

SECTION 22 07 00
PLUMBING PIPING INSULATION

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Society of Heating, Refrigerating & Air-Conditioning Engineers Inc. (ASHRAE): 90.1, Energy-Efficient Design of New Buildings except Low-Rise Residential Buildings.
 2. ASTM International (ASTM):
 - a. B209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - b. C533, Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation.
 - c. C534, Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
 - d. C547, Standard Specification for Mineral Fiber Pipe Insulation.
 3. National Fire Protection Association (NFPA): 255, Standard Method of Test of Surface Burning Characteristics of Building Materials.

1.02 SUBMITTALS

- A. Action Submittals: Product description, include list of materials, thickness for each service scheduled, and locations.
- B. Informational Submittals:
1. Proof of compliance for test of products for fire rating, corrosiveness, and compressive strength.
 2. Manufacturer's installation instructions.

1.03 QUALITY ASSURANCE

- A. Provide standard, cataloged products, new and commercially available, suitable for service requiring high performance and reliability with low maintenance, and free from all defects.
- B. Provide materials by firms engaged in the manufacture of insulation products of the types and characteristics specified herein, whose products have been in use for not less than 5 years.

- C. UL Listing or satisfactory certified test report from an approved testing laboratory is required to indicate fire hazard ratings for materials proposed for use do not exceed those specified.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Manufacturer's Stamp or Label:

1. Deliver insulation, jackets, cements, adhesives and coatings with a manufacturer's stamp or label attached, giving name of manufacturer, brand, and description of material.
2. Insulation Packages and Containers: Mark "asbestos-free."
3. If insulations become wet, remove it from the site and discard it.

PART 2 PRODUCTS

2.01 GENERAL

A. Physical Characteristics:

1. Insulation Exterior: Cleanable, grease-resistant, nonflaking, and nonpeeling.
2. Insulation for Fittings, Flanges, and Valves: Premolded, precut, or job-fabricated insulation of same thickness and conductivity as used on adjacent piping.

B. Functional Characteristics: None.

C. Performance Characteristics:

1. Fire Resistance:
 - a. Provide noncombustible insulation, adhesives, vapor barrier materials and other accessories, except as specified herein.
 - b. Use no fugitive or corrosive treatments to impart flame resistance.
 - c. Flame proofing treatments subject to deterioration as a result of effects of moisture or high humidity are not acceptable.
 - d. Fire Hazard Rating for Materials including Facings, Mastics, and Adhesives: Not to exceed 25 for flame spread without evidence of continued progressive combustion, and 50 for smoke, developed as per tests conducted in accordance with NFPA 255 methods.
 - e. Materials exempt from fire-resistant rating:
 - 1) Polyamide anchors.
 - 2) Treated wood inserts.

- f. Materials exempt from fire-resistant rating when installed in outside locations, buried, or encased in concrete:
 - 1) Polyurethane insulation.
 - 2) PVC casing.
 - 3) Fiberglass-reinforced plastic casing.
2. Conform to referenced publications and specified temperature ranges and densities in pounds per cubic foot.

2.02 PIPE INSULATION

- A. Type P1—Fiberglass (ASTM C547, Type 1 (Minus 20 Degrees F to 500 Degrees F):
 1. Manufacturers and Products:
 - a. Johns Manville; Micro-Lok HP-T.
 - b. Or equal.
 2. Physical Characteristics: Fiberglass, UL-rated, preformed, sectional rigid, minimum 4 pounds per cubic foot (pcf) density, with factory-applied all-service jacket (ASJ) composed of reinforced kraft paper and aluminum foil laminate. Provide jacket with self-sealing lap to facilitate closing longitudinal and end joints.
 3. Functional Characteristics: K factor 0.23 maximum at 75 degrees F mean.
 4. Performance Characteristics: None.
- B. Type P2—Calcium Silicate (ASTM C533, 1,200 Degrees F, Maximum):
 1. Manufacturers and Products:
 - a. Johns Manville; Thermo-12 Gold.
 - b. Or equal.
 2. Physical Characteristics: Calcium silicate without factory-applied jacket.
 3. Functional Characteristics: None.
 4. Performance Characteristics: Minimum 12 pcf density, K factor 0.46 maximum at 300 degrees F mean.
- C. Type P3—Elastomeric (ASTM C534, Minus 40 Degrees F to 220 Degrees F):
 1. Manufacturers and Products:
 - a. Armacell; AP Armaflex.
 - b. Or equal.
 2. Physical Characteristics: Flexible, closed cell elastomeric.
 3. Functional Characteristics: None.
 4. Performance Characteristics:
 - a. Nominal 6 pcf density, K factor 0.27 maximum at 75 degrees F mean.
 - b. Water Vapor Transmission: 0.1 perm-inch, or less.

2.03 INSULATION FINISH SYSTEMS

A. Type F1—PVC:

1. Manufacturers and Products:
 - a. Johns Manville; Zeston.
 - b. Or equal.
2. Physical Characteristics: Polyvinyl chloride (PVC) jacketing, white, for straight run piping and fitting locations.
3. Functional Characteristics: None.
4. Performance Characteristics: Temperatures up to 150 degrees F.

B. Type F2—Paint:

1. Manufacturers and Products:
 - a. Armstrong; WB Armaflex finish.
 - b. Or equal.
2. Physical Characteristics: Acrylic latex paint, white, and suitable for outdoor use.
3. Functional Characteristics: None.
4. Performance Characteristics: None.

C. Type F3—Aluminum:

1. Manufacturers and Products:
 - a. RPR Products; INSUL-MATE.
 - b. Or equal.
2. Physical Characteristics:
 - a. Aluminum Roll Jacketing: For straight run piping, wrought aluminum Alloy 3003, 5005, 1100, or 3105 to ASTM B209 with H-14 temper, minimum 0.016-inch thickness, with smooth mill finish.
 - b. Moisture Barrier: Provide factory-applied moisture barrier, consisting of 40-pound kraft paper with 1-mil thick low-density polyethylene film, heat and pressure bonded to inner surface of the aluminum jacketing.
 - c. Fitting Covers: Material as for aluminum roll jacketing, premolded, one- or two-piece covers, which includes elbows, tee/valves, endcaps, mechanical line couplings, and specialty fittings.
3. Functional Characteristics: None.
4. Performance Characteristics: None.

PART 3 EXECUTION

3.01 INSTALLATION OF INSULATION

- A. Install insulation products in accordance with manufacturer's written instructions, and in accordance with recognized industry practices.
- B. Apply insulation over clean, finish painted, and dry surfaces.
- C. Install insulation after piping system has been pressure tested and leaks corrected.
- D. Use insulating cements, lagging adhesives, and weatherproof mastics recommended by insulation manufacturer.
- E. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with a single cut piece to complete the run. Do not use cut pieces of scraps abutting each other.
- F. Butt insulation joints firmly together to ensure a complete and tight fit over surfaces to be covered.
- G. Maintain integrity of vapor barrier jackets on pipe insulation and protect to prevent puncture or other damage. Seal open ends of insulation with mastic. Sectionally seal butt ends of chilled water and condensate drain piping insulation at fittings with white vapor barrier coating.
- H. Cover valves, flanges, fittings, and similar items in each piping system with equivalent thickness and composition of insulation as applied to adjoining pipe run. Install factory molded, precut or job-fabricated units. Finish cold pipe fittings with white vapor barrier coating and hot piping with white vinyl acrylic mastic, both reinforced with glass cloth.
- I. Extend piping insulation without interruption through walls, floors, and similar piping penetrations, except where otherwise indicated.
- J. Install protective metal shields and foamglass inserts where pipe hangers bear on outside of insulation.
- K. Insulation on piping that is to be heat traced shall be installed after installation of heat tape.
- L. Insulate valve bodies, flanges, and pipe couplings.
- M. Insulate and vapor seal hangers, supports, anchors, and other piping appurtenances that are secured directly to cold surfaces.
- N. Do not insulate flexible pipe couplings and expansion joints.

- O. Do not allow insulation to cover nameplates or code inspection stamps.
- P. Install removable insulation sections on devices that require access for maintenance of equipment or removal, such as unions and strainer end plates.
- Q. Connection to Existing Piping: Cut back existing insulation to remove portion damaged by piping revisions. Install new insulation.
- R. Cold Surfaces: Provide continuous vapor seal on insulation on cold surfaces where vapor barrier jackets are used.
- S. Placement:
 - 1. Slip insulation on pipe or tubing before assembly, when practical, to avoid longitudinal seams.
 - 2. Insulate valves and fittings with sleeved or cut pieces of same material.
 - 3. Seal and tape joints.
- T. Insulation at Hangers and Supports: Install under piping, centered at each hanger or support.
- U. Vapor Barrier:
 - 1. Provide continuous vapor barrier at joints between rigid insulation and pipe insulation.
 - 2. Install vapor barrier jackets with pipe hangers and supports outside jacket.
 - 3. Do not use staples and screws to secure vapor sealed system components.

3.02 INSTALLATION OF INSULATION FINISH SYSTEMS

- A. Use a continuous friction type joint to hold jacket in-place, providing positive weatherproof seal over entire length of jacket.
- B. Secure circumferential joints with preformed snap straps containing weatherproof sealant.
- C. On exterior piping, apply coating over insulation and vapor barrier to prevent damage when aluminum fitting covers are installed.
- D. Do not use screws or rivets to fasten the fitting covers.
- E. Install removable prefabricated aluminum covers on exterior flanges and unions.
- F. Caulk and seal exterior joints to make watertight.

3.03 INSULATION APPLICATIONS

A. Potable Cold Water and Reclaimed Water:

1. Type P3, elastomeric.
2. One-inch thickness for all pipe sizes.

B. Potable Hot Water:

1. Type P1, fiberglass.
2. One-inch thickness for all pipe sizes.

C. Condensate Piping:

1. Type P1.
2. Half-inch thickness.

D. Pipe Hangers:

1. Type P1, Fiberglass: UL-rated, preformed rigid pipe insulation inserts of thickness equal to adjoining insulation, 10 inches in length, with factory-applied, vinyl-coated and embossed vapor barrier jacket with self-sealing lap.
2. Type P3, Elastomeric: Rigid insulation section with 9-inch long, 16-gauge galvanized steel saddle.

3.04 INSULATION FINISH APPLICATIONS

A. Piping Insulation (Concealed Areas): Factory finish.

B. Piping Insulation (Exposed to View, Indoors): Type F1, PVC.

C. Piping Insulation (Outdoors):

1. Type F2, paint (for use with Type P3, elastomeric).
2. Type F3, aluminum.

D. Apply coating of insulating cement where needed to obtain smooth and continuous appearance.

3.05 FIELD QUALITY CONTROL

A. Test factory-applied materials assembled. Field-applied materials may be tested individually.

END OF SECTION

