

SECTION 22 0719
PLUMBING PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Piping insulation
- B. Jackets and accessories

1.02 RELATED REQUIREMENTS

- A. Section 22 0510 - General Plumbing Requirements
- B. Section 22 0553- Identification For Plumbing Piping and Equipment
- C. Section 22 1005 - Plumbing Piping

1.03 REFERENCE STANDARDS

- A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2013.
- B. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2013).
- C. ASTM C 411 - Test Method for Hot-Surface Performance of High Temperature Thermal Insulation.
- D. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2007 (Reapproved 2013).
- E. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2010.
- F. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2015.
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- H. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association 2007.
- I. UL 910 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; 2003.
- J. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 22 0510 - General Plumbing Requirements, for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.05 QUALITY ASSURANCE

- A. All insulation, mastics, coatings, sealants, and adhesives shall be certified by the manufacturer to be Asbestos-free.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.
- C. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum three years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.07 FIELD CONDITIONS

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER (RIGID)

- A. Manufacturers:
 - 1. Knauf Insulation; Earthwool 1000° Pipe Insulation: www.knaufinsulation.us/en.
 - 2. Johns Manville Corporation; Micro-Lok HP Ultra: www.jm.com.
 - 3. Owens Corning Corp; SSLII with ASJ Max Fiberglas Pipe Insulation: www.owenscorning.com.
- B. Insulation: ASTM C 547; semi-rigid, noncombustible, end grain adhered to jacket.
 - 1. 'K' value: ASTM C355 , 0.24 at 100 degrees F (0.035 at 38 degrees C).
 - 2. Maximum service temperature: 850 degrees F.
 - 3. Moisture sorption by weight: Less than 5%.
- C. Jacketing: ASTM C1136; Polymer or Polypropylene coated factory applied vapor barrier jacket with self-sealing lap and butt strips; moisture vapor transmission, when tested in accordance with ASTM E 96 Procedure A, of 0.01 perms max.
- D. Vapor Barrier Lap Adhesive: Compatible with insulation.

2.03 FIRE BARRIER PLENUM WRAP FOR PLASTIC PIPE

- A. Manufacturers: Thermal Ceramics "Firemaster" Duct Wrap, Certainteed "Flamecheck", Unifrax "Fryewrap", 3M Fire Barrier "Fire Barrier Plenum Wrap 5A", and Nelsom "FSB".
- B. Insulation: Non-combustible ceramic fiber blanket with aluminum foil scrim jacket for 2300 F service limit. Wrap piping in accordance with manufacturer's instructions to meet a flame spread index of less than 25 and a smoke development index of less than 50. Install in accordance with manufacturer's installation guide.

2.04 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Manufacturers:
 - 1. Armacell International; Model AP: www.armacell.com.
 - 2. Aerocel; Tube.
 - 3. K-Flex USA; Insul-Tube.
- B. Insulation: Preformed flexible closed-cell elastomeric rubber insulation complying with ASTM C534 Grade 1; use molded tubular material wherever possible.
 - 1. 'K' ('Ksi') value: ASTM C 177; 0.25 at 75 degrees F (0.04 at 24 degrees C).
 - 2. Maximum moisture absorption: < 1.0 percent (pipe) by volume, when tested in accordance with ASTM C 209.
 - 3. Water Vapor Permeability: 0.05 perm-inches, when tested in accordance with ASTM E 96.
 - 4. Flame spread/smoke developed rating of 25/50 maximum when tested in accordance with ASTM E84 .
 - 5. Minimum Service Temperature: -40 degrees F.
 - 6. Maximum Service Temperature: 220 degrees F.
 - 7. Connection: Waterproof vapor barrier adhesive.
- C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

2.05 JACKETS

- A. ASJ (All Service Jacket): Polymer or Polypropylene coated factory applied vapor barrier jacket with self-sealing lap and butt strips; moisture vapor transmission, when tested in accordance with ASTM E 96 Procedure A, of 0.01 perms max. Jackets shall meet the requirements of ASTM C1136.

2.06 ADHESIVES, COATINGS, SEALING COMPOUNDS AND PROTECTIVE FINISHES

- A. Lagging Adhesive and Coating for Glass Cloth Jackets and Other Facings - MIL-A-3316 B, Class 1.
- B. Lap Adhesive for Vapor Barrier Jacket - MIL-A-3316 B, Class 2.
- C. Bonding Adhesives - for securing insulation to metal surfaces - MIL-A-3316 B, Class 2 for temperature up to 200 degree F.
- D. Contact Type Adhesive - For installing flexible unicellular insulation - MIL-A-24179, Type II, Class 1.
- E. Bedding Compound and Joint Sealers - MIL-B-19564A.
- F. Coating Compound - Vapor Barrier Treatment - MIL-C-19565B, Type 1 or II.
- G. Protective Finish Outside of Buildings - Coating Compound MIL-C-19565 B, Type I.
- H. Manufacturers: Childers, Foster, Armstrong, Mon-Eco.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.
- C. Exposed Piping: Locate insulation and cover seams in least visible locations. Exterior of insulation shall be uniform in appearance.
- D. Insulation jacket shall fit snug to insulation.
- E. Fixture Supply Piping Exposed and in Cabinets: Do not insulate.
- F. Domestic Cold Water Piping in Plumbing Chases and Concealed in Non-exterior Walls: Do not insulate.
- G. Valves and fittings:
 - 1. Insulate pipe and all valves and fittings including valve bonnets on domestic cold water and domestic hot water piping. Leave only valve stems, open ends of wells and gauge cocks exposed.
- H. Insulation at Hangers: Hangers for domestic water and trapeze supports shall be outside of insulation with saddles as specified herein.
- I. Saddles: Provide galvanized steel saddles at each point where pipe insulation passes through a hanger or rests on a support. Saddles shall be 180 arc for horizontal piping, 360 arch for vertical piping. Length and gauge of saddle shall be as follows:
 - 1. 2 inch pipe size and smaller: 18 Gauge saddle, 8 inch long, minimum.
- J. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 22 0510.

3.03 CLEANING

- A. Clean adjacent surfaces, valves, valve handles, etc. of jacketing materials.

3.04 SCHEDULES

- A. Plumbing Systems:
 - 1. Domestic Water:
 - a. Domestic Hot, Tempered, Cold, and Circulating Piping: 1 inch thick rigid glass fiber with factory ASJ jacket.
 - 2. Plastic Pipe in Return Air Plenums: Non-combustible ceramic fiber blanket with aluminum foil scrim jacket. Provide one layer wrap around the pipe with a minimum of one inch overlap. Wrap piping in accordance with manufacturer's instructions to meet a flame spread index of less than 25 and a smoke development index of less than 50. Install in accordance with manufacturer's installation guide.

END OF SECTION