

## SECTION 22 0719 - PLUMBING PIPING INSULATION

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Piping insulation.

#### 1.2 RELATED SECTIONS

- A. Section 078400 - Firestopping.
- B. Section 099000 - Painting and Coating: Painting insulation jacket.
- C. Section 221005 - Plumbing Piping: Placement of hangers and hanger inserts.

#### 1.3 REFERENCES

- A. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus; 2004.
- B. ASTM C 534 - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2005.
- C. ASTM C 547 - Standard Specification for Mineral Fiber Pipe Insulation; 2006.
- D. ASTM C 552 - Standard Specification for Cellular Glass Thermal Insulation; 2003.
- E. ASTM C 795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2003.
- F. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2005.
- G. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials; 2005.
- H. IECC - ICC - International Energy Conservation Code
- I. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 2006.
- J. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; 2003.

#### 1.4 SUBMITTALS

- A. See Division 01 specifications 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.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum THREE years of experience.

#### 1.6 DELIVERY, STORAGE, AND PROTECTION

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

#### 1.7 ENVIRONMENTAL REQUIREMENTS

- 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

#### 2.1 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

- A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E 84, NFPA 255, or UL 723.

#### 2.2 GLASS FIBER

- A. Manufacturers:
  - 1. Knauf Fiber Glass: [www.knaufusa.com](http://www.knaufusa.com).
  - 2. Johns Manville Corporation: [www.jm.com](http://www.jm.com).
  - 3. Owens Corning Corp: [www.owenscorning.com](http://www.owenscorning.com).
  - 4. CertainTeed Corporation: [www.certainteed.com](http://www.certainteed.com).

- 5. Substitutions: See Section 016000 - Product Requirements.
  - B. Insulation: ASTM C 547 and ASTM C 795; rigid molded, noncombustible.
    - 1. 'K' value: ASTM C 177, 0.24 at 75 degrees F.
    - 2. Maximum service temperature: 850 degrees F.
    - 3. Maximum moisture absorption: 0.2 percent by volume.
  - C. Insulation: ASTM C 547 and ASTM C 795; semi-rigid, noncombustible, end grain adhered to jacket.
    - 1. 'K' value: ASTM C 177, 0.24 at 75 degrees F.
    - 2. Maximum service temperature: 650 degrees F.
    - 3. Maximum moisture absorption: 0.2 percent by volume.
  - D. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E 96/E 96M of 0.02 perm-inches.
  - E. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
  - F. Vapor Barrier Lap Adhesive:
    - 1. Compatible with insulation.
  - G. Insulating Cement/Mastic:
    - 1. ASTM C 195; hydraulic setting on mineral wool.
- 2.3 FLEXIBLE ELASTOMERIC CELLULAR INSULATION
- A. Manufacturer:
    - 1. Armacell International: [www.armacell.com](http://www.armacell.com).
    - 2. Substitutions: See Section 016000 - Product Requirements.
  - B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C 534 Type I, Tubular Grade 1; ASTM E 84/ UL 723 25/50 rated for use in return air plenums, use molded tubular material wherever possible. ArmaFlex Ultra or approved equal.
    - 1. Thermal Conductivity: 0.27 Btu-in/hr-ft<sup>2</sup>-degF @ 75 deg.F Mean Temp
    - 2. Minimum Service Temperature: -40 degrees F.
    - 3. Maximum Service Temperature: 220 degrees F.
    - 4. Connection: Waterproof vapor barrier adhesive.
  - C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

## 2.4 PLENUM INSULATION

- A. Manufacturer
  - 1. Unifrax Corporation
  - 2. Substitutions: See Section 016000 - Product Requirements.
- B. Insulation: Fyrewrap .5 plenum insulation, high temperature, biosoluble insulation, aluminum foil/fiberglass reinforced scrim encapsulated

## 2.5 JACKETS/SHIELDS

- A. PVC Plastic.
  - 1. Manufacturers:
    - a. Johns Manville Corporation: [www.jm.com](http://www.jm.com).
    - b. Substitutions: See Section 016000 - Product Requirements.
  - 2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
    - a. Minimum Service Temperature: 0 degrees F.
    - b. Maximum Service Temperature: 150 degrees F.
    - c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E 96/E 96M.
    - d. Thickness: 10 mil.
    - e. Connections: Brush on welding adhesive.
- B. Stainless Steel Jackets
  - 1. Standards:
    - a. ASTM-A240 and A666 Standards
  - 2. Thickness
    - a. .016" (.4mm)

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.

- C. Exposed Piping: Locate insulation and cover seams in least visible locations.
- D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- E. Glass fiber insulated pipes conveying fluids below ambient temperature:
  - 1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
  - 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- F. For hot water piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
- G. Glass fiber insulated pipes conveying fluids above ambient temperature:
  - 1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
  - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- H. Inserts and Shields:
  - 1. Application: Piping 1-1/2 inches diameter or larger.
  - 2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
  - 3. Insert location: Between support shield and piping and under the finish jacket.
  - 4. Insert configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
  - 5. Insert material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.
- I. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 078400.
- J. Exposed Insulated Pipe (from floor penetration to 10 feet above finished floor): Provide with Stainless Steel jacket around entire pipe/insulation circumference
- K. Provide UL listed plenum insulation on all piping not conforming to the 25/50 smoke and flame requirements for combustibility as required by the International Mechanical code, and installed within return air plenum spaces.

### 3.3 SCHEDULES

- A. Plumbing Systems: (Provide insulation for piping and appurtenances of the following Plumbing systems as scheduled below)
1. Domestic Cold Water Supply:
    - a. Glass Fiber Insulation (w/All-Service Jacket):
      - 1) Thickness:
        - a) All pipe sizes: 1-inch thick
    - b. Flexible Elastomeric Cellular Insulation (underground piping, piping installed in masonry walls):
      - 1) Thickness:
        - a) All pipe sizes: 1-inch thick
  2. Domestic Hot, Hot Return, 140F Hot, and 140F Return Water Supply:
    - a. Glass Fiber Insulation (w/All-Service Jacket):
      - 1) Thickness:
        - a) Pipe sizes up to and including 1-1/4-inch: 1-inch thick
        - b) Pipe sizes 1-1/2"-inch - 6"-inch: 1-1/2 inch thick
    - b. Flexible Elastomeric Cellular Insulation (underground piping, pipe installed in masonry walls):
      - 1) Thickness:
        - a) Pipe sizes up to and including 1-1/4-inch: 1-inch thick
        - b) Pipe sizes 1-1/2"-inch - 6"-inch: 1-1/2 inch thick
  3. Tempered Domestic Water Supply:
    - a. Glass Fiber Insulation (w/All-Service Jacket):
      - 1) Thickness::
        - a) All pipe sizes: 1-inch thick
  4. Non-Potable Water:
    - a. Glass Fiber Insulation (w/All-Service Jacket):
      - 1) Thickness::
        - a) All pipe sizes: 1-inch thick
    - b. Flexible Elastomeric Cellular Insulation (underground piping, pipe installed in concrete walls):
      - 1) Thickness:
        - a) All pipe sizes: 1-inch thick

END OF SECTION