



# DREXAN™ HeatTracer



## Heating Cable Application Bulletin: Municipal Water and Wastewater Treatment Plants.



Application Bulletin WWTP

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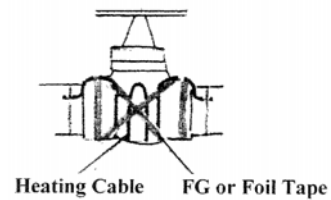
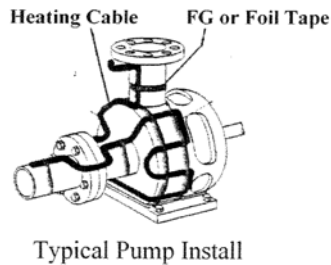
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Right Product, Right Place, Right Price™

Municipal water and wastewater treatment plants require freeze protection in cold climates. Particular requirements are:

- Presence of both hazardous and non-hazardous areas. While most lines will be domestic water lines in ordinary areas, there will be areas with methane gas (CH<sub>4</sub>) and Hydrogen Sulfide gas (H<sub>2</sub>S). The specified systems should be suitable for installation in both ordinary and hazardous areas. Hazardous area cables and components should be specified throughout.
- Reliability of cable type in service. While Mineral Insulated heating cables and series resistance heating cables have been used in municipal water and wastewater treatment, both types have drawbacks that make self regulating cables much more desirable for this application. The benefits are:
  - Cut-to-length in the field vs. factory terminated assemblies;
  - Ability to splice and tee in the field during installation and repair; and
  - Ability to overlap on pump cases, valve bodies, at pipe supports, pipe hangars and other heat sinks where additional heating cable is required.
- Possibility of cable exposure to both benign fluids and organic/inorganic chemicals. While the cables most likely will be exposed to water, there is potential for exposure to chemicals like sodium hypochlorite etc. The specified systems should be suitable for exposure to both water and organic/inorganic chemicals. Fluoropolymer cable jackets should be specified throughout.
- Requirement for monitoring and control. Most municipal water and wastewater plants are highly automated and have streamlined work forces. The heat tracing system should have appropriate monitoring and control to function automatically while providing immediate warnings and alarms in the event of system failure to provide adequate time for the appropriate action by the work force. Stand alone controllers with integral ground fault and alarm outputs should be specified throughout.
- Presence of heat tracing on both metallic and plastic piping systems. The heating cables and installation methods should be suitable for both metallic piping and plastic piping systems, recognizing that plastic pipes require that a heat-loss calculation factor be applied during the engineering design due to their lower thermal conductivity.
- Ensuring adequate heat generation while minimizing electric energy consumption. Many heating systems provide an excessive amount of power per unit pipe length. The heating cables should be designed to make up the heat lost at the minimum design ambient temperature, and no more. Any excess heat is merely wasted. The heating cables should be matched to heat loss calculations for the traced lines.
- Engineering for reliability, robustness, and maintainability. Due to the nature of municipal regulations and streamlined work forces, the heating systems should be designed and installed to ensure easy access to components, easy troubleshooting, and visual aids for rapid assessment of system function. Redundant systems comprising main and back-up heaters with 2-circuit controllers will ensure continued system function while the failed heater is repaired or replaced.
- Heating cable installation for ease of valve and pump maintenance. Pumps and valves must be maintained. The installation method of the cable can make maintenance easy, or difficult. Incorrectly installed cable can not only increase the time to remove and replace components from piping systems, but may result in cable damage that can extend the system down-time and increase the cost of maintenance while damaged heating cables are repaired and replaced.



## Generic Specification for Municipal Water and Wastewater Treatment Plants

### General:

Furnish, install and commission a complete CSA certified heat tracing system comprising self-regulating heating cables, connection components, and monitoring and control panels for the purposes of

- a. **Freeze protection** for any pipes containing water (or water mixture); or
- b. **Process temperature maintenance** for any other process line, tank or accessory requiring a safe, easily installed heat source.

### Products:

#### 1. Self Regulating Heating Cable.

##### a. Construction:

- i. At a minimum self-regulating heating cable shall be:
  1. A parallel circuit consisting of (or comprising) two (2) 16 AWG main bus wires nickel copper extruded within in a semi-conductive, self-regulating polymeric core.
  2. The cable shall be capable of being cut to length and powered and terminated in the field by licensed qualified trades people.
  3. The polymeric core shall be encased in a radiated cross-linked, modified polyolefin dielectric jacket. The dielectric jacket shall have a tinned copper wire shield (braided) encased in an outer jacket of fluoropolymer (SJ) which is specified for service where the cable jacket is exposed or could potentially be exposed to organic or inorganic chemicals. Jacket specification is Drexan HeatTracer –SJ.

##### b. Performance:

- i. Wattage output of self regulating cables shall vary along the linear length of the cable in response to, and in direct proportion to the temperature in immediate proximity (or in contact with) the cable.
- ii. **Tolerances:** Rated output (as certified by CSA) shall be -0% to +10% of published rated output as stated in catalogue and so marked on cable.
- iii. The cable shall be capable of operating at 120, 208, 220, 240, or 277 volts without use of a transformer.
- iv. The wattage output of the cable shall be matched to the heat loss of the pipe at minimum design ambient temperature as calculated by manufacturer's ProTrace heat tracing design software.

##### c. Warranty:

- i. Self Regulating Cable shall be furnished with a standard 3 year warranty against defects in workmanship and product quality.

##### d. Acceptable Products: **Drexan™ HeatTracer PipeGuard SJ.**

#### 2. Components

Drexan™ HeatTracer power connections, splices and end seals must be used, as per installation instructions, with the Drexan HeatTracer Cables to ensure product performance criteria and to comply with requirements of warranty, codes and approvals. The connections components shall be one of the following varieties:

- i. heat shrinkable
- ii. metallic assemblies
- iii. polymeric quick connections

The connections shall be mounted on or above the insulation to allow access for inspection and troubleshooting.

A visible light indicator shall be provided at the end of the circuit to allow for visual confirmation of continuity when the heating cable is energized.

End seals shall be re-enterable for inspection and troubleshooting.

Acceptable Products: **Drexan™ HeatTracer PowerPod.**

### 3. Monitoring and Control

Electronic Monitoring and Control Panel: **RECOMMENDED**

- a. A programmable, solid-state Heat Tracing Monitoring and Control Panel shall be installed to provide the following System Fault Alarms:
- i. Breaker off or tripped.
  - ii. Heater continuity or low current.
  - iii. Ground fault trip.
  - iv. Low temperature.
  - v. High temperature.
  - vi. Sensor fault.
  - vii. The panel shall include
    1. DC or AC alarm output for PLC or remote alarm indication.
    2. A viewable LED Alarm indicator shall be on the door of the enclosure.
    3. The panel shall be a weatherproof, NEMA-4X enclosure.
    4. The panel shall exercise dormant heat tracing systems every 24 hours for early warning to prevent shut-downs.
    5. Note: Alarm relays: where required by applicable law, alarm outputs may also be required.

**Note: In all applications the heating cable circuit shall be protected with ground fault equipment in accordance with the National and Canadian Electrical Codes.**

- b. Where redundant systems are required to ensure uninterrupted freeze protection, two heating systems shall be installed on the lines and a two-circuit controller shall be installed, with one heating cable being operational and the other being available as a stand-by back-up.

#### **Installation and Commissioning:**

- a. Heat tracing cable and cable connection components shall be installed in accordance with Manufacturer's Installation Instructions, including compliance with maximum circuit lengths for the selected breaker size and the design ambient start up conditions.
- b. Heating cable shall be affixed to piping using fiberglass tape or nylon cable ties. Polyvinyl electrical tape and metallic pipe straps shall not be used.
- c. Safety labels shall be affixed to the exterior of the insulated line.
- d. The system shall be considered acceptable when all of the following conditions are met:
  - i. Heating cable has been correctly installed;
  - ii. connection components have been correctly installed;
  - iii. the heat tracing lines are insulated;
  - iv. the monitoring and control panel has been correctly installed;
  - v. the monitoring and control panel has been correctly programmed;
  - vi. power has been applied to the heat tracing control panel; and
  - vii. The heat tracing control panel shows no alarms.
  - viii. All of the above are certified by a representative of the manufacturer or an approved contractor.

**Note: if thermostat and ground fault breaker are installed, then continuity must be confirmed after installation of insulation.**