

MIL-I-2781C

15 FEBRUARY 1960

SUPERSEDING

MIL-I-2781B

3 September 1954

MILITARY SPECIFICATION
INSULATION PIPE COVERING, THERMAL

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 preformed thermal insulation for use as an insulating covering on pipes.

1.2 Classification. - Thermal insulation pipe covering shall be of the following grades, classes and types, as specified (see 6.1):

- Grade I - Temperatures up to 500° F.
 - Class b - Compounded.
- Grade II - Temperatures up to 750° F.
 - Class c - Fibrous.
 - Class d - Compounded.
- Grade III - Temperatures up to 1,050° F.
 - Class e - Compounded.
 - Type I - Light density.
 - Type II - Heavy density.
 - Class f - Fibrous.

PLAINTIFF'S
EXHIBIT

11544.0

PLAINTIFF'S
EXHIBIT

WV-05104

FSC 5640

25

MIL-1-2/81C

2. APPLICABLE DOCUMENTS

2.1 The following specifications and standards, of the issue in effect on date of invitation for bids, form a part of this specification:

SPECIFICATIONS

FEDERAL

PPP-B-585 - Boxes, Wood, Wirebound.
PPP-B-591 - Boxes, Fibertboard, Wood-Cleated.
PPP-B-601 - Boxes, Wood, Cleated-Plywood.
PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
PPP-B-636 - Boxes, Fiber.
PPP-T-78 - Tape, Pressure-Sensitive Adhesive,
Paper, Water Resistant.

MILITARY

MIL-B-10377 - Boxes, Wood-Cleated Veneer, Paper
Overlaid.
MIL-L-10547 - Liners, Case, Waterproof.

STANDARDS

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for
Inspection by Attributes.
MIL-STD-129 - Marking for Shipment and Storage.

(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 documents form a part of this specification. 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.)

AMERICAN SOCIETY FOR TESTING MATERIALS

Standard C-302 - Density of Preformed Pipe-Covering-Type
Thermal Insulation, Method of Test for.

Standard C-335 - Thermal Conductivity of Pipe Insulation,
Method of Test for.

(Application for copies should be addressed to the American Society for
Testing Materials, 1916 Race Street, Philadelphia 3, Penn.)

3. REQUIREMENTS

3.1 Qualification. - The thermal insulation pipe covering furnished under this specification shall be a product which has been tested and has passed the qualification tests specified herein and has been listed on or approved for listing on the applicable qualified products list.

3.2 Material. - The pipe covering shall be composed of heat-resisting compounds suitable for the temperature conditions and the purpose intended.

3.3 Composition. - The composition of the pipe covering shall conform to that of the sample given qualification approval (see 4.2).

3.4 Form and dimensions. -

3.4.1 Form and length. - Pipe covering for nominal pipe sizes up to and including 10 inches shall be furnished in sections 3 feet long, split in half lengthwise. Pipe covering for nominal pipe sizes larger than 10 inches may be furnished in semi-cylindrical sections or as curved segments, 3 feet in length. Each section or segment shall be generally true to shape and roundness and capable of fitting standard iron pipe sizes. A tolerance of plus or minus 1/8 inch in length will be permitted.

MIL-I-2781C

3.4.2 Inner diameter. - The inner diameter of the pipe insulation shall be as shown in table I.

Table I - Inner diameter:

Iron pipe size		Inner diameter	Tolerance	
Nominal	Outer diameter	Nominal	Minus	Plus
Inches	Inches	Inches	Inch	Inch
1/2	0.840	0.856	0	1/32
3/4	1.050	1.066	0	1/32
1	1.315	1.331	0	1/32
1-1/4	1.660	1.676	0	1/32
1-1/2	1.900	1.916	0	1/32
2	2.375	2.408	1/64	1/16
2-1/2	2.875	2.908	1/64	1/16
3	3.500	3.531	1/64	1/16
3-1/2	4.000	4.031	1/64	1/16
4	4.500	4.531	1/64	1/16
4-1/2	5.000	5.031	1/64	1/16
5	5.563	5.641	1/32	1/16
6	6.625	6.703	1/32	1/16
7	7.625	7.703	1/32	1/16
8	8.625	8.703	1/32	1/16
9	9.625	9.703	1/32	1/16
10	10.750	10.828	1/32	1/16
11	11.750	11.828	1/32	1/16
12	12.750	12.844	3/64	1/16
14	14.000	14.094	3/64	1/8
15	15.000	15.094	3/64	1/8
16	16.000	16.094	3/64	1/8
17	17.000	17.094	3/64	1/8
18	18.000	18.094	3/64	1/8
19 thru 32	— .000	— .094	3/64	1/8
33	33.000	33.094	3/64	1/8

Inner diameter measurement shall consist of the average of six readings on each section; three readings of diameter near the ends and at the center of each section in a horizontal direction, and three vertical measurements of leg height multiplied by two.

3.4.3 Thickness - Pipe covering shall be furnished in the thicknesses shown in table II, as specified (see U.I). A tolerance of plus 1/8-inch or minus 1/16-inch in actual thicknesses shown in table II will be permitted.

Table II - Thickness.

Iron pipe size		1 inch		1-1/2 inches		2 inches		2-1/2 inches		3 inches		3-1/2 inches		4 inches		4-1/2 inches		5 inches	
nominal	Outer diameter	Actual thickness	Actual thickness	Actual thickness	Actual thickness	Actual thickness	Actual thickness	Actual thickness	Actual thickness	Actual thickness	Actual thickness	Actual thickness	Actual thickness	Actual thickness	Actual thickness	Actual thickness	Actual thickness	Actual thickness	Actual thickness
Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
1/2	0.840	1	1-9/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16
3/4	1.060	1	1-7/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16
1	1.315	1	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16
1-1/4	1.660	1	1-1/8	1-1/8	1-1/8	1-1/8	1-1/8	1-1/8	1-1/8	1-1/8	1-1/8	1-1/8	1-1/8	1-1/8	1-1/8	1-1/8	1-1/8	1-1/8	1-1/8
1-1/2	1.900	1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
2	2.375	1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
2-1/2	2.875	1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
3	3.500	1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
3-1/2	4.000	1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
4	4.500	1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
4-1/2	5.000	1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
5	5.560	1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
6	6.625	1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
7	7.625	1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
8	8.625	1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
9	9.625	1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
10	10.750	1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
11	11.750	1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
12	12.750	1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
14	14.000	1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
over 14		1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
up to and including		1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
33		1	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2

Note: The inner diameter of pipe insulation listed in table I approximates the outer diameter of iron pipe sizes. The insulation can be applied either to a pipe or to a second layer to a smaller size of pipe insulation. Pipe insulation may be furnished in two layers to form total required thickness where the nominal thickness required is in excess of 2 inches.

3.5 Physical requirements.- Pipe covering shall conform to the requirements shown in table III.

Table III.- Physical requirements.

Characteristics	Test paragraph	Grade I			Grade II			Grade III		
		Class b			Class c			Class e		
		Type I			Type I			Type II		
Density lbs./cu.ft. maximum	4.5.3	19.00	15.00	13.00	13.00	13.00	13.00	27.00	20.00	20.00
Thermal conductivity: B.t.u./sq.ft./°F./inch maximum at a mean temperature of:										
500°F.	4.5.4	.50			.50					
400°F.										
300°F.										
Hardness, penetration, mm. maximum	4.5.6	1.15	.40	1.00	1.00	1.00	1.00	1.00	.85	.40
Resistance to abrasion, percent:										
Loss in weight, maximum:										
After first 10 minutes	4.5.6	40		40	40	40	40	55		
After last 10 minutes		70		70	70	70	70	80		
Modulus of rupture, lbs./sq.in. minimum	4.5.7									
Changes under soaking heat for 6 hours at °F.:										
Hardness, mm. penetration maximum:	4.5.6	500	750	750	750	750	750	1,050	1,050	1,050
Loss in weight, percent, maximum:	4.5.8	1.40	.70	1.15	1.15	1.15	1.15	1.25	1.25	.70
Linear shrinkage, percent, maximum:	4.5.8	18.00	6.00	12.00	12.00	12.00	12.00	16.00	16.00	9.00
	4.5.8	2.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00

Three times density (lbs. per cu. ft.) of the sample tested.
Two and one-half times density (lbs. per cu. ft.) of the sample tested.

3.5.1 Resistance to vibration. - The pipe covering shall be in satisfactory condition upon completion of the test specified in 4.5.9.

3.5.2 Simulative service ~~test grade III only~~. - ~~Grade III~~ Pipe covering shall be in satisfactory condition upon completion of the test specified in 4.5.10.

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

4. QUALITY ASSURANCE PROVISIONS

4.1 Unless otherwise specified herein the supplier is responsible for the performance of all inspection requirements prior to submission for Government inspection and acceptance. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. Inspection records of the examinations and tests shall be kept complete and available to the Government as specified in the contract or order.

4.2 Qualification tests. - Qualification tests shall be conducted at a laboratory designated by the Bureau of Ships. These tests shall consist of the applicable tests specified in 4.5.

4.3 Sampling.

4.3.1 Lot. - For purposes of sampling, a lot shall consist of all half sections or segments of pipe covering of the same grade, class, pipe size and thickness produced in one plant under essentially the same conditions and offered for delivery at one time.

4.3.2 Sampling for visual, dimensional and density examination. ~~_____~~
~~_____~~ A random sample of half sections or segments shall be selected from each lot offered for ~~_____~~ examination in accordance with ~~_____~~ Standard MIL-STD-105 at inspection level L-7. The acceptable quality level shall be equal to 2.5 percent defective.

4.3.3 Sampling for lot acceptance tests. - ~~_____~~
A random sample of half sections or segments shall be selected from each inspection lot in accordance with ~~_____~~ Standard MIL-STD-105 at inspection level L-4 for the tests specified in 4.5.2.

MIL-I-2781C

4.4 Inspection. -

4.4.1 Visual, dimensional and density examination. - Each of the sample half sections or segments selected in accordance with 4.3.2 shall be visually and dimensionally examined and the density determined (see 4.5.3) to verify compliance with this specification. Examination shall be conducted as specified in table IV. Any half section or segment in the sample containing one or more visual, dimensional, or density defects shall be rejected, and if the number of defective half sections or segments in any sample exceeds the acceptance number for that sample, the lot represented by the sample shall be rejected. Rejected lots may be offered again for inspection provided the contractor has repaired or removed all nonconforming half sections or segments. The inspector shall again select and examine samples from such resubmitted lots to verify compliance with this specification.

Table IV - Classification of defects in accordance with
Standard MIL-STD-105.

Categories	Defects
Critical:	
1	None defined.
Major:	
101	Grade, class and type when applicable not as specified.
102	Material not as specified.
103	Form not as required; not furnished in segments or sections as specified, fail to properly encase pipe of the required diameter.
104	Length not as required, not within specified tolerance.
105	Thickness not within required tolerance.
106	Sections cracked, broken or damaged.
Minor:	
201	Packing not as required.

4.4.2 Lot acceptance tests. - Two specimens from each of the sample half sections or segments selected in accordance with 4.3.3 shall be subjected to the test specified in 4.5.5 and for those pipe coverings which in table III have a modulus of rupture requirement, the test specified in 4.5.7. If any one of the sample specimens tested is found to be not in conformance with this specification, the lot which it represents shall be rejected.

4.4.2.1 Possible test failures. - Possible test failures are defined as follows:

- (a) Density:
Density exceeds specified maximum value.
- (b) Hardness:
Penetration exceeds required maximum value when tested as specified.
- (c) Modulus of rupture:
Modulus of rupture less than the specified minimum value when tested as required.
- (d) Composition: (At Government laboratory)
Composition not as required when analyzed as specified.
- (e) Stability: (At Government laboratory)
Inability of sample to withstand vibration test specified.
- (f) Thermal conductivity: (At Government laboratory)
Thermal conductivity exceeds required maximum value when tested as specified.
- (g) Abrasion test: (At Government laboratory)
Loss in weight exceeds specified maximum when subjected to the specified test conditions.
- (h) Heating loss and shrinkage: (At Government laboratory)
Linear shrinkage, loss in weight, change in hardness exceed the specified maximum values when tested as required.

4.4.2.2 Action in case of failure. - A rejected lot may be resubmitted for ~~Government~~ inspection only after the manufacturer, after being informed of the reasons for rejection, has so reworked the entire lot as to remove or correct all nonconforming material.

4.4.2.3 Place of tests. - Lot acceptance tests shall be conducted at the place of manufacture if facilities are available. Otherwise, they shall be conducted at the ~~Government~~ laboratory designated in 4.4.3.

4.4.3 Comparison inspection. - From each contract or order, or when deemed necessary by the Government inspector, but not more than once a year for any one manufacturer, samples of the same grade, class and type of half sections or segments shall be forwarded to the U.S. Naval Engineering Experiment Station, Annapolis, Md., unless otherwise specified in the contract or order. These samples shall be subjected to any test considered necessary by the laboratory to determine that the samples are equal to the samples upon which qualification was based. If an unsatisfactory report is obtained, the laboratory shall immediately notify the Bureau of Ships and the Government inspector.

4.5 Test procedures. -

4.5.1 Conditioning samples. - Test specimens ~~for temperature control~~ shall be dried to constant weight by heating to 220° to 230° F. (105° to 110° C.).

4.5.2 Composition. - The composition shall be determined by chemical analysis, using accepted laboratory methods.

4.5.3 Density. - Density of pipe covering shall be determined in accordance with the method specified in ASTM Standard C-302.

4.5.4 Thermal conductivity. - Thermal conductivity shall be determined in accordance with the method specified in ASTM Standard C-335.

4.5.5 Hardness. - Hardness shall be determined on the plastometer, a commercial instrument consisting mainly of two parallel metal disks supported on uprights, to which are fastened a thin rod with a 1/8-inch diameter ball point, measuring gage graduated in 1/100 millimeter (mm.) divisions, and a kilogram weight. A specimen of the material to be tested shall be placed under the instrument, and the 1/8-inch ball point shall be brought down on the surface of the specimen corresponding to the outside as received, until the index hand on the measuring gage makes two complete revolutions. The kilogram weight shall then be slowly released from its supporting disk and allowed to rest on a shoulder of the ball point holder, causing the ball point to sink into the specimen. The depth that the ball point is depressed into the specimen shall then be read on the graduated measuring gage dial to 1/100 mm.

4.5.6 Abrasion test. - The structural strength shall be determined by the abrasion test. In this test, twelve 1-inch cube specimens of the material and twenty-four 3/4-inch oak cubes (specific gravity of the wood 0.65) shall be placed in an oak box having inside dimensions of 7-1/2 by 7-3/4 by 7-3/4 inches. The opening of the box shall then be closed and the box rotated about its own axis at a speed of 60 revolutions per minute for two 10-minute periods. At the end of each 10-minute period, the cubes of the material under test shall be removed from the box and the percentage of loss in weight, due to pulverization and breakage, shall be determined. The box shall be cleaned to remove all pulverized and broken particles prior to each test.

4.5.7 Modulus of rupture. - The test for determining the modulus of rupture of the materials shall consist of supporting specimens of the materials on 10-inch centers and suspending a load from a saddle centrally located on the specimens with an increase of load until the specimens are broken. The specimens shall be 12 inches in length and in quadrants from the inner and outer layers of pipe covering. The saddles and centers shall be constructed to conform to the curvature of the specimens. Ten specimens of each layer shall be

used for the test. The modulus of rupture shall be the average of the results on all specimens. The following equation shall be used in computing the modulus of rupture:

$$S = \frac{0.25WD \left[\frac{R-0.6(R^3-r^3)}{(R^2-r^2)} \right]}{0.3214(R^4-r^4) - \frac{0.2829(R^3-r^3)^2}{(R^2-r^2)}}$$

Where:

- S = Modulus of rupture (pounds per square inch).
- W = Breaking load (pounds).
- D = Distances between centers of supports (inches).
- R = Radius of outer periphery of pipe-covering specimens (inches).
- r = Radius of inner periphery of pipe-covering specimens (inches).

Hardness, loss in weight, and shrinkage. -

4.5.8 ~~Minimum shrinkage. -~~ Carefully sized specimens shall be placed in an electrically heated oven. Specimens shall be heated at 500°, 750°, and 1,050° F., respectively, for grades I, II, and III for 8 hours. After removal from the oven, the specimens shall be examined to determine loss in weight, linear shrinkage, and change in hardness.

~~4.5.9 Minimum shrinkage. - Pipe covering specimens, each having a total length of 12 inches, shall be heated in an electrically heated oven at 500°, 750°, and 1,050° F., respectively, for 8 hours. The shrinkage shall be determined by recording the percentage increase in length and weight.~~

(pipe covering)

4.5.9 Resistance to vibration. - The ability of the pipe covering ~~material~~ to withstand vibration shall be determined from sections of the covering which have been subjected to the maximum pipe temperature for the respective grade for a period of 100 hours. The sections then shall be applied and secured between two circular 9-1/2 inch diameter metal disks located 36 inches apart on a section of nominal 3-inch pipe. The pipe, with the ~~material~~ applied, shall be connected in a horizontal position in a vibration machine. In this position, the materials shall be subjected to 720 vibrations per minute through an arc of 15 minutes with a radius of 30 inches, for a period of at least 96 hours.

4.5.10 Simulative service test. - Pipe covering shall be applied to a section of nominal 3-inch pipe. The pipe shall be maintained at the maximum temperature for the respective grade for 30 days. Then the pipe covering shall be examined. If the pipe covering is in satisfactory condition, it shall be applied and secured between two circular 9-1/2-inch diameter metal disks located 36 inches apart on a section of nominal 3-inch pipe. The pipe with the pipe covering applied, shall be connected in a vibration machine. In this position, the pipe covering shall be subjected to 720 vibrations per minute through an arc of 15 minutes with a radius of 30 inches, for a period of at least 96 hours.

5. PREPARATION FOR DELIVERY

5.1 Packing. -

5.1.1 Level A. - Pipe covering shall be packed in overseas type wood cleated fiberboard, nailed wood, wirebound wood, fiber, wood cleated paper overlaid, or wood cleated plywood boxes conforming to Specification PPP-B-591, PPP-B-621, PPP-B-585 (class 3), PPP-B-636 (class 3), MIL-B-10377 or PPP-B-601, respectively, at the option of the contractor. Shipping containers shall have *which* case liners conforming to Specification MIL-L-10547, ~~and~~ shall be closed and sealed in accordance with the appendix thereto. Case liners for boxes conforming to Specification PPP-B-636 may be omitted provided all joints and corners of the boxes are sealed with minimum 1-1/2 inch wide tape conforming to Specification PPP-T-76. Box closures and strapping shall be as specified in the applicable box specification or appendix thereto. The gross weight of wood ~~wood~~ boxes shall not exceed 200 pounds; fiberboard boxes shall not exceed the weight limitations of the applicable box specification.

5.1.2 Level B. - Pipe covering shall be packed in domestic type wood cleated fiberboard, nailed wood, wirebound wood, wood cleated plywood, wood cleated paper overlaid or in class 2 fiber boxes conforming to Specification PPP-B-591, PPP-B-621, PPP-B-585, PPP-B-601, MIL-B-10377 or PPP-B-636, respectively, at the option of the contractor. Box closures shall be as specified in applicable box specification or appendix thereto. The gross weight of wood and wood-cleated boxes shall not exceed 200 pounds; fiberboard boxes shall not exceed the weight limitations of the applicable box specification.

5.1.3 Level C. - Pipe covering shall be packed in containers of the type, size and kind commonly used for the purpose in a manner which will insure acceptance and safe delivery at destination. Shipping containers shall comply with the Uniform Freight Classification Rules or other regulations as applicable to the mode of transportation.

5.2 Marking. - In addition to any special marking required by the contract, order, or herein, shipments shall be marked in accordance with Standard MIL-STD-129.

6. NOTES

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

- (a) Title, number, and date of this specification.
- (b) Grade, and if applicable, class and type required (see 1.2).
- (c) Nominal iron pipe size (see 3.4.2).
- (d) Nominal thickness (see 3.4.3).
- (e) Whether the pipe covering shall be packed in accordance with the requirements for level A, B or C (see 5.1).

6.2 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-2781. 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.

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.

Preparing activity:

Navy - Bureau of Ships
(Project 5640-0001)

Custodians:

Army - Corps of Engineers
Navy - Bureau of Ships
Air Force