

## PART 1 – GENERAL

### 1. SUMMARY

- 1.1 - Section includes: The work covered by this specification consists of all labor, equipment, materials, accessories, and all operations required for the correct installation of insulation on all piping, fittings, valves, controls and other necessary items for systems operating up 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 - IIC Code - International Code Council.  
 2.5 - Intertek - Intertek Testing Services NA, Inc.  
 2.6 - ISO - International Organization for Standardization.  
 2.7 - MICA - Midwest Insulation Contractors Association.  
 2.8 - NFPA - National Fire Protection Association.  
 2.9 - NRC - Nuclear Regulatory Commission.  
 2.10 - OSHA - Occupational Safety and Health Act.  
 2.11 - UL - Underwriters Laboratories, Inc.  
 2.12 - ULC/CAN - Underwriters Laboratories of Canada, Inc.  
 2.13 - WHMIS - Work Hazardous Materials Information Systems - Canada.  
 2.14 - PIP - "Process Industry Practice"

### 3. REFERENCES

- 3.1 - ASHRAE - National Voluntary Consensus Standard 90.1 (Current Version) - "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 C 1617 - "Standard Practice for Quantitative Accelerated Laboratory Evaluation of Extraction Solutions Containing Ions Leached from Thermal Insulation on Aqueous Corrosion of Metals"  
 3.4 - ASTM C450 - "Standard Practice for Fabrication of Thermal Insulating Fitting Covers for NPS Piping and Vessel Lagging"  
 3.5 - ASTM C533 - "Specification for Calcium Silicate Block and Pipe Thermal Insulation"  
 3.6 - ASTM C585 - "Standard Practice for Inner and Outer Diameter of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System)"  
 3.7 - ASTM C795 - "Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel"  
 3.8 - ASTM E84 - "Test Method for Surface Burning Characteristics of Building Materials"  
 3.9 - ASTM C1617 - "Quantitative Accelerated Laboratory

Evaluation of Extraction Solutions Containing Ions Leached From Thermal Insulation on Aqueous Corrosion of Metals"

- 3.10 - ASTM E136 - "Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C"  
 3.11 - CAN4-S114-M - "Standard Test Method for Determination of Non Combustibility in Building Materials"  
 3.12 - CAN/ULC-S102-M88 - "Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies"  
 3.13 - MICA - "Commercial and Industrial Insulation Standards"  
 3.14 - NFPA 255 - "Method of Test of Surface Burning Characteristics of Building Materials"  
 3.15 - NRC 1.36 - "Nonmetallic Thermal Insulation for Austenitic Stainless Steel"  
 3.16 - UL 723 - "Test for Surface Burning Characteristics of Building Materials"

### 4. SYSTEM PERFORMANCE

- 4.1 - Insulation material shall meet the minimum thickness requirements of the National Voluntary Consensus Standard 90.1 (Current Version) established by ASHRAE, and IIC Building Codes. 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.  
 4.2 - Insulation materials provided shall meet the fire hazard requirements of:  
 4.2.1 - ASTM E136 and one of the following applicable standards:  
 4.2.1.1 - ASTM E84  
 4.2.1.2 - UL 723  
 4.2.1.3 - CAN/ULC-S102-M88  
 4.2.1.4 - NFPA 255

### 5. SUBMITTALS

- 5.1 - Product Data  
 5.1.1 - Provide product description, list of materials, manufacturer's installation instructions and thickness schedules for each service location and piece of equipment.  
 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 to manufacturer's recommendations. Where available, it is recommended to use a National Insulation Association (NIA) certified (or other similarly certified) mechanical

#### 4.6 - Weather Protection

4.6.1 - Industrial Insulation Group Insulkote ET for weather protective coating.

#### 4.7 - Insulation

4.7.1 - Industrial Insulation Group Thermo-1200 Mitered Fittings for elbows.

4.8 - Accessory materials shall be installed in accordance with project drawings and specifications, manufacturer's instructions and in conformance with the current edition of 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 prior to installing insulation.

1.3 - Verify that it is physically possible to install the 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 vapor/weather barrier could be damaged by the support.

2.4.1 - Support spacing shall be such that the circumferential joint must be outside the hanger.

2.4.2 - Insulation shall be inserted into the support to minimize heat loss.

2.5 - On vertical applications, insulation support rings shall

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