load. The percent indentation is calculated on the basis of the measured specimen thicknesses. The thickness measurements are made using a micrometer dial gauge with a 4 ounce weight and a 1/4 inch diameter flat foot.

4.5.4.2.3 Special precautions. - Care should be taken to ensure that the indenter surface is maintained parallel to the plane of the specimen mounting plate and that it travels perpendicular to that plane. In addition the specimen mounting plates selected for the indentation tests should be checked for flatness before being used.

4.5.4.3 Initial indentation. - The initial indentation shall be taken as the difference in percent between the thickness of the deck covering underlay material before indentation and immediately after the load has been removed.

4.5.4.4 Residual indentation. - The residual indentation shall be taken as the difference in percent between the thickness of the deck covering underlay material before indentation and 2 hours after the load has been removed.

4.5.5 Resistance to elevated temperature. - The resistance of the material to elevated temperature shall be determined as follows:

4.5.5.1 Flow or slip or both. - A specimen prepared as specified in 4.5.1, 6 by 2 inches, shall be scribed with a line parallel to and approximately 1 inch from a 2-inch edge used as a reference. The distance between this line and the edge of the steel plate shall be measured to the nearest 0.01 inch. The specimen shall then be suspended vertically from the end opposite the reference end in an oven maintained at a constant temperature of 158° ± 2°F. for 5 hours. When the specimen has cooled to room temperature, the distance between the reference edge and the line shall be measured again. The difference between the two measurements is called the flow or slip or both.

4.5.5.2 Softening. - The deck covering underlay material shall be examined by touch, immediately after the specimen has been removed from the oven, to determine whether the material has softened under the action of heat.

4.5.6 Resistance to moisture and temperature changes. - Two specimens prepared as specified in 4.5.1, 6 by 2 inches shall be immersed in a solution of 4-percent sodium chloride in water, under a pressure of 8 p.s.i., for 48 hours. Immediately after immersion, the specimen shall be subjected to two complete cycles of alternate exposure to a temperature of 0° + 5°F. for 24 hours followed by a temperature of 120° + 5°F. for 24 hours. The deck covering underlay material shall then be examined for evidence of cracking or other failure. A portion of the underlayment shall be carefully removed from the plate to observe any signs of rusting or corrosion beneath the underlayment.

4.5.7 Moisture absorption. - Three specimens, 2 inches square by 1/4 inch thick, shall be prepared by applying the deck covering underlays to oiled surfaces of steel plate, so that upon drying the underlayment will not adhere to the plates. Each specimen without the steel backing plate shall be weighed dry, dipped into tap water at room temperature, lightly wiped on all surfaces with a paper towel and again weighed to the nearest 0.1 gram. Immediately after weighing, the specimen shall be immersed in the above water for 24 hours, lightly wiped and again weighed. The percent gain in moisture shall be based on the weight of the dry specimen and the difference between the weight after 24-hour immersion and the weight after dipping and wiping.

4.5.8 Resistance to corrosion. - Two specimens prepared as specified in 4.5.1, 6 by 2 inches shall be used. The specimens shall be immersed in a 10-percent salt (NACℓ) solution for 15 days, during which time a continuous stream of air shall be passed through the solution in order to promote corrosion. The specimens shall then be examined to determine whether the material has softened or detached from the steel backing plates. A portion of the deck covering underlay material shall be removed carefully from the steel plates to observe any signs of rusting or corrosion of the steel plate beneath the underlayment.

4.5.9 Fire resistant test. -

4.5.9.1 Apparatus. - The fire resistance of the underlay material shall be determined by an apparatus as shown in Figures 1, 2 and 3 which consists of a communicating horizontal and vertical flue constructed of 1/16 inch steel sheeting lined with 1/8 inch asbestos board as shown in Figures 3 and 4 with the exception of the horizontal bottom plate which is all steel. The bottom plate shall be cut away 3 inches from the firing plate as shown in Figure 4 to provide clearance for the flames of 4 open blast burner nozzles. Details of the test hood and specimen holder shall be as shown in Figure 4. Details of the gas supply manifold and open burner nozzles are shown in Figure 5. A flow diagram for the test apparatus is shown in Figure 6 and a parts list is shown in Figure 7.

4.5.9.2 Procedure. - The underlay material shall be applied in the usual manner to the specimen holder shown in Figure 4. This holder is a 1/8 inch thick mild steel plate 31-1/2 inches long by 7 inches wide with longitudinal flanges for mounting in the horizontal flue after allowing the underlayment to cure at room temperature for 96 hours. The holder shall be secured in the flue 2 inches above the bottom plate and with the inner end spaced 3 inches from the flue end, to permit hot gasses passing beneath the holder to be vented through the vertical flue. The four open blast burners shall be located side by side and parallel to the front end of the holder on 1-3/4 inch centers, equidistant from each side of the flue. The center of the burners shall be located 4 inches below the bottom surface of the holder and shall be 1/2 inch in front of the firing end of the test plate. The gas used shall be commercial propane having a heating value of 2,550 B.t.u. per cubic foot at a temperature of 60°F. and atmospheric pressure of 30 inches of mercury. The gas and air shall be supplied to a common manifold at a rate of 9.6 and 150 cubic feet per hour, respectively, when referred to standard conditions of 60°F. and 30 inches of mercury. The burner flames shall be applied to the test plate for 4 minutes and then immediately removed. A draft of 0.06 (+0.01-0.00) inch of water shall be maintained in the flue of the apparatus for the duration of the test.

4.5.9.2.1 Definitions. - Combustion plus ignition time and average char damage shall be noted. These quantities are defined as follows:

(a) Combustion-plus-ignition time. Time taken from initial application of burner flames until all flaming of the specimen ceases.
(b) Average char. Length of specimen permanently damaged by burning and charring as averaged over the entire width of the specimen. This measurement shall be taken after all flaming and glowing ceases.

4.5.10 Resistance to oil. - Three specimens, 2 inches square by 1/4 inch thick, shall be prepared as for the moisture absorption test. Each specimen without the steel backing plate shall be weighed dry, dipped into SAE 10W oil and lightly wiped on all surfaces with a paper towel. The specimen shall then again be weighed in air, and also while totally immersed in tap water. Immediately after weighing, the specimen shall be immersed for 24 hours in the oil specified herein, lightly wiped and again weighed in air and while totally immersed in tap water. The percent gain in weight shall be based on the weight of the dry specimen and the difference between the weight after 24 hours immersion and the weight after dipping and wiping. The percent change in volume shall be based on the weight of the specimen immersed in water, before and after 24 hours immersion in oil.

4.5.11 Shock resistance. - Three specimens 6 inches square shall be prepared by applying underlay material centrally to three 8 inch square by 1/8 inch thick mild steel plates, by means of wooden templates such that a 1 inch wide portion of the steel plate is exposed along the periphery of the specimen. Each specimen shall be subjected to HI (high impact) shock in a testing machine conforming to Specification MIL-S-901. Each specimen is centrally secured to the test plate of the testing machine by eight 1/4 inch diameter machine screws, equally located along the periphery of the specimen plate, 1/2 inch away from the edge of the specimen steel plate. Each specimen shall then be subjected to a series of shocks consisting of consecutive blows of 100, 200, 400, 700, 1,000, 1,400 and 2,000 foot-pounds to provide approximately

uniform increase of striking velocity. The 2,000 foot-pounds blow shall then be immediately followed by a second 2,000 foot pounds blow. The underlayment shall then be examined for chipping, cracking or detachment from the steel backing plate.

4.5.12 Adhesive strength. - Eighteen 2 by 6 inch specimens shall be prepared as specified in 4.5.1 except that the underlay material shall only cover 2 inches square on each specimen. By using a wooden template the underlay shall be applied such that 1 inch of the steel plate is exposed at one end, and 3 inches exposed at the opposite end. Specimens shall be tested by measuring the load required to shear the 2 inch square area of deck covering underlay from the steel backing plate by means of a shear test jig as shown on Figure 8. Six specimens shall be tested to determine the initial adhesive strength. Six specimens shall be tested after aging in an oxygen bomb for 96 hours under a pressure of 300 p.s.i. and temperature of 70°C. (158°F.). The remaining six specimens shall be tested after a moisture and temperature cycle as specified in 4.5.6. All specimens shall be tested by compression loading at a rate of 0.25 inch per minute. The load at failure, shall be recorded and the average of six readings taken for computations of the adhesive strength in p.s.i. for the respective conditions.

4.5.13 Serviceability. - The deck covering underlay material shall be applied in wet places aboard ship and undergo a minimum 6 months' service test.

5. PREPARATION FOR DELIVERY

5.1 Domestic shipment and early use. -

5.1.1 Packaging. - Packaging shall be sufficient to afford adequate protection during shipment from the supply source to the using activity and until early use.

5.1.2 Packing. - Packing shall be accomplished in a manner which will insure acceptance by common carrier and will afford portection against physical or mechanical damage during direct shipment from the supply source to the using activity for early use. The shipping containers or method of packing shall conform to the Uniform Freight Classification Rules and Regulations or other carrier regulations as applicable to the mode of transportation.

5.1.3 Marking. - Shipment marking information shall be provided on interior packages and exterior shipping containers in accordance with the contractor's commercial practice. The information shall include nomenclature, contract or order number, contractor's name and destination.

5.2 Domestic shipment and storage or overseas shipment. -

(5.2.1 The following provides various levels of protection during domestic shipment and storage or overseas shipment, which may be required when procurement is made by a Government activity (see 6.2).

5.2.1.1 Packaging. - Packaging shall be Level A or C as specified (see 6.2).

5.2.1.1.1 Level A. - The synthetic rubber latex shall be furnished in 1-gallon, multiple friction plug type cans or in 5-gallon steel drums as specified (see 6.2).

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

5.2.1.1.1.2 Five-gallon drums. - Drums shall conform to type II, class 1 of Specification PPP-D-760. Exterior coating of drums shall be olive drab. Wire handles shall be zinc coated or otherwise protectively coated to resist corrosion.

5.2.1.1.2 Level C. - Packaging shall be sufficient to afford adequate protection against corrosion, deterioration and physical damage during shipment from the supply source to the using activity and until early material use.

5.2.1.2 Packing. - Packing shall be Level A, B or C as specified (see 6.2).

5.2.1.2.1 Level A. -

5.2.1.2.1.1 Cans. - Synthetic rubber latex packed in 1-gallon cans shall be arranged and packed for overseas shipment in accordance with the requirements of the appendix to Specification PPP-C-96. Cans packed in tiers shall have a W6 fiberboard pad in accordance with Specification PPP-B-636 placed between the tiers. Five-gallon drums will require no overpacking. When specified (see 6.2) drums shall be palletized in accordance with Standard MIL-STD-147.

5.2.1.2.1.2 Underlay powder. - Underlay powder shall be packed in multiwall paper shipping sacks conforming to Specification UU-S-48. Fifty-pound sacks shall conform to style 3X and 100-pound sacks shall conform to style 43X or 44X.

5.2.1.2.2 Level B. - Cans shall be arranged and packed for domestic shipment in accordance with the requirements of the appendix to Specification PPP-C-96. Cans packed in tiers shall have a 200-pound bursting strength fiberboard pad in accordance with Specification PPP-B-636, class 1, placed between the tiers. Five-gallon drums will require no overpacking. When specified (see 6.2), drums shall be palletized in accordance with Standard MIL-STD-147.

5.2.1.2.2.1 Underlay powder. - Underlay powder shall be packed in multiwall paper shipping sacks conforming to Specification UU-S-48. Fifty-pound sacks shall conform to style 29L/W, and 100-pound sacks shall conform to style 10L/W.

5.2.1.2.3 Level C. - Synthetic rubber latex or underlay powder shall be packed in a manner which will insure carrier acceptance and safe delivery to destination. Shipping containers or method of packing shall comply with the Uniform Freight Classification Rules and Regulations or regulations of other carriers as applicable to the mode of transportation.

5.3 Marking. - In addition to any special marking required by the contract or order, or herein, interior and exterior containers and palletized unit loads shall be marked in accordance with Standard MIL-STD-129.)

6. NOTES

6.1 Intended use. - The deck covering underlay material covered by this specification is intended for use in fairing of the decks, prior to applying latex-mastic (rubber terrazzo) deck covering specified in Specification MIL-D-3134; magnesium-oxychloride deck covering specified in Specification MIL-D-16680; ceramic tile specified in Specification MIL-T-21114; plastic tile specified in Specification MIL-T-18830 and linoleum tile specified in Specification MIL-T-2904.

6.2 Ordering data. - Procurement documents should specify the following:

(a) Title, number, and date of this specification.
(b) Type required (see 1.2).
(c) Size of container required (see 5.2).
(d) Packaging, packing or marking requirements other than those required by paragraph 5.1 (see 5.2).
(e) Whether palletization is required (see 5.2).

6.3 With respect to products requiring qualification, awards will be made only for such products as have, prior to the time set for opening of bids, been tested and approved for inclusion in Qualified Products List QPL-3135, 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 Chief of the Bureau of Ships, Department of the Navy, Washington 25, D.C., 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" (see 6.4).

6.4 Copies of "Provisions Governing Qualification" may be obtained upon application to Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia 20, Pa.

Notice. - When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government

thereby incurs no responsibility nor any obligation whatsoever and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise, as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

Custodians:
Army - CE
Navy - Ships
Air Force - MOA

Preparing activity:
Navy - Ships
(Project 5610-0013)

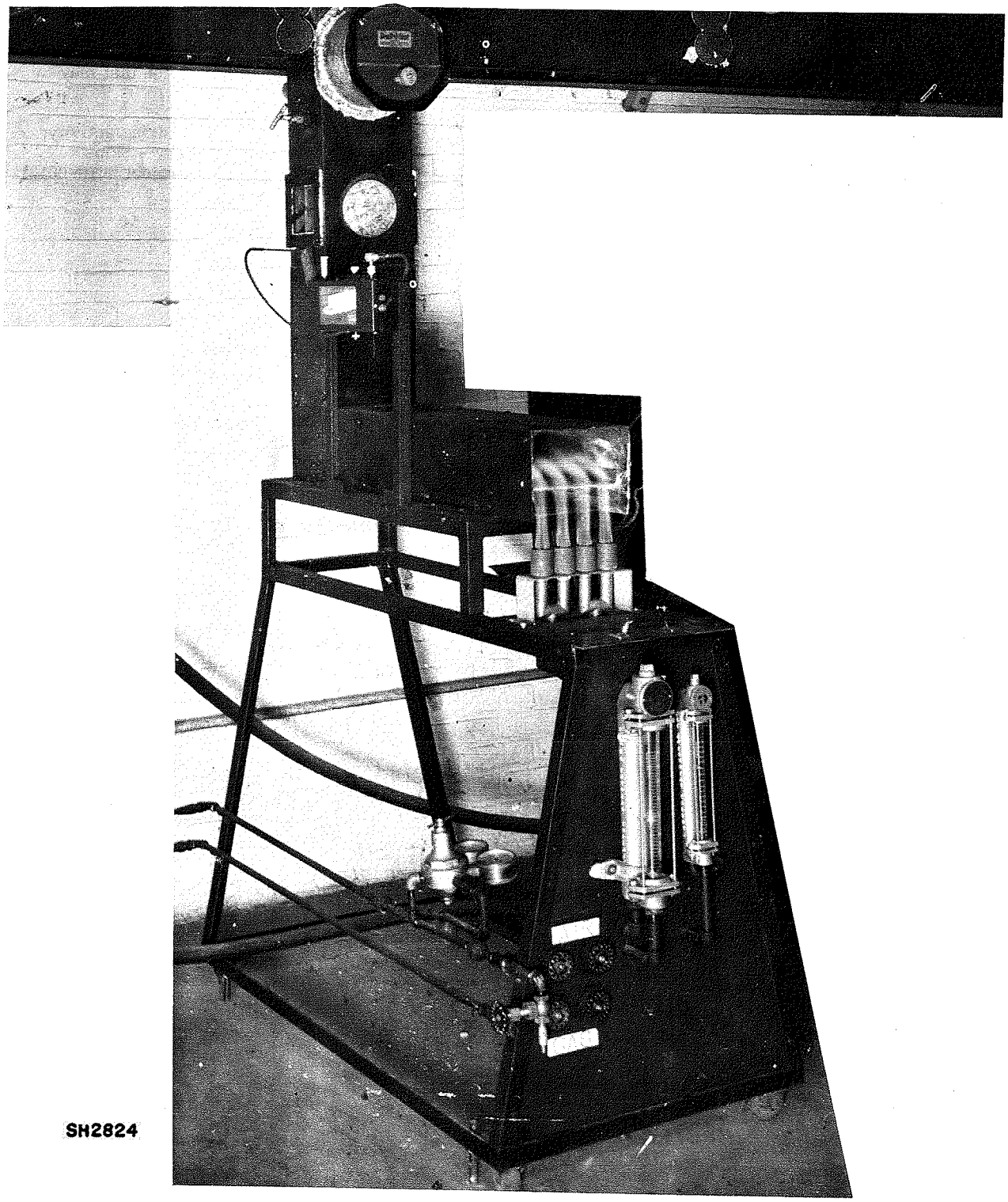

Figure 1 - Fire-resistance test apparatus.

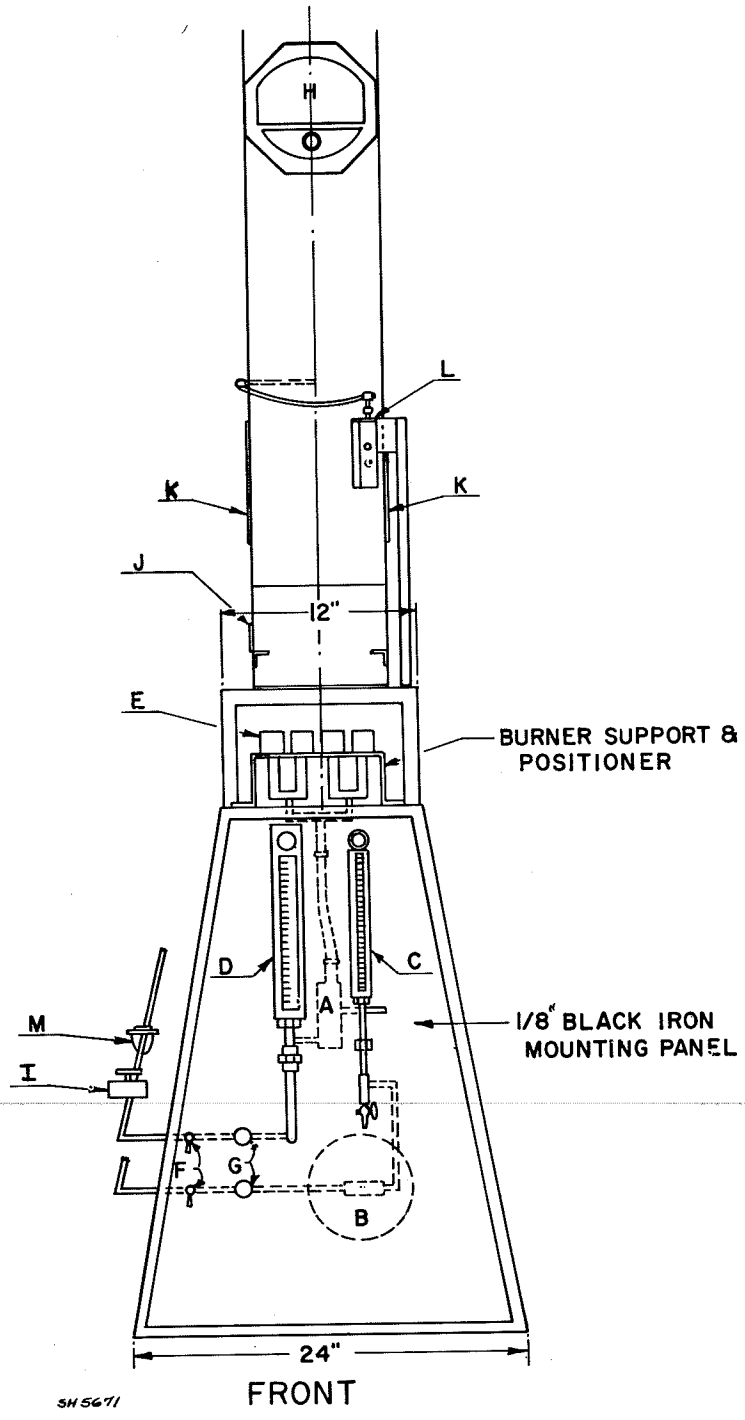

Figure 2 - Fire test apparatus (front view).

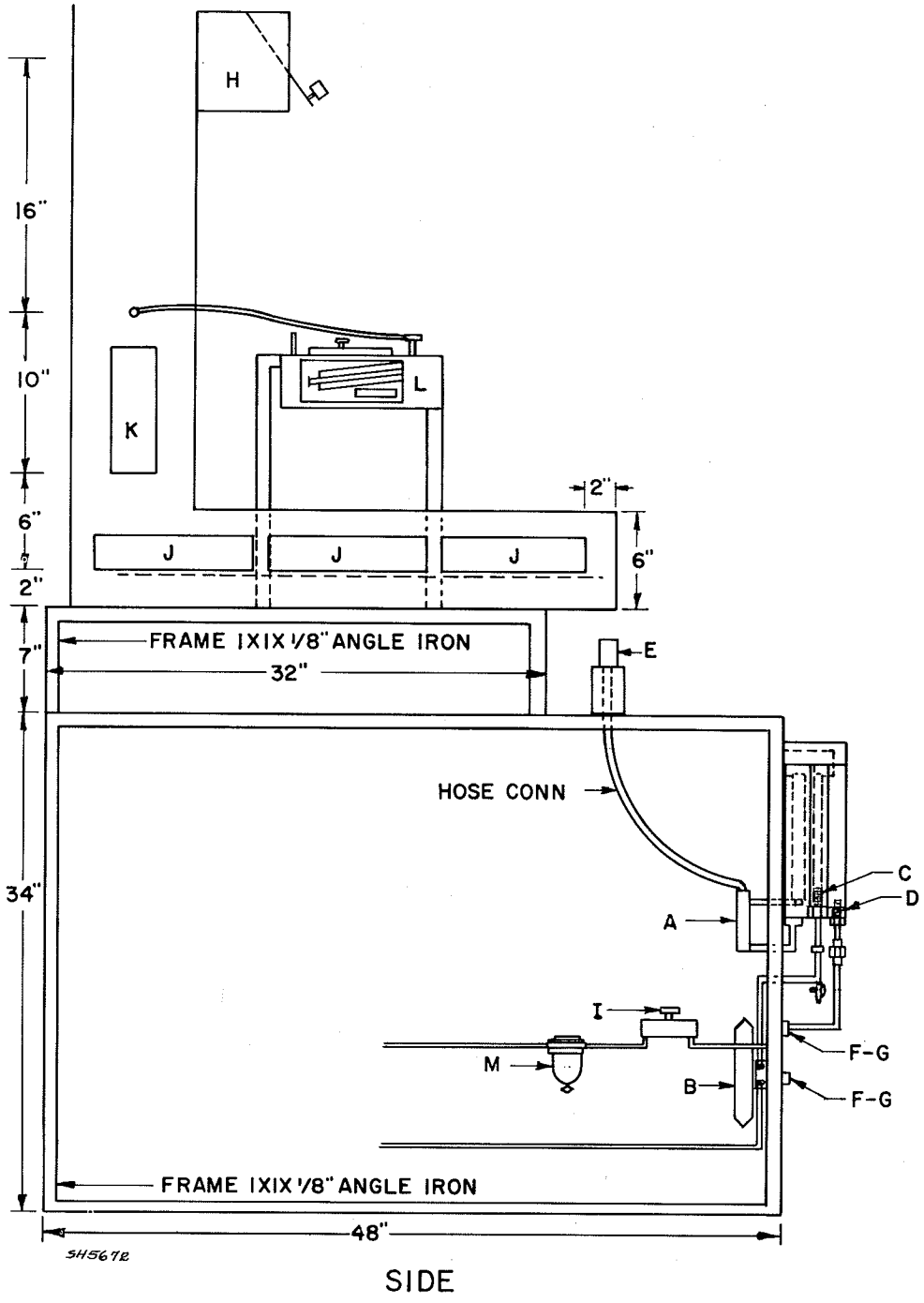

Figure 3 - Fire test apparatus (side view).

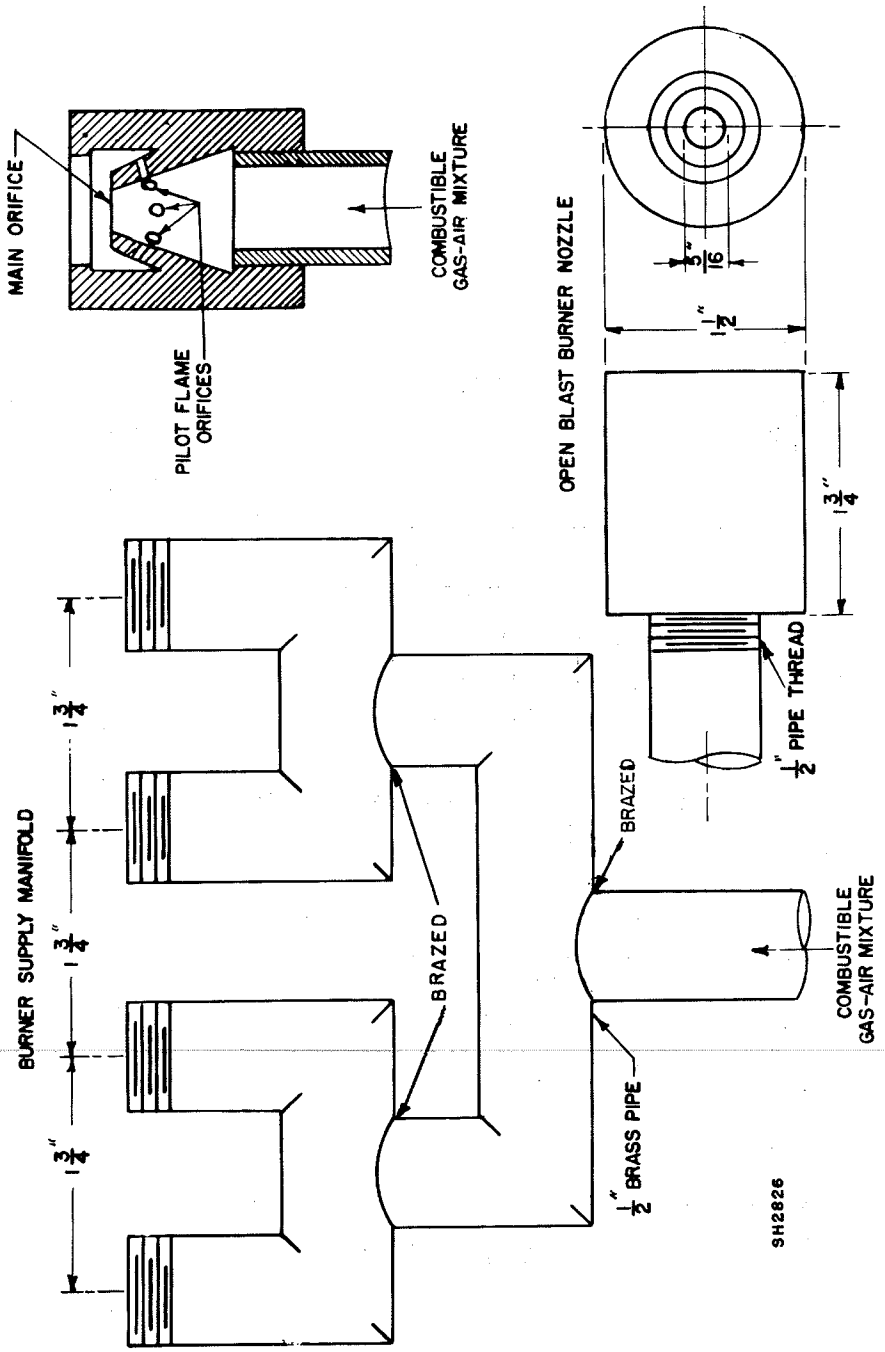

Figure 4 - Detail of fire-resistance test apparatus.

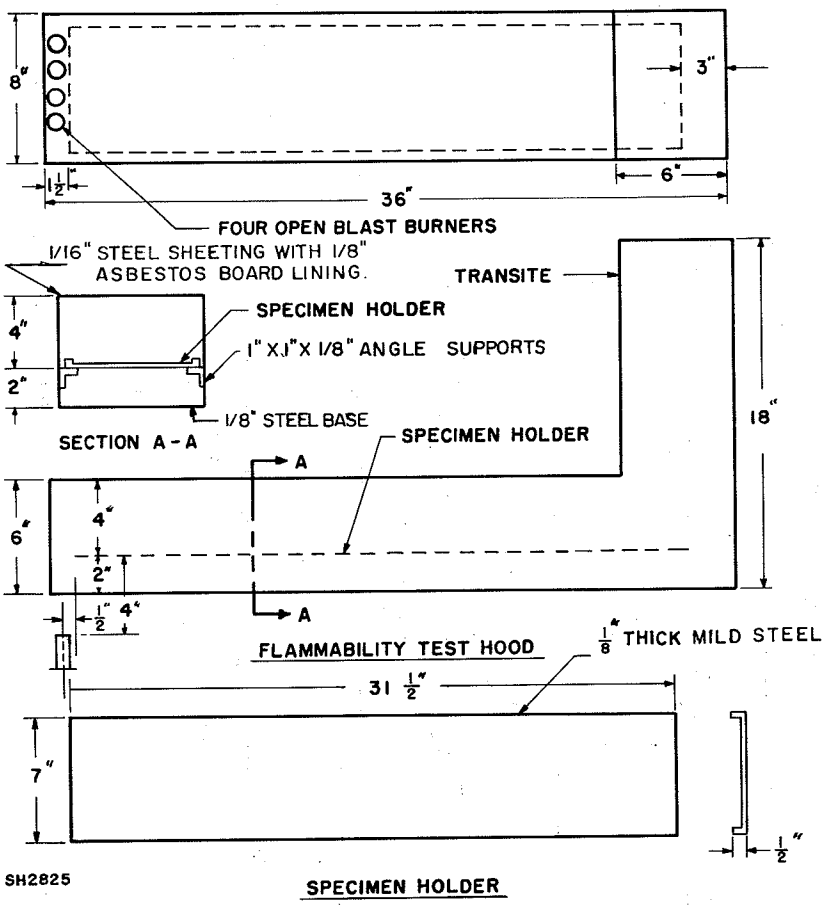

Figure 5 - Burner supply manifold and open blast burner nozzle.

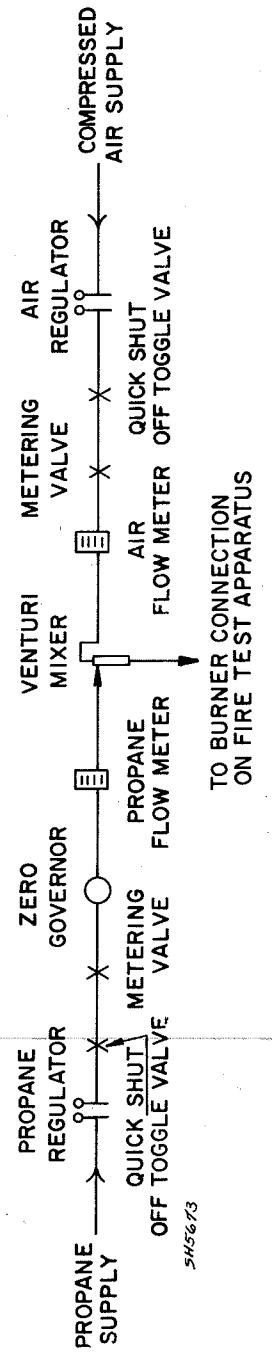

Figure 6 - Schematic flow diagram for fire test apparatus.

Figure 7 - Parts List.

Part	Quantity	Description	Function	Suggested Source
A	1	Venturi Mixer #13-12	Mixing of Propane and Air	American Gas Furnace Co., Elizabeth, N.J.
B	1	Zero Governer for Propane #ZG-1	Reduction of Propane Pressure to Atmospheric	American Gas Furnace Co., Elizabeth, N.J.
C	1	Flowmeter, Propane-X15-155-3	Measurement of Propane Flow	American Gas Furnace Co., Elizabeth, N.J.
D	1	Flowmeter, Air- 3x5-100-6	Measurement of Air Flow	American Gas Furnace Co., Elizabeth, N.J.
E	4	Nozzles, Sticktite ST 2A, Alloy Steel	Control of Igniting and Heating Flame Characteristics	Eclipse Fuel Engineering Co., Rockford, Illinois
F	2	Toggle Valves #455, Brass	Gas and Air Quick Shut-off Valves	Hoke, Inc. Englewood, N.J.
G	2	Metering Valves, Straight Pattern, #4RB281	Fine adjustment of propane and Air Flow	Hoke, Inc. Englewood, N.J.
H	1	Oil Burner Type Draft Regulator	Maintenance of Constant Draft	Any Oil Burner Supply House
I	1	Nullmatic Pressure Regulator and Pressure Gage (0-60 psi) #40-H-50	Regulation of Air Pressure Supply to Apparatus	Moore Product Co., Phila., Pa.
J	3	Windows, Vycor Glass, Ground and Polished 10 1/4 inch by 2 1/4 inch by 1/8 inch	Viewing of Flames	F.S. Gray and Co., Inc. 182 So. Portland Ave. Brooklyn, N.Y.
K	2	Windows, Vycor Glass, Ground and Polished 8 inch by 3 inch by 1/8 inch	Viewing of Flames and Smoke	F.S. Gray and Co., Inc. 182 So. Portland Ave. Brooklyn, N.Y.
L	1	Inclined Draft Gage	Measurement of Draft in Flue	Ellison Draft Gage Co. 345 W. Monroe St. Chicago 6, Illinois
M	1	Air Line Filter	Removal of Contaminants From Air Supply	Commercial

NOTES: Blower, external exhaust and damper not shown. Damper to be installed not less than 12 inches upstream of draft regulator.

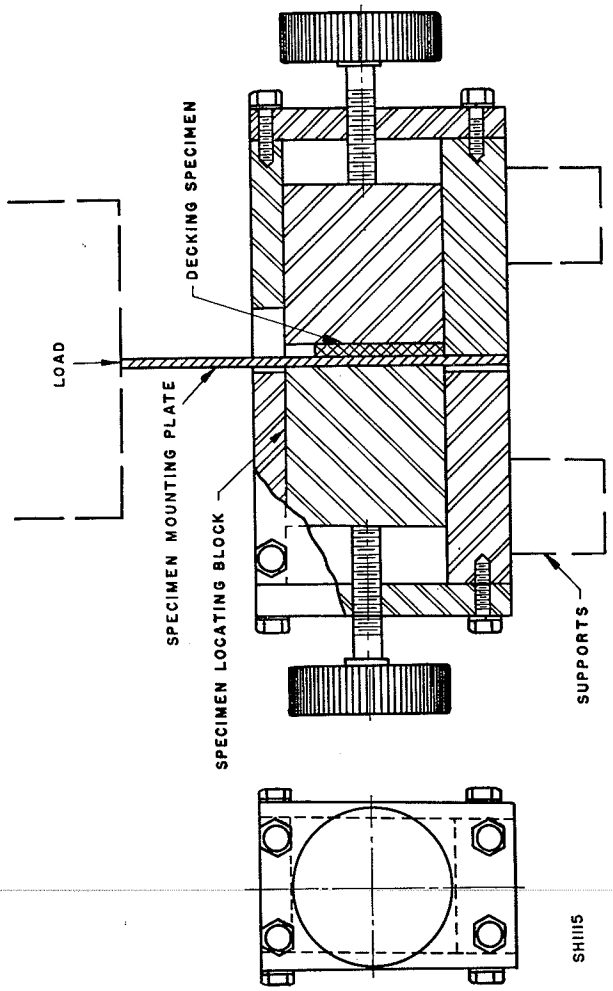

Figure 8 - Shear test jig for hard-setting deck covering materials.

SPECIFICATION ANALYSIS SHEET
NAVSHIPS-4863 (8-61)

BUDGET BU. NO. 45-R309

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Bureau of Ships

This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost.

Comments and the return of this form will be appreciated.

Fold on dotted lines on reverse side, staple in corner, and send to Bureau of Ships, Specifications and Standardization Branch, Washington 25, D.C.

SPECIFICATION

ORGANIZATION	CITY	STATE

CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT
		$

MATERIAL PROCURED UNDER A DIRECT GOVERNMENT CONTRACT ☐ OR A SUBCONTRACT ☐

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?
   a. GIVE PARAGRAPH NUMBER AND WORDING

   b. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID.

3. IS THE SPECIFICATION RESTRICTIVE? ☐ YES ☐ NO IF THE ANSWER IS "YES", IN WHAT WAY?

4. REMARKS *(Attach any pertinent data which may be of use in improving this specification.)* PLACE THIS FORM AND PAPERS IN AN ENVELOPE AND SEND TO THE BUREAU.

SUBMITTED BY *(Print name and activity)*	DATE

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BUREAU OF SHIPS
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