

# N-HEAT® COLLECTION

ELECTRICAL HEATING CABLES 2020



# NEXANS – the inventor of heating cables - 1926



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.

**Heating cables from Nexans have always been regarded as high quality products with focus on easy installation, reliability and safety.**

## Overview

All products are designed and tested in accordance with international standards, such as IEC and CENELEC standards, and meet the requirements of the European low voltage directive. The production is approved in accordance with the quality standard ISO 9001 and the environmental policy standard ISO 14001.

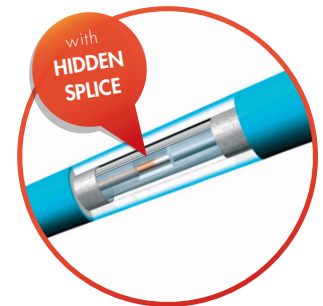
Nexans offers a 20 year warranty on its series resistance heating cable products, and a 10 year warranty on its self-limiting heating cable products. This handbook gives an overview of common applications for electrical heating cables and information about the products of Nexans Norway. The products may be subject to national testing and approvals. This handbook contains general recommendations only and it is not intended for any specific country. It contains no national regulations. When using the manual, national regulations and installation requirements must be followed.

## Quality

Heating cables from Nexans meet the highest quality standards and are certified by local electrical appliance certifying organizations in all major markets. Our series resistance heating cables come with a 20 year warranty given that they are installed according to our instructions and connected by a qualified electrician.

## Innovation

Nexans heating cables are a Norwegian product and invention. We have been



producing heating cables for 90 years. Over the years we have continued developing our products to meet changing demands and to introduce better solutions. One example is our unique hidden splice which provides a seamless integration between the hot and the cold part of the cable.

Another is the advanced screen of our MILLIMAT® cable, and our secure end seals which protect against moisture entering the cable.

## Product information

Our Electrical Heating Cables Handbook is designed to give advice and information about heating cables in general and our goal is to provide a handy source of information to the end user, electricians/installers and consultants.

In this handbook you will find information about underfloor comfort heating and many other applications for heating cables including snow melting in driveways and frost protection of pipes. Whether you choose our traditional cables or one of our thin mat products, you are making the right choice by choosing Nexans for your heating cable solution.

You can also advise customers to visit our heating home page at [nexans.com/nheat](http://nexans.com/nheat) for more general information about heating cables and their applications.

Nexans Norway AS reserves the right to implement product changes without notice, as our products are being continuously developed.

# Index

## Part 1 General information

Comfort heating in buildings.....	5
Heat loss and energy demand.....	6
Project planning and calculations.....	7
Selection of thermostat.....	8
Technical overview - formulas and terms.....	10

## Part 2 Applications

Floor heating in concrete constructions.....	12
Floor heating in bathrooms and wet rooms.....	13
Floor heating in wooden floors.....	14
Floor heating directly below parquet or laminate.....	15
Solutions for renovation projects.....	16
Ice and snow melting installations.....	18
Sport fields and similar.....	19
Heating cables in stairs.....	20
Frost protection of freezer room (floors).....	21
Drying and curing of concrete.....	22
Frost protection of roof gutters and roof drains.....	23
Frost protection of pipes and tank.....	25
Hot water in buildings.....	28

## Part 3 Product information

### Heating cables, series resistant

N-HEAT® TXLP/2R.....	30
N-HEAT® TXLP/1.....	32
N-HEAT® MILLICABLE FLEX 15.....	33
N-HEAT® TXLP drum cable black.....	34
N-HEAT® TXLP TWIN ON DRUM.....	35
N-HEAT® MILLICABLE™.....	36
N-HEAT® MILLICLICK™.....	37
N-HEAT® DEFROST SNOW.....	38
N-HEAT® TXLP/1 28 W/m.....	39
N-HEAT® DEFROST FLEX.....	40

### Heating cable mats

N-HEAT® SNOWMAT.....	41
N-HEAT® MELTMAT.....	42
N-HEAT® MILLIMAT®.....	43

### Heating cables, self-limiting

N-HEAT® DEFROST PIPE - AO.....	45
N-HEAT® DEFROST PIPE - BR.....	47
N-HEAT® WARM WATER PIPE.....	49
N-HEAT® DEFROST WATER AND DEFROST WATER KIT.....	50

### Thermostats

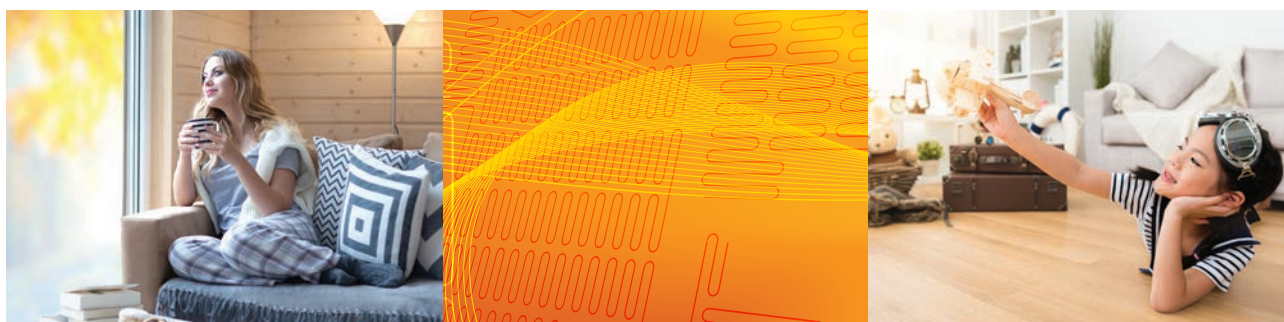
N-HEAT® MILLITEMP™ thermostat.....	51
N-HEAT® MILLITEMP™ 2 thermostat.....	52
N-HEAT® COMFORT TR thermostat.....	53
N-HEAT® COMFORT TD thermostat.....	54

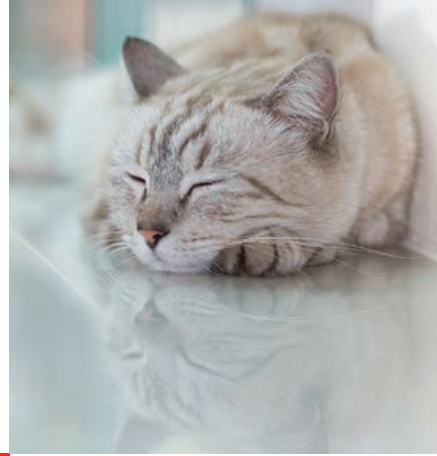
### Accessories

Accessories for heating cables.....	55
Accessories for self-limiting heating cables.....	56

## Part 4 Appendix

Areas of use for Nexans Heating Cables.....	58
Selection table TXLP/2R 10 W/m.....	59
Selection table TXLP/2R 17 W/m.....	60
Power diagram 120V.....	61
Power diagram 230V.....	62
Power diagram 400V.....	63





## Part 1 Comfort heating in buildings

Comfort heating in buildings.....	5
Heat loss and energy demand .....	6
Project planning and calculations .....	7
Selection of thermostat.....	8
Technical overview - formulas and terms.....	10

# Comfort heating in buildings

Heating cables provide an environmentally friendly and comfortable indoor climate, and offer many advantages:

- low installation cost
- maintenance free
- easy management/adjustment
- minimizes energy consumption
- longevity



Electricity is used the world over as an energy source for heating homes and is the most common energy source. As the world's supply of oil and gas becomes depleted, many of the world's countries will be searching for renewable and environmentally friendly sources of energy.

Wind power, solar power, nuclear power, and hydro power are some possible solutions. These energy sources produce electricity and may be the future's only viable option.

## Advantages of Electrical Underfloor Heating

Using electricity for heating your home is becoming more and more popular. Once you have made the choice to use electricity to heat your home, your choice of heating appliances is numerous.

Underfloor heating is becoming the natural choice for many, for obvious reasons. It is invisible, you free wall space compared to

solutions with wall mounted panel heaters, it is odorless, and the temperature is easy to control up and down and thus it saves energy. Even further energy savings can be achieved with a modern thermostat with advanced control functions.

Electrical underfloor heating has many advantages over other forms of underfloor heating. Heating cables are economical and easy to install and incur no yearly maintenance costs. With electrical under floor heating you can easily choose to turn off some rooms during the summer months and leave, for example, just the bathroom floor on, with a low setting. With modern thermostats advanced energy saving functions are available, for example setback temperature for day and night savings.

The heat from underfloor heating is a low temperature radiant heat – which means that the air in the room is warmed up and there will be

less difference in temperature from floor to ceiling compared to rooms with wall mounted heating. Heating the air at floor level will ensure a comfortable heat distribution throughout the room. Heat will not accumulate close to the ceiling as is the case with convection heating.

Our product range includes traditional heating cables for installation under ceramic tiles in wet rooms to thin mats and dry solutions for installing under wooden type floors and where height could be a problem. Our mats are becoming increasingly more popular for their quick and easy installation. Our products are suitable for renovation projects as well as new building construction.

Electrical underfloor heating can be used to heat your home completely or in combination with other heating sources. Key advantages are flexibility, advanced control possibilities and easy

integration possibilities with other systems.

Underfloor heating systems are known for providing a very comfortable inside living environment. Floor heating is ideal in most types of rooms, for example bathrooms, toilets, hallways, living rooms, kitchens and where children play. The floor is a large surface area normally with low temperature. Producing heat under the floor however will ensure radiant heat from the floor and a favorable heat distribution throughout the room. When you compare wall mounted heating with underfloor heating it's proven that you can have a 2-3 °C lower temperature setting with under floor heating and still achieve the same comfort level. This results in a potential 5-10% energy consumption reduction just by choosing underfloor heating over wall mounted panel heaters.

# Heat loss and energy demand



## Floor heating systems are commonly used as the sole heating source for a room.

In new and properly insulated buildings the transmission losses are normally in the range of 40-80 W/m<sup>2</sup> (3.5 - 7.5 W/sq. ft) building area. In old or poorly insulated buildings the installations are normally based on an installed load of 80-100 W/m<sup>2</sup> (7.5 - 9.3 W/sq. ft) building area. A building's energy demand is dependent upon the outside temperature, desired inside temperature, and how well the building is insulated. The degree of draft from windows and exits will strongly influence the energy demand. It is important to remember that installed power does not affect the energy demand nor the energy consumption.

When necessary, a full heat loss calculation should be performed in accordance with local requirements and standards.

The following formula and diagram can help you to quickly calculate an estimate of the energy demand for a room.

1. Calculate the total window area in relationship to the total floor area. This gives the x-axis value.
2. Draw a line from the x-axis to meet the temperature difference line which best describes your situation and draw a corresponding line to the y axis to find the recommended W/m<sup>2</sup> floor area.

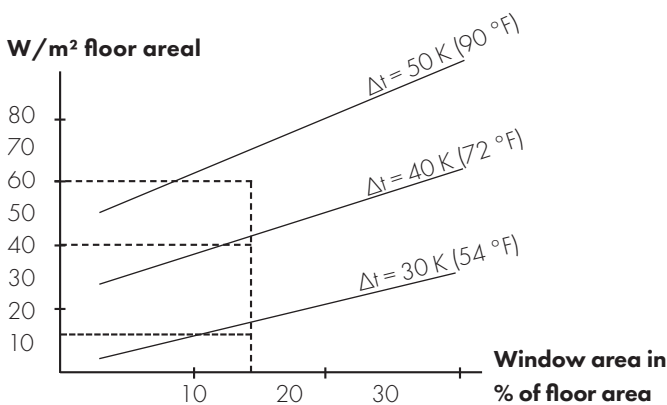


Diagram: Calculation of energy demand for buildings.

## Assumptions:

Ceiling height is 2.5 meters

The method is not reliable for rooms with open stairways which allow warm air to escape.

Standard heat loss coefficients for:

Windows	$U = 2.10 \text{ W/m}^2\text{K}$ (0.20 W/sq.ft.K)
Outer walls	$U = 0.25 \text{ W/m}^2\text{K}$ (0.23 W/sq.ft.K)
Ceiling	$U = 0.23 \text{ W/m}^2\text{K}$ (0.21 W/sq.ft.K)
Floor	$U = 0.30 \text{ W/m}^2\text{K}$ (0.28 W/sq.ft.K)
Inside temperature	$= 20^\circ\text{C}$ (68 °F)

# Project planning and calculations

**Correct planning is vital to ensure that a heated floor will provide the best possible comfort, function for many years, and at the same time be energy efficient.**

To choose the correct product the following should be considered.

## Energy demand

The first step is to determine the area load, W/m<sup>2</sup>. For comfort heating applications this can normally be done either by heat loss calculation or by using empirical values (see appendix page 58 in this booklet), which is a quick and reliable method.

Heat loss calculations can be a complex matter, and should, if possible, be

carried out by the architect, planner or the constructor of the building.

## Area to be heated

The area energy demand is normally regarded as the power requirement for the gross area.

In rooms with obstacles such as fixed furniture, toilet, bath tub etc, it may be necessary to increase the net area power to compensate for the unheated areas (heating cables shall never be laid under fixed objects).

## Selection of heating cable product

The selection of the type of cable shall be based on application type, and construction details such as ground or floor type, power requirement etc.

You will find more information in the section describing applications.

## Centre spacing

This parameter applies specifically to cable elements and not mats, where the centre spacing is fixed. If the cable is installed with the correct centre spacing, it will cover the entire area. The centre spacing is easily found by dividing net area by cable length.

$$c-c(\text{cm}) = \frac{\text{Net area [m}^2\text{]} \times 100}{\text{Cable length [m]}}$$

## NexCalc

Our Internet solution/program for heating cable calculations is a helpful tool for most project planning using series resistive cables from Nexans.

Open [www.nexans.com/nheat](http://www.nexans.com/nheat) and select NexCalc, and you are ready to calculate type of products and amount. The program uses colour coding to give you recommendations and feedback about which calculations are acceptable. Each calculation can easily be printed and used as documentation.

There is also a link to the product database where you will find product data sheets for all our products.

## NexCalc

NexCalc Powered by Nexans

PREFERENCES Help

Language: English

Country: Norge

Units: Metric

Default voltage: 230 V

Trip level RCD/GFCI: mA

Name of company:

Calculated by:

OK Cancel NexCalc 1.8



# Selection of thermostat

## Thermostat control

A thermostat will automatically maintain the desired temperature in a room by turning off and on the heating cables as required. The amount of heating from the heating cables will be influenced by factors such as outdoor temperatures, the heat generated by other electrical appliances, lighting, the sun and even people in the room. These other free heating sources may contribute up to 10-20% of the total heating requirement.

## Save up to 25% with setback temperature settings

In weekdays there may only be need for heating during the morning and then again from the late afternoon to the late evening. In offices, the heating is normally needed during the day from Monday to Friday. Up to 15-25% of energy consumption may be saved if the temperature setting is lowered by about 5°C (9 °F) at night and during the day on weekdays. The setback temperature has its greatest advantage in thin 10 - 20 mm (0.4" - 0.8") floor constructions and wooden floors. Heavy constructions 40-60 mm (1.6" - 2.4") take longer to warm up and cool down, thus the time for lowering or raising of the temperature will be longer. This means that a setback temperature should only be used if the setback period is relatively long, e.g. at night.

## Installation of thermostat with floor sensor

The correct installation of the sensor is a prerequisite for the correct functioning of the thermostat, as well as for the maintenance of comfort and minimum energy consumption of the installation. The floor sensor must be installed in a section of the floor where there is a high probability that it will not be covered by heavy furniture or thick carpets or rugs. The sensor must not be placed close to the heating cable. In order to ensure easy replacement of the sensor in the case of a defect, it should be installed in a tube/conduit in the floor. The tube must be sealed and placed as close as possible to the floor surface – this is the main measuring point. If necessary the sensor cable can be extended. Please check with the thermostat vendor for maximum length.

## Installation of thermostat with built-in room sensor

A thermostat with room sensor should be installed approximately 1.6 meter (5') above the floor level. The sensor must not be installed on cold external walls, exposed to draught, direct sunlight or heat from various appliances. If a correct installation is impossible, a remote room sensor should be used.

Please see page 53-56 for more information about Nexans' thermostat programmes.

## Selection of limitation sensor

Under certain conditions, it might be necessary to use a thermostat that includes a limitation sensor for control of minimum or maximum temperatures.

Primary task of the heating	Description of purpose
Secures that the floor maintains a comfortable minimum temperature. In the case of direct sunshine heating up a room, the floor heating system may be off for so long that the floor temperature will drop. In heavy concrete floor constructions 40 - 80 mm (1.5" - 3.2") the floor heating will react slowly when the heating demand rises.	For installations in wooden floors as well as other applications it might be necessary to limit the maximum temperature of the cable or the floor construction to e.g. 28°C. (83°F).



# Selection Guide

## Sensors and thermostat configuration (sensor mode):

Almost all thermostats available on the market are equipped with an integrated sensor ("room sensor") and the possibility of connecting an external sensor ("floor sensor"). Thermostats with the possibility of connecting an external room sensor also exist. The thermostat configuration of the sensor generally depends on which room the installation is in and on the type of flooring.

**Room mode:** Only the built-in sensor is used for temperature control. In rooms with floors that are not very temperature sensitive (tiles etc.), and a stable room temperature is required. Sometimes this mode is the only option if a regulator or a faulty thermostat is replaced, and there is no possibility of installing a floor sensor

**Floor mode:** Only the external sensor is used. This is the optimal configuration, because the thermostat uses the temperature of the floor, where the heating cables are, to control the heating system. It also allows a thermostat to be installed outside the room in which it controls the temperature.

**Combined mode:** Also referred to as "Dual mode". In this configuration, the internal sensor is used for temperature control/adjustment, while the external (floor) sensor is used for temperature limitation. This mode is typically used in floors with parquet or laminate flooring, as such flooring types generally has a temperature tolerance of maximum ca. 27 degrees Celsius.

## Regulator:

The temperature control is done by adjusting the time the heating cables are switched on. Typical areas of use would be rooms where a certain, stable temperature is required, e.g. a base level temperature for a room not frequently used, where other heating systems are used to raise the temperature to a comfortable level. Regulators do not use sensors, so adjustments are made manually and there is no possibility of temperature limitation.

The N-COMFORT TR can be configured as a regulator

## Analog thermostat:

The temperature settings are done by manual adjustment of a dial or other means. The thermostat would normally have an integrated temperature sensor and the possibility of connecting an external sensor which is installed in the floor with the heating cables. Such thermostat will only work towards maintaining the set temperature.

Note that "Analog" is not a 100% precise description but refers to the user interface (the dial) and is a term used to distinguish it from "Electronic" thermostat. An "Analog" thermostat can be a mechanical thermostat, where the sensors are bimetal types, but normally the same sensor types are used with both Analog and Electronic thermostats. The N-COMFORT TR can be configured as a thermostat with room mode, floor mode and combined mode.

## Digital thermostat:

Also referred to as "Electronical" or "Programmable" thermostat. Such thermostats will most commonly have a display and a set of buttons, or a touch-screen display as an interface to make the settings of the thermostat. Although they may be configured to work in the same way as Analog thermostats, they offer some type of programming possibility which enables the user to regulate the temperature of the floor according to the usage / occupancy of the room. Typically, the temperature is lowered during night, when people are asleep, and during daytime, when the house is empty. The programming possibilities have become more and more advanced with the development of new models. N-COMFORT TD, MILLITEMP and MILLITEMP 2 are in this category of thermostats and can all be configured in room mode, floor mode and combined mode.

## Eco-design:

In EU, the Eco-Design Regulation is in force. This regulation puts forward requirements for the functionality of "Local Space Heaters". Currently, thermostats sold separately from the heating system (heating cables or other) are exempt from the regulation, but it is expected that a revision of the regulation also will restrict, or set requirements to, thermostats. The basic requirement, under the current regulation, is that the thermostat shall offer the possibility of individual programming of every day of the week. In addition, it must offer at least one of the following functionalities:

- Adaptive / self-learning function. This means that rather than (starting) adjusting the temperature at the times set by the user, the thermostat learns when it should start increasing the temperature, so that the desired temperature is reached at the time set. Floor thickness, installed area power and insulation in the floors are amongst parameters that decide the time it takes to warm the floor.
- Open Window Detection. If the thermostat senses that the temperature drops rapidly, it concludes that a door or a window is open and switches off the heating system.
- Remote Control. Remote access to the thermostat. The most common platform for this today is WiFi, but other systems, both wired and wireless exist. N-COMFORT TD and MILLITEMP 2 are Eco-Design ready, i.e., although not mandatory, they fulfil the current requirements of the Eco-Design Regulation.

# Technical overview

## Formulas and terms

Property	Measuring unit and abbreviation	Symbol
Voltage	Volt (V)	U
Current	Ampere (A)	I
Resistance	Ohm ( $\Omega$ )	R
Power	Watt (W)	P

Ohm's law:  $U = R \times I$

Power:  $P = U \times I$  (thus  $P = RI^2$  and  $P = \frac{U^2}{R}$ )

For drum heating cables:

Total resistance ( $\Omega$ ) = Length of cable (m) x specific resistance ( $\frac{\Omega}{m}$ )

c-c distance (cm) =  $\frac{\text{Area (m}^2) \times 100}{\text{Length of cable (m)}}$

### Tables of the most important energy and power units

#### Energy

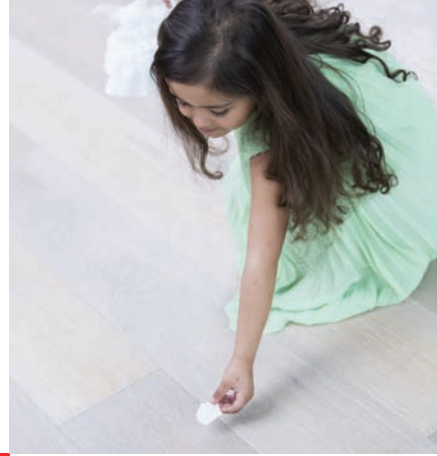
kWh	kp m	kcal	Joule = Ws=Nm	hph
1 kWh = -	367 100	860	3 600 000	1,359
1 kp m = 2,724.106	-	2,343.103	9,80665	3,704.106
1 kcal = 1,163.106	426,9	-	4186	1,581.103
1 Joule				
1 WS = 0,2778.103	0,1020	0,2389.103	-	0,3777.103
1 Nm				
1 hph = 0,7355	270 000	632,5	2 648 000	-

#### Power

kWh	kp m/s	kcal/s	kcal/h	hp
1 kWh = -	102,0	0,2389	860	1,359
1 kp m/s = 9,807.103	-	2,343.103	8,434	0,01333
1 kcal/s = 4,186	426,9	-	3600	5,691
1 kcal/h = 1,163.103	0,1186	0,2778.103	-	1,581.103
1 hp = 0,7355	75	0,1757	632,5	-

### AWG to square mm Wire Gauge Conversion

American Wire Gauge (AWG)	Diameter (inches)	Diameter (mm)	Cross Sectional Area (mm <sup>2</sup> )
0000	0.46	11.68	107.16
000	0.4096	10.40	84.97
00	0.3648	9.27	67.40
0	0.3249	8.25	53.46
1	0.2893	7.35	42.39
2	0.2576	6.54	33.61
3	0.2294	5.83	26.65
4	0.2043	5.19	21.14
5	0.1819	4.62	16.76
6	0.162	4.11	13.29
7	0.1443	3.67	10.55
8	0.1285	3.26	8.36
9	0.1144	2.91	6.63
10	0.1019	2.59	5.26
11	0.0907	2.30	4.17
12	0.0808	2.05	3.31
13	0.072	1.83	2.63
14	0.0641	1.63	2.08
15	0.0571	1.45	1.65
16	0.0508	1.29	1.31
17	0.0453	1.15	1.04
18	0.0403	1.02	0.82
19	0.0359	0.91	0.65
20	0.032	0.81	0.52
21	0.0285	0.72	0.41
22	0.0254	0.65	0.33
23	0.0226	0.57	0.26
24	0.0201	0.51	0.20
25	0.0179	0.45	0.16
26	0.0159	0.40	0.13



## Part 2 Applications

Floor heating in concrete constructions.....	12
Floor heating in bathrooms and wet rooms .....	13
Floor heating in wooden floors.....	14
Floor heating directly below parquet or laminate .....	15
Solutions for renovation projects.....	16
Ice and snow melting installations.....	18
Sport fields and similar.....	19
Heating cables in stairs.....	20
Frost protection of freezer room (floors) .....	21
Drying and curing of concrete .....	22
Frost protection of roof gutters and roof drains .....	23
Frost protection of pipes and tank.....	25
Hot water in buildings.....	28

# Floor heating in concrete constructions

## Area power and C-C distances

For comfort heating in concrete constructions, we recommend the use of MILLIMAT or TXLP heating cable, single or twin conductor elements. To find the correct heating cable element, use this calculation:

$$\text{Cable output [W]} = \text{Gross area [m}^2\text{]} \times \text{[W/m}^2\text{]} \text{ or}$$
$$\text{Cable output [W]} = \text{Gross area [ft}^2\text{]} \times \text{[W/ft}^2\text{]}$$

By using the factory made heating cable elements, of e.g. 17 W/m (5.2 W/ft), the calculation of the centre spacing is simplified. The correct centre spacing (c-c distance) describes the distance between the cable strands and can be calculated like this:

$$\text{C-C [m]} = \text{Net area [m}^2\text{]} / \text{cable length [m]} \text{ or}$$
$$\text{C-C [ft]} = \text{Net area [sq.ft.]} / \text{cable length [ft]}$$

## Output limitations

In wooden floors/combustible constructions:  
Max. 80 W/m<sup>2</sup> and max. 10 W/m linear output.

In tile/stone/non-combustible constructions:  
Max. 150 W/m<sup>2</sup> and max. linear output 17 W/m.

## Direct heating and installation

For comfort heating in buildings, direct acting systems normally require 60 - 150 W/m<sup>2</sup> (5.6 - 13.9 W/sq. ft) depending on the room and building type. These systems require low thermal capacity, and the heating cables are placed as close to the floorsurface as permitted by the national authorities and material. Normally this means that the heating cable is placed in the lower part of a max 50 mm (2") thick screed/concrete slab on a high-grade thermal insulation.

It is important that the cable is embedded and surrounded completely by the screed/concrete to ensure the best possible heat conductivity to the immediate surroundings of the cable. The cable cannot be installed directly on the thermal insulation, as direct contact with the insulation might cause the cable to overheat during operation. One solution is to put a thin slab just above the insulation and then install the cable on top of this. Another is installing the heating cable (TXLP) on top of a chicken mesh or a reinforcement mesh, and in this way creating space between the heating cable and the insulation. Avoid stepping on the cables during the installation.

## Pouring of Concrete/Screed

In all kinds of poured floors, a good mixture of cement, sand, and water is important. Use the correct amount of components (sand, cement, water) and mix thoroughly using a power tool. Apply quickly after mixing. Follow the manual from the vendor. Avoid air pockets and a porous slab by compacting well. This will ensure the best heat conductivity, which means heat will be transported easily from the cable to the surroundings, and thus result in a floor with quicker response to temperature adjustments and protecting the cable from reaching high temperatures. Never put any thermally insulating floor components above the heating cables! The slab with the heating cable must dry and cure by itself, and normally the heating cables cannot be turned on for 6-8 weeks after the concrete/screed has been poured.

## Renovation

When renovating, or when space is essential, special thin screed solutions (MILLIMAT®) can be used, allowing screed thickness down to 10 - 15 mm (3/8" - 5/8"). Please see separate chapter on renovation.

## Storage heating

Storage heating systems normally require an output of 150-200 W/m<sup>2</sup> (13.9 - 18.6 W/sq. ft). These systems require that the heating cables are embedded in a concrete floor construction of high thermal mass. Often an approx. 100 mm (4") concrete slab is laid on top of a high-density insulation, and the cables are installed on top of the slab and covered with an approx. 50 mm (2") screed. With such floors you have the possibility to heat the floor during night and have the power turned off early the next day, then benefit from the heat stored in the slab through the day.



# Floor heating in bathrooms and wet rooms

**A good choice of installed power for bathrooms lies in the range of 120 - 150W/m<sup>2</sup> (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 overtightening 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

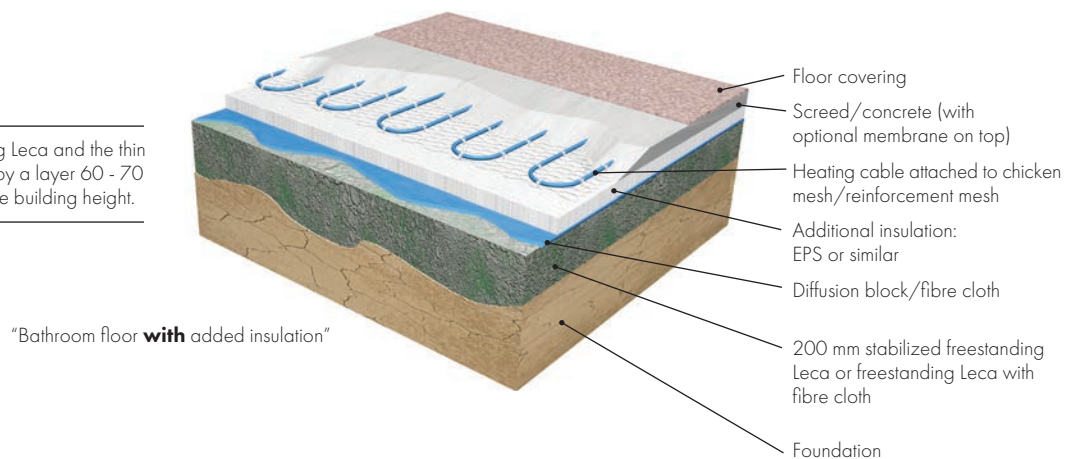
1. Cut one mesh.
2. Put a shrink tube on the earth wire.
3. Strip a small part of the earth wire and tread it on the cut of the mesh (where two mesh threads meet).
4. Put a clamping sleeve on the mesh and the earth wire and apply pressure.
5. The shrink tube is pulled over the clamping sleeve and moulded 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 junction box for the switch/thermostat.

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

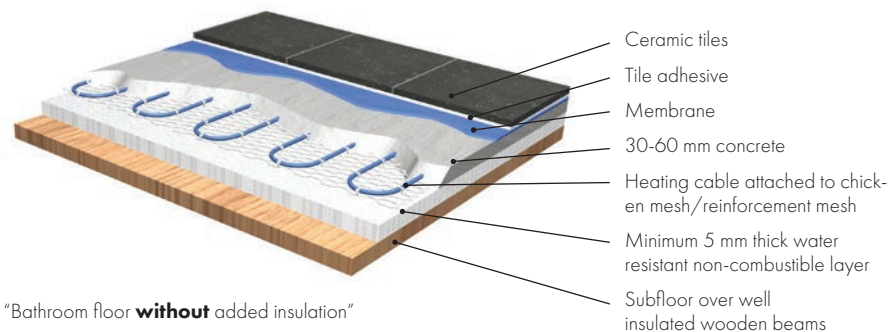
## Floor construction

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.



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.



# Floor heating in wooden floors (joist beam installation)

**When using electrical heating cables in wooden floors, cables with 10 W/m or less are usually installed with a maximum of 80 W/m<sup>2</sup>.**

For heating requirements of 60 - 70 W/m<sup>2</sup> (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/m<sup>2</sup> (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

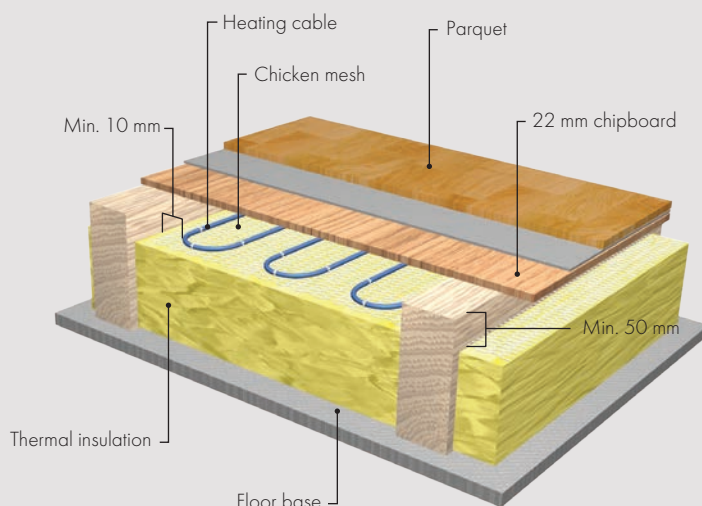
The spaces between the beams should be filled with mineral wool insulation material, creating an air pocket of at least 50 mm (1.2") at the top (see figure). Chicken mesh is laid on top of the insulation and the cable is fixed every 350 mm (14").

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 10 x 10 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 gap.

**Underfloor heating system and installed power/ maximum temperature shall be approved by the supplier of the flooring system (parquet/laminat).**

## Layer of wooden beams with heating cables



# Floor heating directly below parquet or laminate

Nexans floor heating system:

## MILLICABLE™ & MILLICLICK™

An easy and efficient way to install floor heating. A dry solution without any need for screed or concrete.



The system consists of boards covered with aluminium foil (MILLICLICK™) with pre-cut slots for the MILLICABLE™.

Remember to choose the correct amount of boards and combination of products. (Please see selection table on page 36).

MILLICABLE™ is a thin twin conductor heating cable 6 W/m, which can be installed in a traditionally poured floor or together with MILLICLICK™ boards as a dry-floor heating system. The MILLICABLE™ is delivered with a hidden splice\* and a 3.5 m cold lead.

\* 120 W and 180 W elements are delivered with molded splice.

When installed as a freely laid cable, it is attached to the sub-floor with glue or aluminum tape. C-C distance between cable loops must be calculated in advance, and cable integrity checked before pouring screed/concrete.

### **MILLICABLE™ in combination with MILLICLICK™**

MILLICABLE™ together with MILLICLICK™ can be installed directly under wooden floor coverings like parquet, laminate etc. without any use of concrete or levelling compound.

The MILLICLICK™ boards are covered with aluminium foil and have pre-cut slots for the cable which makes the installation very easy to perform. Pre-cut slots have a C-C distance of approx. 10 cm, resulting in an area output of 60 W/m<sup>2</sup>. The boards are placed on a stable and levelled subfloor.

MILLICABLE™ has an outer sheath made of a semi-conducting polymer, which is in continuous contact with the earth conductor inside the cable. Thus, by placing the MILLICABLE™ into the slots the aluminium foil is

“connected” to earth potential. No further grounding of the aluminium foil is required.

Install standard parquet underlay between the parquet and the MILLICLICK™ boards.

MILLICLICK™ boards shall only be used together with MILLICABLE™ heating cables.

**Underfloor heating system and installed power/maximum temperature shall be approved by the supplier of the flooring system (parquet/laminat).**

# 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

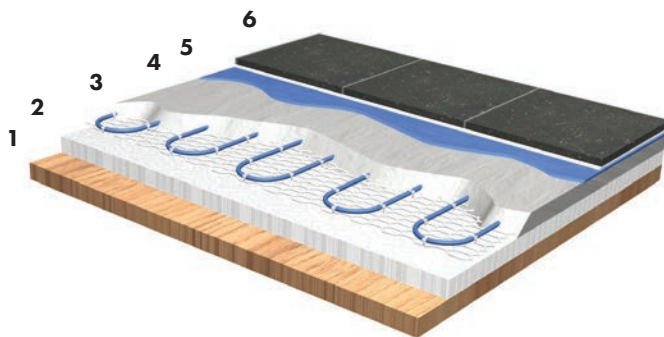
TXLP, twin or single conductor, 10 W/m (3 W/ft) or 17 W/m\* (5.2 W/ft), are products recommended for this use.

Apply the cable (TXLP) to a non combustible subfloor (minimum thickness 5 mm (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.

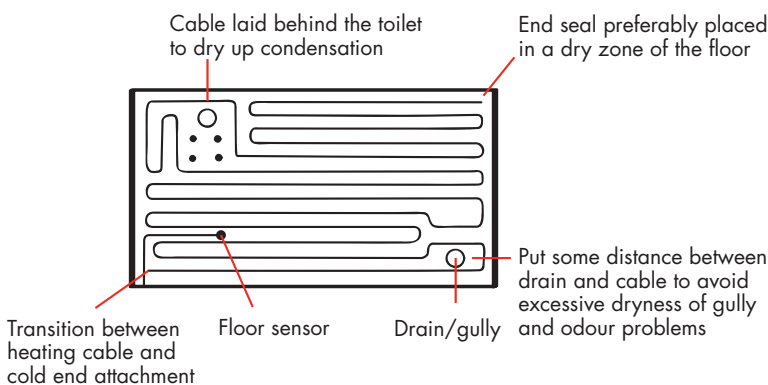
See picture illustrating the placement of a free laid heating cable. Make sure the cable is neither crossing nor touching itself, this to provide the best possible heat conductivity to the surroundings of the cable. Then the heating cable is embedded in a screed/concrete with low overall height. After 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 the heating cable is installed directly on a combustible (wooden) subfloor, linear output shall be limited to 10 W/m and area output to 80 W/m<sup>2</sup>.

Please see page 12 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/m<sup>2</sup> (9.3 W/sq.ft.) mat is recommended for such rooms as livingrooms, hallways and kitchens. The mat can be installed on any type of sub floor, levelled and stable. The 100 W/m<sup>2</sup> mat may also be used under parquet or other wooden floor coverings (\*), with the recommended use of a

thermostat with a temperature limiting function.

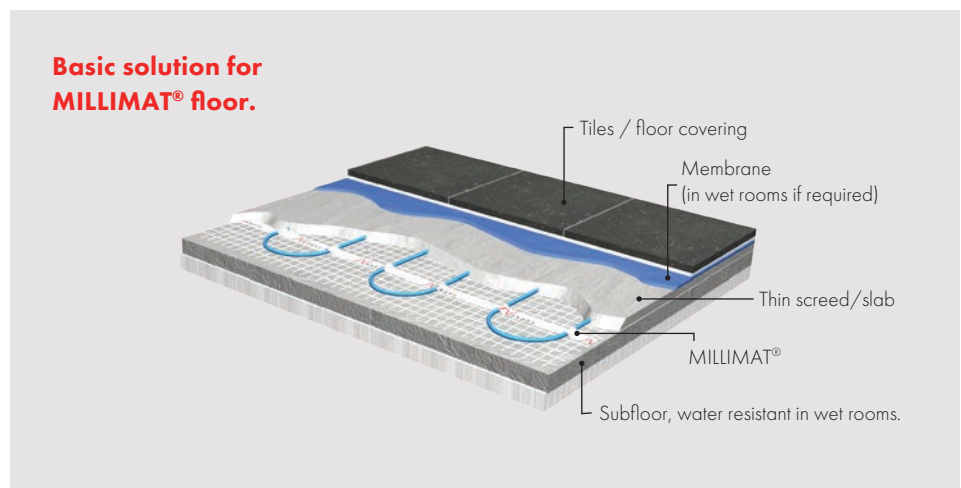
The 150 W/m<sup>2</sup> (13.9 W/sq.ft.) mat is recommended for bathrooms, toilets, laundry rooms and other areas requiring high output. The mat must be installed on a noncombustible sub floor, levelled and stable.

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.

(\* )Underfloor heating system and installed power/ maximum temperature shall be approved by the supplier of the flooring system (parquet/laminat).



# Ice and snow melting installations

## Cable type

Nexans heating cables are perfect for snow and ice melting applications. Use series resistive general purpose heating cable, TXLP, DEFROST SNOW or SNOWMAT.

## Dimensioning of power

Snow melting area power is normally in the range 250W/m<sup>2</sup> to 350W/m<sup>2</sup>. With automatic temperature control, up to 400W/m<sup>2</sup> is approved. The power to be installed is determined principally by what is required from the installation with regards to the climatic conditions and the control system.

## Installation

In roads, driveways, sidewalks etc. the heating cable should be installed on a levelled base. The base should be made of compressed and levelled quarry dust/paver sand, asphalt or similar, free of sharp edges that can damage the cable. The base shall be dimensioned to fit the expected load. Do not place the heating cable(s) directly onto insulation. In general, insulation is not recommended under snow melting installations, the exception being ramps and other structures which can be cooled down from below.

## Section of Pavement with asphalt/concrete

1. 50 mm asphalt/concrete
2. SNOWMAT / TXLP / DEFROST SNOW
3. **20 - 30 mm compacted crushed stone/sand or similar. (Grain size 0 - 8 mm/ 0 - 4 mm)**
4. Crushed stone

## Section of area with pavement block/facing stone

1. Pavement block / Facing stone
2. **20 - 30 mm quarry dust (0 - 8 mm/0 - 4 mm, grain size) embedding heating cables**
3. Subbase (compacted and levelled)

Top covering can be asphalt, concrete, or pavement blocks/stone. For ease of installation we recommend the use of SNOWMAT for outdoor snow and ice melting applications.

When using traditional heating cables like the TXLP or DEFROST SNOW, installed on an insulated base, a wire mesh should be put on top of the insulation. Attaching the cables to this mesh will prevent the cables from being pressed/compacted into the insulation.

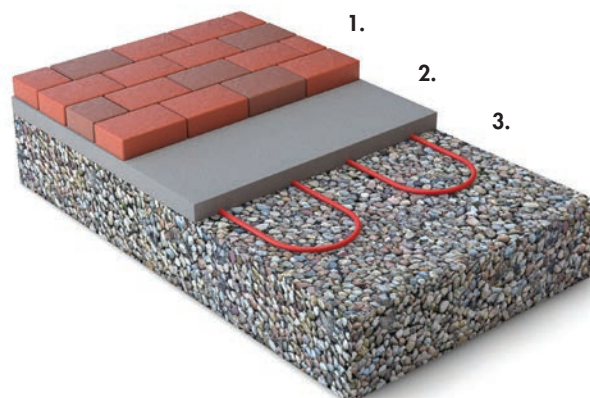
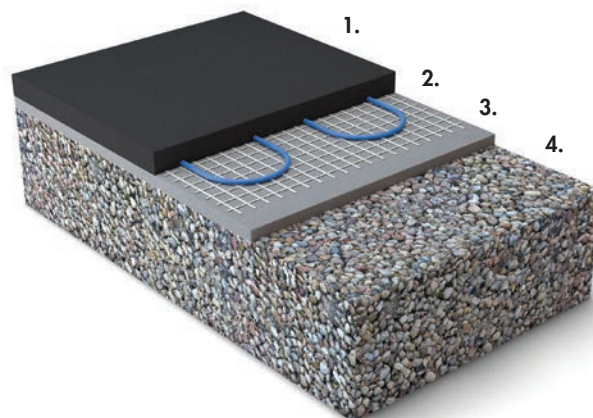
## Special precautions with asphalt

For all outdoor installations, care must be taken when covering the heating cables. Do not drop stones or slabs on the heating cable. Asphalt should not have a higher temperature than approx. 160°C (320°F).

The cable should first be manually covered by a thin layer of asphalt. This layer should cool off for about 10 minutes before the total thickness is laid and compacted with machinery/vehicles.

If the heating cables shall be moulded in concrete, it is important that the underlay is stable, and that the concrete is compacted.

The cables are normally covered by 50 mm (2") asphalt, concrete, or sand and pavement blocks.



# Heating cables in sports fields and similar

## Cable type

Use series resistant heating cable type TXLP DRUM.

## Dimensioning of power

For soil heating in green houses or similar, the power demand is approx.  $5 \text{ W/m}^2/\text{°C}$  ( $0.26 \text{ W/Sq. ft}/\text{°F}$ ). In other words, to raise the soil temperature by  $1 \text{ °C}$  ( $1.8 \text{ °F}$ ),  $5 \text{ W/m}^2$  is required. For soil heating of sports arenas, the load is normally  $50\text{-}90 \text{ W/m}^2$  ( $4.6\text{-}8.4 \text{ W/sq. ft}$ ).

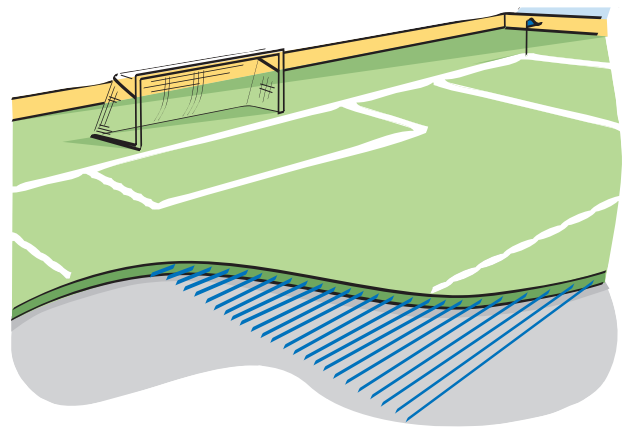
With soil heating in sports arenas, the green season may be extended, and the grass may grow faster. The ground can be kept frost free, and some ice and snow can be melted. Note! During heavy snowfalls the installed power as specified above will not be sufficient to melt all snow and ice. To have efficient snow melting, a standard snow melting installation, with approximately  $300\text{W/m}^2$  of installed power, is required.

## Installation

Selection and location of heating cable as well as installation method have to be individually decided. Normally the heating cables are placed 25-30 cm into the ground.

Note: Always measure the insulation and conductor resistance before embedding.

During installation it is important to keep focus on the pulling forces applied to the heating cable, especially if using a tractor or similar when installing. A little slack is good, and the sand embedding the cables should be fine grain (not coarse).



# Heating cables in stairs

## Cable type

DEFROST SNOW or TXLP drum cable are recommended for this type of installation. TXLP/2R 17 W/m may be used, but area power will be limited by bending radius restrictions. Maximum installed power using this type of cable will be 242 W/m<sup>2</sup>, which is normally considered to be on the low side.

## Dimensioning of power

Recommended area power for stairs is normally in the range of 300-350W/m<sup>2</sup>. In mild areas, going down to 250W/m<sup>2</sup> can be sufficient. Area power in landings can generally be a bit less than in the steps; 250-300 W/m<sup>2</sup>.

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. Install several cable runs in each step, so that C-C distance does not exceed 10 cm.

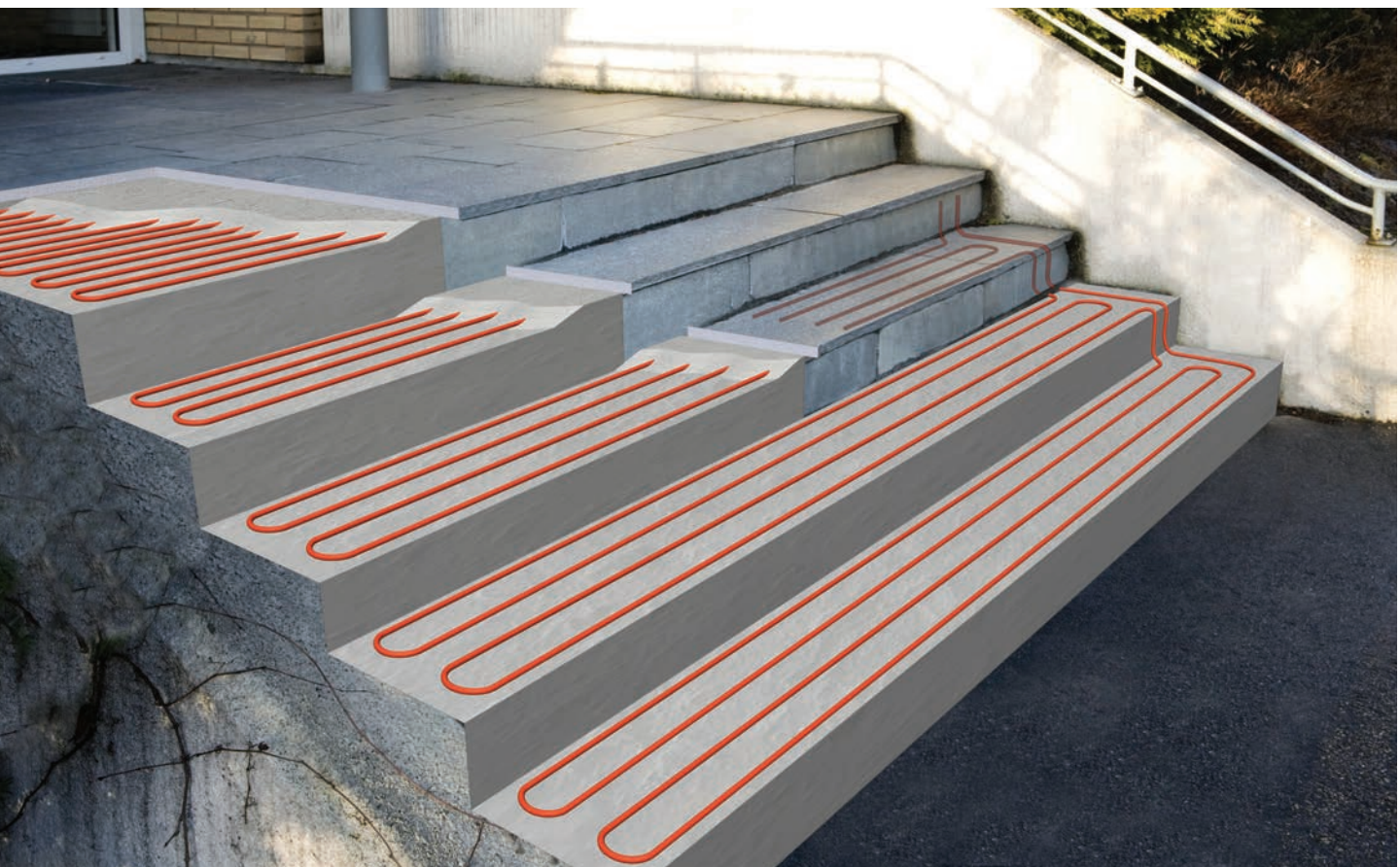
The heating cable should be installed with even spacing. Avoid concentration of heating cable that will give uneven cable and surface temperatures and in worst case cause overheating and breakdown. In order to compensate for extra heat loss from the front of the steps, the heating cable installation may be shifted slightly towards the edge of the each step.

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.

## Limitations

With sand*/slabs:	Max. 28 W/m (8.5 W/ft) of cable
Asphalt:	Max. 30 W/m (9 W/ft) of cable
Concrete:	Max. 35 W/m (10 W/ft) of cable

\*Sand shall be understood as quarry dust/crushed stone with grain size 0-8 mm/0-4 mm.



# Frost protection of freezer room (floors)

## Cable type

Use series resistant heating cable type TXLP Drum or TXLP/2R 10 W/m.

## Dimensioning of power

In freezer room floors, which are well insulated, the power requirement is 10 - 15 W/m<sup>2</sup> (1 - 1.5 W/Sq. ft).

## Thermostat control

The heating cable should be controlled by use of a thermostat, with a remote sensor located at the same depth as the heating cable and between two cable runs.

## Installation

Use a cable with a linear load of 5 - 10 W/m (1.5 - 3 W/ft). The centre spacing will then be in the range of 50 - 70 cm (19 - 27"). The heating cable is normally embedded in a concrete layer before the floor is insulated and finished. Always measure the insulation and conductor resistance before embedding.

## Tip!

As heating cables in freezer rooms are very difficult to access, installing an additional cable as backup is generally recommended.



Example of heating cable in freezer floor.

# Drying and curing of concrete

Electrical heating cables may be used for drying and curing of concrete in new buildings. Curing can prove difficult in cold climates, and by installing heating cables the curing time will be reduced.



Reduction of the drying time will contribute to the shortening of the complete construction time, which is economically advantageous. The heating cables are placed directly in the concrete. It prevents freezing and accelerates the curing of the concrete, which, in turn, makes it possible to remove the frames after 72 hours, even in severe cold. At a later stage, the heating cables can be reconnected for effective drying of the building structure and providing basic heating during the construction period. With rapid drying of the concrete, the painting work can also begin earlier than with other heating methods.

## Cable type

Standard TXLP heating cables are often used for this purpose. Using a standard 230 V elements of 10 W/m connected to 400V is one possibility, giving an output of 30 W/m. For drying and curing of concrete, a load of 85 - 135 W/m<sup>2</sup> is used. The cable is fixed to the reinforcement mesh, and should neither cross nor overlap itself at any point. The cable should not come in contact with plastic or combustible materials.

The cables may be used at a later stage in the construction period and the cold leads should be cut only when the construction is completed.

## Caution

It is not recommended to use heating cables for this purpose in environments with ambient temperatures of 5°C or higher.

## Recommended installed power:

Outside Temperature °C	Area power W/m <sup>2</sup>
0 to -5	95
-5 to -10	110
-10 to -15	130

The concrete should have a temperature of approx. 20°C when poured. The heating cables should be turned on straight after the concrete has been poured. Curing time is approx. 72 hours.

## How to install

Use heating cable with linear output 30 - 35 W/m.

1. Calculate total power needed according to temperature and find total number of elements. Round up.
2. For each form where concrete shall be poured find the amount of cable to be installed. Attach the cable inside the form to the reinforcement mesh, cables shall not be closer to each other than 6 cm.
3. The entire length of the heating cable, including the splice connecting the cold lead, shall be embedded.
4. Remember the cable shall not be in contact with insulation, plastics, mineral wool or similar.
5. Place a temperature sensor (if necessary) in the middle between two heating cables.
6. Connect the heating cables to the power supply and check that the correct voltage is applied. Heating cables shall be protected by a earth fault protection device (RCD/GFCI) with a maximum trip level of 30 mA. Set the desired temperature if a thermostat is used. Finally check that the heating cable(s) are producing heat by measuring the current.

## Important!

Heating cables in underfloor heating systems shall never be used to accelerate drying and curing when the ambient temperature is above freezing.

# Frost protection of roof gutters and roof drains

Heating cables are ideal to prevent the build-up of ice and heavy snow in gutters and roof drains. This implies an important safety aspect, as it prevents damage and injury that might be caused by falling snow, ice and icicles.



## Cable type

For this application, series resistive heating cable type TXLP (drum or 17 W/m elements) or self-limiting heating cable type DEFROST PIPE 20 is recommended.

## Evaluating the roof construction: Warm or cold roof?

**A warm roof** is a poorly insulated roof, where the heat loss through the roof construction might cause a temperature above 0°C (32°F) on the roof surface under a layer of snow. Water from melting snow will end up in the cold roof drains and freeze.

**A cold roof** is a well insulated roof where the problem of ice is caused often in the late winter. Sunshine will melt the snow on

the roof while the roof drains and gutters may be in the shade. The melting water will then freeze.

## Selecting the right power level, recommendations:

### Warm roof:

40 - 50 W/m of gutter

### Cold roof:

30 - 40 W/m of gutter

## Control system

For the control, use an outdoor water-proof thermostat placed in a shaded location on the building. The thermostat is to disconnect at approx. + 5°C (41°F). With cold roofs, a thermostat disconnecting at approx. -10°C (14°F) can also be used for energy saving purposes.

For even further energy savings, use an advanced control system. These systems

often include two or three sensors (moisture, precipitation and temperature sensor) along with an advanced controller, making it possible to reduce energy consumption to a minimum.

It is required to use a ground fault circuit interrupter, along with a circuit breaker, disconnecting/tripping at max. 30 mA (for safety).

## Installation

The cable is installed in a continuous loop in the gutter/drain. The cable is suspended at the top of each drain by using a stainless steel suspension bracket (maximum free hanging length = 1.5 m for TXLP and DEFROST PIPE).

In some difficult situations with warm roofs, it may be necessary to install heating cable loops on the outer part

of the roof in addition to the cable in the gutters/drains. The linear cable power should be limited to 16 - 18 W/m.

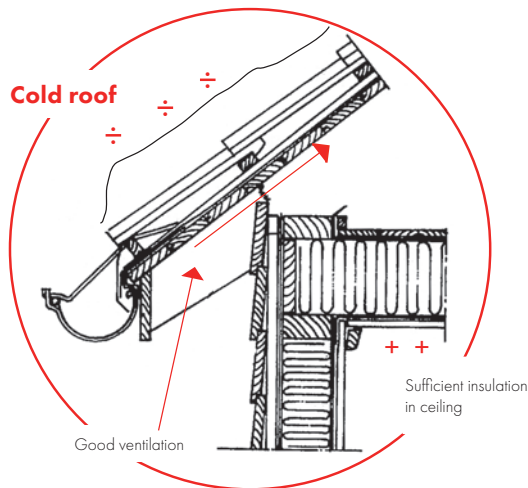
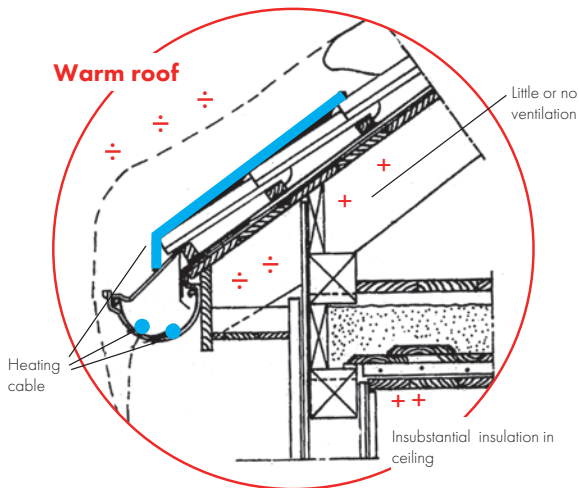
## Self limiting heating cable

With DEFROST PIPE 20/ GUTTER placing one length of the cable in the gutter is normally sufficient. Use DEFROST PIPE CLIP to install the cable in the gutter. Attach with asphalt glue if necessary. Note that a self limiting heating cable never switches off, so that temperature control system should be used, both to minimize power consumption and to maximize lifetime.

## Limitations: Output per meter gutter and linear output

Metal gutters	Max. 50 W/m 15.2 W/ft gutter, max 25 W/m 7.6 W/ft heating cable
Wooden gutters	Max. 36 W/m 11.0 W/ft gutter, max 18 W/m 5.5 W/ft heating cable
Plastic gutters	Max. 40 W/m 12.2 W/ft gutter, max 20 W/m 6.1 W/ft heating cable
Combustible base	Max. 18 W/m 5.5 W/ft heating cable

No power limits for self limiting heating cable, DEFROST PIPE.



## Planning and calculation

Due to the high power level and varying gutter and drain lengths, TXLP drum type single conductor cable is a good choice.

Sum up the total length of roof drain and gutters. If needed, the loop in the drain is to go down to frost proof depth.

Multiply this length by 2, and this gives the cable length and power. Select the correct length and resistance value

by using the power diagram as shown in the appendix. As the cable is laid in a loop, the power per meter cable has to be the W/m roof drain/pipe divided by 2. Use the power diagram to find the desired cable length from the horizontal line and the correct power per meter cable from the resistance line.



### Example:

A 21 m long gutter with 2 drains, each 8 m. Total length is 37 m and we want approx. 40W/m gutter/drain. Cable length;  $37 \times 2 = 74$  m. Cable linear load;  $40/2 = 20$  W/m. From the diagram we find that 74 m, 0.49 Ohm/m gives 20 W/m and 1450W total at 230V.

### Roofs

Traditionally, private houses have sloping roofs (e.g. "saddle roofs"), and it has primarily been commercial and industrial buildings which have had flat roofs. Flat, or nearly flat, roofs have, however, become more and more common also in private homes and cottages, and although they are dimensioned to withstand snow loads, it can be both comfortable and clever to remove snow

using heating cables. This is particularly true for roofs which are covered with roofing membrane, normally not intended for manual snow cleaning (due to risk of damaging the membrane with snow shovels).

For snow melting on flat roofs, an area power of approximately 200W/m<sup>2</sup> is recommended, with the linear power of the heating cable not exceeding 20W/m.

Attachment to flat roofs may be by using bituminous glue or similar, attachment bands, or sandwiching between two layers of roofing membrane. With the latter method, a temperature sensor should be installed in direct contact with the heating cable and used for protection against overheating.



# Frost protection of pipes and tanks

## Choice of cable type

Usually for frost protection the cost efficient solution is to use TXLP on drum. Self limiting heating cables type DEFROST PIPE and DEFROST WATER can also be used, and prove practical in many cases. When using TXLP on drum it is important to take into account a maximum pipe temperature of 50°C (122°F). In all cases regulation by thermostat is recommended. Choose a thermostat with external sensor, which will ensure low power consumption and an even temperature.

## The following restrictions apply (TXLP):

Pipe temperature	Maximum power/meter (W/m)
Temp. = 45 - 50°C	10
Temp. = 30 - 45°C	15
Temp. = <30°C	20

## Limitations for TXLP

TXLP cannot be used on pipes requiring a temperature above 50 °C (122 °F).

## Calculation of required power in Watt

To do a calculation for choosing the correct heating cable(s) you need the following data:

- Pipe dimensions / the surface area of the tank
- Thermal insulation thickness
- The surrounding temperature
- Target temperature to keep on the tank or pipe

Unknown and non-controllable factors imply that you should adjust the results from your heat loss calculation a little upwards. A safety margin equal to a factor 1.5 is not uncommon.

## Insulated pipes

In general, pipes installed in air need to be insulated. If they are not, the heat loss will be quite high, even for small pipe diameters. For example, a non-insulated 1" water pipe will have a power demand of 45 W/m at -30°C.

## Power demand, recommended power for insulated pipes (W/m) surrounded by air

Inside pipe diam. Inches (")	Thickness of insulation																				
	15 mm			20 mm			25 mm			30 mm			40 mm			50 mm			100 mm		
	$\Delta t^{\circ}\text{C}$			$\Delta t^{\circ}\text{C}$			$\Delta t^{\circ}\text{C}$			$\Delta t^{\circ}\text{C}$			$\Delta t^{\circ}\text{C}$			$\Delta t^{\circ}\text{C}$			$\Delta t^{\circ}\text{C}$		
	10	20	30	10	20	30	10	20	30	10	20	30	10	20	30	10	20	30	10	20	30
3/4	3.5	6.5	11	3.1	5.5	8.0	2.5	5.5	7.0	2.5	4.5	6.5	2.0	3.5	5.5	2.0	3.5	5.0	1.5	2.5	3.5
1	4.0	8.0	12	3.5	7.0	10	3.0	6.0	9.0	3.0	5.0	8.0	2.5	5.0	7.0	2.0	4.0	6.0	1.5	3.0	4.0
1 1/4	5.0	10	15	4.0	8.0	12	4.0	7.0	10	3.0	6.0	9.0	3.0	5.0	8.0	2.5	5.0	7.0	2.0	3.0	5.0
1 1/2	5.5	11	16	4.5	9.0	13	4.0	8.0	11	4.0	7.0	10	3.0	6.0	8.0	2.5	5.0	7.0	2.0	3.5	5.0
2	6.5	13	19	5.0	10	15	5.0	9.0	13	4.0	8.0	12	3.0	6.0	9.0	3.0	6.0	8.0	2.0	4.0	6.0
2 1/2	8.0	16	24	6.0	12	18	5.0	10	15	5.0	9.0	13	4.0	7.0	11	3.0	6.0	9.0	2.0	4.0	6.0
3	9.0	18	27	7.0	14	21	6.0	12	17	5.0	10	15	4.0	8.0	12	4.0	7.0	11	2.5	4.5	7.0
4	11	22	33	9.0	18	27	8.0	15	22	6.0	12	18	5.0	10	15	4.0	8.0	12	2.5	5.0	8.0
5	14	28	42	11	21	31	8.0	17	25	7.0	14	21	6.0	12	17	5.0	10	15	3.0	6.0	9.0
6	15	30	45	12	24	36	10	20	30	9.0	17	25	7.0	14	21	6.0	11	17	3.5	7.0	10
7	17	34	51	14	28	42	11	22	33	10	19	29	8.0	15	22	6.0	12	18	4.0	8.0	11
8	20	40	59	15	30	45	13	25	37	11	21	32	9.0	17	25	7.0	14	21	4.0	8.0	12
9	22	43	64	17	34	51	14	27	40	12	23	35	10	18	28	8.0	15	23	4.5	9.0	13
10	23	46	69	19	37	55	15	30	45	13	26	39	10	20	30	8.0	16	24	5.0	10	14

$\Delta t$  = temperature difference between the surroundings and the inside of the pipe.

## Pipes buried in the ground

For pipes buried in the ground without thermal insulation you can use the following table to find the power demand. The table shows the total power demand in W/m and W/ft of the pipe.

### Power demand, recommended power for non-insulated pipes buried in the ground

Lowest winter air temperature -30°C (-22°F)							
Pipe diameter		Power requirements of pipe buried at different depths					
Inside Inches (")	Outside mm	500 mm 20"		800 mm 20"		1000 mm 20"	
		W/m	W/ft	W/m	W/ft	W/m	W/ft
1/2	21	6	2.0	5	1.5	5	1.5
3/4	27	8	2.5	7	2.0	6	2.0
1	33	10	3.0	8	2.5	7	2.0
1 1/4	42	12	3.5	10	3.0	9	3.0
1 1/2	48	14	4.5	11	3.5	10	3.0
2	60	17	5.0	14	4.0	12	3.5
2 1/2	75	21	6.5	17	5.0	15	4.5
3	89	25	8.0	21	6.5	18	5.5
4	114	32	10.0	26	8.0	23	7.0
6	165	46	14.0	38	12.0	33	10.0

The table show the power requirement per meter (W/m) or per feet (W/ft) of pipeline.

Single conductor TXLP heating cables should normally be used. The heating cable is laid back and forth in a loop. The linear power of the cable shall therefore be half the requirement per unit length of pipe as shown in the table. (TXLP cannot be used inside water pipes! For this application use DEFROST FLEX or self limiting cable DEFROST WATER.)

### Tanks

The power demand for tanks are usually calculated and based on the following parameters:

U = Power conductivity coefficient [W/Km<sup>2</sup>] (of the insultaion)

A = Surface area of the tank

ΔT = Temperature difference between the inside of the tank and its surroundings.

This calculation does not take into account warming up the contents of the tank, but merely maintaining the temperature against the "cold" outside.

### Heat demand P

$$P = U \times A \times \Delta T$$

### Installation in general for both pipes and tanks

The surface on which the heating is installed, should be even and without any sharp edges, and the heating cable should be in good contact with the surface along the entire length of the cable. Insulation should be protected against water intrusion.

### Pipes

To keep a rational and even temperature around pipes with diameter smaller than 100 mm, it is normal to apply two cables along the pipe. With a single conductor this is easy by going back and forth on the pipe in a loop. For pipes with diameter larger than 100 mm it is normal to install four cables along the pipe to ensure even power distribution. Heating cables can also be installed spiraled on the pipe. To choose the correct cable you can use the tables on pages 61 and 62, 230V and 400V respectively.

Regardless of the type of cable, it should be fixed to the pipe for every 30 cm with fiberglass tape. After this, the cable should be covered by aluminum tape or foil along the entire pipe length. This foil or tape ensures good thermal contact/conductivity to the tank or pipe. At valves and flanges the installation of cables should be in such a way that disassemblies of these parts are possible without harming or cutting the heating cable.

The thermal insulation should be well protected against moisture and water intrusion. The screen/earth wire of the heating cable must be connected to the electrical system's earth. Electrical insulation of the heating cable is measured before and after applying thermal insulation.

## Using self limiting heating cables

After having found the heat loss, the following table is used to select the cable type:

Type	Output at reference temperature (W/m)	Most common application
DEFROST PIPE 10 (at 10°C)	10	Frost protection of pipes
DEFROST PIPE 15 (at 10°C)	15	Frost protection of pipes
DEFROST PIPE 20 (at 10°C)	20	Frost protection of pipes, roof gutters and drains
DEFROST PIPE 30 (at 10°C)	30	Frost protection of pipes
DEFROST PIPE 40 (at 10°C)	40	Frost protection of pipes
DEFROST WATER (at 5°C)	26 in water/11 in air	Frost protection of pipes (installed inside pipe)

A self-limiting heating cable will adjust the heat output in response to increasing or decreasing pipe temperature. Due to this it is important to select the cable with the correct output depending on the temperature of the pipe. Check the operating pipe temperature and use the relevant diagrams in the product data sheet to select the correct cable temperature.

### Installation

Self-limiting heating cables are normally laid straight along the pipe or spiralled in order to give the correct power. The heating cables are fixed to the pipe by means of a temperature resistant tape. The best thermal contact and heat distribution is achieved by wrapping an aluminum foil over the heating cable before the insulation is applied. The insulation must be suitably protected against moisture or water. On flanges and vents on process piping, 1 - 1.5 m (40 - 60") of heating cable is wrapped carefully in such a way that uncoupling can be done later if necessary.

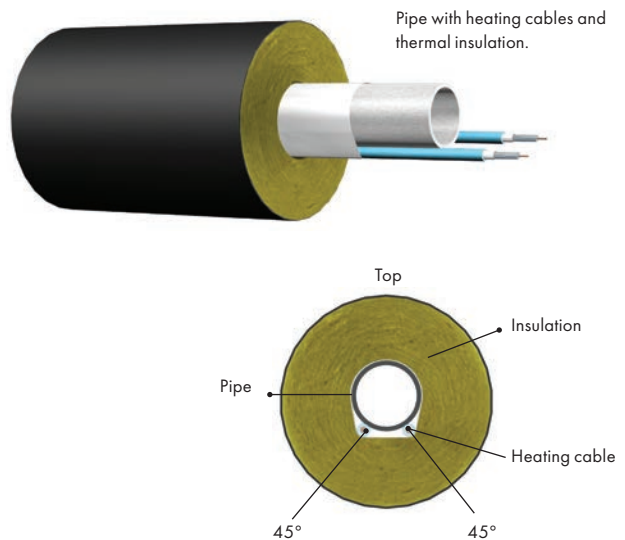
### Thermostat control

Thermostat control is recommended in order to maintain a steady temperature and save energy. An electronic thermostat with a remote sensor should be used.

### Inrush currents

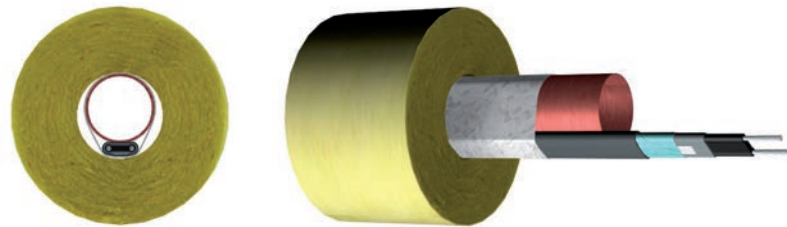
Self limiting heating cables are subject to inrush currents. This applies at the very moment the heating cables are turned on. As the cable is cold it will, for a few seconds, consume relative high power. For our defrost cables, you can use the following rules of thumb.

Temp. 10°C:	Inrush current = approx. 4x normal current
Temp. -5°C:	Inrush current = approx. 5x normal current
Temp. -20°C:	Inrush current = approx. 6x normal current



# Hot water in buildings

Instant hot water supply by single pipe system can be achieved by using WARM WATER PIPE self-limiting heating cable for hot water temperature maintenance.



The WARM WATER PIPE self-limiting heating cable is fitted to a single hot water supply pipe to maintain the hot water temperature by compensating for the heat loss under non-flow condition. Compared with a re-circulation system, this reduces the capital costs and lowers the operating costs.

## Installation

Attach the heating cable to the water pipe by wrapping aluminum tape or foil all around the pipe and heating cable (see picture to the top of the page). The aluminium will secure an even heat distribution. Then apply insulation around the aluminium foil/tape according to the table on page 25. This table shows the relation between insulation thickness, pipe diameter and corresponding maintenance temperature.





## Part 3 Product information

### Heating cables, series resistant

N-HEAT® TXLP/2R .....	30
N-HEAT® TXLP/1 .....	32
N-HEAT® MILLICABLE FLEX 15 .....	33
N-HEAT® TXLP drum cable black.....	34
N-HEAT® TXLP TWIN ON DRUM.....	35
N-HEAT® MILLICABLE™.....	36
N-HEAT® MILLICLICK™.....	37
N-HEAT® DEFROST SNOW.....	38
N-HEAT® TXLP/1 28 W/m.....	39
N-HEAT® DEFROST FLEX.....	40

### Heating cable mats

N-HEAT® SNOWMAT.....	41
N-HEAT® MELTMAT .....	42
N-HEAT® MILLIMAT®.....	43

### Heating cables, self-limiting

N-HEAT® DEFROST PIPE - AO .....	45
N-HEAT® DEFROST PIPE - BR .....	47
N-HEAT® WARM WATER PIPE .....	49
N-HEAT® DEFROST WATER AND DEFROST WATER KIT .....	50

### Thermostats

N-HEAT® MILLITEMP™ thermostat.....	51
N-HEAT® MILLITEMP™ 2 thermostat.....	52
N-HEAT® COMFORT TR thermostat.....	53
N-HEAT® COMFORT TD thermostat.....	54

### Accessories

Accessories for heating cables.....	55
Accessories for self-limiting heating cables.....	56

# N-HEAT® TXLP/2R

## Twin conductor heating cable units for direct heating



### Applications:

TXLP/2R 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:

- Linear load: 10 or 17 W/m (3 or 5.2 W/ft)
- Series resistance
- Rated voltage: 230 V
- Highest system voltage: 300/500 V
- Max. cont. operating temperature outer jacket: 65°C (149°F)
- Min. bending radius: 5 x cable diameter
- Tolerance on conductor resistance: -5/+10 %
- Mechanical class: M2
- Length of cold lead: 2.3 m
- UV resistant: Yes
- Minimum installation temperature: 0°C (32°F)

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

TYPE	Load at 230V		Element length(*)		R_nom	Outer diameter	Weight per unit		Nexans code no.	GTIN
	(W)	(m)	(ft)	(Ω)			(kg)	(lb)		
TXLP/2R 200/17	200	11.7	38.4	264.5	7.0	1.0	2.4	10561693	7045210068511	
TXLP/2R 300/17	300	17.6	57.7	176.3	7.0	1.2	3.4	10561694	7045210068528	
TXLP/2R 400/17	400	23.5	77.1	132.3	7.0	1.6	4.3	10561695	7045210068535	
TXLP/2R 500/17	500	29.3	96.1	105.8	7.0	2.0	5.3	10561696	7045210068542	
TXLP/2R 600/17	600	35.2	115.5	88.2	7.0	2.5	6.3	10561697	7045210068559	
TXLP/2R 700/17	700	41.0	134.5	75.6	7.0	2.6	7.0	10561698	7045210068566	
TXLP/2R 840/17	840	49.7	163.1	63.0	7.0	3.0	8.4	10561699	7045210068573	
TXLP/2R 1000/17	1000	59.0	193.6	52.9	7.0	3.6	9.9	10561700	7045210068580	
TXLP/2R 1250/17	1250	72.4	237.5	42.3	7.0	4.3	12.0	10561701	7045210068597	
TXLP/2R 1370/17	1370	80.8	265.1	38.6	7.0	4.8	12.8	10561702	7045210068801	
TXLP/2R 1500/17	1500	86.4	283.5	35.3	7.0	5.0	14.6	10561703	7045210079562	
TXLP/2R 1700/17	1700	100.0	328.1	31.1	7.0	5.7	16.1	10561704	7045210068818	
TXLP/2R 2100/17	2100	123.7	405.8	25.2	7.0	7.0	17.6	10561705	7045210068825	
TXLP/2R 2600/17	2600	154.5	506.9	20.4	7.0	9.0	21.3	10561706	7045210068832	
TXLP/2R 3300/17	3300	192.0	629.9	16.0	7.0	10.7	26.6	10561707	7045210068849	

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

## TXLP/2R – Twin conductor heating cable units 10 W/m

TYPE	Load at 230V	Element length (*)		R_nom	Outer diameter	Weight per unit		Nexans code no.	GTIN
	(W)	(m)	(ft)	(Ω)	(mm)	(kg)	(lb)		
TXLP/2R 230/10	230	23.0	75.5	230.0	7.0	1.5	3.3	10561680	7045210068856
TXLP/2R 300/10	300	31.2	102.4	176.3	7.0	2.0	4.4	10561681	7045210125221
TXLP/2R 380/10	380	38.0	124.7	139.2	7.0	2.4	5.9	10561683	7045210068863
TXLP/2R 450/10	450	47.0	154.2	117.6	7.0	3.4	7.5	10561684	7045210125238
TXLP/2R 530/10	530	53.4	175.2	99.8	7.0	3.2	8.2	10561685	7045210068870
TXLP/2R 650/10	650	64.7	212.3	81.4	7.0	3.9	9.2	10561686	7045210068887
TXLP/2R 760/10	760	77.7	254.9	69.6	7.0	4.5	11.5	10561687	7045210068894
TXLP/2R 890/10	890	85.2	279.5	59.4	7.0	5.1	10.4	10561688	7045210120318
TXLP/2R 1050/10	1050	105.4	345.8	50.4	7.0	6.1	15.2	10561689	7045210068917
TXLP/2R 1300/10	1300	130.4	427.8	40.7	7.0	7.3	18.9	10561690	7045210068924
TXLP/2R 1450/10	1450	141.5	464.2	36.5	7.0	8.2	18.8	10561691	7045210120271
TXLP/2R 1610/10	1610	161.0	528.2	32.9	7.0	9.1	23.6	10561692	7045210068931

\*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:

- **Linear load:** 10 or 17 W/m (3 or 5.2 W/ft)
- **Series resistance**
- **Rated voltage:** 230 V
- **Highest system voltage:** 300/500 V
- **Max. cont. operating temperature outer jacket:** 65°C (149°F)
- **Min. bending radius:** 5 x cable diameter
- **Tolerance on conductor resistance:** - 5/+10 %
- **Mechanical class:** M2
- **Length of cold lead:** 2.3 m (both ends)
- **UV resistant**
- **Minimum installation temperature:** 0°C (32°F)



### TXLP/1 – Single conductor heating cable units 17 W

Type	Load at 230V	Element length (*)		R_nom	Outer diameter	Weight per unit		Nexans code no.	GTIN
	(W)	(m)	(ft)	(Ω)	(mm)	(kg)	(lb)		
TXLP/1 300/17	300	17.7	58.1	176.3	6.5	1.2	2.6	10022267	7045210013306
TXLP/1 400/17	400	23.5	77.1	132.3	6.5	1.5	3.3	10022269	7045210013320
TXLP/1 500/17	500	29.4	96.5	105.8	6.5	1.8	4.0	10022270	7045210013337
TXLP/1 600/17	600	35.3	115.8	88.2	6.5	2.0	4.4	10022271	7045210013344
TXLP/1 700/17	700	41.2	135.2	75.6	6.5	2.3	5.0	10022272	7045210013351
TXLP/1 850/17	850	50.0	164.0	62.2	6.5	2.7	6.0	10022273	7045210013368
TXLP/1 1000/17	1000	60.1	197.2	52.9	6.5	3.2	7.0	10022261	7045210013245
TXLP/1 1250/17	1250	73.5	241.1	42.3	6.5	4.0	8.8	10022262	7045210013252
TXLP/1 1400/17	1400	82.3	270.0	37.8	6.5	4.3	9.5	10022263	7045210013269
TXLP/1 1750/17	1750	102.9	337.6	30.2	6.5	5.5	12.1	10022264	7045210013276
TXLP/1 2200/17	2200	129.4	424.5	24.1	6.5	6.8	15.0	10022265	7045210013283
TXLP/1 2600/17	2600	156.0	511.8	20.4	6.5	7.6	16.7	10022266	7045210013290
TXLP/1 3100/17	3100	185.0	607.0	17.1	6.5	9.3	20.5	10022268	7045210013313

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

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

Type	Load at 230V	Element length (*)		R_nom	Outer diameter	Weight per unit		Nexans code no.	GTIN
	(W)	(m)	(ft)	(Ω)	(mm)	(kg)	(lb)		
TXLP/1 750/10	750	80.2	263.1	70.5	6.5	4.6	10.1	10022904	7045210019568
TXLP/1 950/10	950	95.8	314.3	55.7	6.5	5.5	12.1	10070076	7045210030907
TXLP/1 1070/10	1070	107.4	352.4	49.4	6.5	6.0	13.2	10022901	7045210019520
TXLP/1 1340/10	1340	134.1	440.0	39.5	6.5	7.6	16.7	10022902	7045210019544
TXLP/1 1680/10	1680	168.9	551.2	31.5	6.5	9.3	20.5	10022903	7045210019551

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



# N-HEAT® MILLICABLE FLEX™ 15

Twin conductor heating cable units for direct heating



MILLICABLE FLEX™ 15 is a thin heating cable element ideal for comfort heating in concrete/screed floors. The heating cable is designed for heating all types of rooms, including bathrooms, and well suited for renovation projects. MILLICABLE FLEX™ 15 is packed in a user-friendly reel-box for ease of installation.

MILLICABLE FLEX™ 15 heating cable is designed to be embedded into mortar, screed or tile-adhesive, and can be installed beneath most floor coverings. It is approved for up to 200 W/m<sup>2</sup> installed power in indoor installations.

## Construction:

- Solid resistance wire
- FEP insulation
- Solid, tinner copper drain wire
- PVC outer jacket

## Technical data:

- 4 mm diameter
- Output range from 375W to 1800W
- Tolerance on element resistance: -5/+10 %
- Linear output: 15 W/m
- Max. cont. operating temperature, outer jacket: 65°C
- Mechanical class: M1
- Min. bending radius: 20 mm
- Rated voltage: 230 VAC
- Length of cold lead: 2.5

## MILLICABLE FLEX™ 15 – Thin twin conductor heating cable units for direct heating

Type	Load at 230V	Element length(*)	R <sub>nom</sub>	Outer diameter	Weight per unit	Nexans code no.	GTIN
	(W)	(m)	(Ω)	(mm)	(kg)		
MILLICABLE FLEX 15™ 375W	375	24.9	141.1	4.0	2.3	10264044	7045210081220
MILLICABLE FLEX 15™ 450W	450	30.2	117.6	4.0	2.5	10264045	7045210081237
MILLICABLE FLEX 15™ 525W	525	35.1	100.8	4.0	2.7	10264046	7045210081244
MILLICABLE FLEX 15™ 600W	600	40.8	88.2	4.0	2.9	10264047	7045210081251
MILLICABLE FLEX 15™ 750W	750	48.7	70.5	4.0	3.1	10264048	7045210081268
MILLICABLE FLEX 15™ 900W	900	57.0	58.8	4.0	3.5	10264049	7045210081275
MILLICABLE FLEX 15™ 1050W	1050	70.7	50.4	4.0	3.9	10264050	7045210081282
MILLICABLE FLEX 15™ 1200W	1200	76.4	44.1	4.0	4.0	10264051	7045210081299
MILLICABLE FLEX 15™ 1500W	1500	101.9	35.3	4.0	6.2	10264052	7045210081404
MILLICABLE FLEX 15™ 1800W	1800	123.5	29.4	4.0	7.2	10264053	7045210081411

\* The cables are delivered with a 2.5 m cold lead

## MILLICABLE FLEX™ 15 – Area table

Area power	200 W/m <sup>2</sup>	190 W/m <sup>2</sup>	180 W/m <sup>2</sup>	170 W/m <sup>2</sup>	160 W/m <sup>2</sup>	150 W/m <sup>2</sup>	140 W/m <sup>2</sup>	130 W/m <sup>2</sup>	120 W/m <sup>2</sup>	110 W/m <sup>2</sup>	100 W/m <sup>2</sup>
CC distance	7,5 cm	7,9 cm	8,3 cm	8,8 cm	9,4 cm	10 cm	10,7 cm	11,5 cm	12,5 cm	13,6 cm	15 cm
Element power	Area (m <sup>2</sup> )	Area (m <sup>2</sup> )	Area (m <sup>2</sup> )	Area (m <sup>2</sup> )	Area (m <sup>2</sup> )	Area (m <sup>2</sup> )	Area (m <sup>2</sup> )	Area (m <sup>2</sup> )	Area (m <sup>2</sup> )	Area (m <sup>2</sup> )	Area (m <sup>2</sup> )
375 W	1.9	2.0	2.1	2.2	2.3	2.5	2.7	2.9	3.1	3.4	3.7
450 W	2.3	2.4	2.5	2.7	2.8	3.0	3.2	3.5	3.8	4.1	4.5
525 W	2.6	2.8	2.9	3.1	3.3	3.5	3.8	4.0	4.4	4.8	5.3
600 W	3.1	3.2	3.4	3.6	3.8	4.1	4.4	4.7	5.1	5.5	6.1
750 W	3.7	3.8	4.0	4.3	4.6	4.9	5.2	5.6	6.1	6.6	7.3
900 W	4.3	4.5	4.7	5.0	5.4	5.7	6.1	6.6	7.1	7.8	8.6
1050 W	5.3	5.6	5.9	6.2	6.6	7.1	7.6	8.1	8.8	9.6	10.6
1200 W	5.7	6.0	6.3	6.7	7.2	7.6	8.2	8.8	9.6	10.4	11.5
1500 W	7.6	8.1	8.5	9.0	9.6	10.2	10.9	11.7	12.7	13.9	15.3
1800 W	9.3	9.8	10.3	10.9	11.6	12.4	13.2	14.2	15.4	16.8	18.5

# N-HEAT® TXLP

## Single conductor general purpose heating cable on drums



### Applications:

This heating cable is ideal for floor warming in concrete constructions. It is also used in snow melting installations, for frost protection of pipes, roof gutters and drains, and soil heating.



### Construction:

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

### Technical data:

- Max. cont. operating temperature  
outer jacket: 65°C (149°F)
- Series resistant
- Minimum bending radius: 5 x cable diameter
- Tolerance on conductor resistance: -5/+10 %
- Highest system voltage: 300/500 V
- Mechanical class: M2
- UV resistant

### TXLP on drum – Single conductor heating cable with specific resistance

Type	Linear resistance	Outer diameter	Weight per 100 m	Weight per 100 yds.	Nexans code no.	GTIN
	(Ω/m)	(mm)	(kg)	(lb)		
TXLP 0.02 Ω/m*	0.02	6.2	5.6	10.5	10156606	7045210053913
TXLP 0.05 Ω/m	0.05	6.3	5.8	11.6	10156607	7045210053920
TXLP 0.07 Ω/m	0.07	6.1	5.3	10.7	10156608	7045210053937
TXLP 0.09 Ω/m	0.09	6.3	5.3	10.8	10156609	7045210053944
TXLP 0.13 Ω/m	0.13	6.5	5.6	10.5	10156610	7045210053951
TXLP 0.2 Ω/m	0.20	6.1	5.3	10.7	10156611	7045210053968
TXLP 0.25 Ω/m	0.25	6.0	5.3	10.7	10211620	7045210076318
TXLP 0.3 Ω/m	0.30	6.0	5.3	10.7	10156612	7045210053975
TXLP 0.39 Ω/m	0.39	6.0	5.3	10.7	10211621	7045210076325
TXLP 0.49 Ω/m	0.49	6.0	5.3	10.7	10156613	7045210053982
TXLP 0.7 Ω/m	0.70	6.9	5.1	10.3	10156644	7045210053999
TXLP 1.0 Ω/m	1.00	6.3	5.2	10.5	10156645	7045210054002
TXLP 1.4 Ω/m	1.40	6.3	5.0	10.1	10156646	7045210054019
TXLP 2.5 Ω/m	2.50	6.1	5.1	10.3	10156647	7045210054026
TXLP 3.5 Ω/m	3.50	6.1	4.9	9.9	10156648	7045210054033
TXLP 5.35 Ω/m	5.35	6.1	4.6	9.3	10156649	7045210054040
TXLP 7.7 Ω/m	7.70	6.0	4.6	9.3	10156650	7045210054057
TXLP 12.7 Ω/m	12.70	6.3	4.6	9.3	10156651	7045210054064

\* not in stock - moq 6,000 m

# N-HEAT® TXLP TWIN ON DRUM

## Twin conductor general purpose heating cable on drums



### Applications:

This heating cable is ideal for floor warming in concrete constructions. It is also used in snow melting installations, for frost protection of pipes, roof gutters and drains, and soil heating. The cable is extremely versatile, and can be customized to fit almost any application. TXLP TWIN ON DRUM can be installed directly on reinforcement bars.

TXLP TWIN ON DRUM may also be installed directly in hot asphalt with a max. temperature of 160 °C (320 °F).



### Construction:

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

### Technical data:

- Max. cont. operating temperature  
outer jacket: 65 °C (149 °F)
- Series resistant
- Minimum bending radius: 5 x cable diameter
- Tolerance on conductor resistance: -5 / +10 %
- Highest system voltage: 300/500 V
- Mechanical class: M2
- UV resistant: Yes

### TXLP TWIN ON DRUM – Twin conductor heating cable with specific resistance

Type	Linear resistance	Outer diameter	Weight per 100 m	Weight per 100 yds.	Nexans code no.	GTIN
	(Ω/m)			(mm)		
TXLP TWIN 0.05 Ω/m	0.05	6.9	5.5	11.10	10232219	7045210073300
TXLP TWIN 0.07 Ω/m	0.07	6.9	5.6	11.30	10232228	7045210073317
TXLP TWIN 0.09 Ω/m	0.09	6.9	5.2	10.50	10232229	7045210073324
TXLP TWIN 0.13 Ω/m	0.13	6.7	5.3	10.70	10232230	7045210073331
TXLP TWIN 0.18 Ω/m	0.18	6.9	5.3	10.70	10232231	7045210073348
TXLP TWIN 0.32 Ω/m	0.32	6.7	5.3	10.70	10232232	7045210073355
TXLP TWIN 0.48 Ω/m	0.48	6.7	5.3	10.70	10232233	7045210073362
TXLP TWIN 0.73 Ω/m	0.73	6.3	5.0	10.10	10232244	7045210073379
TXLP TWIN 1.08 Ω/m	1.08	6.5	4.9	9.90	10232245	7045210073386
TXLP TWIN 1.5 Ω/m	1.50	6.7	5.0	10.10	10232246	7045210073393
TXLP TWIN 2.5 Ω/m	2.50	6.5	5.1	10.30	10232247	7045210073409
TXLP TWIN 3.7 Ω/m	3.70	6.5	4.9	9.90	10232248	7045210073416
TXLP TWIN 5.7 Ω/m	5.70	6.5	4.8	9.70	10232249	7045210073423
TXLP TWIN 8.6 Ω/m	8.60	6.6	4.9	9.90	10232250	7045210073430
TXLP TWIN 13.1 Ω/m	13.10	6.2	4.5	9.10	10232251	7045210073447

# N-HEAT® MILLICABLE®

## Thin twin conductor heating cable



### Applications:

MILLICABLE® is a thin twin conductor heating cable, which can be installed in a traditionally poured floor or together with MILLICLICK® boards as a dry-floor heating system.

MILLICABLE® is delivered spooled on a reel, packed in a user-friendly box. In addition the product comes with 5 m of aluminum tape up to 575W and 10m (2x5m) from 575W and larger for installation with MILLICLICK®.

The heating cable has an outer diameter of 4 mm and is delivered with hidden splice\*.

\* 120 W and 180 W elements are made with a molded splice.



### Construction:

- Solid resistance wires
- FEP insulation
- Solid, finned copper drain wire
- Conductive polymer combined sheath and screen
- Hidden splice\*

### Technical data:

- Linear load: 6 W/m (1.83 W/ft) at 230 V
- Series resistance
- Rated voltage: 230 V
- Highest system voltage: 300/500 V
- Max. cont. operating temperature outer jacket: 65°C (149 °F)
- Min. bending radius: 5 x cable diameter
- Tolerance on conductor resistance: -5/+10 %
- Mechanical class: M1
- Length of cold lead: 3.5 m
- Minimum installation temperature: 0°C (32°F)

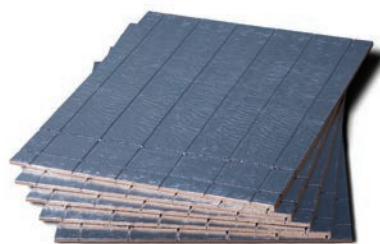
### MILLICABLE® – Thin twin conductor heating cable units for direct heating

Nominal output at 230V	Element length (*)	R_nom	Outer diameter	Weight	Covers in MILLICLICK	Nexans art. no.	GTIN
(W)	(m)	(Ω)	(mm)	(kg)	(m <sup>2</sup> )		
120	20	442.4	4.2	1.0	2.0	10127990	7045210048025
180	30	299.0	4.2	1.3	3.0	10196901	7045210061307
235	40	226.5	4.2	1.4	4.0	10264858	7045210080810
290	50	182.0	4.2	1.8	5.0	10264859	7045210080827
355	60	151.0	4.2	1.9	6.0	10264860	7045210048032
400	70	131.5	4.2	2.3	7.0	10264861	7045210070841
510	85	102.7	4.2	2.8	8.5	10264862	7045210080858
575	100	91.8	4.2	3.4	10.0	10264863	7045210048049
690	120	75.2	4.2	3.8	12.0	10264894	7045210048056
880	140	59.7	4.2	4.6	14.0	10264895	7045210080889
930	160	57.0	4.2	5.5	16.0	10264896	7045210080896
1070	180	49.7	4.2	6.0	18.0	10264898	7045210081107
1170	200	44.4	4.2	6.9	20.0	10264901	7045210048063

\* In addition the products are delivered with a 3.5 m cold lead.

# N-HEAT® MILLICLICK®

Boards covered with aluminium foil and pre-cut slots for MILLICABLE®



MILLICLICK® boards are to be installed together with MILLICABLE®. They are covered with aluminium foil and have pre-cut slots for MILLICABLE®. The boards provide sound attenuation between floors, and the aluminum foil ensures an efficient and even heat distribution. With MILLICABLE® 6 W/m installed the system has a rated output of 60 W/m<sup>2</sup>.

### Construction:

- Size: 590 x 790 x 8 mm (width x length x thickness)
- Made from wooden fibres (environmentally friendly)
- Covered by aluminium foil

### Technical data:

- Slots for MILLICABLE®, C-C approx. 10 cm
- Thermal insulation 6,25 W/m<sup>2</sup>K
- Sound attenuation 19 dB

**Table - MILLICABLE® installed together with MILLICLICK®**

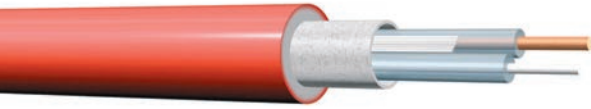
Room area	Total output	MILLICABLE® - thin twin conductor heating cable												
		120/6	180/6	235/6	290/6	355/6	400/6	510/6	575/6	690/6	880/6	930/6	1070/6	1170/6
m <sup>2</sup>	W													
2 – 2.9	120	1												
3 – 3.9	180		1											
4 – 4.9	235			1										
5 – 5.9	290				1									
6 – 6.9	355					1								
7 – 8.4	400						1							
8.5 – 9.9	510							1						
10 – 10.9	575								1					
11 – 11.9	645				1	1								
12 – 12.9	690									1				
13 – 13.9	755					1	1							
14 – 14.9	880										1			
15 – 15.9	865				1				1					
16 – 16.9	930											1		
17 – 17.9	1020							2						
18 – 18.9	1070												1	
19 – 19.9	1090						1			1				
20 – 20.9	1170													1
21 – 21.9	1220				1							1		
22 – 22.9	1285					1						1		
23 – 23.9	1330						1					1		
24 – 24.9	1380									2				
25 – 25.9	1460				1									1
26 – 26.9	1525					1								1
27 – 27.9	1570						1							1
28 – 28.4	1645								1				1	
28.5 – 29.9	1680							1						1
30 – 30.9	1745								1					1

### MILLICLICK® boards

Description	Nexans code no.	GTIN	Thickness
MILLICLICK® boards 590 x 790 x 8 mm (10 boards - 4.66 m <sup>2</sup> )	10135472	7045210051308	8 mm

# N-HEAT® DEFROST SNOW

Twin conductor TXLP cable for snow and ice melting



## Applications:

DEFROST SNOW are ready made twin conductor heating cable elements for snow and ice melting applications such as driveways, courtyards, stairs etc. The units can be installed directly in hot asphalt (160 °C/320 °F), or covered with concrete or flagstone and sand (i.e. crushed stone or similar, grain size 0-8 mm or 0-4 mm). DEFROST SNOW is equipped with a 10 m (32.8') cold lead and integrated splice.

Note that there is some heat dissipation also in the cold leads, and that special precautions shall be made for installation of 2700W and 3400W, as described in the installation instructions.



## Construction:

- Solid resistance wire
- XLPE insulation
- Tinned copper drain wire
- Aluminum armor screen
- PVC outer jacket
- Integrated cold lead splice
- Overall diameter: approx. 7.0 mm (0.28")

## Technical data:

- Linear load: 28 W/m (8.5 W/ft) at 230 V
- Series resistance
- Rated voltage: 230 V
- Highest system voltage: 300/500 V
- Max. cont. operating temperature outer jacket: 65°C (149°F)
- Min. bending radius: 5 x cable diameter
- Tolerance on conductor resistance: - 5/+10 %
- Mechanical class: M2
- Length of cold lead: 10 m
- Minimum installation temperature: 0°C (32°F)
- UV resistant\*

\* Used in an open installation (e.g. roofs and roof gutters) a temperature control system must be installed (sensor in contact with the heating cable) to ensure that the heating cable does not overheat. Switch-off temperature shall be maximum 50°C.

## DEFROST SNOW – Twin conductor heating cable for snow and ice melting

Output (W)	Element length (**) (m)	R_nom (Ω)	Outer diameter (mm)	Weight. (kg)	Nexans code no.	GTIN
640	22.9	82.7	7.0	2.3	10092292	7045210034400
890	31.9	59.4	7.0	2.8	10092293	7045210034417
1270	46.2	41.7	7.0	3.7	10092324	7045210034424
1900	68.1	27.8	7.0	5.2	10092325	7045210034431
2700	96.4	19.6	7.0	7.0	10082427	7045210033113
3400	116.8	15.6	7.0	8.4	10070744	7045210030709

\*\*In addition the products are delivered with a 10 m cold lead

# N-HEAT® TXLP/1 28 W/m

Single conductor TXLP cable for snow and ice melting



## Applications:

TXLP/1 28 W/m are ready made single conductor heating cable elements for snow and ice melting applications such as driveways, courtyards, stairs etc. The units can be installed directly in hot asphalt (160°C/320°F), or covered with concrete or flagstone and sand (i.e. crushed stone or similar, grain size 0-8 mm or 0-4 mm). TXLP/1 28 W/m is equipped with a 2.5 m cold lead and integrated splice in each end.

Note that there is some heat dissipation also in the cold leads, and that special precautions shall be made for installation of 2800W, 3380W and 4060W, as described in the installation instructions.

## Construction:

- Solid resistance wire
- XLPE insulation
- Tinned copper drain wire
- Aluminum armor screen
- PVC outer jacket
- Integrated cold lead splice
- Overall diameter: approx. 6.5 mm (0.26")

## Technical data:

- **Linear load:** 28 W/m (8.5 W/ft) at 230 V
- **Series resistance**
- **Rated voltage:** 230 V
- **Highest system voltage:** 300/500 V
- **Max. cont. operating temperature outer jacket:** 65°C (149°F)
- **Min. bending radius:** 5 x cable diameter
- **Tolerance on conductor resistance:** - 5/+10 %
- **Mechanical class:** M2
- **Length of cold lead:** 2.5 m at both ends
- **Minimum installation temperature:** 0°C (32°F)
- **UV resistant\***

\* Used in an open installation (e.g. roofs and roof gutters) a temperature control system must be installed (sensor in contact with the heating cable) to ensure that the heating cable does not overheat. Switch-off temperature shall be maximum 50°C.

## TXLP/1 28 W/m – Single conductor heating cable for snow and ice melting

Product name	Output	Element length (**)	R_nom	Outer diameter	Weight.	Nexans code no.	GTIN
	(W)	(m)	(Ω)	(mm)	(kg)		
TXLP/1-28 W/m 340W	340	12.2	155.6	6.5	1.0	10546447	7045210123852
TXLP/1-28 W/m 380W	380	13.8	139.2	6.5	1.1	10548655	7045210025019
TXLP/1-28 W/m 440W	440	16.2	120.2	6.5	1.2	10546449	7045210123869
TXLP/1-28 W/m 530W	530	18.1	101.7	6.5	1.3	10546460	7045210123876
TXLP/1-28 W/m 640W	640	22.9	82.7	6.5	1.6	10548656	7045210013412
TXLP/1-28 W/m 770W	770	27.7	68.7	6.5	1.8	10546461	7045210123883
TXLP/1-28 W/m 900W	900	32.1	58.8	6.5	2.0	10548657	7045210013429
TXLP/1-28 W/m 1030W	1030	36.4	51.3	6.5	2.3	10546462	7045210123890
TXLP/1-28 W/m 1280W	1280	46.9	41.3	6.5	2.8	10548659	7045210013375
TXLP/1-28 W/m 1460W	1460	53.5	36.2	6.5	3.2	10546463	7045210123906
TXLP/1-28 W/m 1600W	1600	57.3	33.1	6.5	3.4	10548660	7045210013382
TXLP/1-28 W/m 1800W	1800	64.0	29.4	6.5	3.6	10548662	7045210024906
TXLP/1-28 W/m 1950W	1950	69.3	27.1	6.5	4.1	10546464	7045210123913
TXLP/1-28 W/m 2240W	2240	80.2	23.6	6.5	4.6	10548663	7045210013399
TXLP/1-28 W/m 2440W	2440	90.0	21.7	6.5	5.1	10546465	7045210123920
TXLP/1-28 W/m 2800W	2800	100.8	18.9	6.5	6.2	10548664	7045210029802
TXLP/1-28 W/m 3380W	3380	119.8	15.6	6.5	6.8	10546466	7045210123937
TXLP/1-28 W/m 4060W	4060	143.8	13.0	6.5	8.1	10546467	7045210123944

\*\*In addition the products are delivered with a 2.5 m cold lead in both ends.

# N-HEAT® DEFROST FLEX

Heating cable for installation inside water pipes



## Applications:

DEFROST FLEX is a series resistant heating cables for installation inside water pipes. It comprises 3 single core resistance wires for heating and single core copper return wire, plus a grounding wire. Maximum operating voltage is 500 V. In the 7-12W/m interval, suitable lengths are between 60 and 170 meters for 230 V, and for 400 V, suitable lengths are between 95 and 295 meters. For other voltages, calculations can be made.

All 4 conductors are connected in one end of the cable, and according to the installed length, the resistance wires are connected to the power supply cable in various patterns.

Only end termination and splice kit (art.no. 10265444) is approved for use with defrost flex. Maximum approved pressure is 10 bars.

Linear power would generally be recommended in the 7-12W/m range, but up to 25W/m is approved.

## Construction:

- Solid resistance wires
- XLPE insulation
- Tinned copper earthing conductor
- Aluminium screen
- PE outer jacket
- Overall diameter: approx. 7 mm (0.28")

## Technical data:

- **Linear load (recommended):** 7 W/m to 12 W/m (2.1 W/ft to 3.7 W/ft) at 230 V
- **Series resistance**
- **Highest system voltage:** 500 V
- **Max. cont. operating temperature outer jacket:** 65°C (149°F)
- **Min. bending radius:** 5 x cable diameter
- **Tolerance on conductor resistance:** - 5/+10 %
- **Mechanical class:** M2
- **Minimum installation temperature:** 0°C (32°F)

Type	Outer diameter	Weight per 100 m	Weight per 100 yds.	Nexans code no.	GTIN
	(mm)	(kg)	(lb)		
DEFROST FLEX	7.0	7.3	15.3	10264907	7045210081121





# N-HEAT® SNOWMAT

## Twin conductor heating TXLP/2R cable mat with integrated splice

### Applications:

SNOWMAT is ideal for quick installation of snow and ice melting in outdoor areas such as driveways, courts etc. It can be installed in hot asphalt, concrete or flagstone and sand (i.e. crushed stone or similar, grain size 0-8 mm or 0-4 mm). The mat comprises a twin conductor TXLP cable unit attached to a thin and flexible fibre glass net. Two mat widths, 40 cm for wheel tracks and small areas and 80 cm for large areas are available. The heating cable unit is delivered with integrated splice and 10 m cold lead.

Note that there is some heat dissipation also in the cold leads, and that special precautions shall be made for installation of 2600W og 3300W, as described in the installation instructions.



### Construction:

- Solid resistance wire
- XLPE insulation
- Tinned copper drain wire
- PVC outer jacket
- Aluminium sheath
- Overall diameter: approx. 7.5 mm (0.3")

### Technical data:

- Area output: 300 W/m<sup>2</sup> (27.9 W/sq.ft.)
- Series resistance
- Rated voltage: 230 V
- Highest system voltage: 300/500 V
- Max. cont. operating temperature outer jacket: 65°C (149°F)
- Min. bending radius: 5 x cable diameter
- Tolerance on conductor resistance: - 5/+10 %
- Mechanical class: M2
- Maximum asphalt temperature: 160°C (320°F)
- Length of cold lead: 10 m
- Minimum installation temperature: 0°C (32°F)

Output (W)	Mat width (m)	Mat length (m)	Mat area (m <sup>2</sup> )	R_nom (Ω)	Nexans code no.	GTIN
1100	0.4	9.0	3.6	48.1	10035242	70452210026221
1500	0.4	12.0	4.8	35.3	10035243	70452210026405
1800	0.4	14.5	5.8	29.4	10035244	70452210026412
2150	0.4	17.2	6.9	24.6	10035245	70452210026429
2600	0.8	11.0	8.8	20.4	10035246	70452210026436
3300	0.8	13.9	11.1	16.0	10035249	70452210026443

# N-HEAT® MELTMAT™

## Portable mat for thawing of frozen ground

### Applications:

Heating cable mat for thawing frozen ground and melting of snow and ice. The mat is connected via the integrated power supply lead to a standard 230V outlet. Areas of use include thawing of the ground before excavation during winter, melting of snow and ice at building entrances, thawing frozen pipes and thawing wells / cisterns etc. The mat can also be used indoors in locations without other sources of heating, such as barns, warehouses etc. with the purpose of thawing e.g. fodder. The mat is only intended for thawing/melting purposes, and shall never be in permanent operation.



### Construction:

The mat consists of a series resistant heating cable protected by insulation and a PVC coated nylon tarp. The insulation ensures that the heat flow is directed downwards, rather than being lost to the surrounding air. The insulation is made of self-extinguishing foam, and the mat is protected against overheating through a built-in sensor, triggering at approximately 60 °C.

### Technical data:

- Operating voltage: 230V
- Output: 1000W
- Length: 3 m
- Width: 1 m
- Thickness: 2 cm
- Area output: 333 W/m<sup>2</sup>
- Power supply lead: 2,5 m

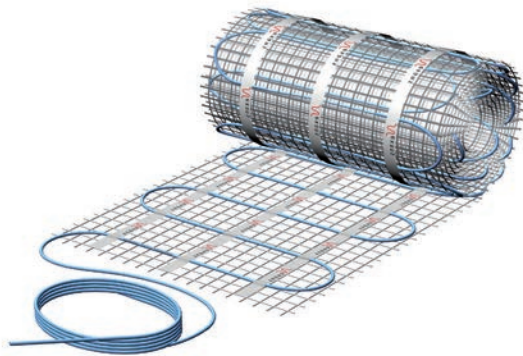
Type	Nexans code no.	GTIN
MELTMAT™	10229832	7045210072532

# N-HEAT® MILLIMAT®

## Thin twin conductor heating cable mat

### Applications:

MILLIMAT® is ideal for renovation of all types of rooms, including bathrooms. The mat consists of a twin conductor heating cable unit attached to a thin self-adhesive fiberglass net. The outer diameter of the heating cable is approx. 4 mm. The heating cable unit is delivered with 2.5 m cold lead.



### Construction:

- Conductor: Twin resistance wires
- FEP Insulation
- Solid copper earth wire
- Fiberglass net
- PVC outer jacket
- Aluminum sheath
- Total thickness is 4.5 mm (0.18")
- Width 50 cm (19.7")

### Technical data:

- Area output: 100 or 150 W/m<sup>2</sup>  
(9.3 or 14.0 W/sq.ft.)
- Elements values from: 100W to 1800W
- Max. cont. operating temperature outer jacket: 65 °C
- Tolerance on conductor resistance: -5/+10 %
- Mechanical class: M1
- Rated voltage: 230 V

### Hidden splice

The hidden splice is as thin and robust as the cable itself, and simplifies the installation as it is not necessary to modify the subfloor when placing the splice.



## MILLIMAT® – 100 W/m<sup>2</sup>

Mat Area (m <sup>2</sup> )	Output (W)	Mat Length (m)	Mat Width (m)	Min room (m <sup>2</sup> )	Element Resistance			Nexans code no.	GTIN
					Min (-5%)	Nominal	Max (+10%)		
1.0	100*	2.0	0.5	1.2	505.0	531.6	584.8	10143274*	7045210054507
1.5	150*	3.0	0.5	1.8	335.2	352.7	388.8	10143276*	7045210054514
2.0	200*	4.0	0.5	2.3	251.3	264.5	291.0	10143277*	7045210054521
2.5	250*	5.0	0.5	2.8	201.0	211.6	232.8	10143278*	7045210054538
3.0	300*	6.0	0.5	3.4	166.6	176.3	194.9	10143279*	7045210054545
3.5	350	7.0	0.5	3.9	143.6	151.1	166.3	10167423	7045210055917
4.0	400	8.0	0.5	4.5	125.6	132.3	145.5	10167644	7045210055924
5.0	500	10.0	0.5	5.6	100.0	105.8	116.9	10167645	7045210055931
6.0	600	12.0	0.5	6.7	83.8	88.2	97.0	10167646	7045210055948
7.0	700	14.0	0.5	7.8	71.8	75.6	83.1	10167647	7045210055955
8.0	800	16.0	0.5	8.9	62.8	66.0	72.7	10167648	7045210055962
10.0	1000	20.0	0.5	11.1	50.3	52.9	58.2	10167649	7045210055979
12.0	1200	24.0	0.5	13.3	41.9	44.1	48.5	10167650	7045210055986

The products are delivered with a 2.5 m cold lead

\* This mat size is not delivered with hidden splice

## MILLIMAT® – 150 W/m<sup>2</sup>

Mat Area (m <sup>2</sup> )	Output (W)	Mat Length (m)	Mat Width (m)	Min room (m <sup>2</sup> )	Element Resistance			Nexans code no.	GTIN
					Min (-5%)	Nominal	Max (+10%)		
1.0	150*	2.0	0.5	1.2	342.7	360.7	396.8	10224766*	7045210069709
1.5	225*	3.0	0.5	1.8	223.3	235.1	258.6	10224783*	7045210069716
2.0	300*	4.0	0.5	2.3	166.6	176.3	194.9	10224784*	7045210069723
2.5	375	5.0	0.5	2.8	134.0	141.1	155.2	10224785	7045210069730
3.0	450	6.0	0.5	3.4	111.7	117.6	129.4	10224786	7045210069747
3.5	525	7.0	0.5	3.9	95.8	100.8	110.9	10224787	7045210069754
4.0	600	8.0	0.5	4.5	83.8	88.2	97.0	10224788	7045210069761
5.0	750	10.0	0.5	5.6	67.0	70.5	77.6	10224789	7045210069778
6.0	900	12.0	0.5	6.7	55.9	58.8	64.7	10224790	7045210069785
7.0	1050	14.0	0.5	7.8	47.9	50.4	55.4	10224791	7045210069792
8.0	1200	16.0	0.5	8.9	41.9	44.1	48.5	10224792	7045210069808
10.0	1500	20.0	0.5	11.1	33.4	35.3	38.7	10224793	7045210069815
12.0	1800	24.0	0.5	13.3	27.9	29.4	32.3	10224794	7045210069822

The products are delivered with a 2.5 m cold lead

\* This mat size is not delivered with hidden splice

# N-HEAT® DEFROST PIPE - AO

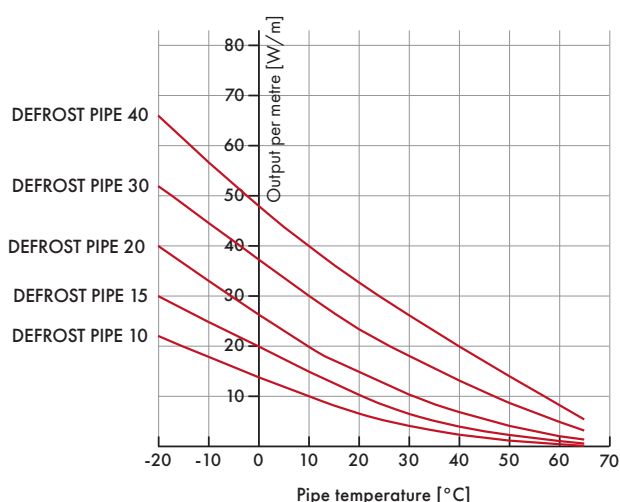
## Self-limiting heating cable



### Applications:

DEFROST PIPE - AO is a light commercial grade self-limiting heating cable that is ideal for frost protection of pipes, tanks, roof gutters and drains. It can be cut-to-length on site within the given limitations, and exact lengths can be fitted without any complicated design considerations. Its self-limiting characteristics improve safety and reliability. DEFROST PIPE - AO will not overheat or burnout, even when overlapping itself. The output is self-limiting in response to the pipe temperature.

DEFROST PIPE 20 - AO is particularly suitable for roof gutters and drains, and may be regarded as a universal cable for this field of use.



### Construction:

- Nickel-plated copper bus wires
- Semi conductive polymer matrix
- Insulation: cross-linked TPE
- Aluminum screen
- Tinned copper drain wire
- Polyolefin outer jacket

### Technical data:

- **Linear power:** 10, 15, 20, 30 or 40 W/m (at 10°C/50°F)
- **Rated voltage:** 230 VAC
- **Max. temperature energized, outer jacket:** 65°C (149°F)
- **Max. temperature not energized, outer jacket:** 80°C (176°F) (65°C/149°F for DP15)
- **Min. bending radius:** 35 mm (1.38")
- **UV-resistant**
- **Min. installation temperature:** -45°C (-49°F)
- **Maximum free hanging length:** 15 m

### DEFROST PIPE - AO with aluminium foil screen

Type AO Aluminium foil screen	Output at 10°C	Outer dimension		Bus bar cross section	Weight	Nexans code no.	GTIN
	(W/m)	Width (mm)	Height (mm)				
DEFROST PIPE 10 - AO	10	13.6	5.5	2 x 1.23	9.1	10182113	7045210059007
DEFROST PIPE 15 - AO	15	8.0	5.5	2 x 0.56	5.3	10174809	7045210028713
DEFROST PIPE 20 - AO	20	13.6	5.5	2 x 1.23	9.1	10174810	7045210028720
DEFROST PIPE 30 - AO	30	13.6	5.5	2 x 1.23	9.1	10174811	7045210028773
DEFROST PIPE 40 - AO	40	13.6	5.5	2 x 1.23	9.1	10182504	7045210059014

# DEFROST PIPE - AO

Maximum cable lengths and corresponding circuit breakers at different temperatures.

For installation on roofs and in roof gutters, use 75% of the values in the above table, as the heating cable will be partially submerged in cold water.

Type	Temp	Max length [m] and circuit breaker size (C/D-characteristic)					
	(°C)	6 A	10 A	16 A	20 A	25 A	32 A
DEFROST PIPE 10 - AO	+10	77	128	177	177	177	177
	0	64	106	160	160	160	160
	-10	54	90	144	149	149	149
	-20	47	78	125	139	139	139
	-40	37	62	99	124	124	124
DEFROST PIPE 15 - AO	+10	59	98	105	105	105	105
	0	50	83	97	97	97	97
	-10	43	72	91	91	91	91
	-20	38	64	85	85	85	85
	-40	31	52	77	77	77	77
DEFROST PIPE 20 - AO/ GUTTER	+10	41	68	109	129	129	129
	0	34	57	92	115	119	119
	-10	30	50	79	99	111	111
	-20	26	44	70	87	104	104
	-40	21	35	56	71	88	93
DEFROST PIPE 30 - AO	+10	31	52	83	104	113	113
	0	27	45	71	89	105	105
	-10	23	39	63	78	98	98
	-20	21	35	56	69	87	87
	-40	17	28	45	57	71	83
DEFROST PIPE 40 - AO	+10	22	36	57	71	89	94
	0	19	31	50	62	78	88
	-10	17	28	44	55	69	83
	-20	15	25	40	50	62	78
	-40	13	21	33	42	52	71

For self limiting heating cables totally surrounded by ice/water the following restrictions apply (max. length):

Type	Temp	Max length [m] and circuit breaker size (C/D-characteristic)					
	(°C)	10 A	16 A	20 A	25 A	32 A	40 A
DEFROST PIPE 10 - AO	+10	74.0	89.5	89.5	89.5	89.5	89.5
	0	61.5	89.5	89.5	89.5	89.5	89.5
	-30	61.5	89.5	89.5	89.5	89.5	89.5
DEFROST PIPE 20 - AO	+10	34.5	55.0	69.0	86.0	100.5	100.5
	0	29.0	46.5	58.0	72.5	93.0	100.5
	-30	29.0	46.5	58.0	72.5	93.0	100.5

# N-HEAT® DEFROST PIPE - BR

## Self-limiting heating cable



### Applications:

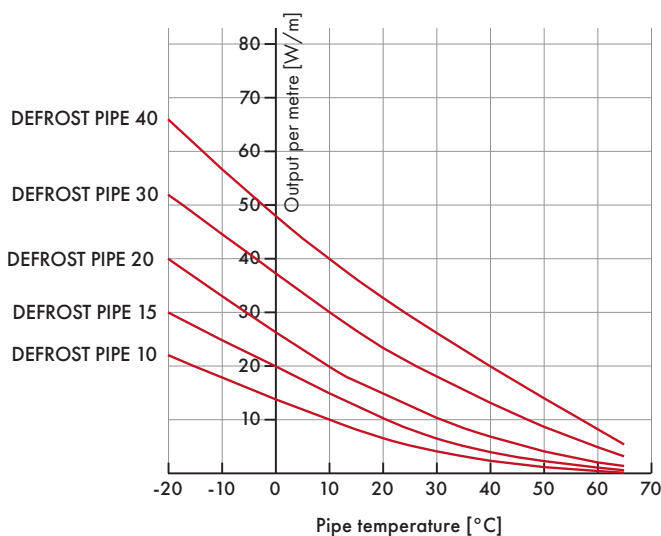
DEFROST PIPE - BR is a self-limiting heating cable/tape that is ideal for frost protection or temperature maintenance of pipe work and vessels in the construction and refrigeration industries. It can be cut-to-length on site, and exact piping lengths can be matched without any complicated design considerations. Its self-limiting characteristics improve safety and reliability. DEFROST PIPE - BR will not overheat or burnout, even when overlapped upon itself. Its power output is self-limiting in response to the pipe temperature. The installation of DEFROST PIPE - BR is quick and simple and require no special skills or tools. Termination, splicing and power connection components are all provided in convenient kits.

### Construction:

- Nickel-plated copper bus wires
- Semi conductive polymer matrix
- Insulation: cross-linked TPE
- Braided screen
- Tinned copper drain wire
- Polyolefin outer jacket

### Technical data:

- Linear power: 10, 15, 20, 30 or 40 W/m (at 10°C/50°F)
- Rated voltage: 230 VAC
- Max. temperature energized, outer jacket: 65°C (149°F)
- Min. bending radius: 36 mm (1.42")
- UV-resistant
- Min. installation temperature: -40°C (-49°F)
- Maximum free hanging length: 15 m



### DEFROST PIPE - BR with braided screen

Type BR Braided screen	Output at 10°C (W/m)	Outer dimension		Bus bar cross section (mm²)	Weight (kg/100m)	Nexans code no.	GTIN
		Width (mm)	Height (mm)				
DEFROST PIPE 10 - BR	10	12.6	6.0	2x1.25	12	10557914	7045210125528
DEFROST PIPE 15 - BR	15	12.6	6.0	2x1.25	12	10557915	7045210125535
DEFROST PIPE 20 - BR	20	12.6	6.0	2x1.25	12	10557916	7045210125559
DEFROST PIPE 30 - BR	30	12.6	6.0	2x1.25	12	10557917	7045210125566
DEFROST PIPE 40 - BR	40	12.6	6.0	2x1.25	12	10557918	7045210125573

**DEFROST PIPE - BR - Maximum cable lengths and corresponding circuit breakers at different temperatures in air**

Type	Temp	Max length [m] and circuit breaker size (C/D-characteristic)					
	(°C)	10A	15A	20A	25A	30A	40A
DEFROST PIPE 10 - BR	10	146	201	201	201	201	201
	0	146	201	201	201	201	201
	-20	79	120	162	162	201	201
	-40	67	94	125	146	189	201
DEFROST PIPE 15 - BR	10	98	140	165	165	165	165
	0	98	140	165	165	165	165
	-20	61	87	116	146	165	165
	-40	48	67	90	110	134	165
DEFROST PIPE 20 - BR	10	73	91	122	128	128	128
	0	73	91	122	128	128	128
	-20	43	61	81	133	122	128
	-40	34	47	64	75	96	128
DEFROST PIPE 30 - BR	10	53	73	96	110	110	110
	0	45	64	85	91	104	110
	-20	34	49	66	79	99	110
	-40	27	38	52	62	78	104
DEFROST PIPE 40 - BR	10	34	49	82	88	94	94
	0	34	46	79	82	88	94
	-20	27	37	49	55	85	94
	-40	20	27	38	46	58	85

For installation on roofs and in roof gutters, use 75% of the values in the above table, as the heating cable will be partially submerged in cold water.

**For self limiting heating cables totally surrounded by ice/water the following restrictions apply (max. length):**

Type	Temp	Max length (m) and circuit breaker size (C/D characteristic)			
	(°C)	15A	20A	30A	40A
DEFROST PIPE 10 - BR	0	98	130	155	155
	-7	92	122	155	155
	-18	81	110	155	155
DEFROST PIPE 15 - BR	0	68	90	122	120
	-7	64	85	120	120
	-18	57	76	115	120
DEFROST PIPE 20 - BR	0	62	81	122	120
	-7	59	77	115	115
	-18	49	64	96	115
DEFROST PIPE 30 - BR	0	36	48	73	98
	-7	33	44	67	91
	-18	31	41	63	83
DEFROST PIPE 40 - BR	0	26	40	54	73
	-7	20	30	51	65
	-18	14	20	41	53



# N-HEAT® WARM WATER PIPE

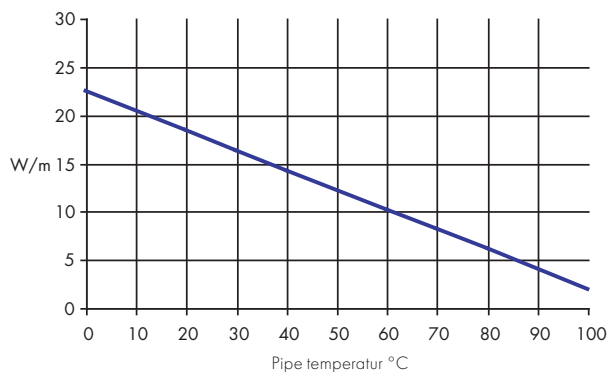
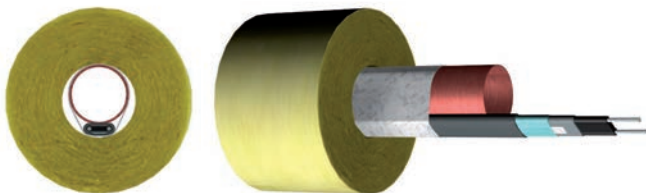
Self-limiting heating cable for temperature maintenance of hot water pipes



## Applications:

WARM WATER PIPE is a commercial grade self-limiting heating cable that is ideal for temperature maintenance of hot water pipes. WARM WATER PIPE is used to keep the pipe temperature at approx. 55°C (131°F). It can be cut-to-length on site within the given limitations, and exact lengths can be fitted without any complicated design considerations. Its self-limiting characteristics improve safety and reliability.

WARM WATER PIPE will not overheat or burnout. The output is self-limiting in response to the pipe temperature.



## Construction:

- Nickel-plated copper bus wires
- Semi conductive polymer matrix
- XLPE insulation
- Aluminum screen
- Tinned copper drain wire
- Polyolefin outer jacket

## Technical data:

- Linear power: 9 W/m at 55°C (2.74 W/ft. at 131°F)
- Rated voltage: 230 VAC
- Max. temperature energized, outer jacket: 80°C (176°F)
- Max. temperature not energized, outer jacket: 100°C (212°F)
- Min. bending radius: 20 mm (0.79")
- Max. circuit breaker size: 20A
- Min. installation temperature: -20°C (-68°F)

Type	Output at 55 °C	Outer dimension		Bus bar cross section	Weight	Max length	Nexans code no.	GTIN
	(W/m)	Width (mm)	Height (mm)					
WARM WATER PIPE	9	11.6	5.1	2 x 1.23	9.0	120	10061634	7045210028744

Circuit breaker size	6 A	10 A	16 A	20 A
Max. length	30	50	80	120

Maintenance temp.	Pipe diameter (mm)					
	15	20	28	35	42	54
°C						
55	20	20	25	30	37	50
50	12	12	19	25	25	37

Based on a thermic insulation with a K-value = 0,038 W/mK  
 < Recommended insulation  
 < Recommended thickness

# N-HEAT® DEFROST WATER and DEFROST WATER KIT

Self-limiting heating cable for installation in drinking water pipes



## Applications:

DEFROST WATER is a halogen free self-limiting heating cable that is ideal for frost protection of drinking water pipes, suitable for installation inside the pipe. The outer sheath material is approved for this use.

While DEFROST WATER is an “on drum” heating cable, DEFROST WATER KIT comes in specific lengths with end seal, splice and a cold lead with plug (Schuko).

DEFROST WATER can be cut to any length on site within the given limitations, and exact lengths can be fitted without any complicated design considerations. The fixed length of DEFROST WATER KIT is not intended to be modified. For lengths exceeding the limitations of DEFROST WATER, DEFROST FLEX may be an alternative.

The output is self-limiting in response to the pipe temperature, however it is recommended to use a thermostat to control the cable, so as to avoid unnecessary operation, for example during summer.

Note that DEFROST WATER is not flame retardant.

## Construction:

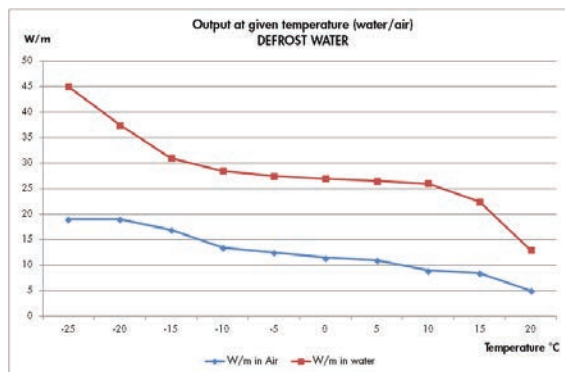
- Tinned copper bus wires
- Semi conductive polymer matrix
- PE insulation
- Aluminum screen
- Tinned copper drain wire
- PE outer jacket

## Technical data:

- **Linear power:** 11 W/m in air or 26 W/m in water (at 5°C/41°F)
- **Rated voltage:** 230 VAC
- **Max. temperature energized, outer jacket:** 45°C (113°F)
- **Min. installation temperature:** -10°C (14°F)
- **Min. bending radius:** 35 mm (1.38")
- **Length cold lead (DW KIT):** 1.5 m
- **Max. circuit breaker size:** 10 A
- **Max. resistance of drain wire:** 18.5 Ohm/km

Type*	Weight kg	Nexans art. no.	GTIN
DEFROST WATER KIT 2 m	0.37	10253081	7045210076905
DEFROST WATER KIT 4 m	0.50	10253082	7045210076912
DEFROST WATER KIT 6 m	0.60	10253083	7045210076929
DEFROST WATER KIT 8 m	0.75	10253104	7045210076936
DEFROST WATER KIT 10 m	0.85	10254904	7045210063332
DEFROST WATER KIT 15 m	1.20	10254905	7045210063349
DEFROST WATER KIT 20 m	1.50	10254906	7045210063356
DEFROST WATER KIT 25 m	1.85	10254907	7045210063363

\* DEFROST WATER KIT has otherwise got the same characteristics as DEFROST WATER below.



Type	Output at 5 °C	Outer dimension (mm)	Bus bar cross section (mm <sup>2</sup> )	Weight (kg/100m)	Max length (m)	Nexans code no.	GTIN
	(W/m)						
DEFROST WATER	26 in water 11 in air	7.0	2 x 0.5	6.1	60 in water 100 in air	10064795	7045210030303

Type	Temp. (°C)	In-rush current (A/m)	Max. length [m] Circuit breaker size 10 A In water	Max. length [m] Circuit breaker size 10 A In air
	DEFROST WATER		5	0.2
	0	0.3	54	90
	-10	0.4	42	70
	-20	0.5	30	50
	-30	0.7	24	40

# N-HEAT® MILLITEMP™

## Digital thermostat

### 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.

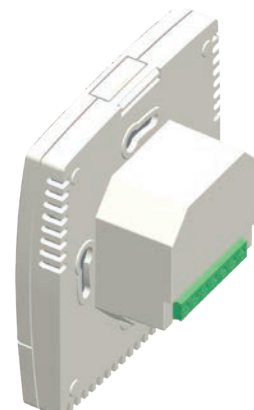
Type	Nexans code no.	GTIN
Thermostat MILLITEMP digital CDFR-003 EN	10175393	7045210059809

### 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
- Sensing Element: NTC 10 kΩ



# N-HEAT® MILLITEMP™ 2

## Digital touch-screen thermostat

### Applications:

MILLITEMP 2 is an elegant and sophisticated, touch-screen thermostat, constituting an appealing and important part of the Nexans electrical under floor heating cable system.

The thermostat is programmable, and regulates the room or floor temperature automatically. It can be configured to keep a constant temperature (as set by the user) or be programmed according to a day/night energy savings program. In day/night savings program, the thermostat controls the temperature according to time and day. For weekdays and weekend, different temperatures can be set at different times.

Type	Nexans code no.	GTIN
Thermostat MILLITEMP 2 Digital TOUCHSCREEN	10264451	7045210081619

### Features:

- Key: Capacitive touch screen
- 7 days 4 periods programmable
- Clock: 12 hours (AM/PM)/24 hours
- Day display: Monday - Sunday
- Sensor: Floor/Room or combined with limiting function
- Temperature setting Range: 5~35°C
- Temperature measurement Range: 0~55°C

### Specifications:

- Rated Voltage: 230Vac 50/60Hz
- Maximum load: 16A
- Dimension: 86×86×15.8 mm (W×H×D)
- Encapsulation: IP 30
- Wiring terminals: connection wire max 2.5 mm<sup>2</sup>
- Enclosure: fire retardant: PC+ABS
- Hole pitch: 60 mm
- Sensing Element: NTC 10 kΩ

**ECO**  
DESIGN READY



# N-HEAT® N-COMFORT TR

## Thermostat and power regulator

### Applications:

N-COMFORT TR is a simple, yet versatile thermostat/regulator for use with Nexans electrical under floor heating cable system.

The thermostat offers minimum and maximum setting limitations within its operating temperature range, and is configured through settings of DIP switches and a potentiometer, accessible under the housing of the thermostat. It is operated with a two-pole mechanical on/off switch and temperature setting dial on the front.

N-COMFORT TR has got a (built-in) room sensor and is delivered with an external floor sensor for floor temperature control or limitation functionality. The unit can be configured to work as a power regulator. In this configuration the temperature limiting functionality will not work.

The thermostat is delivered with ELKO PLUS polar white and SCHNEIDER EXXACT white compatible frames/housings.

### Features:

**Sensor:** Floor/room or combined with limiting function Frost protection mode

**Temperature setting Range:** 10~50°C

**Time setting range:** 0-10 minutes

### Specifications:

- **Rated Voltage:** 230Vac, 50/60Hz
- **Maximum load:** 16A
- **Wiring terminals:** connection wire max 2.5 mm<sup>2</sup>
- **Enclosure:** fire retardant: PC+ABS
- **Dimension:** 81.5×81.5×30.4 mm (W×H×D)
- **Hole pitch:** 60 mm
- **Encapsulation:** IP 21
- **Sensing Element:** NTC 10 kΩ

Type	Nexans code no.	GTIN
Thermostat/Regulator N-COMFORT TR	10265863	7045210081084



# N-HEAT® N-COMFORT TD

## Thermostat and power regulator

### Applications:

N-COMFORT TD is an advanced, yet user friendly 7-day programmable thermostat, for use with Nexans heating cables and heating cable mats. Its programming options, with the additional Open Window Detection functionality, even makes it compliant with the requirements described in the ECO Design Regulation.

It can be configured to control the room temperature by using the built-in temperature sensor, or to control the floor temperature through the external sensor. The external (floor) sensor can also be used to limit the temperature in the floor, whilst the room temperature is controlled by the internal sensor (dual sensor mode). As the thermostat can be configured to use both NTC10K and NTC100K floor sensors, it could also be suitable for the replacement of faulty or broken thermostats from other manufactures, without the necessity of replacing the sensor cable.

The thermostat is delivered with two different housings, making it compatible with Elko PLUS and Schneider Exxact frames.

### Features:

- **Sensor:** Floor and room sensors
- **Frost protection mode**
- **Temperature setting Range:** 5~50°C

### Specifications:

- **Rated Voltage:** 230Vac, 50/60Hz
- **Maximum load:** 16A
- **Wiring terminals:** connection wire max 2.5 mm<sup>2</sup>
- **Dimension:** 86×86×16 mm (W×H×D)
- **Hole pitch:** 60 mm
- **Encapsulation:** IP 21
- **Sensing Element:** NTC 10 kΩ

Type	Nexans code no.	GTIN
Thermostat N-COMFORT TD	10545713	7045210123203

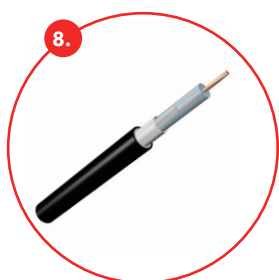
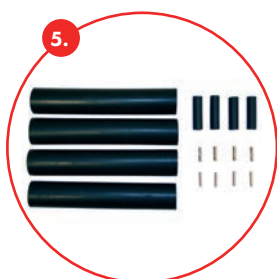
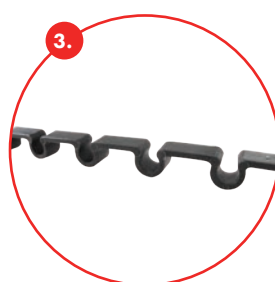


# ACCESSORIES

for N-HEAT® heating cables

The following accessories are available:

Type designation	Description	Suitable for the following cables	Nexans code no.	GTIN
1. Suspension bracket	Stainless steel suspension bracket for heating cable in roof drains.	TXLP	10191134	7045210029949
2. Spacer strip (galvanized steel)	Galvanized spacer strip for heating cables in floors/outdoor applications. May also be used in gutters.	TXLP	10191073	7045210030402
3. Spacer strip (plastic), 1m	Plastic spacer strip for heating cables in floors and outdoor applications. May also be used in gutters.	TXLP	10229831	7045210072525
4. Plastic spacers	Plastic spacers for heating cable in roof drains and gutters.	TXLP	10068944	7045210030501
5. Splice kit 1.5 - 2.5 mm <sup>2</sup> (4 splices)	Splice kit for single conductor heating cable to cold lead 1.5 - 2.5 mm <sup>2</sup> .	TXLP DRUM single core	10066638	7045210030204
6. Splice kit 4.0 - 6.0 mm <sup>2</sup> (2 splices)	Splice kit for single conductor heating cable to cold lead 4.0 - 6.0 mm <sup>2</sup>	TXLP DRUM single core	10066639	7045210030228
7. End termination and splice kit for DEFROST FLEX	Kit for one splice and one end termination	DEFROST FLEX	10265444	7045210081428
8. TXLP cold lead 1 x 2.5 mm <sup>2</sup>	Cold lead for heating cable	Coil (50 m)	10180293	7045210058208
TXLP cold lead 1 x 2.5 mm <sup>2</sup>	Cold lead for heating cable	Drum (1000 m)	10180292	7045210058192
TXLP cold lead 1 x 4 mm <sup>2</sup>	Cold lead for heating cable	Drum (1000 m)	10180314	7045210058215
9. End termination kit for TXLP TWIN ON DRUM	End termination kit for 2 cables	TXLP TWIN ON DRUM	10233516	7045210073614

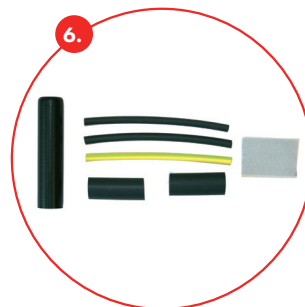
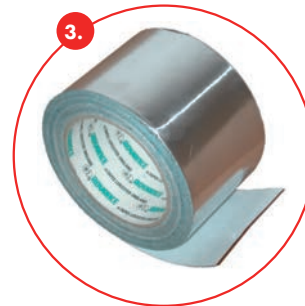


# ACCESSORIES

## for self-limiting heating cables

The following accessories are available for our self limiting heating cables:

Type designation	Suitable for the following cables	Nexans code no.	GTIN
1. Fiberglass fixing tape, W=12 mm L=50 m	DEFROST PIPE, WARM WATER PIPE	10068945	7045210030518
2. Splice, end termination and connection kit	DEFROST PIPE, WARM WATER PIPE	10072993	7045210031508
3. Aluminum fixing and heat distribution tape, W=50 mm L=50 m	DEFROST PIPE, WARM WATER PIPE	10021005	7045210030273
4. DEFROST PIPE CLIP, Clip for attaching DEFROST PIPE to a gutter	DEFROST PIPE	10212359	7045210065916
5. Brass gland R15/R20 (1/2" / 3/4"), watertight	DEFROST WATER, DEFROST WATER KIT	10212358	7045210065909
6. End termination kit, watertight	DEFROST WATER	10066641	7045210030242
7. PIPETERM-S™ Junction box for self-limiting heating cables	DEFROST PIPE – AO (except from DP 15 – AO) / DEFROST PIPE – BR / WARM WATER PIPE	10259630	7045210078329
8. PIPETERM-PT™ Junction box w/power supply cable for self-limiting heating cables.	DEFROST PIPE – AO (except from DP 15 – AO) / DEFROST PIPE – BR / WARM WATER PIPE	10259629	7045210078312
9. PIPETERM™ End termination kit	DEFROST PIPE – AO (except from DP 15 – AO) / DEFROST PIPE – BR / WARM WATER PIPE	10541940	7045210121100







## Part 4 Appendix

Areas of use for Nexans Heating Cables.....	58
Selection table TXLP/2R 10 W/m.....	59
Selection table TXLP/2R 17 W/m.....	60
Power diagram 120V.....	61
Power diagram 230V.....	62
Power diagram 400V.....	63

# Areas of use of Nexans heating cables

By using the factory made heating cable elements, of e.g. 17 W/m (5.2 W/ft), the calculation of the centre spacing is simplified. The correct centre spacing (c-c distance) describes the distance between the cable loops.

Application	Output [W/m <sup>2</sup> ]		Product								
	Max*	Normal	TXLP elements	MILLI-CABLE FLEX 15	MILLICABLE 60 W/m <sup>2</sup>	MILLIMAT® 100 W/m <sup>2</sup>	MILLIMAT® 150 W/m <sup>2</sup>	SNOWMAT DEFROST SNOW	TXLP drum	DEFROST FLEX	Self-limiting
<b>Comfort heating:</b>											
Living room	100	70-100	X	X	X	X					
Kitchen	100	70-100	X	X	X	X					
Bedroom	100	70-100	X	X	X	X					
Children's room	100	70-100	X	X	X	X					
Basement family room	100	70-100	X	X	X	X					
Bathroom	160**	120-150	X	X			X				
WC	160**	120-150	X	X			X				
Laundry room	160**	120-150	X	X			X				
Hall/Corridor	160**	80-100	X	X	X	X					
Entrance/Hall	160**	80-100	X	X	X	X					
Entrance/Porch	160**	120-150	X	X			X				
Basic heating	100	40-60	X	X	X						
Daycare		50-70	X	X	X						
Office	100	80-100	X	X	X	X					
Storage room	100	80-100	X	X		X					
Shop	100	80-100	X	X		X					
Workshop	100	80-100	X	X		X					
<b>Snow melting:</b>											
Street		250-350	X						X		
Sidewalk		250-350	X					X	X		
Ramp		250-350	X					X	X		
Balcony		250-350	X					X	X		
Stairs		250-350	X					X	X		
Driveway		250-350	X					X	X		
<b>Other:</b>											
Wooden floor (1)	80	50-70	X (1)		X				X		
Cold storage room (1)	15	10-15							X		
Storage heating	250	180-250	X	X					X		
Concrete drying		85-135							X		
Sports arena/hall		50-90							X		
Football field		50-90							X		
Greenhouse		70-90							X		
<b>Frost protection: [W/m]</b>											
Roof gutters		30-50	X						X		X
On pipes < 2"		8-13							X		X
On pipes > 2"		10-14							X		X
Inside pipes < 2"		6-13								X	X (2)
<b>Temperature maintenance:</b>											
Warm water		9w/55°C									X

\* MILLICABLE FLEX 15 is approved for indoor installations up to 200 W/m<sup>2</sup>.

\*\* 160 W/m<sup>2</sup> is the maximum approved area power. Other values in this column may be exceeded as long as other restrictions/limitations or demands are complied with.

\*\*\* 400W/m approved when automatic temp control system is used.

(1) Max 10 W/m: Underfloor heating system and installed power/maximum temperature shall be approved by the supplier of the flooring system (parquet/laminat).

(2) For drinking water use DEFROST WATER or DEFROST FLEX

$$\text{Cable output [W]} = \text{Gross area [m}^2\text{]} \times \text{Area output [W/m}^2\text{]}$$

For comfort heating in concrete constructions, we recommend the use of TXLP heating cable, single or twin conductor elements. To find the correct heating cable element, use the above calculation.

$$\text{C-C [cm]} = \text{Net area [m}^2\text{]} \times 100 / \text{Cable length [m]}$$

# SELECTION TABLE, 10 W/m

The table below shows recommended products with TXLP/2R - 10 W/m and centre spacing for various room sizes and outputs.

m <sup>2</sup>	Output 40-60 W/m <sup>2</sup>	cc-cm	Output 60-80 W/m <sup>2</sup>	cc-cm	Output 80-100 W/m <sup>2</sup>	cc-cm	Output 100-120 W/m <sup>2</sup>	cc-cm
4	1 TXLP 230 W	17	1 TXLP 230 W	17	1 TXLP 380 W	11	1 TXLP 380 W	13
5	1 TXLP 300 W	22	1 TXLP 300 W	13	1 TXLP 450 W	13	1 TXLP 530 W	9
6	1 TXLP 380 W	16	1 TXLP 380 W	16	1 TXLP 530 W	11	1 TXLP 650 W	9
7	1 TXLP 380 W	18	1 TXLP 530 W	13	1 TXLP 650 W	11	1 TXLP 760 W	9
8	1 TXLP 450 W	21	1 TXLP 530 W	15	1 TXLP 760 W	11	1 TXLP 890 W	9
9	1 TXLP 530 W	17	1 TXLP 650 W	14	1 TXLP 760 W	12	1 TXLP 1050 W	9
10	1 TXLP 530 W	19	1 TXLP 760 W	13	1 TXLP 890 W	12	1 TXLP 1050 W	9
11	1 TXLP 650 W	17	1 TXLP 760 W	14	1 TXLP 890 W	13	1 TXLP 1300 W	8
12	1 TXLP 650 W	18	1 TXLP 760 W	16	1 TXLP 1050 W	11	1 TXLP 1300 W	9
13	1 TXLP 760 W	17	1 TXLP 890 W	15	1 TXLP 1050 W	12	1 TXLP 1450 W	9
14	1 TXLP 760 W	18	1 TXLP 890 W	16	1 TXLP 1050 W	11	1 TXLP 1610 W	9
15	1 TXLP 890 W	18	1 TXLP 1050 W	14	1 TXLP 1300 W	12	1 TXLP 1610 W	9
16	1 TXLP 890 W	19	1 TXLP 1050 W	15	1 TXLP 1450 W	11	1 TXLP 1610 W	10
17	1 TXLP 890 W	20	1 TXLP 1300 W	13	1 TXLP 1610 W	11	2 TXLP 890 W	10
18	1 TXLP 890 W	21	1 TXLP 1300 W	14	1 TXLP 1610 W	11	2 TXLP 1050 W	9
19	1 TXLP 1050 W	18	1 TXLP 1300 W	15	1 TXLP 1610 W	12	2 TXLP 1050 W	10
20	1 TXLP 1050 W	19	1 TXLP 1450 W	14	1 TXLP 1610 W	12	2 TXLP 1050 W	9
21	1 TXLP 1050 W	20	1 TXLP 1450 W	15	2 TXLP 940 W	11	2 TXLP 1050 W	9
22	1 TXLP 1050 W	21	1 TXLP 1450 W	16	2 TXLP 1050 W	10	2 TXLP 1300 W	10
23	1 TXLP 1300 W	18	1 TXLP 1610 W	14	2 TXLP 1050 W	11	2 TXLP 1300 W	8
24	1 TXLP 1300 W	18	1 TXLP 1610 W	15	2 TXLP 1050 W	11	2 TXLP 1300 W	9
25	1 TXLP 1300 W	19	1 TXLP 1610 W	15	2 TXLP 1050 W	12	2 TXLP 1450 W	9
26	1 TXLP 1450 W	18	2 TXLP 890 W	15	2 TXLP 1050 W	12	2 TXLP 1450 W	9
27	1 TXLP 1450 W	19	2 TXLP 1050 W	13	2 TXLP 1300 W	10	2 TXLP 1450 W	10

See page 58 for recommended output per room type.

# SELECTION TABLE, 17 W/m

The table below shows recommended products with TXLP/2R - 17 W/m and centre spacing for various room sizes and outputs.

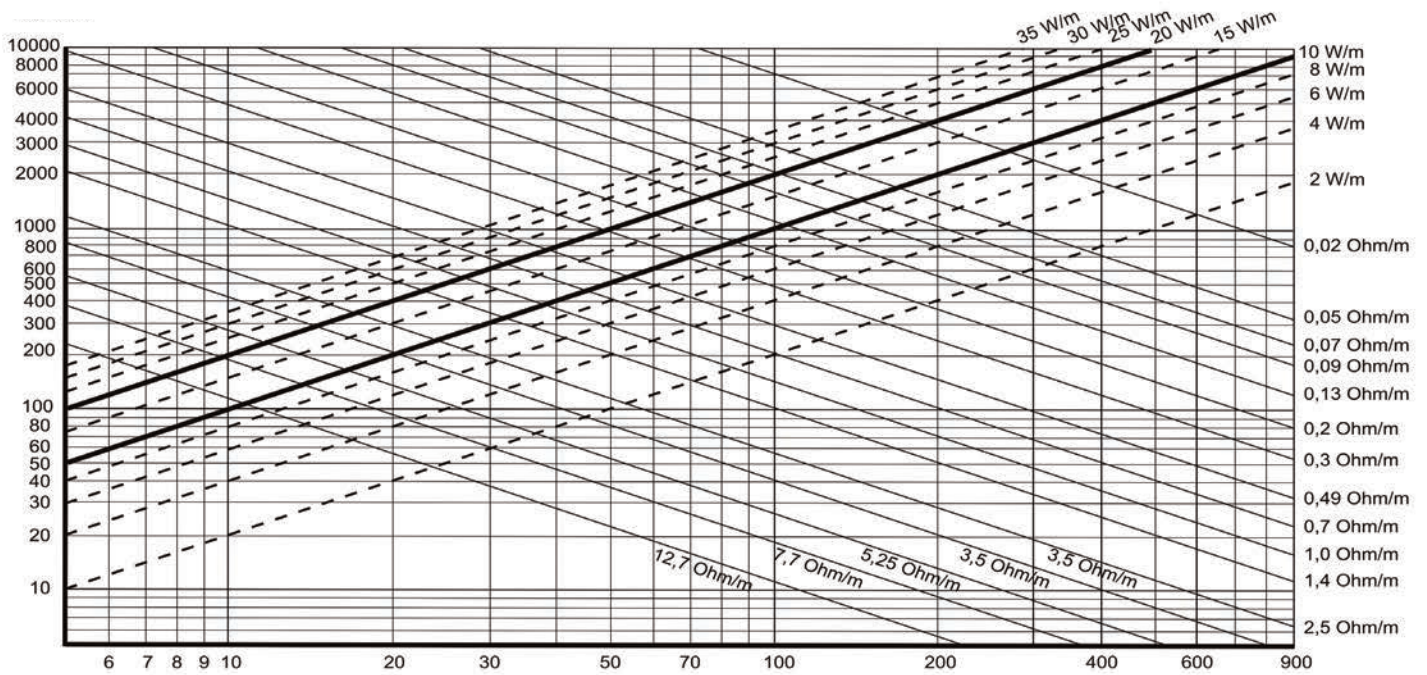
m <sup>2</sup>	Output 60-80 W/m <sup>2</sup>	cc-cm	Output 80-100 W/m <sup>2</sup>	cc-cm	Output 100-120 W/m <sup>2</sup>	cc-cm	Output 120-150 W/m <sup>2</sup>	cc-cm
3	1 TXLP 200 W	25	1 TXLP 300 W	17	1 TXLP 300 W	17	1 TXLP 400 W	12
4	1 TXLP 300 W	22	1 TXLP 400 W	17	1 TXLP 400 W	17	1 TXLP 500 W	13
5	1 TXLP 300 W	28	1 TXLP 400 W	21	1 TXLP 500 W	17	1 TXLP 600 W	14
6	1 TXLP 400 W	25	1 TXLP 500 W	20	1 TXLP 700 W	14	1 TXLP 840 W	12
7	1 TXLP 500 W	23	1 TXLP 600 W	20	1 TXLP 840 W	14	1 TXLP 1000 W	12
8	1 TXLP 500 W	27	1 TXLP 700 W	19	1 TXLP 840 W	16	1 TXLP 1000 W	13
9	1 TXLP 600 W	25	1 TXLP 840 W	18	1 TXLP 1000 W	15	1 TXLP 1250 W	12
10	1 TXLP 600 W	28	1 TXLP 840 W	20	1 TXLP 1000 W	17	1 TXLP 1250 W	13
11	1 TXLP 700 W	26	1 TXLP 840 W	22	1 TXLP 1250 W	15	1 TXLP 1370 W	13
12	1 TXLP 700 W	29	1 TXLP 1000 W	20	1 TXLP 1370 W	15	1 TXLP 1500 W	13
13	1 TXLP 840 W	26	1 TXLP 1000 W	22	1 TXLP 1370 W	16	1 TXLP 1700 W	13
14	1 TXLP 840 W	28	1 TXLP 1250 W	19	1 TXLP 1500 W	16	1 TXLP 1700 W	14
15	1 TXLP 1000 W	25	1 TXLP 1250 W	20	1 TXLP 1500 W	17	1 TXLP 2100 W	12
16	1 TXLP 1000 W	27	1 TXLP 1370 W	19	1 TXLP 1700 W	16	1 TXLP 2100 W	13
17	1 TXLP 1250 W	23	1 TXLP 1500 W	19	1 TXLP 1700 W	17	1 TXLP 2100 W	13
18	1 TXLP 1250 W	24	1 TXLP 1500 W	20	1 TXLP 2100 W	14	1 TXLP 2600 W	12
19	1 TXLP 1250 W	25	1 TXLP 1700 W	19	1 TXLP 2100 W	15	1 TXLP 2600 W	12
20	1 TXLP 1250 W	27	1 TXLP 1700 W	20	1 TXLP 2100 W	16	1 TXLP 2600 W	13
21	1 TXLP 1370 W	26	1 TXLP 1700 W	21	1 TXLP 2100 W	17	1 TXLP 2600 W	14
22	1 TXLP 1370 W	27	1 TXLP 1700 W	22	1 TXLP 2600 W	14	2 TXLP 1500 W	12
23	1 TXLP 1500 W	26	1 TXLP 2100 W	18	1 TXLP 2600 W	15	1 TXLP 3300 W	12
24	1 TXLP 1500 W	27	1 TXLP 2100 W	19	1 TXLP 2600 W	16	1 TXLP 3300 W	12
25	1 TXLP 1700 W	25	1 TXLP 2100 W	20	1 TXLP 2600 W	16	1 TXLP 3300 W	13
26	1 TXLP 1700 W	26	1 TXLP 2600 W	17	2 TXLP 1370 W	16	1 TXLP 3300 W	13
27	1 TXLP 1700 W	27	1 TXLP 2600 W	18	2 TXLP 1370 W	17	1 TXLP 3300 W	14
28	1 TXLP 2100 W	23	1 TXLP 2600 W	18	1 TXLP 3300 W	14	2 TXLP 1700 W	14
29	1 TXLP 2100 W	23	1 TXLP 2600 W	19	1 TXLP 3300 W	15	2 TXLP 2100 W	11
30	1 TXLP 2100 W	24	1 TXLP 2600 W	20	1 TXLP 3300 W	15	2 TXLP 2100 W	12

See page 57 for recommended output per room type.

# POWER DIAGRAM

120 VOLT

Output W

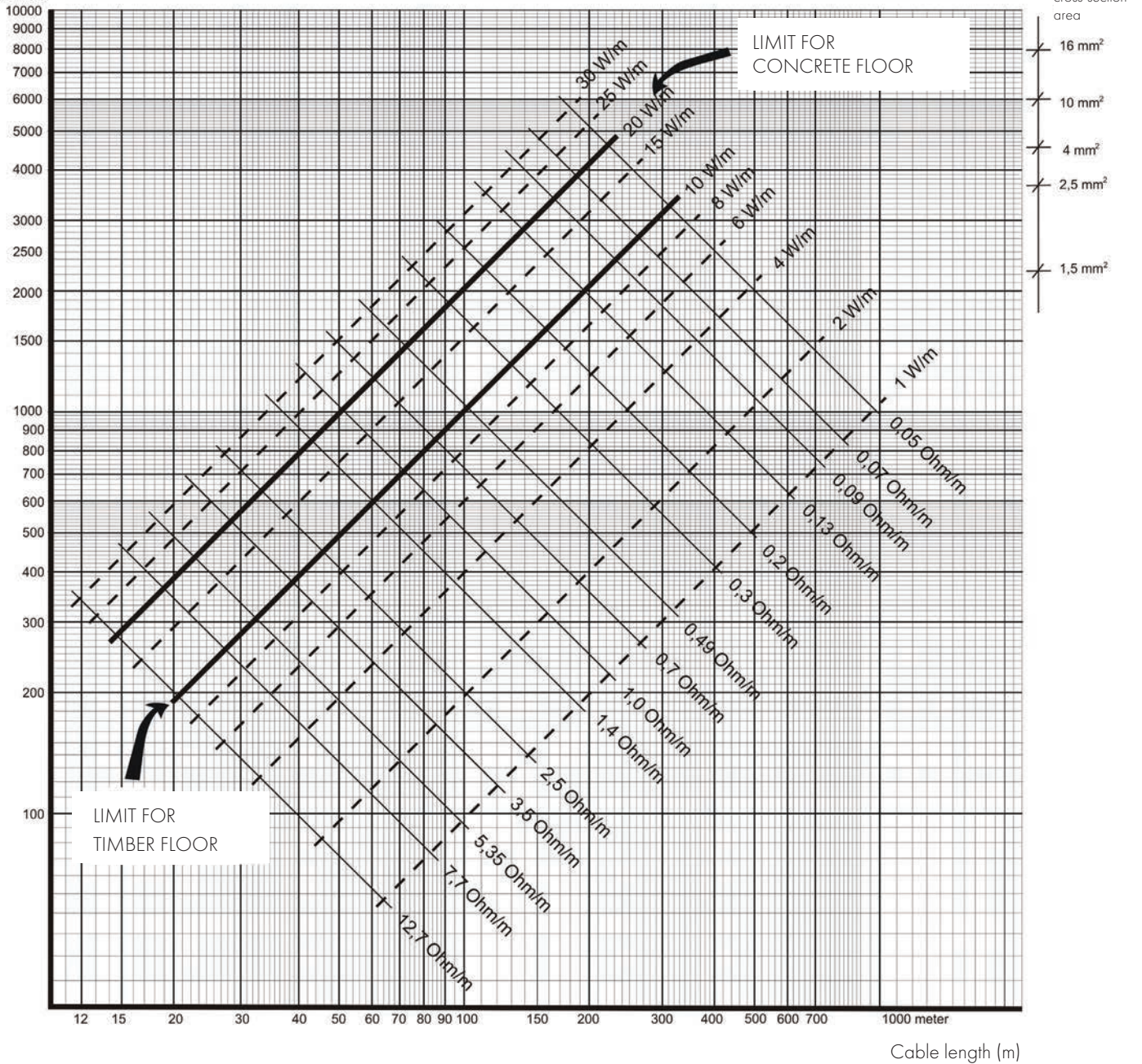


Cable length (m)

# POWER DIAGRAM

## 230 VOLT

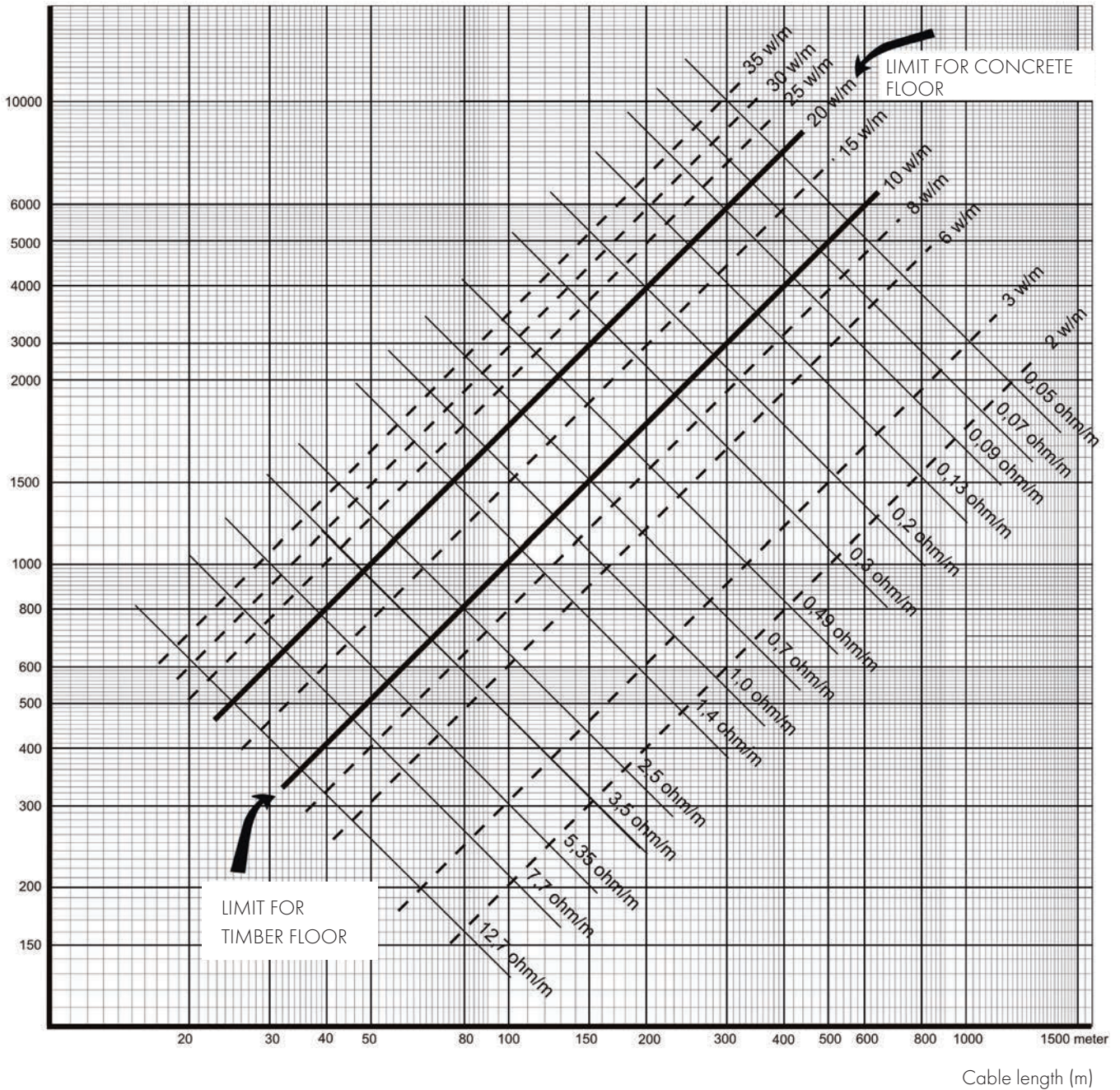
Output W



# POWER DIAGRAM

## 400 VOLT

Output W





Nexans Norway AS is a leading supplier of power, telecommunications, installations and heating cables in Norway, and is among the world's leading manufacturers of offshore control cables and high-voltage submarine cables. The company's head office is in Oslo, and it has manufacturing plants at Rognan, Langhus and Halden. The company has nearly 1,600 employees and is a part of the Nexans Group which has an industrial presence in 34 countries and commercial activities worldwide. Nexans employs close to 26,000 people and is listed on the Paris stock exchange.

More information on [www.nexans.no/nheat](http://www.nexans.no/nheat).

## **NEXANS BRINGS ENERGY TO LIFE**

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