Raychem SPECIFICATION GUIDELINE

T2Red

Underfloor Heating System Engineering Specification for Raychem T2Red Heating Cable, T2Reflecta Plates and Thermostats

(I) General Specification

1) An electrical underfloor heating system shall be installed to provide a comfortable floor temperature (around 18-27°C).
2) The underfloor heating system shall consist of a pre-grooved insulated aluminium profile and self-regulating type heating cable.
3) The underfloor heating components i.e. heating cable and insulation plate shall be supplied by the same manufacturer, to ensure the ideal compatibility.
4) The underfloor heating system shall be compatible with all stable subfloor types e.g. concrete, anhydrite, plaster, ceramic subfloor, wooden subfloors.
5) All the underfloor heating circuits shall be controlled and monitored by programmable digital floor temperature sensing thermostats with integrated timer, economy setback and boost functions.
6) All the underfloor heating circuits shall be protected by MCB (to BS EN 60898, type C/D) and RCD (30 mA sensitivity, tripping within 100ms).
7) The manufacturer shall provide a 15-year warranty for the underfloor heating components, after tested and commissioned according to their requirements.
8) A 3-stage testing work shall be provided for the safety of all underfloor heating circuits. Stage 1 is right after the installation of the heating cables, an insulation test should be done with high potential tester using ≥ 500 VDC, the result resistance should be ≥ 100 MΩ. Stage 2 is after laying screed or covering parquet, the above insulation test should be repeated to ensure the intactness of all the heating cables. Stage 3 is the last insulation test for the heating cables before installing the thermostats. All the insulation test results should be well recorded.

(II) Electrical Heating Cable Specification

1) The underfloor heating cables shall be energy efficient, self-regulating type, delivering nominal output power 5W/m – 15W/m @ 230V voltage @25°C temperature depending on floor covering.
2) The self-regulating type heating cable shall be able to apply under any type of floor surface, there is no risk on overheating under carpets, furniture, etc.
3) The self-generating temperature of the heating cable shall be at maximum 45°C or lower, there should be no risk of overheating.
4) The heating cable shall deliver automatic self-regulating output depending on environment (more output in cold zones, less output in warm zone).
5) The heating cable shall be rugged and chemically resistant, with fluoropolymer electrical insulation, tinned copper braid and fluoropolymer over jacket.
6) The heating cable shall have approx. 8.7 mm x 6.0 mm dimensions in cross sectional area, and its minimum bending radius is 35 mm.
7) All the underfloor heating cable shall be capable of a maximum circuit length of 100 m @ 10 A.
8) The heating cable shall be cut to length and therefore flexible to adapt to the room shape and interior design.
9) The termination of self-regulating heating cable shall be made using components as approved by the manufacturer, i.e. connection and end seal kit.
10) The heating cable shall be able to be spliced and crossed without risk of overheating.
11) The heating cable should not require cold lead in installation, shall allow direct connection possible in junction box or to thermostat.
12) The heating cable should not have joint or interconnection located underfloor, to avoid any weakness due to aging problem.
13) No measurable electro-magnetic fields should be present due to the heating cable.
14) The heating cable shall comply with SEMKO SS 4242411 standard and CE-marked.

(III) Insulation Plate Specification

1) The insulation plate shall consist of expanded polystyrene (EPS) and aluminium plate formed with installation grooves which allow the heating cable to be pushed inside, maintaining a low and flat profile.

2) Dimension of the insulation plate shall be 720mm x 400mm x 13mm (EPS insulation layer 12.5mm thick, aluminium heat distribution layer 0.5mm thick). While dimension of the EPS end plates shall be 100mm x 400mm x 12.5mm (without aluminium layer).

3) The insulation layer shall have heat transfer coefficient of 0.033W/(mK), U-value of 2.33 W/m^2K, thermal expansion coefficient of 2.4 x 10^{-5} 1/K and long term pressure capability of 140 kPa (14000 kg/m^2).

4) The insulation plate integrated aluminium heat distribution layer shall provide 20% extra energy saving, shall also deliver a uniform and adaptive heat distribution across the area.

5) The insulation plate shall be glued or screwed on all types of subfloors which are dry, clean, stable and rigid, without cracks or adhesion-reducing substances.

6) The insulation plate shall comply with fire classification DIN 4102-B1 standard.

(IV) Thermostat Controller Specification

A. Senz Wifi Thermostat

1) The thermostat shall be wall-mounted, with WiFi enabled programmable touchscreen to allow temperature control of electrical underfloor heating system.

2) The thermostat shall combine an app enabled remote function, to control, monitor and program the thermostat via free smartphone app (included iOS and Android).

3) The thermostat shall have wireless compatibility of IEEE 802.11 b/g/n.

4) The thermostat shall have 7 operation modes, including 3 economic programs (1 to 7 events/day; 7 days/week; 1 temperature per event), 1 constant mode (1 set-point temperature), 1 flexible boost mode (temporary override of the programmable or constant modes), 1 holiday mode (programmable in advance; calendar based, adaptable temperature) and 1 OFF mode (including frost protect option).

5) The thermostat shall be able to work at supply voltage of 230VAC, 50Hz. Its relay output to heating cable shall be at 230V, maximum 13A resistive load.

6) The thermostat shall comply with IP21 protection rating.

7) The thermostat shall comply with CE and VDE approvals.

8) The thermostat shall operate at temperature set-point range from 5°C to 35°C in its floor sensing mode.

9) The thermostat shall have 1 room ambient temperature sensor and 1 external floor temperature sensor, while the default floor temperature sensor shall be 12kΩ/25°C NTC type. The thermostat shall be also compatible with other NTC sensors e.g. 2/10/15/33/100kΩ if required.

10) The thermostat shall include a floor sensor with 3m long cable, the maximum length of the floor sensor cable can be extended optionally up to 100m long (by 2 x 1.5mm^2 230VAC cable).

11) The floor sensor cable shall be put in a conduit and the sensor should be put in the middle between two heating cables.

B. Greenleaf Thermostat

1) The thermostat shall be wall-mounted, with user-friendly touchscreen to allow temperature control of electrical underfloor heating system.

2) The thermostat shall have 2 operation modes, including manual on/off mode (1 set-point temperature) and an editable pre-program (4 temperature set-points per day).

3) The thermostat shall be able to work at supply voltage of 230VAC, 50Hz. Its relay output to heating cable shall be at 230V, maximum 13A resistive load.

4) The thermostat shall comply with IP20 protection rating.

5) The thermostat shall comply with CE EN 60730-1 and EN 60730-2-9; also RoHS complaint and WEEE complaint.

6) The thermostat shall operate at temperature set-point range from 5°C to 35°C in its floor sensing mode.

7) The thermostat shall have 1 room ambient temperature sensor and 1 external floor temperature sensor, while the default floor temperature sensor shall be 10kΩ/25°C NTC type.

8) The thermostat shall include a floor sensor with 3m long cable, the maximum length of the floor sensor cable can be extended optionally up to 100m long (by 2 x 1.5mm^2 230VAC cable).

9) The floor sensor cable shall be put in a conduit and the sensor should be put in the middle between two heating cables.

C. NRG-DM Thermostat

1) The thermostat shall be wall-mounted, with user-friendly buttons and LCD display to allow temperature control of electrical underfloor heating system.

2) The thermostat shall have 3 operation modes, including 1 manual on/off mode (1 set-point temperature), 1 editable pre-program event mode (based on a 7-day weekly schedule, 1 to 6 events/day; 7 days/week; 1 temperature per event) and 1 flexible boost mode (temporary override of the programmable or constant modes).

3) The thermostat shall have child lock to prevent accidental changes on the thermostat settings.

4) The thermostat shall be able to work at supply voltage of 230VAC, 50Hz. Its relay output to heating cable shall be at 230V, maximum 13A resistive load.

5) The thermostat shall comply with IP21 protection rating.

6) The thermostat shall comply with CE and VDE approvals.

7) The thermostat shall operate at temperature set-point range from 5°C to 35°C in its floor sensing mode.

8) The thermostat shall have 1 room ambient temperature sensor and 1 external floor temperature sensor, while the default floor temperature sensor shall be 10kΩ/25°C NTC type.

9) The thermostat shall include a floor sensor with 3m long cable, the maximum length of the floor sensor cable can be extended optionally up to 100m long (by 2 x 1.5mm^2 230VAC cable).

10) The floor sensor cable shall be put in a conduit and the sensor should be put in the middle between two heating cables.