

SECTION 15086

PART 1 GENERAL

1. SUMMARY

1.1 This section includes: The work covered by this specification consists of furnishing all labor, equipment, materials, accessories, and performing all operations required for the correct installation of insulation on all piping, fittings, valves, controls and other necessary items connected into the system operating from 80°F (27°C) to 1200°F (650°C).

2. DEFINITIONS

- 2.1 ASHRAE** - American Society of Heating, Refrigeration and Air Conditioning Engineers.
- 2.2 ASTM** - American Society of Testing and Materials.
- 2.3 IIG** - Industrial Insulation Group, LLC.
- 2.4 ISO** - International Organization for Standardization.
- 2.5 MICA** - Midwest Insulation Contractors Association.
- 2.6 NRC** - Nuclear Regulatory Commission.
- 2.7 OSHA** - Occupational Safety and Health Act.
- 2.8 PST** - Pressure Sensitive Tape.

3. REFERENCES

- 3.1 ASHRAE National Voluntary Consensus Standard 90.1 (2004)** - "Energy Standards for Buildings Except Low-Rise Residential Buildings"
- 3.2 ASTM C165** - "Test Method for Measuring Compressive Properties of Thermal Insulations"
- 3.3 ASTM C533** - "Specification for Calcium Silicate Block and Pipe Thermal Insulation"
- 3.4 ASTM C585** - "Standard Practice for Inner and Outer Diameter of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System)"
- 3.5 ASTM C795** - "Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel"
- 3.6 ISO** - International Standards Organization
- 3.7 MICA** - "Commercial and Industrial Insulation Standards"
- 3.8 NRC 1.36** - "Nonmetallic Thermal Insulation for Austenitic Stainless Steel"
- 3.9 PIP** - "Process Industry Practices"

4. SYSTEM PERFORMANCE

4.1 Insulation material furnished should meet the minimum thickness requirements of the National Voluntary Consensus Standard 90.1 (2004) established by ASHRAE. However if other factors such as condensation control or personal protection are to be considered, the selection of thickness of insulation should satisfy the controlling factor.

5. SUBMITTALS

5.1 Product Data

5.1.1 Provide product description, list of materials, thickness schedules for each service location and piece of equipment and manufacturer's installation instructions.

5.2 Shop Drawings

5.2.1 Submit a list of insulation to be used for each service location. Include installation details for valves, fittings, pipe and all other items to be insulated.

5.3 Samples

5.3.1 Submit samples of each insulation material to be used.

6. QUALITY ASSURANCE

- 6.1** All work shall conform to accepted industry and trade standards for commercial and industrial insulations and shall conform to manufacturer's recommendations.
- 6.2** Insulation shall be installed by skilled and experienced applicators who are regularly engaged in commercial or industrial insulation work.
- 6.3** Damaged, wet or contaminated insulation shall not be installed.

7. DELIVERY, STORAGE and HANDLING

- 7.1** Deliver all materials (insulation, coverings, cements, adhesives, coatings, etc.) To the job site in factory containers with manufacturer's label showing manufacturer and product name.
- 7.2** Protect the insulation from dirt, water, chemical attack and mechanical damage before, during and after installation.

8. PROJECT AND SITE CONDITIONS

- 8.1** Maintain job site temperature and conditions before, during and after installation as required by the manufacturer of the insulation, cement, adhesives and coatings.
- 8.2** Prior to leaving the job site seal all butt joints with joint tape.
- 8.3** Installed insulation that has not been weatherproofed and is not protected by a roof and walls shall be protected from precipitation by completely sealing the weatherproof jacketing and covering all exposed insulation.
- 8.4** Any insulation that becomes wet due to not following the above procedure shall be removed and replaced by the contractor at no additional cost to the customer.

PART 2 PRODUCTS

1. MANUFACTURERS

- 1.1** Industrial Insulation Group, LLC is certified and registered under the ISO 9001:2000 Quality Standard.
 - 1.1.1** Preformed calcium silicate pipe insulation.
 - 1.1.1.1** IIG Thermo-12 RainJacket[®] pipe insulation.
 - 1.1.1.2** IIG Thermo-12 RainJacket[®] Mitered Fittings.
 - 1.1.1.3** IIG Thermo-12 Gold[®] pipe insulation for double layer applications.
 - 1.1.2** Adhesive for calcium silicate to calcium silicate joints.
 - 1.1.2.1** IIG CalBond Gold[™]
 - 1.1.2.2** Approved alternate
 - 1.1.3** Surface Stabilizers
 - 1.1.3.1** IIG RainKote[®] Surface Stabilizer
 - 1.1.4** Insulating cement to fill voids
 - 1.1.4.1** IIG CalCoat 127[™]
 - 1.1.4.2** Approved alternate
 - 1.1.5** Tape to cover joints in jacketing
 - 1.1.5.1** Venture Tape 1577 or 1579 (PST)
 - 1.1.5.2** Approved alternate

2. MATERIALS

- 2.1 IIG Thermo-12 RainJacket preformed calcium silicate pipe insulation with jacketing.
 - 2.1.1 Complies with ASTM C533 Type 1 or 1A.
 - 2.1.2 Color coded to identify product as asbestos free.
 - 2.1.3 Furnished in standard lengths of 36" (914mm) with square cut ends.
 - 2.1.4 Conforms to the dimensional requirements of ASTM C585.
 - 2.1.5 Rated maximum service temperature of 1200°F (650°C).
 - 2.1.6 Maximum density of 15 lb/ft³
 - 2.1.7 Compressive strength of 100 psi minimum when tested in accordance with ASTM C165.
 - 2.1.8 Certified to meet the requirements of ASTM C795 for use over stainless steel.

3. ACCESSORIES

- 3.1 Tie Wire (for double layer applications only)
 - 3.1.1 16 gauge (1.6mm) or 18 gauge (1.8mm) stainless steel.
- 3.2 Bands
 - 3.2.1 0.5" x 0.020" (13 x 0.5mm) type 304 stainless steel.
 - 3.2.2 0.5" x 0.020" (13 x 0.5mm) T-3003 H-14 aluminum.
- 3.3 Adhesives
 - 3.3.1 IIG CalBond™ Gold for calcium silicate to calcium silicate joints
 - 3.3.2 IIG CalCoat™ 127 to fill voids
- 3.4 Surface Stabilizer
 - 3.4.1 IIG RainKote® Surface Stabilizer
- 3.5 Insulation
 - 3.5.1 IIG Thermo-12 RainJacket® Mitered Fittings
 - 3.5.2 IIG Thermo-12 Gold® pipe insulation
- 3.6 Jacketing
 - 3.6.1 Venture Tape 1577 or 1579 (PST)
- 3.7 Accessory materials shall be installed in accordance with project drawings and specifications, manufacturer's instructions and in conformance with the current edition of the MICA - "Commercial & Industrial Insulation Standards," Process Industry Practices, or other recognized standard.

PART 3 EXECUTION

1. EXAMINATION

- 1.1 Verify that testing of piping has been completed and that the piping is ready for the insulation to be installed.
- 1.2 Verify that all surfaces are clean, dry and free from dirt, scale, moisture, oil and grease.
- 1.3 Verify that it is physically possible to install the RainJacket insulation in accordance with project drawings, operation performance parameters and the limitations of this specification.

2. INSTALLATION

- 2.1 All work activities shall be conducted in accordance with all applicable codes and laws.
- 2.2 All insulation shall be installed by a skilled and experienced applicator.
- 2.3 All work shall conform to accepted industry and trade standards for commercial and industrial insulations.
- 2.4 All piping shall be supported in such a manner that neither the insulation nor the attached jacketing is compromised by the hanger or the effects of the hanger.

2.4.1 Hanger spacing shall be such that the circumferential joint may be outside the hanger.

2.5 Where pipe shoes and roller supports are used, insulation shall be inserted in the pipe shoe to minimize heat loss.

2.5.1 All penetrations must be sealed.

2.5.2 Where possible the pipe shoe shall be sized to be flush with the outer diameter of the pipe insulation.

2.6 On vertical applications, insulation support rings shall be used with no more than 15' (4.58m) spacing between them or as indicated on contract drawings.

2.7 For piping and equipment operating at or above 600°F (315°C) or insulation thicknesses above 3" (75mm). Use double layer insulation.

2.7.1 In double layer applications the inner layer is to be made of IIG Thermo-12 Gold pipe insulation and wired in place.

2.7.2 Stagger both longitudinal and circumferential joints to reduce the impact of the thermal expansion and contraction.

2.8 Where long unbroken stretches of insulation are encountered, expansion joints may be required as noted on the contract drawings.

2.9 In all applications, the longitudinal joints shall be placed on the bottom of the pipe to minimize the chances of water incursion.

2.10 Insulation shall be firmly fastened in place with all joints (longitudinal and circumferential) butted tightly and mechanically held in place using 0.5" x 0.020" (13 x 0.5mm) stainless steel bands and clips.

2.10.1 In single layer applications place the bands as follows:

2.10.1.1 For 1/2" (13mm) to 6" (152mm) pipe, use one band located in the center of each piece of insulation.

2.10.1.2 For pipe 7" (178mm) and larger in diameter, use two bands spaced 9" (225mm) from the ends of the insulation and about 18" (450mm) from each other.

2.10.2 In double layer applications, the inner layer is to be strapped in place using 16 gauge (1.6mm) or 18 gauge (1.8mm) stainless steel wire.

2.11 Maintain a vapor barrier in all applications by properly sealing all joints, penetrations and other openings.

2.11.1 Every 60ft (18.3m) or about 20 pipe sections, leave off the PST until after start up to allow the insulation to breathe.

2.12 All valve stems must be sealed with caulking to allow free movement of the stem but still provide a seal against moisture incursion.

2.13 Apply equipment insulation as smooth as possible by grooving, scoring and beveling insulation as necessary.

2.14 Bevel and seal the ends of insulation to equipment, flanges and piping.

2.15 Fittings and valves shall be covered with Thermo-12 RainJacket Mitered Fittings.

2.15.1 Approved insulating cement such as IIG CalCoat 127 can be used to form fittings provided it is covered with PST to provide a water tight cover.

2.15.1.1 Form the cement to be of equal thickness to the surrounding insulation.

2.15.1.2 Cover all cement with IIG RainKote Surface Stabilizer prior to covering with PST.

2.15.1.3 Cover the cement with PST such that there are no gaps in the jacketing for water incursion to occur.

2.16 Flanges, couplings and valve bonnets shall be covered with an oversized pipe insulation section sized to provide the same insulation thickness as the surrounding pipe sections.

2.16.1 PST shall be used wherever a break in the jacketing occurs to ensure a water tight cover on the entire system.

2.16.2 On hot systems where fittings are to be left exposed, insulation ends should be beveled away from bolts for easy access. The exposed insulation should then be covered with PST to ensure a water tight seal.

2.16.3 Fill joints, cracks and seams with insulating cement such as IIG CalCoat 127 or approved alternate.

2.17 Neatly finish insulation at supports, protrusions and interruptions.

2.18 Do not insulate over nameplates or ASME stamps. Instead form a tight insulation seal around them.

2.19 When equipment with insulation requires periodic opening for maintenance, repair or routine inspection, the joint tape is to be cut with a razor knife allowing the insulation to be removed. When the insulation is reinstalled, PST is to be used to seal all joints to ensure a water tight seal over the entire area.

3. FIELD QUALITY CONTROL

3.1 Upon completion of the installation of the insulation and before start up, visually inspect and verify that the insulation has been installed correctly.

4. INSULATION PROTECTION

4.1 Replace damaged insulation which cannot be satisfactorily repaired, including insulation with damage to the vapor barrier and insulation that has been saturated with moisture.

4.2 The insulation contractor shall advise the general and/or mechanical contractor as to the requirements for protecting the insulation from damage and deterioration during the duration of the construction period.

5. SAFETY PRECAUTIONS

5.1 The insulation installers shall be properly protected during installation of the insulation. Protection when handling and applying insulation materials shall include but not be limited to:

5.1.1 Disposable dust respirators

5.1.2 Gloves

5.1.3 Hard hats

5.1.4 Eye protection

5.2 The insulation contractor shall conduct all job site operations in compliance with applicable provisions given by OSHA as well as with all state and local safety and health codes and regulations that may apply.

Industrial Insulation Group, LLC is a Calsilite/Johns Manville joint venture. IIG manufactures MinWool-1200® mineral fiber pipe, block and a variety of other insulations; Thermo-12® Gold Calcium Silicate pipe and block insulation; Super Firetemp® fireproofing board; SprouleWR-1200™ Perlite pipe and block insulation; high temperature adhesives, and insulating finishing cement.

The physical and chemical properties presented herein represent typical, average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Numerical flame spread and smoke developed ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions. Check with the Customer Service Office to assure current information. All Industrial Insulation Group products are sold subject to the IIG Limited Warranty and Limitation of Remedy. For a copy of the IIG Limited Warranty and Limitation of Remedy, email - info@iig-llc.com.



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