SECTION 21 07 00 - FIRE SUPPRESSION SYSTEMS INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Insulation Materials, Adhesives, Jackets, etc.:

a. All shall be listed for use with heat tracing systems on fire suppression piping.
b. All shall meet all required fire ratings.

2. Related Requirements:

a. Section 21 05 33 “Heat Tracing for Fire Suppression Piping.”

1.3 DESCRIPTION OF WORK

A. Provide all required labor, material, equipment and services necessary for insulation of wet system piping as hereinafter described and as shown on the engineering drawings.

B. It is intended that the engineering drawings and specification shall describe and provide for a working installation complete in every detail and all items necessary for such complete installation shall be provided whether or not specifically mentioned herein or shown on the engineering drawings.

1.4 SUBMITTALS

A. The engineering drawings have been prepared using computer aided drafting software. These documents will be made available to the successful fire sprinkler contractor in either electronic format. Utilization of these documents for the development of shop drawings and submittals does not relieve the fire sprinkler contractor from any of his responsibilities required herein.

B. Submittals shall be in accordance with requirements of the General Conditions of the Contract.

C. Product Literature: For all materials, adhesives, jackets, etc.

1. Literature shall clearly identify exactly what components are being provided and shall include: thermal conductivity, thickness, and jackets (if any). Literature which is not clearly identified will be rejected.

D. Shop Drawings:

1. Two (2) copies of each shop drawing. Drawings must be comprehensive, demonstrating coordination with other disciplines, complete in all detail and the same scale as the engineering drawings.
2. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
3. Detail attachment and covering of heat tracing inside insulation.
4. Detail insulation application at pipe expansion joints for each type of insulation.
5. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
6. Detail removable insulation at piping specialties and equipment connections.
7. Detail application of field applied jackets.
8. Detail application at linkages of control devices.

E. Samples: If required by Owner or Architect, provide for each type of insulation and jacket indicated. Identify each Sample, describing product and intended use. Sample sizes are as follows:

1. Preformed Pipe Insulation Materials: 12 inches long by NPS 2.
2. Sheet Form Insulation Materials: 12 inches square.
3. Jacket Materials for Pipe: 12 inches long by NPS 2.
4. Sheet Jacket Materials: 12 inches square.
5. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.

F. Field Test Reports and Certificates: Indicate test results for compliance with performance requirements.

G. Field quality control reports.

H. The Engineer will review this submittal for consistency with the Engineer’s Construction Documents.

I. After the satisfactory review by the Engineer, provide submittals to the Authority Having Jurisdiction (AHJ) and the insurance underwriter for approval.

J. The fire sprinkler contractor shall be responsible for responding, in writing, to any comments from the AHJ or the insurance underwriter within ten (10) working days after the receipt of their comments. Copies of the response shall be sent to the General Contractor and the Engineer.

K. Provide record documents in accordance with requirements of the General Conditions of the Contract.

L. Providing operating and maintenance instructions to the Owner in accordance with requirements of the General Conditions of the Contract.

1.5 QUALITY ASSURANCE

A. Installer’s responsibilities include preparing shop drawing submittal, installing insulation and providing professional engineering services needed to assume engineering responsibility.

1. Installer shall be State and Locally Licensed.

B. Fire Test Response Characteristics: Insulation and related materials shall have fire test response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing

and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke- developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke- developed index of 150 or less.

C. References: Materials, adhesives and installation shall comply with all applicable codes and referenced design standards.

1. International Building Code - 2015 Edition with DFW Amendments
2. International Fire Code - 2015 Edition with DFW Amendments
3. NFPA 13, Sprinkler Systems - 2013 Edition.
4. DFW International Airport Design Criteria Manual – Nov 2015 (Rev 2, Oct 2020)

D. Materials and components shall be UL Listed for fire protection systems installation.

E. All materials shall be installed free of any visible damage. All items not complying with this requirement shall be replaced without cost to the Owner.

1.6 COORDINATION

A. Coordinate size and location of supports, hangers, and insulation shields.

B. Coordinate clearance requirements with piping Installer for piping insulation application and equipment Installer for equipment insulation application. Before preparing piping, Shop Drawings establish and maintain clearance requirements for installation of insulation and field applied jackets and finishes and for space required for maintenance.

C. Coordinate with the installation and testing of heat tracing.

1.7 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.8 REGULATORY REQUIREMENTS

A. All work shall meet the requirements of Section 1.5.

B. The fire sprinkler contractor shall not pursue any approvals or interpretations of the Engineer’s Construction Documents except through the Engineer.

C. Insulation shall not be concealed where it is inaccessible unless it is first inspected and accepted by a representative of the authority having jurisdiction.

D. Any work performed prior to the satisfactory review by the Engineer and approval by the authority having jurisdiction and the insurance underwriter, will be solely at the fire sprinkler contractor's risk.

E. The system will not be acceptable until final testing and receipt of the Contractor's Material and Test Certificate has been obtained.

1.9 WARRANTY

A. Repair all defective workmanship or replace all defective materials for a period of one year from the date of acceptance by the Owner. Workmanship or equipment found to be defective during that period shall be replaced without cost to the Owner.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Products shall not contain asbestos, lead, mercury, or mercury compounds.

B. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

C. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

D. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

2.3 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.

2.4 SEALANTS

A. Joint Sealants:

1. Sealants shall be compatible with insulation, jackets, adhesives, etc.

2.5 FACTORY AND FIELD APPLIED JACKETS

A. Jackets shall be compatible with all other materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.

1. Verify that systems and equipment to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:

1. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
2. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment and piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment and pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs. E Install multiple layers of insulation with longitudinal and end seams staggered.

E. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

K. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

L. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

M. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 FIELD QUALITY CONTROL

A. Perform all required tests and inspections.

END OF SECTION