

FEDERAL SPECIFICATION

INSULATION SLEEVING; THERMAL (PIPE AND TUBE COVERING)

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

1. SCOPE AND CLASSIFICATION

1.1 Scope: This specification covers the general requirements for Insulation Sleaving; Thermal (Pipe and Tube Covering). Specific requirements for particular forms, types, styles, classes; and sizes of the products are covered by the applicable detailed specification HS-I-1751/1 through HS-I-1751/5 (see 6.3):

1.2 Classification. Forms, types, styles, classes, and sizes shall be as designated in the detail specification for each product:

2. APPLICABLE DOCUMENTS

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

Federal Specifications:

PPP-B-858 = Boxes, Wood, Wirebound.  
 PPP-B-591 = Boxes, Shipping; Fiberboard; Wood-Cleated.  
 PPP-B-601 = Boxes, Wood, Cleated-Plywood.  
 PPP-B-621 = Boxes, Wood, Nailed and Lock-Corner.  
 PPP-B-636 = Box, Shipping Fiberboard.  
 PPP-B-640 = Boxes, Fiberboard, Corrugated, Triple-Wall:

Federal Standard:

Fed. Std. No: 123 = Marking for Domestic Shipment (Civil Agencies):

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

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

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

Military Standards:

MIL-STD-105 = Sampling Procedures and Tables for Inspections by Attributes.  
 MIL-STD-129 = Marking for Shipment and Storage.  
 MIL-STD-147 = Palletized and Containerized Unit Loads:

(Copies of Military Specifications and Standards required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

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2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specified issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

American Society for Testing and Materials (ASTM) Standards:

- C 105 - Compressive Strength of Preformed Block-Type Thermal Insulation.
- C 177 - Test for Thermal Conductivity of Materials by Means of the Guarded Hot Plate.
- C 302 - Test for Density of Preformed Pipe-Covering Type Thermal Insulation.
- C 335 - Thermal Conductivity of Pipe Insulation.
- C 411 - Test for Hot-Surface Performance of High Temperature Thermal Insulation.
- C 446 - Test for Breaking Load and Calculated Modulus of Rupture of Preformed Insulation for Pipes.
- C 518 - Thermal Conductivity of Materials by Means of the Heat Flow Meter.
- C 553 - Mineral Fiber Blanket and Felt Insulation (Industrial Type).
- E 84 - Test for Surface Burning Characteristics of Building Materials.

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

National Motor Freight Traffic Association, Inc., Agent:

National Motor Freight Classification.

(Application for copies should be addressed to the American Trucking Association, Inc., Tariff Order Section 1616 P Street, N.W., Washington, DC 20036.)

Uniform Classification Committee, Agent:

Uniform Freight Classification.

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

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

3. REQUIREMENTS

3.1 Material. The basic materials listed in this general specification for thermal insulation sleeving (pipe and tube covering) shall meet the requirements specified in the detailed specification for that particular insulation sleeving thermal, (see 6.3)..

3.2 Jackets and bands.

3.2.1 Jackets. When specified, jackets for thermal insulation sleeving, shall be furnished in accordance with the specified requirements of the detailed specification in effect.

3.2.2 Bands. When specified, bands for thermal insulation sleeving, shall be furnished in accordance with the specified requirements of the detailed specification in effect.

3.3 Physical requirements.

3.3.1 The thermal conductivity, corrosiveness, fire hazard classification, compressive strength, density, flexural strength, temperature rating, moisture adsorption and other physical properties shall be as specified in the detailed specification in effect, and unless otherwise specified in the detailed specification, shall be tested in accordance with 4.4 of this specification.

3.3.2 Workmanship. Thermal insulation sleeving, (pipe and tube covering), specified in the detailed specifications referenced in this general specification; (see 6.3); shall meet the requirements of the detailed specifications; and shall not have visual defects that adversely affect its serviceability.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection: Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Sampling:

4.2.1 Lot: A lot shall consist of thermal insulation sleeving of the same form, type, style, class and size which are offered for delivery at one time:

4.2.2 Visual and dimensional examination. Sampling for this examination shall be in accordance with level S-4 in MIL-STD-105. The acceptable quality level (AQL's) for defects listed in table I shall be 2.5 percent defective for major defects and 6.5 percent defective for minor defects.

4.2.3 Sampling for tests: Sampling for test shall be in accordance with level S-2 in MIL-STD-105:

4.2.4 Frequency of tests: Unless otherwise specified (see 6.2); all tests in 4.4.1 to 4.4.9 shall be performed on the initial inspection, and thereafter only when specified in the purchase order or contract; and when changes are made in the material.

4.3 Examination:

4.3.1 End item: Insulation selected in accordance with 4.2.2; shall be examined for defects listed in table I:

TABLE I - Classification of defects; end item

Defects	Major	Minor
Form, type, style, class and sizes of insulation not as specified	X	
Dimensions not as specified or not within tolerances	X	
Corners and edges not square	X	
Holes puncturing insulation	X	
Dents or depressions in molded pipe insulation		X
Damage or defects affecting function or serviceability	X	
Damage or defects not affecting function or serviceability		X

4.3.2 Inspection of preparation for delivery: An inspection shall be made to determine that the packaging, packing, and marking requirements comply with section 5. Defects shall be scored in accordance with table II. For examination of interior packaging, the sample unit shall be one shipping container fully prepared for delivery selected just prior to the closing operations. Sampling shall be in accordance with MIL-STD-105. Defects of closure listed shall be examined on shipping containers fully prepared for delivery. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 and the AQL shall be 6.5 defects per hundred units.

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TABLE II. Classification of preparation for delivery defects	
Examine	Defects
Markings (exterior and interior)	Omitted; incorrect; illegible; improper size, location, sequence, or method of application.
Materials	Any component missing or damaged.
Workmanship	Inadequate application of components such as incomplete closure of container flaps, loose strappings, inadequate stapling. Bulging or distortion of container.
Contents	Number per container is more or less than required. Net weight exceeds the requirements of the applicable box specification.

#### 4.4 Test methods.

4.4.1 Thermal conductivity. Determination of the thermal conductivity shall be in accordance with ASTM C 335, ASTM C 177, or ASTM C 518, (see section 3 of detailed specification in effect).

4.4.2 Fire hazard classification. Determination of the flame spread and smoke developed ratings, when required shall be in accordance with ASTM E 84 (see section 3 of detailed specification in effect).

4.4.3 Compressive strength. Determination of the compressive strength shall be in accordance with ASTM C 165 (see section 3 of detailed specifications in effect).

4.4.4 Density. Determination of the density shall be in accordance with ASTM C 302 (see section 3 of detailed specifications in effect).

4.4.5 Flexural strength. Determination of the flexural strength shall be in accordance with ASTM C 446 (see section 3 of detailed specifications in effect).

4.4.6 Temperature ratings. Determination of the temperature ratings shall be in accordance with ASTM C 411 (see section 3 of detailed specifications in effect).

4.4.7 Moisture adsorption. Determination of the amount of moisture adsorption shall be in accordance with ASTM C 553 (see section 3 of detailed specifications in effect).

#### 5. PREPARATION FOR DELIVERY

5.1 Packaging. Packaging shall be level A or C, as specified (see 6.2).

5.1.1 Level A. Insulation segment sections, of like description and accessory materials, shall be packaged together in quantities as specified (see 6.2), in a snug-fitting box conforming to PPP-B-636, class domestic. The box shall be closed and sealed in accordance with the appendix to the box specification. All joints and seams shall be sealed with tape as specified in the appendix to PPP-B-636.

5.1.2 Level C. Insulation shall be packaged in accordance with the supplier's standard practice, providing that this will insure protection for the insulation sleeving during shipment and provides for safe delivery to its destination.

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

5.2.1 Level A. Insulation, of the like description packaged as specified in 5.1, shall be packed in a close fitting box conforming to PPP-B-585, class 3; PPP-B-591, class II; PPP-B-601, overseas type; PPP-B-621, class 2; or PPP-B-640, class 2, grade A. The gross weight of the triple-wall box or the wood boxes shall not exceed 200 pounds. The gross weight of fiberboard boxes shall be subject to the limitation of the box specification. Each fiberboard container shall be waterproof sealed with tape in accordance with the appendix to the box specification. Closure and strapping shall be in accordance with the applicable box specification.

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5.2.2 Level B. Insulation of the like description packaged as specified in 5.1.1, shall be packed in a close fitting box conforming to PPP-B-636, class weather-resistant, in quantities not to exceed the weight limitation of the box specification. The box shall be closed and sealed in accordance with method two of the appendix to the box specification.

5.2.3 Level C. Insulation packaged as specified in 5.1 shall be packed in containers that will assure carrier acceptance and safe arrival at destination in compliance with the National Motor Freight Classification rules or the Uniform Freight Classification rules, as applicable.

### 5.3 Marking.

5.3.1 Civil agencies. In addition to markings required by the contractor or order, the packages and shipping containers shall be marked in accordance with Fed. Std. No. 123.

5.3.2 Military agencies. In addition to markings required by the contract or order, the packages and shipping containers shall be marked in accordance with MIL-STD-129.

### 6. NOTES

6.1 Intended use. Insulation units covered by the detailed specifications are intended, as indicated, for use on surfaces at low and high temperatures.

6.2 Ordering data. Purchasers should select the preferred options permitted in the detailed specifications and include the information in procurement documents.

6.3 The requirements in section 3 through 5 and notes on ordering data in section 6 of this specification are applicable to the following detailed insulation sleeving, thermal, (pipe and tube covering) Federal specifications.

HH-I-1751/1	-	Insulation Sleeving, Thermal (Pipe Covering) Mineral Fiber..
HH-I-1751/2	-	Insulation Sleeving, Thermal (Pipe Covering) Flexible Unicellular Glass.
HH-I-1751/3	-	Insulation Sleeving, Thermal (Pipe Covering) Cellular Glass.
HH-I-1751/4	-	Insulation Sleeving, Thermal (Pipe Covering) Urethane.
HH-I-1751/5	-	Insulation Sleeving, Thermal (Pipe Covering) Calcium Silicate.

#### MILITARY CUSTODIANS:

Army - ME  
Navy - YD  
Air Force - 84

#### Review activity:

Army - CE

#### User activities:

Army - ME  
Navy - YD  
Air Force - 84

#### Military Coordinating Activity:

Army - ME

#### Preparing activity:

GSA-FSS

#### Civil Agency Coordinating Activities:

COMMERCE - NBS  
DOT - FIS  
GSA-FSS, PCD, TCS  
INTERIOR - BPA

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Orders for this publication are to be placed with the General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein. Price 10 cents each.