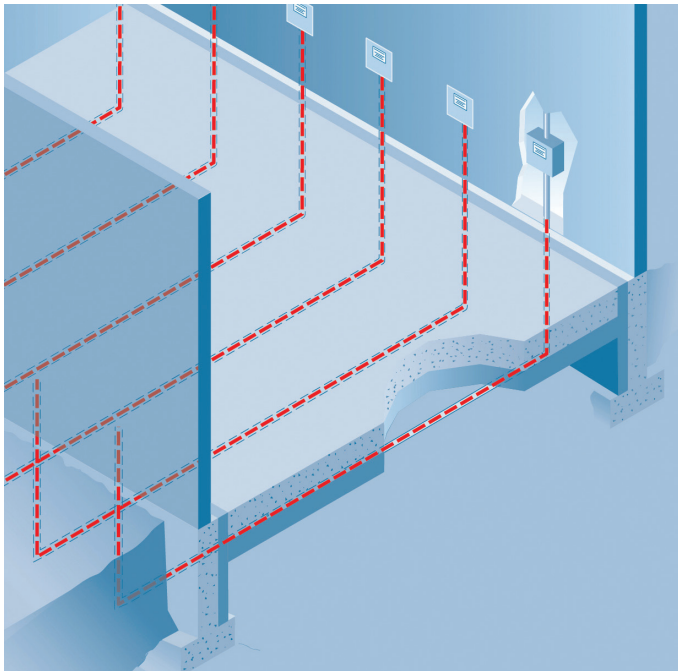


SPECIFICATION GUIDELINE

FROST HEAVE PREVENTION



SCOPE

This specification describes an energy efficient freezer frost heave prevention system for freezers, cold rooms, and ice arenas.

MANUFACTURER

Manufacturer to show minimum forty years (40) experience in manufacturing self regulating heating cables and shall be ISO 9001 registered. Manufacturer shall be nVent.

SELF-REGULATING HEATING CABLES

- Heating cable shall be self-regulating heating nVent RAYCHEM FS-C-2X cable as manufactured by nVent.
- The heating cable shall have a modified fluoropolymer inner jacket, to protect the core from chemical ingress and a tinned-copper braid, to provide a ground path and enhance the cable ruggedness.
- The heating cable shall have a modified polyolefin outer jacket for enhanced mechanical and chemical protection.
- All cables shall be tested and approved to IEC 62395 and verified by a third party agency such as VDE.

INTERCONNECTION AND TERMINATION

- Under no circumstances shall terminations be used which are manufactured by a vendor other than the cable manufacturer.
- Interconnection and termination shall be made with heat shrinkable components and junction boxes as manufactured by nVent.

CONTROL SYSTEM

[Select one option]

[Option 1] Single Application Controller

- All self regulating frost heave prevention circuits shall be controlled and monitored with a line sensing thermostat, Raystat-Control-10, as manufactured by nVent.
- The controller must have the following functions: Adjustable hysteresis, high and low temperature alarm function, digital display, capacity for "Off-site" programming without external power supply, 25 amp switching capacity rating, sensor failure alarm, voltage failure alarm, selectable fail safe mode, either ON or OFF, alarm relay for remote BMS monitoring, system error codes for quick diagnostic of system failure

[Option 2] Single Application Controller, Panel Mounted

- All heat tracing circuit shall be controlled and monitored via a line sensing DIN rail mounted thermostat with digital display, Raystat-Control-11-DIN, mounted in the multi circuit control panel SBS-xx-SV, as manufactured by nVent, integrated with MCB's (BS EN 60898 type C) and RCD (30 mA sensitivity (tripping within 100mS).

[Option 3] Multi-Application Controller

- All heat-tracing circuits shall be controlled and monitored via an electrically protected, multi circuit, multi application control solution, with an integrated centralised user interface terminal (UIT) that includes 3 customisable alarm outputs for customer specification, all known as RAYCHEM ACS-30, by nVent.

- The C&M system shall be certified and approved by the manufacturer for use with the heat-tracing system.
- The C&M system shall be modular for easy design and shall include: [select some or all of the following product modules]
 - nVent RAYCHEM ACS-30-EU-UIT2 Touch screen colour user interface terminal for control and monitoring of up to 260 individual circuits. [always included in the system].
 - nVent RAYCHEM ACS-30-EU-PCM2 power & control modules which include integrated control & monitoring capability and electrical safety for equipment personnel and circuit protection switchgear. The power & control module will also include 5, 10, or 15 heating circuit capability, dependent upon selection, and will include an input (temperature sensor or external device) per circuit for individual heater circuit temperature monitoring. [At least one PCM shall be included in the system].
 - nVent RAYCHEM ACS-30-EU-Moni-RMM2-E remote monitoring module for the addition of 8 resistance temperature detectors (RTDs) for connection to the ACS-30-EU-PCM or to the ACS-30-EU-UIT2. Up to 16 RMM modules may be controlled via a single User Interface Terminal (UIT).
 - nVent RAYCHEM ACS-30-EU-VIA-DU-20-MOD surface snow melting and de-icing multi-sensor module for monitoring of the ground surface heat-tracing system.
 - nVent RAYCHEM ACS-30-EU-EMDR-10-MOD gutter and roof de-icing multi-sensor module for monitoring of the roof and gutter de-icing heat-tracing system.
 - nVent RAYCHEM ProtoNode-RER high performance protocol gateway for connection of the ACS-30 system to the buildings BMS using BacNet or Metasys N2 protocol.
- The control system shall be capable of controlling and monitoring up to 260 individual circuits of heat-tracing via a centralised user interface terminal (UIT) for easy system monitoring. The UIT shall be fully 2 way BMS compatible via RS485 port or Ethernet port. The C&M system shall be compatible with BacNet, Metasys N2 and Lonworks BMS protocols for effective inter-system communication.
- The heating circuit power and control modules (PCM) shall be modular, decentralised solutions to enable placement throughout the building, or group of buildings, in proximity to the required heating system to limit the quantity of power cabling.
- The PCMs shall be connected to the UIT via RS-485 cable for communication, control & monitoring purposes. In the event of power failure or communication failure from the UIT, the PCM shall be capable of continued function for safety and system continuity.
- The C&M system shall be capable of monitoring circuit by circuit line or ambient temperature, energy consumption, energy usage pattern, and ground fault/earth fault detection. There shall be alarm function on a circuit by circuit basis. In the event of an alarm, the UIT shall provide details of the alarm reason as well as indicating the specific circuits (s) affected.
- The control system shall be compliant with European norm EN60439 and be tested and CE approved to this standard.
- All UIT and PCM units shall be RAL7035 (light grey) coloured metal enclosures for hard wearing durability.
- Type C circuit protection and residual current device (30mA rated) shall be included in the PCM per heating circuit.
- All electrical connections between the electrical supply, UIT, power & control modules, ancillaries, and heating circuits shall be carried out by a qualified and approved electrical contractor.

EXECUTION

DESIGN

Provide heat tracing layout drawing, single line diagram, slab heat calculation and distribution panel drawings.

INSTALLATION

- The system shall be installed, tested and commissioned strictly in accordance with the manufacturer's instructions and in accordance with the design plans.
- Installation of equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate subcontractors.

TESTING AND COMMISSIONING

- Acceptance Test: Provide the service of competent, factory trained engineer or technician from the manufacturer of the frost heave prevention equipment to technically supervise and participate during all of the adjustments and commissioning of the system.

WARRANTY

- Manufacturer shall make available a ten year limited product warranty on the heating cable and related standard components. Manufacturer shall also provide six year warranty for all heat trace controllers.
- Contractor shall submit to owner the results of all installation tests required by the manufacturer.
- Contractor shall complete the online warranty registration form at nVent.com within 30 days from the date of the installation.

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