

ECOFLOOR

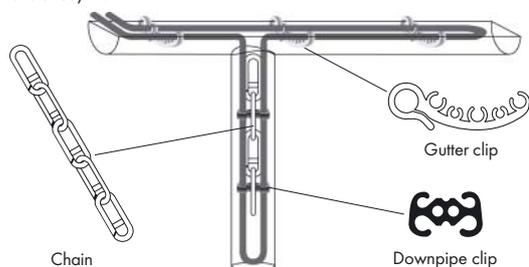
ANTIFREEZE PROTECTION SYSTEMS
ICE AND SNOW MELTING, PIPE HEATING



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Ice and snow melting in Roofs, Gutters and Downpipes

Heating cables prevent snow from accumulating on roofs, in places where it is undesirable—at snow shelters, in roof valleys, gutters etc. Thus, they provide protection against possible expensive damages. The heating cables are suitable especially for gutters and downpipes of roofs with insufficient thermal insulation where snow melts even in heavy frost, water runs down the gutter, freezes and makes an ice barrier there. Subsequently, the gutter overflows and icicles are created as a beautiful but undesirable roof "decoration" which is dangerous to pedestrians. ADPSV and MADPSP robust double-core heating cables with full screen protection and UV protection are offered for these applications. These cables have very good mechanical properties and high specific input up to 30 W/m.



Dimensioning

For common gutters and downpipes (Ø 150 mm) the heating input of 30-40 W/m is usually installed, at least 60 W/m should be installed in the heights around 1000 m above sea level. It is better to install two cables of lower input in a gutter (as larger surface is covered) than to use a single cable of higher output. Gutter and downpipe clips are used to fix the heating cable in gutters and downpipes, respectively. The distance of two cables in a gutter should be 50-80 mm.

On roofs, the heating cable is installed in a zigzag manner (see the picture), in such spacing that the input density is approx. 250 W/sqm, or at least 300 W/sqm in the heights around 1000 m above sea level.



Control

For the correct and economic operation we recommend to equip the system with a suitable controller, e.g. EBERLE EM 524 87 with a temperature sensor (TFD 524 004) and a humidity sensor (ESD 524 003) offered by Fenix.



EBERLE EM 524 87
Controller

TFD 524 004
Temperature Sensor

ESD 524 003
Ice and Snow Sensor

Self regulating heating cables ELSR

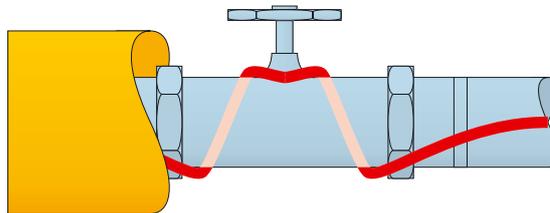
Thanks to their construction, these special heating cables can regulate their thermal performance automatically according to ambient temperature and this property is characteristic for any place throughout the cable. Heating cable consists of two copper conductors and a semi-conductor heating core between them. With increasing ambient temperature the heating core resistance increases, which decreases automatically its performance. On the other hand, the cable performance increases when ambient temperature goes down. Thus, the cables may touch and cross one another or pass through ambients of different temperatures without risks of overheating or burning. The cable construction enables to cut the cable to any length, exactly according to customer's request (just the cable max. length is limited). Cables are manufactured with protective braiding and TPE (thermoplastic elastomer) jacket. Its double insulation ensures high dielectric strength, protection against humidity and resistance against mechanical damage. That is why cable is most suitable for ice and snow melting in roofs, gutters and downpipes.

ELSR-M 10(15) – 10(15) W/m at 10 °C – pipe protection against freezing

ELSR-A 20(30) – 20(30) W/m at 10 °C – ice and snow melting in roofs, gutters and downpipes or technologic pipe heating (certification EE II)

Pipe heating

The ECOFLOOR heating cables can also be used to protect metal and plastic piping against freezing. The cable is fixed directly to metal piping, plastic piping must be packed into aluminium foil first and then the cable is fixed to the piping and covered with aluminium tape in its entire length. If self-adhesive aluminium foil is used, it is possible to fix the cable to piping first and then to apply the foil across the cable. The foil will ensure an even distribution of heat on the whole piping surface. Piping should always be equipped with thermal insulation (across the heating cable). The cable is not to replace thermal insulation, it just balances heat losses which cannot be prevented completely by any insulation.



Calculation of Heating Cable Input

The heating cable input depends on the ambient temperature, thermal insulation thickness and type and the required temperature of delivered medium. Usually, heating cables 10-15 W/m – ADPSV, MADPSP, MPSV and PPC are suitable for heat piping. The PPC heating cable circuit includes a thermostat with a sensor and a connection lead with a plug. For the other types of heating cable circuits thermostats and sensors must be ordered separately (e.g. Kablereg A1, ITR 3, ETV 1991 offered by Fenix).

Cable input per 1 linear meter can be roughly determined from the following table, the values hold for maintaining the temperature of delivered medium at 5 °C.

Insulation thickness (mm)	Min. ambient temperature (°C)	Piping diameter (G/mm)										
		1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"
		15	20	25	32	40	50	65	80	100	150	200
Heating cable input per 1 linear meter [W]												
10	-15	7	9	11	13	15	19	23	28	34	50	66
	-25	11	14	16	19	23	28	35	42	52	75	99
20	-15	5	6	7	8	9	11	13	15	19	27	34
	-25	7	9	10	12	14	16	20	23	28	40	52
30	-15	4	5	5	6	7	8	10	11	13	19	24
	-25	6	7	8	9	10	12	14	17	20	28	36

The table is valid for insulations with thermal conductivity $\lambda=0,05$ W/mK

Example

Piping diameter G 1" (DN 25), piping length 48 m, ambient temperature -25 °C, thermal insulation 20 mm thick.

The temperature of delivered medium must not drop below 5 °C (nonfreezing temperature).

Table result:

Read the required input for 1 m = 10 W from the table. Total required output is approx. 480 W (48 m × 10 W/m).

The ECOFLOOR ADPSV heating cable type 10550 may be used (input 550 W, length 56.1 m) with ETV 1991 control.

CAUTION: The cable length should be checked too. The cable should not be shorter than piping (it can occur if you choose a cable with high specific input per 1 m).

Warning

Never cut heating cables!

With decreasing ambient temperature the cable output increases



ELSR-M cable performance – ambient temperature curve



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