

SECTION 23 07 19
HVAC PIPING INSULATION

PART 1 GENERAL

1.1 REFERENCES

- A. ASTM A53/A53M – Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated Welded and Seamless
- B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
- C. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form
- D. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation
- E. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation
- F. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
- G. ASTM C921 - Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials

1.2 SUBMITTALS

- A. Submit under provisions of Section 23 05 00.
- B. Product Data: For each product used in this project, provide catalog data for insulation, jackets and accessories, and installation instructions.
- C. Samples: Not required

1.3 QUALITY ASSURANCE

- A. Materials: Flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84.
- B. Applicator: A company specializing in performing the work of this section with minimum 3-years of experience.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.
- B. Store insulation in original wrapping, and protect from weather and construction traffic.
- C. Protect insulation against dirt, water, chemical and mechanical damage.

PART 2 PRODUCTS

2.1 RIGID FIBER GLASS INSULATION

- A. Provide molded, heavy density, noncombustible, one-piece pipe insulation made from inorganic glass fibers bonded with a thermosetting resin and K-value of 0.28 at 75°F per ASTM C547.
- B. Provide factory installed all service jacket of white kraft paper bonded to aluminum foil and reinforced with glass fibers and provide self-sealing lap for longitudinal seam and butt strips for circumferential joints per ASTM C921.
- C. Provide 18-ga, Type 304 stainless steel tie wire with twisted ends on 24" centers but not less than two tie wires per insulation section.
- D. Fittings and valves, provide one-piece, molded, 20-mil thick, PVC covers with fiberglass inserts.
 - 1. Use pressure sensitive, color matching vinyl tape to seal PVC fitting covers to jacket of insulation per ASTM C921

2.2 FLEXIBLE FIBER GLASS INSULATION

- A. Provide flexible, noncombustible, blanket insulation made from highly resilient, inorganic glass fibers bonded by a thermosetting resin.
 - 1. Density shall be 1.0 lb/cu ft K-value shall be 0.28 at 75°F per ASTM C553
- B. Provide factory applied, foil-scrim-kraft vapor barrier with 2" wide stapling flange.
 - 1. Secure seams with outward clinching staples on 6" centers.
 - 2. Seal seams with two coats of vapor barrier mastic reinforced with 4" wide, open weave glass fabric per ASTM C921

2.3 CELLULAR GLASS INSULATION

- A. Provide molded, impermeable, noncombustible, cellular glass pipe insulation, with K-value of 0.30 at 75°F per ASTM C552.
- B. Interior Applications in Concealed Locations
 - 1. Pipe: All service jacket with self-sealing lap.
 - 2. Pipe: 5 ply self-adhesive vapor barrier mold inhibiting jacket (0.0000 perms)
 - 3. Fittings: Vapor barrier mastic and reinforcing membrane.
- C. Interior Applications in Exposed Locations
 - 1. Pipe: Vapor barrier mastic and reinforcing membrane.
 - 2. Pipe: 5-ply self-adhesive vapor barrier mold inhibiting jacket (0.0000 perms) fittings either pre-formed aluminum or PVC.
 - 3. Fittings: Same as pipe
- D. Exterior Applications
 - 1. Pipe: Vapor barrier mastic, reinforcing membrane and aluminum jacket.
 - 2. Pipe: 5-ply self-adhesive vapor barrier mold inhibiting jacket (0.0000 perms), UV stable; fittings either pre-formed aluminum or PVC.
 - 3. Fittings: Same as pipe
- E. Buried Applications
 - 1. Pipe: Prefabricated material, 120 mil thick, consisting of bituminous resin reinforced with a woven glass fiber, an integral aluminum foil layer and a protective plastic film coating.
 - 2. 5-ply or 13-ply high performance protective jacket – back fill around the pipe 12" in diameter.
 - 3. Fittings: Same as pipe
- F. Provide open mesh, synthetic membrane to reinforce mastic finishes, with thread count shall be 6 by 6 strands per square inch 27 mils thick.
- G. Provide 18-ga, Type 304 stainless steel tie wire with twisted ends on maximum 12" centers but not less than two tie wires per insulation section.
- H. Provide flexible, acrylic latex coating for use with cellular glass insulation to provide a vapor barrier finish.

2.4 CELLULAR FOAM INSULATION

- A. Provide flexible, closed-cell, slit tubing form, elastomeric pipe insulation.
 - 1. For large diameter pipe, provide sheet form.
 - 2. K-value of 0.30 at 75°F
 - 3. Use contact adhesive to seal longitudinal seams and circumferential joints per ASTM C534/C534M.
- B. Fittings and valves, fabricate insulation from mitered-cut tubular form using contact adhesive to seal joints.

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- C. If necessary, provide two layers of insulation to obtain specified thickness, staggering the longitudinal and circumferential joints.

2.5 ALUMINUM JACKET

- A. For pipes, provide 16- mil thick stucco embossed pattern finish, Type 1100 aluminum jacket, ASTM B209. For horizontal pipe, locate longitudinal lap on bottom.
- B. Fittings provide 24-mil thick die shaped smooth finish, Type 1100 aluminum jacket, ASTM B209.
- C. Provide 0.5" wide, 20-mil thick, Type 3003 aluminum bands on maximum 24" centers but not less than 2-bands per jacket section.

2.5 5-Ply Self-Adhesive Vapor Barrier and Weather Barrier Jacket.

- A. Pipes; provide Self-Adhesive high performance Vapor Barrier and Weather Barrier Jacket 6-mil thick with a perm rating of 0.0000 and UV stable-finishes include, stucco embossed, white, white, embossed, black, and smooth silver, 10-year warranty.
- B. Fitting, provide 24-mil thick die shaped smooth finish silver, may use PVC fitting if matching white.
- C. High performance acrylic adhesive capable of installation with no further mechanical attachments

2.6 SADDLES, SHIELDS AND INSERTS

- A. At all pipe hangers or pipe supports, provide 12" long 180°-arc galvanized sheet metal shields matching the insulation outside dimension.
- B. For pipes larger than 2" diameter, provide 12" long 180°-arc cellular glass insulation inserts.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Before applying insulation, verify that piping is inspected, tested, and approved.
- B. Before applying insulation, verify that surfaces are clean (foreign material removed) and dry.
- C. Before applying insulation, verify the installation of the brass thermo wells with 2.5" lagging extensions.
- D. Before applying insulation, verify the installation of the 4" long brass nipples for gage cocks.

3.2 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Exposed insulation, provide jacket or finish, and locate longitudinal seams in least visible locations.
 - 1. Where insulated piping extends to weather exposed areas, provide specified aluminum sheet metal jacket.
- C. Piping, ductwork and equipment insulation or covering shall not penetrate fire-rated assembly unless the specific material has been tested and approved as part of the fire-rated assembly. (FBC,)
- D. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe.
- E. For above grade applications, maintain 0.5" air space on all sides of the insulation.
- F. Finish insulation at supports, protrusions, and interruptions.
- G. Chilled Water Black Steel Pipe, Schedule 40 ASTM A53/A53M Grade B
 - 1. Provide cellular glass insulation with vapor barrier jacket for pipe, fittings, valves, strainers, unions, flanges, etc. No Armaflex permitted.
 - 2. Apply insulation with all joints tightly fitted and buttered with joint sealer.
 - a. Eliminate voids by refitting or replacing insulation.
 - b. Do NOT fill voids with joint sealer.
 - 3. Interior Applications:
 - a. Pipes 3" diameter and smaller, provide 1.5" thick insulation.
 - b. Pipes larger than 3" diameter provide 2" thick insulation.

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4. Exterior and Buried Applications: All pipe sizes provide 2" thick insulation.
 5. Expansion joints:
 - a. Flexible connections and mechanical couplings for grooved pipe provide two layers of 1" thick cellular foam insulation.
 - b. The longitudinal seam for each layer shall be staggered 180°.
 - c. The cellular foam insulation shall overlap the cellular glass insulation a minimum of 3".
 6. Provide 1½" cellular glass insulation with vapor barrier jacket for pipe to the expansion tank.
 7. Provide 1½" cellular glass insulation with vapor barrier jacket for the pipe to the chilled water make-up system and chilled water chemical treatment system for a minimum length of 6' from the chilled water pipe.
- H. Chilled water pre-insulated steel pipe, schedule 40.
1. Carrier pipe shall be black steel schedule 40 ASTM A53/A53M Grade B, surrounded with polyurethane closed cell insulation enclosed in PVC outer jacket.
 2. Insulate all joints per manufacturer's requirements, after completing the welding and passing the hydrostatic testing.
 3. Use coupling insulation kits of field mixed urethane components poured into a PVC mold sealed to form a watertight seal.
 4. Use fitting insulation kits of field mixed urethane components poured into a PVC molded fitting cover, then tape to form a watertight seal.
- I. Refrigerant Pipe (Interior and Above Grade Applications)
1. For suction lines, provide 1" thick, cellular foam insulation.
 2. For liquid lines, insulation is not required.
 3. For hot gas lines, provide ¾" thick, cellular foam insulation.
 4. Jacket is not required.
- J. Refrigerant Pipe (Exterior Applications)
1. For suction lines, provide 1" thick, cellular foam insulation.
 2. For liquid lines, insulation is not required.
 3. For hot gas lines, provide ¾" thick, cellular foam insulation.
 4. For pipe and fittings insulation, provide 2-coats of UV protection paint or 5-ply Self Adhesive laminate UV stable offers 10-year warranty.
 5. For vertical wall installations provide galvanized or stainless steel chase cover.
- K. Refrigerant Pipe (Buried Applications)
1. For suction lines, provide 1" thick, cellular foam insulation.
 2. For liquid lines, insulation is not required.
 3. For hot gas lines, provide ¾" thick, cellular foam insulation.
 4. Route pipe within schedule 40 PVC sleeve with ends sealed watertight.

END OF SECTION