

Section 15145

PIPE AND EQUIPMENT INSULATION

PART 1 GENERAL

1.01 SUMMARY

This Section includes insulation for piping and equipment as called out on the Plans.

1.02 MEASUREMENT AND PAYMENT

No separate payment will be provided for the requirements of this Section. Include payment in lump sum bid for Work of which this is a component part.

1.03 REFERENCES

This specification references the following publications in their current editions. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

- A. ASTM C553: Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
- B. ASTM D1056: Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber
- C. ASTM E96/E96M: Standard Test Methods for Water Vapor Transmission of Materials

1.04 SUBMITTALS

Submit the following in accordance with Section 01330 – “Submittal Procedures:”

- A. Shop Drawings:
 - 1. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced
 - b. Manufacturer's installation instructions
 - c. Submit complete specification of insulation materials, adhesives, cement, together with manufacturer's recommended methods of application and coverage for coatings and adhesives.
 - 2. Submit itemized schedule of proposed insulation systems showing density, thermal conductivity, thickness, adhesive, jackets and vapor barriers.

3. Provide a Certification that products will meet the requirements of the Contract Documents.

1.05 RELATED REQUIREMENTS

Section 01330 – “Submittal Procedures”

1.06 QUALITY ASSURANCE (NOT USED)

1.07 SYSTEM DESCRIPTION

The Requirements:

The Contractor shall furnish and install all pipe and equipment insulation, complete and operable, as called out on the Plans and in accordance with the requirements of the Contract Documents. In addition to the insulation shown and specified, the Contractor shall insulate any cold or hot piping and exhausts that could be hazardous to plant personnel upon contact.

1.08 DELIVERY, STORAGE, AND HANDLING (NOT USED)

1.09 PROJECT SITE CONDITIONS

Cleanup:

After completion of installation of all insulation, the Contractor shall remove all debris from the site and clean all parts of the Work to hand over the system in perfect condition.

1.10 – 1.13 (NOT USED)

PART 2 PRODUCTS

2.01 MANUFACTURER(S)

- A. Certain-Teed Corporation
- B. Johns Manville
- C. Owens-Corning Fiber Glass Corp.
- D. P.P.G. Industries, Inc.
- E. Or Approved Equal

2.02 MATERIALS AND/OR EQUIPMENT

A. General

1. All components of the insulation system, including covering, mastics, and

adhesives shall have a flame-spread rating of not over 25, and a smoke development rating of not over 100. Ratings shall be as established by tests in accordance with ASTM E84 and Federal Specification standards. The integrated insulation assemblies shall also conform to the above specifications. Insulation shall be applied in strict accordance with the manufacturer's instructions.

2. Provide minimum insulation thickness conforming to “Insulation Schedule” in the “ATTACHMENT” or as shown on the Plans, whichever is greater.

B. Piping Insulation - Elastomeric

1. Indicate on product labels or their shipping cartons that flame and smoke ratings do not exceed above requirements:
2. Water-soluble treatments are prohibited
3. Insulated shields are required to be installed at pipe support points
4. Flexible elastomeric closed cell pipe insulation
 - a. Average thermal conductivity not to exceed $0.27 \text{ (Btu-IN)/(HR-FT}^2\text{-DegF)}$ at mean temperature of 75°F
 - b. Permeability is not to exceed 0.20 by ASTM E96/E96M; water absorption 3 percent by ASTM D1056 and ozone resistance.
 - c. Temperature range -40°F to 220°F

C. Piping Insulation - Fiberglass

1. Preformed fiberglass insulation
 - a. Temperature rated at 650° F, and a density of 4 lbs/CF
 - b. Average thermal conductivity not to exceed $0.22 \text{ (Btu-IN)/(HR-FT}^2\text{-DegF)}$ at mean temperature of 75°F
 - c. Moisture adsorption per requirements of ASTM C553, and not greater than 0.5 percent moisture by volume when exposed to moisture laden air at 120°F and 96 percent RH
2. Piping jackets (general applications)
 - a. Preformed 0.028 inch thick PVC jackets fabricated from B.F. Goodrich PVC sheeting V-66 with proven resistance to ultraviolet degradation when temperatures do not exceed the limits of PVC
 - b. Aluminum: 16 mil embossed

3. Piping jacket is not required on concealed piping

D. Equipment Insulation

1. Provide minimum insulation thickness conforming to the “Insulation Schedule” in the “ATTACHMENT” or as shown on Plans.

2.03 – 2.04 (NOT USED)

PART 3 EXECUTION

3.01 – 3.02 (NOT USED)

3.03 INSTALLATION, APPLICATION AND CONSTRUCTION

A. General:

1. All insulation shall be installed by a qualified insulation contractor in strict accordance with the manufacturer’s recommendations
2. Piping below ground and covered with earth shall not be insulated except as specified in Plans
3. Pipe insulation and jacketing shall be applied to piping where shown, and shall include fittings, flanges and valves.
4. Insulated fittings adjacent to vapor-barrier insulation shall be sealed with acceptable vapor barrier cement before installation of the finish jacket.
5. Pipe insulation shall be continuous through hangers and supports.
6. Insulation shall be coordinated with the pipe hangers and supports and where insulation protection shields are provided the top half section of pipe insulation at support locations shall be of the same specified density, and the bottom half insulation segments provided between the pipe and the insulation protection shields shall have a density of not less than 6 lb/cu ft.
7. The insulation shall be oversized for installation over electric heating cable where required.
8. Fittings and valves shall be covered with the same material as the pipe, cut in segments to fit snugly without open spaces, held in place with copper wire or cement, and then covered with the same jacketing material as the pipe.
9. Apply insulation on clean, dry surfaces after inspection

B. Piping Insulation - Elastomeric

1. Slip insulation on pipe prior to connection. Whenever the slip-on technique is not possible provide insulation neatly slit and snapped over the pipe

2. Seal joints, slits, miter-cuts and other exposed edges of insulation with adhesive, recommended by the insulation manufacturer, to ensure complete vapor barrier
- C. Piping Insulation - Fiberglass
1. Apply over clean dry pipe
 2. Butt all joints together firmly
 3. Seal joints, slits, miter-cuts and other exposed edges of insulation as recommended by the insulation manufacturer
 4. Insulate fittings, valves, and flanges with insulation thickness equal to adjacent pipe
 5. PVC pipe jacket
 - a. Apply jacketing with a minimum of 1-inch overlap. Weld longitudinal and circumferential seams with adhesives as recommended by manufacturer
 - b. Provide slip-joints every 30-feet and between fittings if distance exceeds 8-feet. Construct slip-joints by overlapping jacket sections 6-inches to 10-inches.
 - c. Provide premolded PVC covers of same material and manufacturer as jacket for fittings, valves, flanges, and related items in insulated piping systems
 6. Aluminum pipe jacket
 - a. Field-applied aluminum jacket with vapor-sealed longitudinal and butt joints
 - b. Provide smooth and straight joint with a minimum 2-inch overlap.
 - c. Secure joints with corrosion-resistant screws spaced 0.25-inch to 0.50-inch back from edge.
 - d. Center spacing of screws 5-inch maximum or as required to provide smooth tight-fitted joints.
- D. Equipment Insulation
1. Equipment insulation shall be installed per manufacturer's instructions.

3.04 REPAIR

When any factory applied insulation or job-applied insulation is removed or damaged, replace with the same quality of material and workmanship.

3.05 – 3.10 (NOT USED)

ATTACHMENT

[Design Engineer is to complete blanks per site requirements]

INSULATION SCHEDULE				
Service	Type of Insulation	Manufacturer	Model	Thickness

END OF SECTION