


N-HEAT® COLLECTION

Electrical Heating Cables







NEXANS

– the inventor of heating cables -1926

N-HEAT® COLLECTION

When choosing the **N-HEAT®** electrical heating solutions you choose undisputable quality, a century of experience and the reliability of an industry leader.

The Kremlin, the Sivas stadium in Turkey, the Bird's Nest and other Olympic sites in China all have one thing in common with thousands of office buildings and private homes ; electrical heating solutions from Nexans. In fact, the heating cable was invented by Nexans in Norway in 1926. Since then, we have produced and marketed high quality heating cables in every corner of the world. For the past 100 years we have focused on the continuous development of heating solutions, constantly exceeding the demands of the market.

Today, our leading heating concept, **N-HEAT®**, is the obvious choice for maximum comfort and reliability. The high quality heating solutions are easy to install, durable and energy saving, keeping people safe and healthy.

PATENT SPECIFICATION
Convention Date (Germany) : June 1926
Application Date (in United Kingdom) : June 1926
Complete Accepted : June 23, 1926
COMPLETE SPECIFICATION.
An Electric Heating Cable.
SKANDINAVISKE
r, a company
of Norway, of
MAR OLSEN,
Prestegaards-
y (Assi-
of a wire resistance
bottom thereof.
An electric heating
the present invention
factor made of a mater-
mic resistance, an in-
heat-resisting material
ch is substantially
n of heat, such, for
tos, impregnated asbe-
outer sheath of magn-
a high hysteresis
loss so as to increase
generated in the cabl-
or more such cond-
rm the cable and are
mon insulating cover-
ing material.
proved material.
heating cable is pr-
or warming large areas, e-
purposes rather than
ch as cooking or like
the known forms of h-
usually designed.
event damage owing
surroundings, the insu-
e preferably provided
heath of relatively
ed to resist chemical
l shocks.
cable according to
e instance of its
are illustrated by 80
e accompanying
shows another form of cable 85
a single conductor,
illustrates a cross-section
lower bed provided with a
according to the invention,
longitudinal section on
Figure 3. 90

Part 1

Comfort heating in buildings

- 07** Comfort heating in buildings
- 08** Heat loss and energy demand
- 09** Project planning and calculations
- 10** Selection of thermostat
- 11** Technical overview - formulas and terms



Part 2 Applications

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 - 24** Frost protection of pipes and tanks
 - 27** Frost protection of freezer room (floors)
 - 27** Sport fields and similar
 - 28** Drying and curing of concrete
 - 29** Hot water in buildings

Floor heating in bathrooms and wet rooms

A good choice of installed power for bathrooms lies in the range of 120 - 150W/m² (11 - 14 W/sq.ft.).

Controller

Use a thermostat with a floor sensor or a power regulator.

Installation

The heating cable is normally installed on a chicken mesh or a reinforcement mesh. Fixing the cable with cable ties can be a good solution, but remember not to tighten the ties too much. Do not tighten a cable tie over the end seal of the cable. The intention is only to keep the cable more or less in place during the pouring of screed/concrete, and over-tightening might damage the cable. If you are installing a twin conductor heating cable with an end seal, remember to put the end seal in a zone where moisture/water most likely will not be present. The chicken mesh and/or reinforcement mesh must always be electrically connected to the earth wiring of the installation. If the gully grating/grid is made of metal, this should also be connected to the ground wire.

How to connect ground/earth wire to a chicken mesh

- 1 Cut one mesh.
- 2 Put a shrink tube on the earth wire.
- 3 Strip a small part of the earth wire and tread it on the cut of the mesh (where two mesh threads meet).
- 4 Put a clamping sleeve on the mesh and the earth wire and apply pressure.
- 5 The shrink tube is pulled over the clamping sleeve and moulded around it.
- 6 The earth wire is then connected to the heating cable's earth wire and the main installation's earth wire in the connection box for the switch/thermostat.

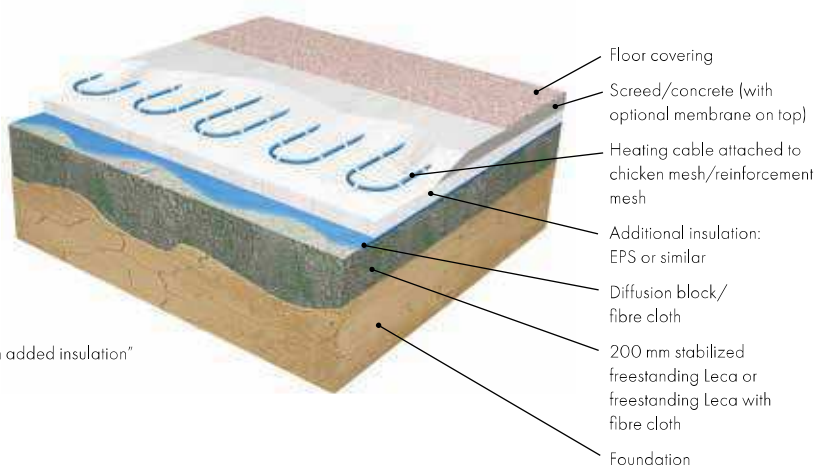
Multiple chicken mesh fields installed in parallel must have an overlap of minimum 150 mm (6").

Floor construction

An optimal installation for bathroom floors where both the positioning of the cables and the floor construction are taken into consideration is shown below with two alternative solutions.

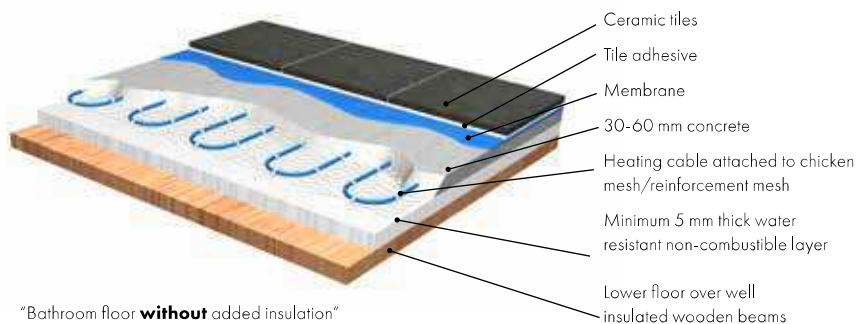
Alternatively the freestanding Leca and the thin insulation can be replaced by a layer 60 - 70 mm of EPS in order to reduce building height.

"Bathroom floor **with** added insulation"



The screed/concrete should be laid so that the floor slopes downwards towards the drain, thus all water falling on the floor drains away. In a bathroom it is very important that the screed/concrete layer is uniform and non-porous. See previous page regarding the pouring of concrete.

"Bathroom floor **without** added insulation"



Floor heating in wooden floors (between beams)

When using electrical heating cables in wooden floors, cables with 10 W/m or less are usually installed with a maximum of 80 W/m².

For heating requirements of 60 - 70 W/m² (5.6 - 6.5 W/sq.ft) and a cable output of maximum 10 W/m (3W/ft), the centre distance should normally be in the range of 90 - 130 mm. (3.5" - 5.1").

Planning

In order to avoid damaged or creaking floorboards, the following precautions should be taken in rooms where people spend prolonged periods of time:

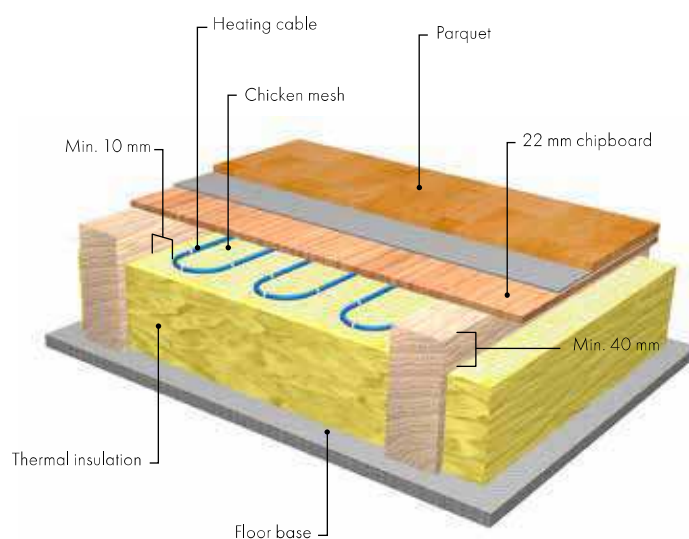
- Install maximum 60 W/m² (5.6 W/sq.ft).
- Distribute the cables evenly across the entire floor area.
- Protect all material against rain and moisture in the construction period, and make sure that all the materials are dry before the floor covering is laid.
- Use an electronic thermostat with room and floor sensor with limiting function. Ideally the temperature should be limited so that the surface temperature of the floor never exceeds 28 °C. Dependent on floor construction, this corresponds to a higher temperature (normally around 35 °C) in the floor where the floor sensor is installed.

- If possible, floorboards should be placed loosely on top of the heated floor for a few days before they are fastened.
- Avoid laying any thick rugs or wall-to-wall carpets on top of parquet.

Installation

The spaces between the beams should be filled with mineral wool insulation material, creating an air pocket of at least 30 mm (1.2") at the top (see figure). Chicken mesh is laid on top of the insulation and the cable is fixed every 350 mm (14"). To attach the cable, cut a mask and twist it over the cable. The heating cables are to be laid parallel to the beams. The distance from the cable to combustible material must be at least 10 mm.

When crossing the supporting beams, a 10x10 mm slot must be scored, through which the cable will run. The slots must be scored in such a way that the supporting function of the beam is not significantly reduced, and with min. 50 mm distance between the slots. If the cables can be laid prior to the battening of joists, slots will not be necessary. In so-called platform floors, in which the beams are shut off at an early stage to form a working platform, you are recommended not to install insulation from below since the heating cables may be pushed up towards the floor. This can lead to the cable being enclosed by insulation, reducing the air pocket.



Layer of wooden beams with heating cables

Solutions for renovation projects

Renovation of existing rooms improves the comfort and value of every home. It is also the perfect opportunity to install electrical floor heating. Nexans offers solutions that require minimal elevation of the floor, thus few modifications and adjustments have to be done to the room itself.

Renovation can be done with freely laid cable (TXLP, traditional solution) or with a thin mat solution.

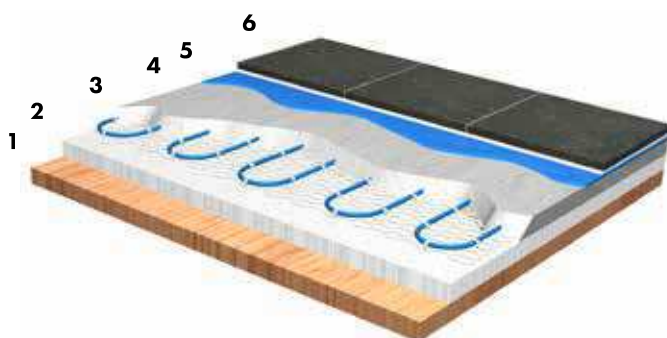
Renovation with TXLP

TXLP, twin or single conductor, 10 W/m (3 W/ft) or 17W/m* (5.2 W/ft), are products recommended for this use. Apply the cable (TXLP) to a non-combustible subfloor (minimum thickness 5mm (0.2")) and take into consideration the placement of permanent installations such as water closet, gully, bath tub, etc. Place the end seal away from potentially wet areas of the floor. See picture illustrating the placement of a free laid heating cable.

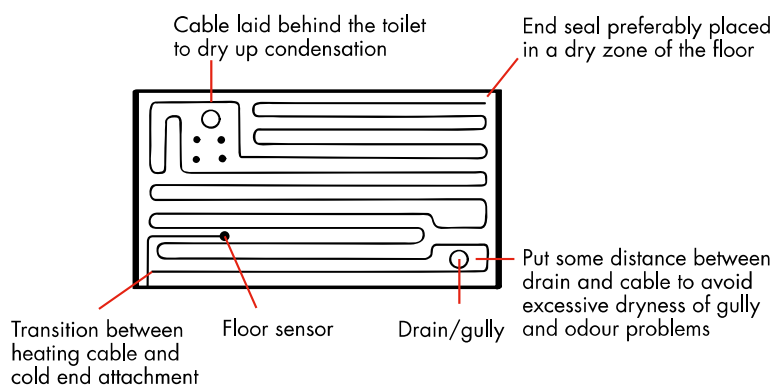
Make sure the cable is neither crossing nor touching itself, this to provide the best possible heat conductivity to the surroundings of the cable. Then the heating cable is embedded in a screed/concrete with low overall height. After drying and curing, the moisture barrier/membrane can be put on top of the screed/concrete before the floor covering is installed.

* In floors with low building height, a linear output of 10 W/m or less is recommended. This to ensure an even heat distribution. If subfloor and/or floor covering are made of combustible materials, limit linear output to 10 W/m and area output to 80 W/m².

Please see page 13 for information about pouring.



1. Wooden subfloor
2. Non combustible sub floor (min 5 mm), water resistant in wet rooms
3. Heating cable TXLP attached to chicken mesh / reinforcement mesh
4. Thin screed/slab
5. Membrane
6. Adhesive and ceramic tiles



Solution with freely laid cable

Solution with freely laid cable, 30 mm maximum floor elevation – traditional and simple solution using freely laid cable.

Renovating with MILLIMAT™

Minimum floor thickness can be important in renovation processes in order to avoid extra work on doors and thresholds. For these projects MILLIMAT is the ideal product.

The heating mat consists of a thin twin conductor heating cable unit attached to an adhesive flexible fiberglass net. The thin heating cable unit is delivered with a 2.5 m cold lead. Total thickness of the mat incl. cable is 4.5 mm (0.18"). The width is 50 cm (1,6 ft).

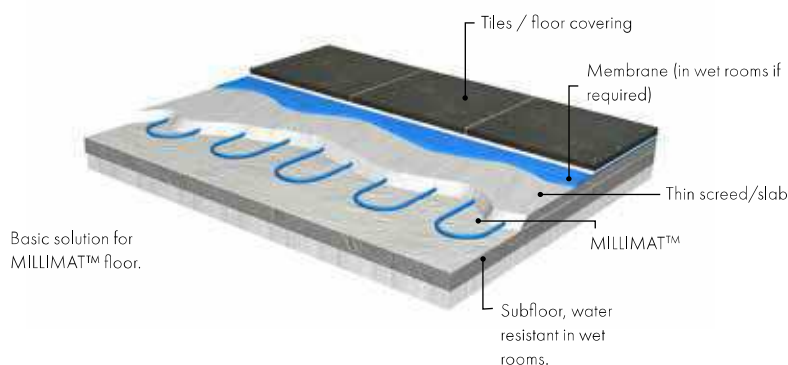
The MILLIMAT can easily be cut and adjusted to adapt to the shape of the room. It can be installed directly into the tile glue or embedded in the concrete/screed below the tiles and the tile glue. If installed directly into tile adhesive, be careful not to damage the heating cable when installing tiles, and make sure to avoid air pockets in the glue.

The 100 W/m² (9.3 W/sq.ft.) mat is recommended for such rooms as living rooms, hallways and kitchens. The mat can be installed on any type of sub floor, levelled and stable. The 100 W/m² mat may also be used under parquet or other wooden floor coverings, with the recommended use of a thermostat with a temperature limiting function.

The 150 W/m² (13.9 W/sq.ft.) mat is recommended for bathrooms, toilets, laundry rooms and other areas requiring high output. The mat must be installed on a non-combustible sub floor, levelled and stable.

A floor in which heating has been installed during renovation is usually very quick and easy to regulate, because the heating mat is located near the top of the floor construction, resulting in low energy consumption.

Please see picture illustrating a basic solution of a MILLIMAT floor.



Heating cables in stairs

Nexans heating cables in stairs should be laid lengthways on the steps so that they lie only on the horizontal surfaces. The cables are covered with a 30 - 50 mm (1.2" - 2.0") concrete layer, or put into a layer of tile adhesive beneath stone or pavement blocks. Use DEFROST SNOW or TXLP with several cable runs in each step, so that C-C distance does not exceed 10 cm.

Limitations

| | |
|------------------|--------------------------------|
| With sand/slabs: | Max. 30 W/m (9 W/ft) of cable* |
| Asphalt: | Max. 30 W/m (9 W/ft) of cable |
| Concrete | Max. 35 W/m (10 W/ft) of cable |

* If unsure about the sand's heat conductivity please limit the power to 28 W/m (8.5 W/ft)

Installation

The heating cable should be installed with even spacing. Avoid concentration of heating cable that will give uneven cable and surface temperatures and in worst case cause overheating and breakdown. Always measure insulation and conductor resistance before and immediately after covering the cables.

Be aware that the insulation resistance tends to become lower at high temperature, e.g. when measuring the cable in warm asphalt. Conductor resistance (ohm) increases with higher temperatures.





Part 3

Product information

Heating cables, series resistant

- 31** N-HEAT® TXLP/2R NORDIC
- 32** N-HEAT® TXLP/2R CLASSIC
- 33** N-HEAT® TXLP/1
- 34** N-HEAT® TXLP TWIN on drum cable
- 35** N-HEAT® TXLP drum cable
- 36** N-HEAT® MILLICABLE™
- 37** N-HEAT® MILLICLICK™
- 39** N-HEAT® DEFROST SNOW

Heating cable mats

- 40** N-HEAT® MILLIMAT™
- 42** N-HEAT® CABLEMAT
- 43** N-HEAT® SNOWMAT
- 44** N-HEAT® MELTMAT

Heating cables, self-limiting

- 46** N-HEAT® DEFROST PIPE / GUTTER
- 48** N-HEAT® DEFROST WATER AND DEFROST WATER KIT
- 49** N-HEAT® WARM WATER PIPE

Thermostats

- 51** N-HEAT® MILLITEMP™ thermostat
- 52** N-HEAT® COMFORT thermostat program
- 53** N-HEAT® N-ECO™ thermostat

Accessories

- 54** Accessories for heating cables
- 55** Accessories for self-limiting heating cables

N-HEAT® TXLP/2R CLASSIC

Twin conductor heating cable units for direct heating



Applications:

TXLP/2R CLASSIC heating cable units are ideal for floor warming in concrete constructions. They are also suitable for use in snow melting installations, for frost protection of roof gutters and drains, and soil heating. Each unit has a unique factory made integrated or hidden splice which is marked =>SPLICE<= on the cable surface. There is no need for a return conductor. The installation is simplified as the end of the cable can be placed where it is most convenient. The sealed end is 100% waterproof (factory made seal), and the cold end is marked with *** on the cable surface.



Construction:

- Solid resistance wire and copper return wire
- XLPE insulation
- Tinned copper earthing conductor
- Aluminium screen
- PVC outer jacket
- Overall diameter: approx. 7.0 mm (0.28")

Technical data:

- Series resistance, element values from 200 to 3300 W
- Linear load: 17 W/m (5.2 W/ft)
- UV resistant
- Max. cont. operating temperature outer jacket: 65 °C (149 °F)
- Min. bending radius: 5 x cable diameter
- Tolerance on conductor resistance: - 5 / + 10 %
- Highest system voltage: 300/500 V
- Rated voltage: 230 V

TXLP/2R CLASSIC– Twin conductor heating cable units 17 W / m

| TYPE | Load at 230V | Element length(*) | | Nominal element resistance | Outer diameter | Max magnetic flux density | Weight per unit | | Nexans code no. | GTIN |
|-----------------|--------------|-------------------|------|----------------------------|----------------|---------------------------|-----------------|------|-----------------|---------------|
| | (W) | (m) | (ft) | | | | (kg) | (lb) | | |
| TXLP/2R 200/17 | 200 | 11.8 | 38,7 | 264,5 | 7.0 | 0.55 | 1.1 | 2.4 | 10215082 | 7045210066203 |
| TXLP/2R 300/17 | 300 | 17.6 | 58 | 176.3 | 7.0 | 0.80 | 1.4 | 3.4 | 10022293 | 7045210013566 |
| TXLP/2R 400/17 | 400 | 23.5 | 77 | 132.3 | 7.0 | 1.06 | 1.8 | 4.3 | 10022294 | 7045210013573 |
| TXLP/2R 500/17 | 500 | 29.3 | 96 | 105.8 | 7.0 | 1.33 | 2.2 | 5.3 | 10022295 | 7045210013580 |
| TXLP/2R 600/17 | 600 | 35.2 | 115 | 88.2 | 7.0 | 1.46 | 2.6 | 6.3 | 10022296 | 7045210013597 |
| TXLP/2R 700/17 | 700 | 41.0 | 135 | 75.6 | 7.0 | 1.59 | 2.9 | 7.0 | 10022297 | 7045210013603 |
| TXLP/2R 840/17 | 840 | 49.7 | 162 | 63.0 | 7.0 | 1.86 | 3.5 | 8.4 | 10022298 | 7045210013610 |
| TXLP/2R 1000/17 | 1000 | 58.3 | 191 | 52.9 | 7.0 | 2.23 | 4.1 | 9.9 | 10022288 | 7045210013511 |
| TXLP/2R 1250/17 | 1250 | 72.4 | 237 | 42.3 | 7.0 | 2.65 | 5.0 | 12.0 | 10022289 | 7045210013528 |
| TXLP/2R 1370/17 | 1370 | 80.8 | 265 | 38.6 | 7.0 | 3.32 | 5.3 | 12.8 | 10022290 | 7045210013535 |
| TXLP/2R 1700/17 | 1700 | 100.0 | 328 | 31.1 | 7.0 | 3.63 | 6.7 | 16.1 | 10022291 | 7045210013542 |
| TXLP/2R 2100/17 | 2100 | 123.7 | 405 | 25.2 | 7.0 | 4.51 | 8.0 | 17.6 | 10022292 | 7045210013559 |
| TXLP/2R 2600/17 | 2600 | 154.5 | 507 | 20.3 | 7.0 | 5.57 | 9.7 | 21.3 | 10047809 | 7045210026511 |
| TXLP/2R 3300/17 | 3300 | 194.0 | 615 | 16.0 | 7.0 | 6.90 | 12.1 | 26.6 | 10022300 | 7045210013634 |

*In addition the products are delivered with a 2.3 m cold lead



N-HEAT® TXLP/1

Single conductor heating cable units for direct heating



Applications:

The heating cable units are ideal for direct floor warming in concrete constructions. They are also used in snow melting installations, for frost protection of roof gutters and drains, and soil heating. Each unit comes with two unique factory made integrated or hidden splices, which are marked =>SPLICE<= on the cable surface.



Construction:

- Solid resistant wire
- XLPE insulation
- Tinned copper earthing conductor
- Aluminium screen
- PVC outer jacket
- Overall diameter: approx. 6.5 mm (0.26")

Technical data:

- Series resistant, element values from 750 to 1680 W, 10W/m (3W/ft) at 230 VAC
- Series resistance, element values from 300 to 3100 W, 17W/m (5.2W/ft) at 230 VAC
- UV resistant
- Max. cont. operating temperature outer jacket: 65 °C (149 °F)
- Minimum bending radius: 5 x cable diameter
- Tolerance on conductor resistance: -5 / +10 %
- Highest system voltage: 300/500 V
- Rated voltage: 230 V

TXLP/1 – Single conductor heating cable units 17 W/m and 10 W/m

| Type | Load at 230V | Element lenght (*) | | Nominal element resistance | Outer diameter | Weight per unit | | Nexans code no. | GTIN |
|----------------|--------------|--------------------|--------|----------------------------|----------------|-----------------|-------|-----------------|---------------|
| | (W) | (m) | (ft) | (Ω) | (mm) | (kg) | (lb) | | |
| TXLP/1 300/17 | 300 | 17.7 | 58.07 | 176.3 | 6.5 | 1.35 | 2.98 | 10022267 | 7045210013306 |
| TXLP/1 400/17 | 400 | 23.5 | 77.10 | 132.3 | 6.5 | 1.61 | 3.55 | 10022269 | 7045210013320 |
| TXLP/1 500/17 | 500 | 29.4 | 96.46 | 105.8 | 6.5 | 1.93 | 4.25 | 10022270 | 7045210013337 |
| TXLP/1 600/17 | 600 | 35.3 | 115.81 | 88.2 | 6.5 | 2.26 | 4.98 | 10022271 | 7045210013344 |
| TXLP/1 700/17 | 700 | 41.2 | 135.17 | 75.6 | 6.5 | 2.52 | 5.56 | 10022272 | 7045210013351 |
| TXLP/1 850/17 | 850 | 50.0 | 164.04 | 62.2 | 6.5 | 3.03 | 6.68 | 10022273 | 7045210013368 |
| TXLP/1 1000/17 | 1000 | 58.8 | 192.91 | 52.9 | 6.5 | 3.60 | 7.94 | 10022261 | 7045210013245 |
| TXLP/1 1250/17 | 1250 | 73.5 | 241.14 | 42.3 | 6.5 | 4.36 | 9.61 | 10022262 | 7045210013252 |
| TXLP/1 1400/17 | 1400 | 82.3 | 270.01 | 37.8 | 6.5 | 4.67 | 10.30 | 10022263 | 7045210013269 |
| TXLP/1 1750/17 | 1750 | 102.9 | 337.60 | 30.2 | 6.5 | 5.99 | 13.21 | 10022264 | 7045210013276 |
| TXLP/1 2200/17 | 2200 | 129.4 | 424.54 | 24.0 | 6.5 | 7.41 | 16.34 | 10022265 | 7045210013283 |
| TXLP/1 2600/17 | 2600 | 156.0 | 508.53 | 20.3 | 6.5 | 8.48 | 18.70 | 10022266 | 7045210013290 |
| TXLP/1 3100/17 | 3100 | 185.0 | 606.96 | 17.1 | 6.5 | 10.24 | 22.58 | 10022268 | 7045210013313 |
| TXLP/1 750/10 | 750 | 76.7 | 251.64 | 70.5 | 6.5 | 4.61 | 10.16 | 10022904 | 7045210019568 |
| TXLP/1 950/10 | 950 | 95.8 | 314.30 | 55.7 | 6.5 | 5.52 | 12.17 | 10070076 | 7045210030907 |
| TXLP/1 1070/10 | 1070 | 107.4 | 352.36 | 49.4 | 6.5 | 5.99 | 13.21 | 10022901 | 7045210019520 |
| TXLP/1 1340/10 | 1340 | 134.1 | 439.96 | 39.5 | 6.5 | 7.55 | 16.64 | 10022902 | 7045210019544 |
| TXLP/1 1680/10 | 1680 | 168.9 | 554.13 | 31.5 | 6.5 | 9.27 | 20.44 | 10022903 | 7045210019551 |

*In addition the products are delivered with a 2.3 m cold lead in both ends



N-HEAT® MILLITEMP™

Thermostat for comfort heating

Applications:

Precise and accurate temperature control is important to fully achieve the advantages of floor heating without using more electric energy than necessary. Heating cables in combination with an accurate thermostat is probably the most energy efficient heating system one can have in a modern building.

The design of the thermostat is unique, and every detail has been carefully designed, paying special attention to aesthetic appearance, user-friendliness and quality, as required and demanded by both consumers and professional installers.

Features:

- Large screen with blue backlighting
- 4-event program or constant temperature control
- Clock: 12 hours (am/pm) / 24 hours
- Day display: Monday - Sunday
- Sensor: Floor/room or combined with limiting function
- Celsius or Farenheit display selection
- Frost protection mode
- 5 to 40 °C working range (default)

Specifications:

- Accuracy: +0.5 °C / 1 °F
- Maximum load: 16A
- Power supply: 230V
- Dimensions: 86 x 86 x 13 mm (WxHxD)
- IP 21



| Type | Nexans code no. | GTIN |
|--|-----------------|---------------|
| Thermostat MILLITEMP digital CDFR-003 EN | 10175393 | 7045210059809 |

