# SECTION 21 05 33 - HEAT TRACING FOR FIRE SUPPRESSION PIPING

## 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. This Section includes heat tracing with the following electric heating cables:

1. Self-regulating, parallel resistance.

### 1.3 DESCRIPTION OF WORK

A. Provide all required labor, materials, equipment and services necessary for heat tracing 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 system equipment.

1. Literature shall clearly identify exactly what components are being provided and shall include: Rated capacities, operating characteristics, furnished specialties, and accessories. Literature which is not clearly identified will be rejected.
2. Schedule heating capacity, length of cable, spacing, and electrical power requirement for each electric heating cable required.

D. Shop Drawings:

1. Drawings must be comprehensive of entire project, demonstrating coordination with other disciplines, complete in all detail and the same scale as the engineering drawings.
2. Wiring Diagrams: Power, signal, and control wiring.

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

F. Field quality control reports.

G. The Engineer will review this submittal for consistency with the Engineer's Construction Documents.

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

I. 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.

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

K. 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 Qualifications:

1. Installer's responsibilities include preparing shop drawing submittal, fabricating, and installing heat tracing and providing professional engineering services needed to assume engineering responsibility.

    a. Installer shall be State and Locally Licensed.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. References: Heat tracing equipment, accessories, installation, and testing 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. Equipment and components shall be UL Listed for fire protection systems installation.

E. All fire sprinkler system components 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 with the installation of insulation.

B. Coordinate installation of heat tracing with all other disciplines.

### 1.7 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. Heat tracing 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. All Heat tracing systems shall be supervised by the Terminal fire alarm system.

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

### 1.8 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 SELF REGULATING, PARALLEL RESISTANCE HEATING CABLES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Chromalox, Inc.; Wiegard Industrial Division; Emerson Electric Company.
2. Easy Heat Inc.
3. Heat Trace Products.

B. Heating Element: Pair of parallel stranded copper bus wires embedded in crosslinked conductive polymer core, which varies heat output in response to temperature along its length. Terminate with waterproof, factory assembled non-heating leads with connectors at one end, and seal the opposite end watertight. Cable shall be capable of crossing over itself once without overheating.

C. Electrical Insulating Jacket: Flame retardant polyolefin.

### 2.2 CONTROLS

A. Remote bulb unit with adjustable temperature range.

B. Snap action: open on rise, single-pole switch with minimum current rating adequate for connected cable.

C. Remote bulb on capillary, resistance temperature device, or thermistor for directly sensing pipe wall temperature.

D. Corrosion resistant, waterproof control enclosure.

### 2.3 ACCESSORIES

A. Cable Installation Accessories: Fiberglass tape, heat conductive putty, cable ties, silicone end seals and splice kits, and installation clips all furnished by manufacturer, or as recommended in writing by manufacturer

B. Warning Tape: Continuously printed "Electrical Tracing"; vinyl, at least 3 mils thick, and with pressure sensitive, permanent, waterproof, self-adhesive back.

1. Width for Markers on Pipes with OD, Including Insulation, Less Than 6 Inches: 3/4 inch minimum.
2. Width for Markers on Pipes with OD, Including Insulation, 6 Inches or Larger: 1½ inches minimum.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine surfaces and substrates to receive electric heating cables for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Ensure surfaces and pipes in contact with electric heating cables are free of oil, dirt, burrs and sharp protrusions.
2. proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

A. Install electric heating cable across expansion joints according to manufacturer's written recommendations using slack cable to allow movement without damage to cable.

B. Install electric heating cables after piping has been tested and before insulation is installed.

C. Install electric heating cables according to IEEE 515.1.

D. Install insulation over piping with electric cables according to Division 21 Section "Fire Suppression Systems Insulation."

E. Install warning tape on piping insulation where piping is equipped with electric heating cables.

F. Set field adjustable switches and circuit breaker trip ranges.

G. Protect installed heating cables, including non-heating leads, from damage.

## 3.3 CONNECTIONS

A. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

B. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

## 3.4 FIELD QUALITY CONTROL

A. Testing: Perform tests after cable installation but before application of coverings such as insulation, wall or ceiling construction, or concrete.

1. Test cables for electrical continuity and insulation integrity before energizing.
2. Test cables to verify rating and power input. Energize and measure voltage and current simultaneously.

B. Repeat tests for continuity, insulation resistance, and input power after applying thermal insulation on pipe-mounting cables.

C. Remove and replace malfunctioning units and retest as specified above.

**END OF SECTION**