This master should be used by designers working on Port of Portland construction projects and by designers working for PDX tenants (“Tenants”). Usage notes highlight a few specific editing choices, however the entire section should be evaluated and edited to fit specific project needs.

SECTION 210520 - PIPING SPECIALTIES FOR WATER-BASED FIRE SUPPRESSION PIPING

1. GENERAL
	* + 1. DESCRIPTION
				1. This section describes heat trace cable (freeze protection) for fire suppression piping systems.
			2. RELATED WORK SPECIFIED ELSEWHERE
				1. Section 210719, Fire Suppression Systems Insulation
			3. REFERENCES
				1. IEEE: Institute of Electrical and Electronics Engineers

IEEE Bulletin 515: Standard for the Testing, Design, Installation, and Maintenance of Electrical Resistance Trace Heating for Industrial Applications

* + - * 1. NEC: National Electric Code
			1. SUBMITTALS
				1. For each item specified herein, submit product/material data; shop drawings; operation and maintenance data; as-constructed data; installation, startup, and testing manuals; operation and maintenance manuals; and as-constructed drawings.

Use only if Commissioning Section 019100 is included in the project manual.

* + - * 1. For the following items, submit commissioning plans and schedules; checkout, start up, operational, functional and final acceptance test plans, procedures, checklists, and reports; and operation and maintenance training plans.

Heat trace cables and accessories. Provide calculations for heat trace cable, including power requirements and points of connection.

1. PRODUCTS
	* + 1. HEAT TRACE CABLE (FIRE SPRINKLER PIPING FREEZE PROTECTION)
				1. Acceptable Manufacturers: Raychem or equal.
				2. General: Provide a complete UL listed system of heating cables, components, and controls to provide freeze protection of sprinkler system piping passing through areas subject to freezing. The system shall comply with the manufacturer’s requirements for a UL listed freeze protection system.

Provide Schedule 5, 10, 20, or 40 steel sprinkler pipe up to and including 4-inches in diameter.

Provide UL listed glass fiber insulation with weatherproof cladding.

Protect the circuit by a 30-mA nominal ground-fault protection device with alarm contacts connected to a fire control panel.

Install heating cable per manufacturer’s instructions with approved Raychem components.

Modify outer jacket material below, as appropriate.

* + - * 1. The heating cable materials shall:

Consist of two 16 AWG nickel-copper bus wires embedded in parallel in a self-regulating polymer core that varies its power output to respond to temperature all along its length, allowing the heating cable to be cut to length in the field. The heating cable shall be covered by a radiation-crosslinked, modified polyolefin dielectric jacket. To provide a ground path and to enhance the heating cable’s ruggedness, the heating cable shall have a braid of tinned copper and an outer jacket of modified polyolefin (-CR) or fluoropolymer (-CT), as required by Section 427-23 of the NEC.

Have a self-regulating factor of at least 90 percent in order to conserve energy and to prevent overheating. The self-regulation factor is defined as the percentage reduction, without thermostatic control, of the heating cable output going from 40°F pipe temperature operation to 150°F pipe temperature operation.

Operate on a line voltage of 208 volts without the use of transformers.

Be sized according to the table below. The required output rating is in watts per foot at 50°F. (Heating cable selection is based on 1-inch fiberglass insulation on metal piping.)

|  |
| --- |
| **Minimum Ambient Temperature** |
| **Pipe size (inches)** | **0°F** | **-20°F** |
| 3 or less | 5 watts | 5 watts |
| 4 | 5 watts | 8 watts |
| 6 | 8 watts | 8 watts |

* + - * 1. Components: Enclosures shall be rated NEMA 4X to prevent water ingress and corrosion. Installation shall not require the Contractor to cut into the heating-cable core to expose the bus wires. Connection systems that require the Contractor to strip the bus wires or that use crimps or terminal blocks are not permitted. All components that make an electrical connection shall be re-enterable for servicing. No component shall use silicone to seal the electrical connections. An exception may be made in areas where a conduit transition is required.
				2. The system shall be controlled by an ambient sensing thermostat set at 40°F.
1. EXECUTION
	* + 1. HEAT TAPE (FREEZE PROTECTION)
				1. Provide heat trace on all piping in unheated spaces to prevent freezing.
				2. Install cable in a straight run(s) and without heat transfer aids. Install in accordance with the manufacturer’s instructions and recommendations and with the NEC.
				3. Heating installation shall include allowances for valves, flanges and other heat sinks based on the manufacturer’s recommendations.
				4. All circuits shall be protected with 30mA ground fault interruption devices.
				5. Before and after installing thermal insulation, the heater shall be meggered at 500-2500 VDC. Minimum insulation resistance is 20 megohms regardless of heater length.
				6. Install heat trace cable on pipes indicated to maintain a minimum of 35ºF at pipe surface in an ambient temperature of 0ºF. Lay cable parallel on pipe or spiral wrap to maintain adequate temperature as required by pipe size and thermal properties of the pipe insulation to be applied.
				7. Attach heat trace cable to pipe with polyester tape at maximum 1‑foot increments.
				8. Install thermostat capillary and bulb to pipe with polyester tape assuring a firm bulb contact with pipe. Bulb shall not be in contact with heat cable.
				9. Install thermostat at accessible location adjacent to pipe with a minimum of exposed capillary. Tape capillary to pipe run under insulation to bulb.
				10. Coordinate installation with work specified in Division 26 for adequate electrical service to each thermostat.
				11. Affix an “Electric Traced” label to the outside of the pipe’s thermal insulation on alternating sides at intervals of 5 to 15 feet immediately after the piping has been insulated.

Choose the Commissioning or Testing article. Use Commissioning if Section 019100 is included in the project manual; otherwise use Testing.

* + - 1. COMMISSIONING
				1. Commission the following items:

Heat trace cables and accessories.

* + - 1. TESTING
				1. Check out, start up, and test heat trace cables and accessories.

END OF SECTION 210520