



TTS™ Self-Regulating Heating Cable For Roof & Gutter Snow & Ice Melting

Specifications

Product: TTS 8 (A) Open Specification

1.0 General:

Design, furnish and install a complete system of heaters and components approved by the Canadian Standards Association (CSA) specifically for roof and gutter snow and ice melting heat tracing applications. The heat tracing system shall conform to the latest edition of the applicable requirements of the following codes and standards:

- Canadian Electrical Code(CEC)
- National Fire Protection Association (NFPA)
- Occupational Health and Safety Act(OSHA)
- National Electrical Manufacturers Association(NEMA)
- American National Standards Institute(ANSI)
- Institute of Electrical and Electronics Engineers(IEEE)
- National Electrical Code(NEC/NFPA 70)
- All applicable local codes and standards

2.0 Products:

2.1 Temperature ratings, watt densities, supply voltage:

The Heating cables shall be Self-Regulating in nature and vary their output in response to temperature variations. Self-regulating heating cable design shall be capable of producing 20 W/m (6 W/ft) in dry air, 39 W/m (12 W/ft) under snow and ice conditions, and withstand a maximum continuous exposure temperature of 85 °C (185 °F). Available watt densities shall be 26 W/m @ 10 °C (8 W/ft @ 50 °F). Available supply voltages shall be 120Vac, 208Vac and 240Vac.

2.2 The Self-Regulating Heating Cable will have a minimum installation temperature of -51 °C (-60 °F) and a minimum bend radius of 32 mm (1.25”).

2.3 Cable must be capable of being cut to a desired length to accommodate the installation conditions and must form a continuous heating circuit.

2.4 Construction:

The cable construction shall consist of two parallel nickel plated copper bus wires (16 AWG), a radiation cross-linked semi-conductive heating matrix, a radiation cross-linked dielectric insulation, a tinned copper braid and a polyolefin over jacket.



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2.5 Performance tests:

2.5.1 Service life:

Long-term stability shall be established by the service life performance test per IEEE 515-2004. The TTS™ series of Self-Regulating Heating Cables must meet or exceed the IEEE 515, IEEE 515.1, CSA 130.1, CSA 130.2, CSA 130.3, CSA 138 standards and must be approved for use in ordinary and hazardous (classified) locations Class I, Division 2, Groups A, B, C, D and Class II, Division 2, Groups F, G.

2.5.2 TTS™ self- regulating heat trace cables must meet or exceed the following performance tests:

Abrasion Resistance	UL 1588 (8.3): IEEE 515.1 (4.3.4)
Cold Bend	CSA 130-3(6.2.9), IEEE 515.1 (4.2.10)
Deformation	CSA 130-3(6.2.7), IEEE 515.1 (4.2.8)
Dielectric Withstand	CSA 130-3(6.2.1),IEEE 515.1 (4.2.1)
Resistance to Impact	CSA 130-3(6.2.10.1), UL 1588 (8.2)
Resistance to Cutting	CSA 130-3(6.2.8), IEEE 515.1 (4.3.3)
Resistance to Crushing	CSA 130-3(6.2.7), UL 1588 (8.1)
Temperature	CSA 130-3(6.2.5.4.3), UL 1588 (9.1-9.3)
UV and Condensation	CSA 130-3(A.2), IEEE515.1 (4.3.2)
Vertical Flame	CSA 130-3(6.2.14), UL 1588 (8.5)

2.5.3 The heating cables shall be qualified to withstand continuous submersion in water for 2000h (12 weeks) in accordance with the test requirements of CSA 130.3, section A.3 (Wet Location Applications) and IEEE 515.1-2004, section 4.3.1(Increased Moisture Resistance Test).

3.0 Accessories:

Accessory kits like power connection gland kit without junction box 18-SXG, metallic power connection kit with junction boxes ECA-1-SR-SP, non-metallic power connection kit with junction box PCA-1-SR, metallic T splice kit ECT-2-SR, inline splice kit HS-PBSK, T splice kit HS-TBSK, end termination kit ET-4S, shall be applied in the field.

3.1 Accessory kits and heating cable components shall be CSA approved and UL listed for use as part of the roof and gutter snow and ice melting system.

4.0 Protection:

Heating cable circuit shall be protected by a ground fault device for equipment protection. This requirement is in accordance with section 62-300(4) of the C.E.C. The system shall be protected by a 30 mA trip ground-fault circuit breaker.

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Heating cable must have a metallic braid or sheath according to section 62-300(2) of the C.E.C. The metallic braid or sheath of each heating cable shall be bonded to ground in accordance with section 62-308(3) of the C.E.C

6.0 System Control:**6.1 Option 1: Manual Control**

The system shall be controlled by a switch, either directly or through an appropriate contactor

6.2 Option 2: Thermostatic Control-Ambient Sensing

The system shall be controlled by an ambient sensing thermostat. The R3C-0120-DP(outdoor installation) has an adjustable range from 0 °C to 120 °C. The thermostat has a 10ft long capillary.

6.3 Option 3: Snow and ice sensor/controller

The system shall be controlled by a sensor/controller. Choose either STC-DS-2B with an adjustable temperature trigger set point from 1 °C to 7 °C with a single 30A load contact or STC-DS-8 with an adjustable temperature trigger set point from 1 °C to 7° C with a single 30A load contact and a 10 ft lead wire.

6.3.1 The sensor/controller unit must include the following features:

6.3.1.1 The unit must incorporate a moisture sensor, temperature adjustment switch, delay switch

6.3.1.2 The unit must accommodate 120Vac, 208Vac and 240Vac supply voltage

6.3.1.3 The unit must be able to control heater to maintain temperature above freezing point.

Either sensor/controller can control a heat tracing cable or a number of circuits directly or through an appropriate contactor.

7.0 Execution**7.1 Installation**

7.1.1 System (including heat trace cable and accessories) must be installed per manufacturer's recommendations and installation instructions.

8.0 Testing:

8.1 Heating cable shall be tested with a 2500Vdc megohmmeter between the heating cable bus wires and the metallic braid, before installation, after installation and completion of all accessory kits (in-line splices, T-splices etc), prior to connecting to power.

8.2 The minimum acceptable level for the megger readings is 20 megohms, regardless of the circuit length. Test results must be recorded and submitted to the construction manger.

9.0 Installation assistance:

Technical assistance at installation available upon request in advance.


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**(B) Closed Specification
Engineering/Architectural:**

Heat tracing for roof and gutter snow and ice melting shall utilize 3M™ Self-Regulating Heating Cable type TTS 8-1 or TTS 8-2. The selection of the cable shall be done in accordance with the 3M™ Design Guide for Roof and Gutter Snow and Ice Melting. The maximum circuit length will be established based on breaker size and start-up temperature as per the following table below.

TTS cable selection tables:

120 Vac Service Voltage		Max. Circuit Length vs. Breaker Size Ft (m)			
Catalog Number	Start-up Temp. °C (°F)	15A	20A	30A	40A
TTS 8-1	-7 (20)	100 (31)	135 (42)	175 (54)	175 (54)
	-18 (0)	80 (25)	105 (33)	155 (48)	175 (54)

208 Vac Service Voltage		Max. Circuit Length vs. Breaker Size Ft (m)			
Catalog Number	Start-up Temp. °C (°F)	15A	20A	30A	40A
TTS 8-2	-7 (20)	185 (57)	245 (75)	350 (107)	350 (107)
	-18 (0)	145 (45)	190 (58)	290 (89)	350 (107)

240 Vac Service Voltage		Max. Circuit Length vs. Breaker Size Ft (m)			
Catalog Number	Start-up Temp. °C (°F)	15A	20A	30A	40A
TTS 8-2	-7 (20)	190 (58)	250 (77)	350 (107)	350 (107)
	-18 (0)	150 (46)	200 (61)	295 (90)	350 (107)



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