

SECTION 22 07 00

PLUMBING INSULATION

PART 1 GENERAL

1.01 QUALITY ASSURANCE

- A. Installer qualifications: Three years minimum successful installation experience on projects with mechanical insulation similar in scope and nature to that required for the project.

1.02 PERFORMANCE CRITERIA

- A. Insulation and accessory materials shall meet the following criteria.
 - 1. Insulation Materials: Non-combustible as defined in National Fire Protection Association Pamphlet 220 and Underwriters' Laboratory Listed or Labeled.
 - 2. Flame/Smoke Ratings: Composite mechanical insulation (insulation, jackets, coverings, sealers, mastics and adhesives) flame-spread rating 25 or less, smoke-developed rating 50 or less, as tested by ANSI/ASTM E-84 (NFPA 255) method.

PART 2 PRODUCTS

2.01 APPROVED MANUFACTURERS

- A. Armstrong
- B. Certain-Teed
- C. Knauf
- D. Manson
- E. Owens Corning
- F. Schuller (Johns-Manville)

2.02 MATERIALS

- A. Insulation:
 - 1. Fiberglass
 - 2. Flexible Closed-Cell
- B. Adhesives, Sealers, Facings and Vapor Barrier Coatings must be able to accept paint where painting is required.

2.03 JACKETS

- A. Puncture resistance rating based on ASTM D781 test method.
- B. Permeance ratings based on ASTM E96, Procedure A.
- C. Type AA-1 jacket:
 - 1. Material: T3003, H14 to H19 aluminum alloy.
 - 2. Thickness: 0.016" (0.4mm), minimum.
 - 3. Factory applied to insulation with 1 mil thick polyethylene moisture barrier continuously laminated across full width of jacketing.
 - 4. Seal: Integral longitudinal Pittsburgh seam with butt joint strips and weatherproof mastic.
 - 5. Approved manufacturer: Insul-Coustic "Alcorjac" or equivalent.
- D. Type GFR-1 jacket:
 - 1. Material: Heavy-duty, fire-retardant, glass fiber reinforced material with self-sealing lap.

2. Factory applied to insulation.
 3. Finish: White vinyl or white kraft suitable for painting.
 4. Bench puncture resistance: 50 units minimum.
 5. Permeance: 0.02 perms, maximum.
 6. Vapor barrier: 0.001" aluminum foil adhered to inner surface of jacket.
 7. Approved manufacturer: Owens Corning Type ASJ or equivalent.
- E. Type GFR-2 jacket:
1. Material: Heavy-duty, fire-retardant, glass fiber reinforced material.
 2. Factory applied to insulation.
 3. Finish: White vinyl or white kraft suitable for painting.
 4. Bench puncture resistance: 25 units minimum.
 5. Permeance: 0.02 perms, maximum.
 6. Vapor barrier: 0.001" aluminum foil adhered to inner surface of jacket.
 7. Approved manufacturer: Owens Corning type ASJ or equivalent.
- F. Type GFR-3 jacket:
1. Material: Glass fiber reinforced.
 2. Factory applied to insulation.
 3. Finish: White kraft.
 4. Bench puncture resistance: 15 units, minimum.
 5. Permeance: 0.01 perms, maximum.
 6. Vapor barrier: Aluminum laminated to inner surface of jacket.
 7. Approved manufacturer: Owens Corning type FRK or equivalent.
- G. Type GF-1 jacket:
1. Material: 20 x 20 mesh glass fabric.
 2. Embed in coat of lagging adhesive; finish with second coat of lagging adhesive.
 3. Approved manufacturers: Manville "Duramesh" Type 205 or equivalent.
- H. Banding:
1. Over aluminum jacketing with insulation less than 13" diameter: Stainless steel, 1/2" x 0.020.
 - a) Approved manufacturer: AJ Gerrard & Co., No. 305-SS with No. 202-SS seals.
 2. Maximum spacing 12" on center.

2.04 PIPING INSULATION MATERIALS

- A. Fire-retardant, moisture- and mildew-resistant, and verminproof.
- B. Suitable to receive jackets, adhesives, and coatings as indicated.
- C. Glass fiber insulation: Inert inorganic material, noncorrosive to mechanical surfaces, preformed into flexible or rigid board as indicated, suitable for temperatures to 450°F.
- D. Insulation blankets shall be the same surface temperature as the rest of the pipe.
- E. Jackets shall have all seams turned under, double stitched.
- F. Insulating cement:
 1. Dry density 34 lb/cu ft, thermal conductivity 0.91 Btu-in/hr-sq ft-°F at 400°F.

2. Approved manufacturers:
 - a) PK “Super Stick”.
 - b) Ryder “GP”.
- G. Filling and finishing cement:
1. Dry density 40 lb/cu ft, thermal conductivity 0.89 Btu-in/hr-sq ft-°F at 400°F.
 2. Approved manufacturers.
 - a) PK “Quick Cote”.
 - b) Ryder “MW”.
- H. Rigid fiberglass insulation (RFG):
1. ASTM C547, Class 1.
 2. Temperature rating: -20 to 850°F only for pipe insulation.
 3. Density: 3 lb/cu ft.
 4. Conductivity: Not more than 0.24 Btu-in/hr-sq ft-°F at 75°F.
 5. Approved manufacturers: Owens Corning “Fiberglas 25” or equivalent.
- I. Mineral wool fiber pipe insulation (MW):
1. ASTM C547.
 2. Temperature rating: 1,200°F.
 3. Density: 10 lb/cu ft.
 4. Conductivity: Not more than 0.45 Btu-in/hr-sq ft-°F at 450°F.
 5. Approved manufacturers: Roxul 1200 or equivalent.
- J. Cellular glass pipe insulation (CG):
1. ASTM C552, Type II, Class 2.
 2. Temperature rating: -450°F to 900°F.
 3. Density: 7.5 lb/cu ft.
 4. Conductivity: Not more than 0.29 Btu-in/hr-sq ft-°F at 75°F.
 5. Approved manufacturers: Pittsburgh Corning Foamglas or equivalent.
- K. Elastomeric thermal insulation (ET):
1. ASTM C534, Type 1 for piping materials; Type II for sheet materials.
 2. Temperature rating: -40 to 220°.
 3. Density: 5.5 lb/cu ft.
 4. Conductivity: Not more than 0.27 Btu-in/hr-sq ft-°F at 75°F.
 5. Permeance: 0.19 perms per inch.
 6. Approved manufacturers: Armstrong “Armaflex II” or equivalent.
- L. Expanded urethane insulation (EU):
1. ASTM C591.
 2. Temperature rating: -100°F to 220°F.
 3. Conductivity: Not more than 0.16 Btu-in/hr-sq ft-°F at 75°F.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Do not insulate cleanouts, access openings or identification plates.
- B. Neatly bevel insulation and finishes up to edges of openings, and seal edges.
- C. Hangers shall be plumb and tight against the pipe or insulation saddle with adjustment nuts and lock nuts installed. If hangers are found to be out of plumb or not properly adjusted, the contractor shall be responsible for the cost of removal and reinstallation of the ceiling in order to inspect and correct the hanger installation.
- D. Provide saddles and shields under pipe hangers.
- E. Prepare a schedule of mechanical insulation showing systems insulated, types, thickness for various sizes, temperatures and special conditions. Include saddles and shields per standard Section 23050. Include schedule on drawings or include in specifications.
- F. Plumbing system insulation:
 - 1. Domestic cold water.
 - 2. Roof drains (horizontal only but including drain bowls and initial vertical drop to horizontal).
 - 3. Domestic hot and tempered supply and circulating water.
 - 4. Domestic water heaters, storage tanks and Accumulators (not factory insulated).
 - 5. Under lavatories: Pre-molded insulation to meet ADA requirements.
 - 6. Chilled Drinking Water.
 - 7. Fittings.
 - 8. Valves.
- G. Protective jackets:
 - 1. Provide protective jackets where piping insulation is exposed to weather and where abrasion is likely.

3.02 INSULATION SCHEDULE

- A. Minimum insulation thicknesses shall comply with IECC 2015.

Item	Insulation Type	Jacket Type	Insulation Thickness
Potable Hot Water Piping (140°F)	RFG	GFR-1	1-1/2"
Potable Cold Water Piping (45°F)	RFG	GFR-1	1"
Heating Water Return Piping (125°F)	RFG	GFR-1	1-1/2"
Roof Drain Piping (-6°F)	ET	---	2"
Heat Exchangers	CS	GF-1	3-1/2"
Storage Tanks	RFG	GF-1	2"

END OF SECTION 22 07 00