Introduction

A complete electric heat tracing system will typically include the following components:

1. Electric heat tracing cable (self-regulating and parallel constant watt).

2. Power and end termination kit.

3. Temperature controller.

The absence of any of these items can cause a system to malfunction or represent a safety hazard.

Cable Testing

After a heat tracing circuit has been installed and fabricated, the heating cable should be tested to ensure electrical resistance integrity. The cable should be tested with at least a 500 Vdc megohmmeter (megger) between the heating cable bus wires and the heating cable metallic braid. It is recommended that the test voltage for polymer-insulated heating cables be 2500 Vdc.

After properly terminating the cable, connect the positive lead of the megger to the bus wires and the negative lead to the metallic braid. The minimum acceptable level for the megger reading for any polymer-insulated heat tracing cable is 20 megohms.

Final Inspection

The heating circuit can now be tested for proper operation. This includes measuring and recording the connected voltage, steady-state current draw, length and type of cable. (See the Inspection Report Form.)

Maintenance

Once the heat tracing system has been installed, an ongoing preventive maintenance program should be implemented using qualified personnel. Support documentation providing general information and an operating history of the specific circuits in the system should be maintained.

The results of the operational testing described above form the testing “base line” or normal range. Subsequent measurements should be recorded periodically and compared to this base-line data to help identify potential malfunctions.
# Inspection Report Form for Electric Heat Tracing

## CIRCUIT INFORMATION

<table>
<thead>
<tr>
<th>Location</th>
<th>System</th>
<th>Reference Drawing(s)</th>
<th>Circuit #</th>
</tr>
</thead>
</table>

### Heater Controller

- **Visua**
  - Panel Number
  - Date
  - Initial

### Heating System Components

- Enclosures, Boxes Sealed
- Presence of Moisture
- Sign of Corrosion
- Heater Lead Discoloration

### Heating and/or High Limit Controller

- Operating Properly
- Controller Setpoint

## ELECTRICAL

### Dielectric Insulation Resistance Testing

- (bypass controller if applicable) Refer to IEEE 515-2004, Section 7.2.2
  - Test Voltage
  - Megger Value

### Heater Supply Voltage

- Value at Power Source
- Value at Field Connection

### Heater Circuit Current Reading

- Amps Reading at 5 min.
- Ground-Fault Current

### Comments and Actions

- Performed by
  - Company
  - Date

- Approved by
  - Company
  - Date
Troubleshooting

The following information is intended to assist in troubleshooting electric heat tracing systems. The primary objective is to provide an enhanced understanding of the elements of a successful heat tracing installation.

If an electric heat tracing circuit is suspected to be damaged, a dielectric insulation resistance (megger) test should be performed using a 2500 Vdc megohmmeter for polymer-insulated heating cables. Periodic testing with accurate records will establish a “normal” range of operation (refer to the Inspection Report Form). Dielectric insulation resistance readings which deviate from the normal range can quickly reveal a damaged circuit.

| I. No heat/no current | A. Loss of power (voltage) | A. Restore power to tracing circuit (check circuit breaker and electrical connections). Poorly made terminations can cause EPD-type breakers to trip unexpectedly |
| B. Controller setpoint too low | B. Adjust setpoint |
| C. Controller failure | C. Repair sensor or controller |

| II. Low system temperature | A. Controller setpoint too low | A. Adjust setpoint |
| B. Low voltage (check at power connection point) | B. Adjust voltage to meet design requirements |

| III. High system temperature | A. Controller “on” continuously | A. Adjust setpoint or replace sensor |
| B. Controller failed with contacts closed | B. Replace sensor or controller |

| IV. Excessive cycling | A. Controller differential too narrow | A. Widen differential or replace controller to avoid premature contact failure |

Notes . . .

1. The operation of most electric heat tracing cables is dramatically affected by changes in the supply voltage. Before making any changes, consult the cable manufacturer with information on the alternate voltages available. Otherwise, cable failure and/or an electrical safety hazard may result in some situations.