elektra.eu

ELEKTRA®

snow & ice protection

- Constant wattage heating cables
- Self-regulating heating cables
- Temperature controllers

PREMIUM QUALITY for everyone

Protection of roofs, gutters and downpipes

Snow and ice protection systems protect against:

- snow and ice build-up on roofs,
- damage caused by ice build-up in gutters and downpipes,
- unsightly water damage on building walls,
- icicle formation.

For protecting roofs and their elements, heating cables with UV-resistant outer sheath need to be applied:

- **ELEKTRA VCDR heating cables,**
- **ELEKTRA TuffTec™ heating cables,**
- **ELEKTRA SelfTec®.**

Protective solutions for winter conditions

The heat output value of the **ELEKTRA VCDR constant wattage heating cables** is 20 W/m, the TuffTec™ heating cables - 30 W/m, they are terminated with a power supply conductor (the so-called "cold tail"). When designing your heating system, account for the available cable lengths.

Thanks to their exceptionally high resistance against damaging influence of any bituminous substances, **ELEKTRA TuffTec™** heating cables are ideally suited for the purposes of heating covered with roof felt or bituminous shingles.

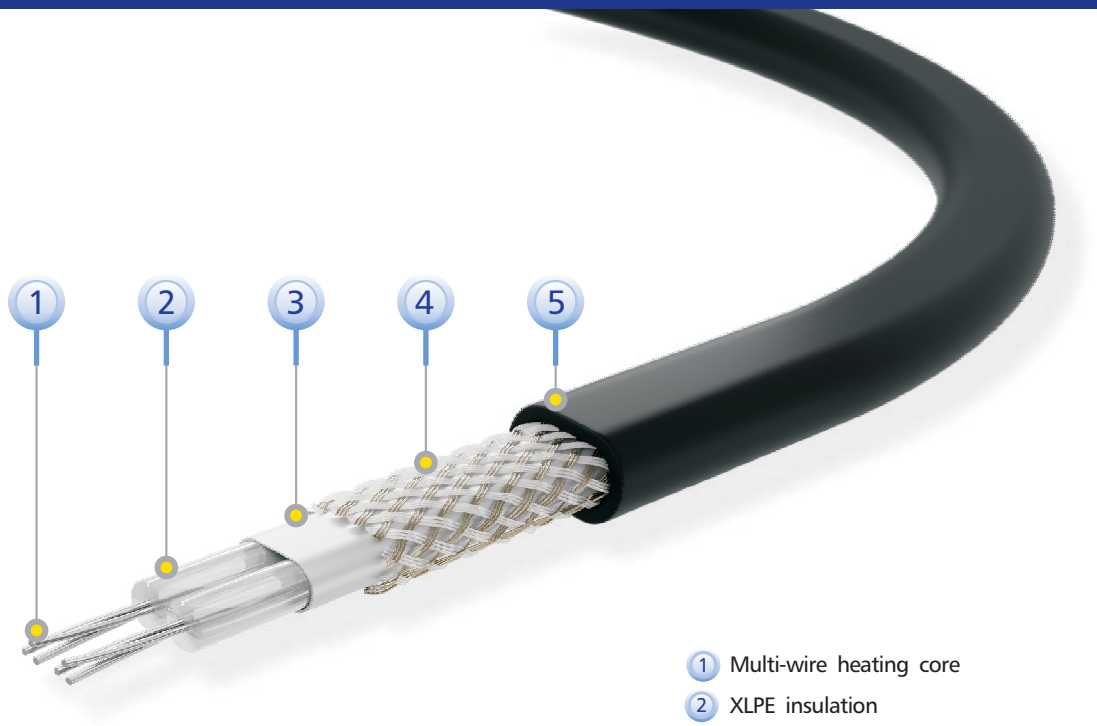
ELEKTRA SelfTec® self-regulating heating cables will adjust their heat output according to ambient temperatures:

- **ELEKTRA SelfTec®16 ready2heat available as ready-to-install units** – terminated with a power supply conductor with a sealed plug, for DIY installation on short segments

ELEKTRA VCDR heating cable

ELEKTRA TuffTec™ heating cable

ELEKTRA SelfTec®16 ready2heat ready-to-install cable



ELEKTRA VCDR
heating cable structure

1. Multi-wire heating core
2. XLPE insulation
3. PET covered aluminum foil shield
4. Hybrid copper/monofilament fiber braiding
5. Heat and UV resistant PVC outer sheath

of gutters, downpipes or in other vulnerable places requiring emergency application. The cables do not require installation of temperature controllers, but manual system switch on during snowfall, until complete snow removal.
When designing your heating system, account for the cable lengths available in units.

- **ELEKTRA SelfTec®PRO available on spools** – for extended heating systems, carried out by installers. Cables will be adjusted to gutter lengths or roof span directly on a building site. These cables require termination and power supply connection.

ELEKTRA SelfTec®PRO heating cable

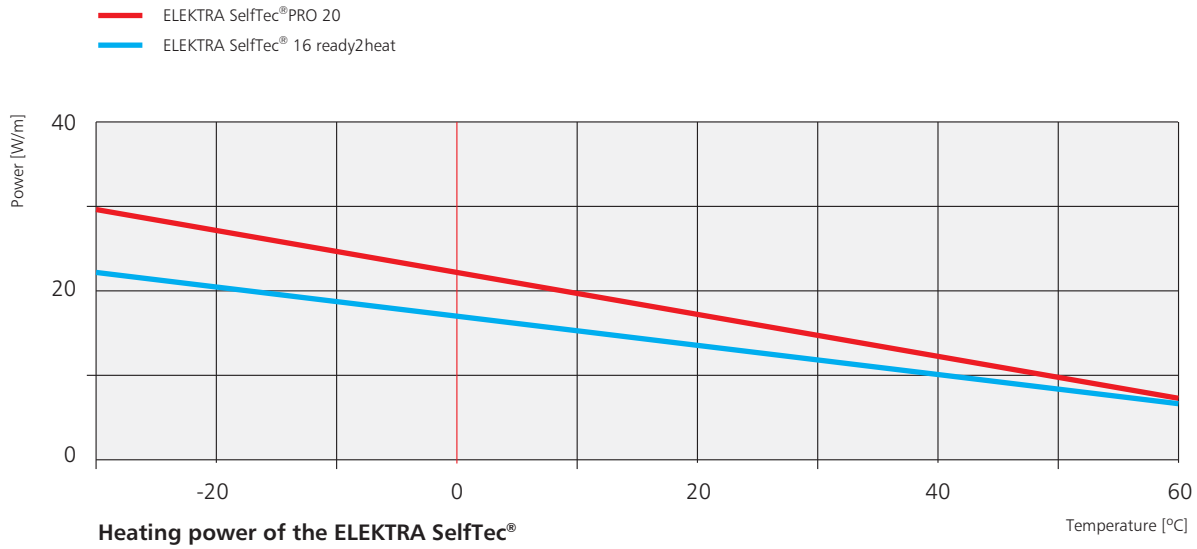
	Heating Power			
Ambient temperature	>-5°C	-5°C ÷ -20°C	-20°C ÷ -30°C	<-30°C
Gutters	20 W/m	20 ÷ 40 W/m	40 ÷ 60 W/m	60 W/m
Downpipes	20 W/m	20 ÷ 40 W/m	20 ÷ 40 W/m	40 W/m
Roof troughs	200 W/m²	200 ÷ 250 W/m²	250 ÷ 300 W/m²	350 W/m²
Roof edges	~150 W/m²	~250 W/m²	~300 W/m²	~350 W/m²
Roof area extending beyond the building outline	~250 W/m²	~300 W/m²	~350 W/m²	~500 W/m²

The values given above refer to gutters of the Ø100-125 mm diameter. Gutters of larger diameter require application of the 20 W/m higher heat output. Flat roofs, or when roof snow barriers are installed which would cause snow deposition, require increase of the given values with approx. 15%.

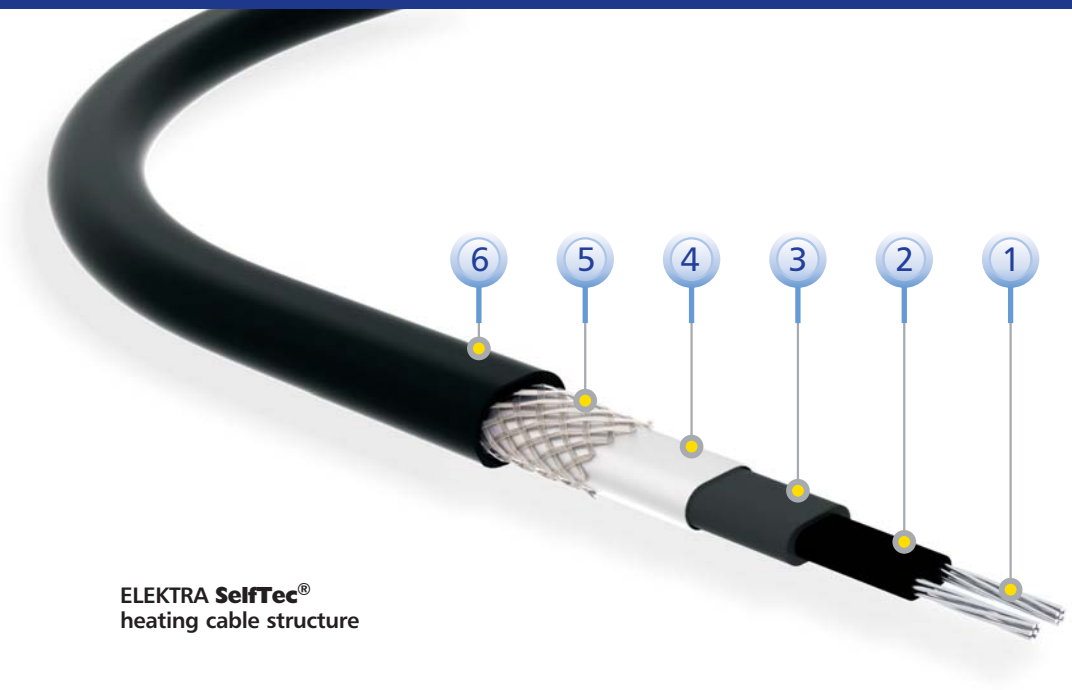
Advantages of self-regulating cables

- Cutting directly on the construction site possible, to match the required length (max. length depends on the min. switch-on temperature). This feature facilitates matching the constant wattage heating cable's length to that of the heated element's, on the design-, as well as installation stage.
- Cable crossing possible.
- Ambient temperature drop will automatically increase the cable's heat output.

Required heat output selection will depend on the regional climate conditions, min. ambient temperature and snowfall intensity.



Heating power of the ELEKTRA SelfTec® self-regulating cables in the function of temperature



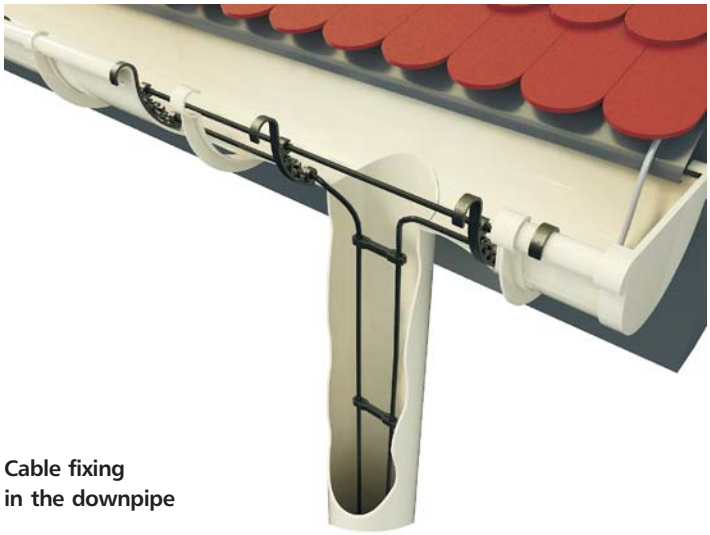
ELEKTRA **SelfTec®**
heating cable structure

1. Tin-coated multi-wire copper conductor
2. Self-regulating conductive core
3. Modified polyolefin insulation
4. PET covered aluminum foil shield
5. Tinned copper braiding
6. UV resistant halogen free polyolefin outer sheath

Only self-regulating ELEKTRA SelfTec®PRO cables can be trimmed to required length

For gutter and downpipes the cables usually are installed in 2 runs.

In gutters and downpipes of the min. 12 cm width (diameter), and in climate zones where winters are mild, cables can be one run.



Cable fixing
in the downpipe

Heating cable fixing in gutters and roof troughs

Gutters

Heating cables can be fixed to gutters and downpipes in either of the two following ways: with holders or spacing wire with clips.

Gutter holder
GH-2

Gutter spacing wire with clips
GSW-2
(this cable fixing method facilitated later gutter cleaning)

Flexible cable support
FCS-1-SS

Downpipes

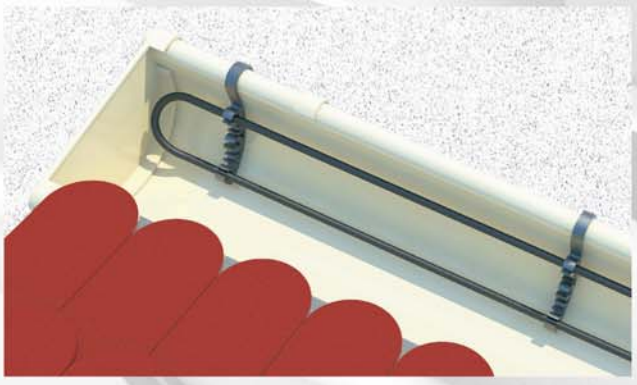
In downpipes, heating cables are fastened by means of clips.

Downpipe spacing clip
DSC-2

In case the length of the downpipe exceeds 6 m, a wire with holders should be used.
Holders distancing should not exceed 40 cm.

Downpipe spacing wire with clips
DSW-2

Downpipe spacing wire support bar
DSW-SB-1



Cable fixing in the gutter

Installation in the transition spot between the gutter and the downpipe

Cable fixing procedure
in the roof runners

Roof troughs

Roof trough
installation
band
RT-IB-1-P

Self-adhesive
installation
tape
RT-L500-S-AL

Protection of roof edges

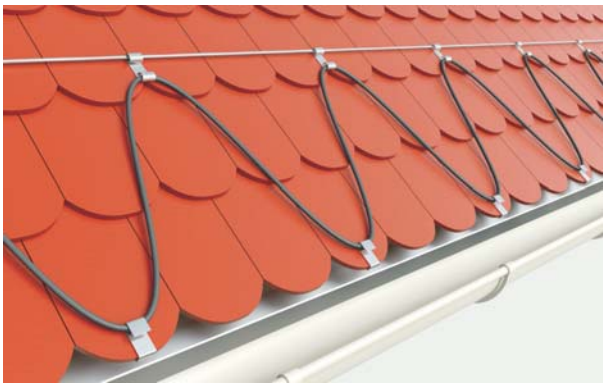
In regions of intense snowfall, gutter or downpipes heating only will not ensure complete removal of snow and icicles.

It is necessary to warm up the roof edge adjoining the gutter, at the width of approx. 50 cm, and entire roof areas extending beyond the building outline.

Heating cables need to be fixed to the roof surface with copper or titanium zinc alloy-plated holders.

– **on metal sheet-covered roofs**
  the holders can be:
  - glued to the roof surface,
  - fastened through means of rivets (with the fastening insulated with silicone),
  - suspended on insulated structural wires.

– **on tiles-covered roofs**
  the holders can be:
  - fastened to the battens,
  - fastened to the battens and structural wires.



Holders made of titanium zinc RE-IH-1-ZNTI or copper RE-IH-1-CU

– **on roof felt-, tiled- or bituminous shingles-covered roofs**
  the holders should be fastened to the roof by securing strips of thermal weldable roofing membrane across the holders.

Protection of drives, traffic routes, parking spaces and stairs

When heating external areas, it is required to assess the required heat output value per m^2. Recommended heat output depends on the regional climate conditions, i.e. minimum ambient temperature, snowfall intensity and wind strength.

Ambient temperature	Power output [W/m^2]
> -5°C	200
-5°C ÷ -20°C	300
-20°C ÷ -30°C	400
< -30°C	500

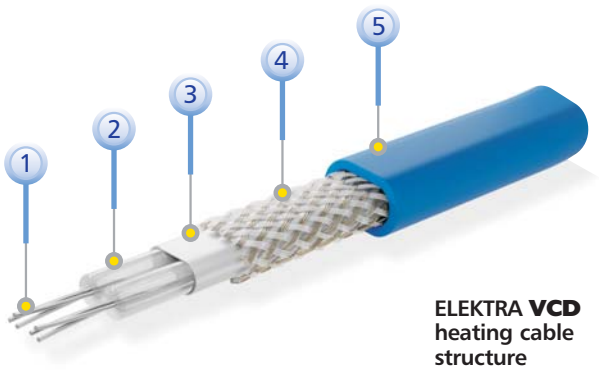
Higher output is required if the heated area is:

- exposed to low temperatures,
- exposed to wind chill from below:
  – bridges, stairs, loading platforms,
- located in regions of intense snowfall.

Applying insulation layer to the surfaces exposed to wind chill from below can improve the heating system's effectiveness.

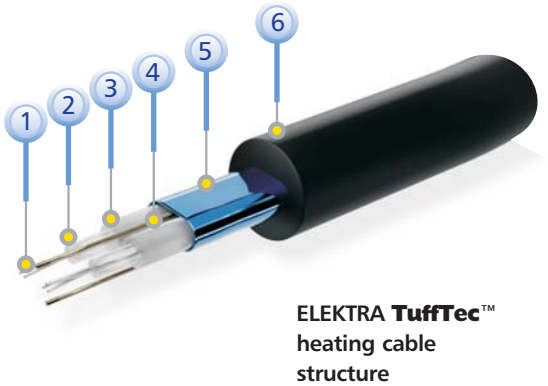
For heating external areas, the following options can be utilised:

- **ELEKTRA VCD25 single-side supplied heating cables** (power output 25 W/m),
- **ELEKTRA SnowTec® heating mats,** made from ELEKTRA VCD heating cable (mat's power output 300 W/m^2),
- **ELEKTRA TuffTec™ single-side supplied** (power output 30 W/m),
- **ELEKTRA SnowTec®$_{Tuff}$ heating mats** made from ELEKTRA TuffTec™ heating cable (mat's power output 400 W/m^2).



ELEKTRA **VCD** heating cable structure

1. Multi-wire heating core
2. XLPE insulation
3. PET covered aluminum foil shield
4. Hybrid copper/monofilament fiber braiding
5. Heat resistant PVC outer sheath



ELEKTRA **TuffTec™** heating cable structure

1. Multi-wire heating core
2. FEP first insulation layer
3. HDPE second insulation layer
4. Tinned copper wires
5. PET covered aluminum foil shield
6. UV resistant HFFR outer sheath

Selection of the proper heating cable or heating mat depends on:

- the required power output per m^2 of the heated area,
- time horizon for completing the works on the heating system,
- shape of the heated area, number of power supply cables (double-side supplied cables require having both power supply conductors fed to the installation box, single-side supplied cables – only one),
- the cable's endurance and thermal requirements.

Time horizon for completing the installation of the heating mats is 6-8 times shorter than the one for the heating cable. They require, however, a uniform rectangular area, and are available in one specific output of 300 W/m² or 400 W/m².

ELEKTRA TuffTec™ heating cables and SnowTec®Tuff heating mats are intended for installations characterized by increased risk of mechanical damages, e.g. in case when concrete consolidation machinery is utilized for surface works. Due to their exceptionally high thermal properties, as well as resistance against bituminous substances, the TuffTec™ heating cables and SnowTec®Tuff heating mats can be safely laid directly in asphalt.

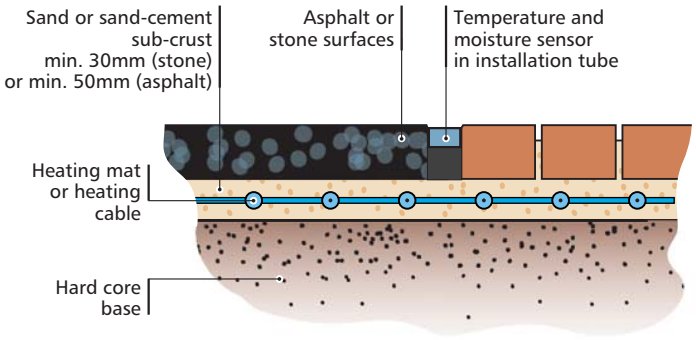
Installation

Heating mats or cables are laid:

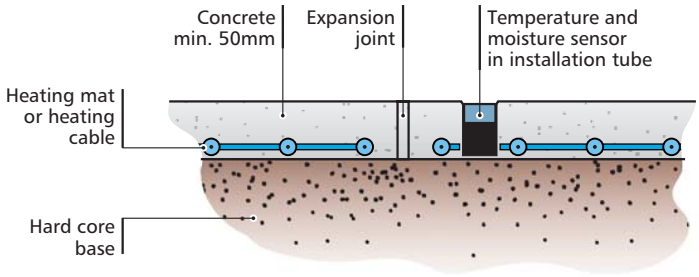
- in a layer of sand bedding or dry concrete, on which paving blocks, concrete paving slab or asphalt will be laid,
- directly in concrete,
- directly in asphalt (TuffTec™ and SnowTec®Tuff exclusively).

To maintain the steady position of the heating cables and retain the fixed – previously calculated – spacing, application of the ELEKTRA TMS steel installation tape is recommended (in sand bedding or directly in asphalt), or the ELEKTRA TME aluminium installation tape (in concrete).

To fix the cable it is also possible to use a Ø 2 mm-diameter installation grid of the 5 x 5 cm mesh. The heating mat also requires fastening in such a way to retain the steady distancing between cables.

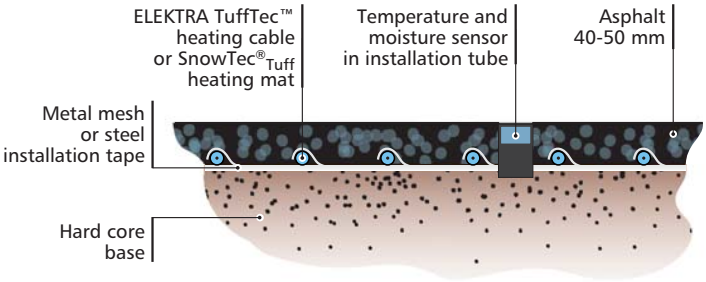


Crosssection of a driveway made of asphalt or paving blocks (installation in a layer of sand bedding)



Crosssection of a driveway made of concrete slab (installation directly in concrete)

Length of mats or cables needs to be adjusted so that they would not cross the expansion joints.

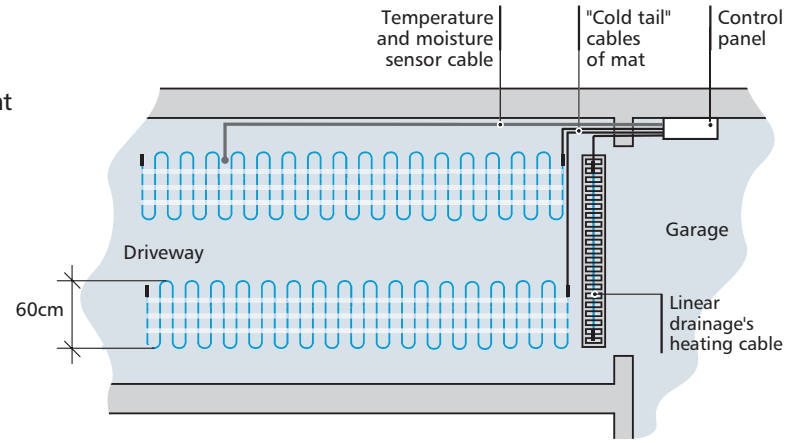


Crosssection of a driveway with asphalt surface (installation directly in asphalt)

The effect of the driveway heating

The heating mats are characterized by constant power output value SnowTec® 300W/m² or SnowTec®$_{Tuff}$ 400W/m².

For heating cables, the specific power output value per 1 m² depends on the heating cable distancing, as given in the table. Cable spacing cannot drop below 5 cm.



Typical layout of ELEKTRA SnowTec® on driveway to garage

Selection of the distancing between cables

Heating power	25W/m	30W/m
[W/m²]	[mm]	[mm]
250	100	120
300	80	100
350	~70	~85
400	~60	~75
500	50	60

ELEKTRA SnowTec® heating mat

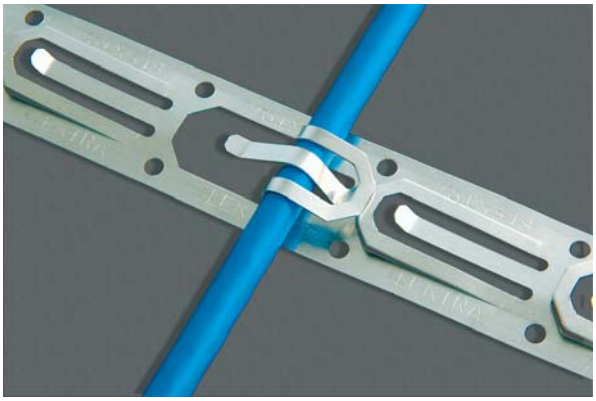
Stairs:

For the stairs heating, the following solutions can be utilised:

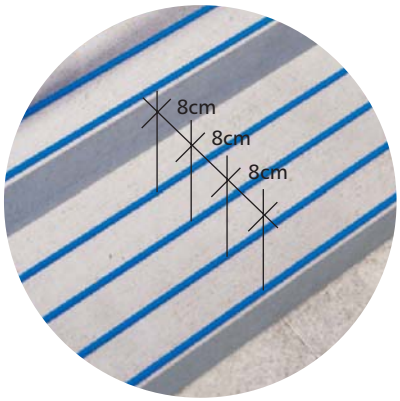
- **ELEKTRA VCD25 single-side supplied heating cables,**
- **ELEKTRA TuffTec™ single-side supplied heating cables.**

It is recommended to place the cables in the chases cut at the stage of construction of the stairs. In case the heating system needs to be laid on the existing stairs, the cable's type selection depends on the possibility of stairs level elevation.

- If the possibility exists to lay the cables on the stairs surface, they need to be fixed to the ground with a metal wire mesh or **ELEKTRA TME** installation tape. Then the 3 cm-deep layer of concrete slab is poured on the cables. Here, only the ELEKTRA VCD25 single-side supplied cables can be applied (only one power supply conductor needs to be fed into an installation box).



ELEKTRA TME installation tape



As the substeps are not heated, edge segments of the cable need to be positioned as close to the step's edge as possible.

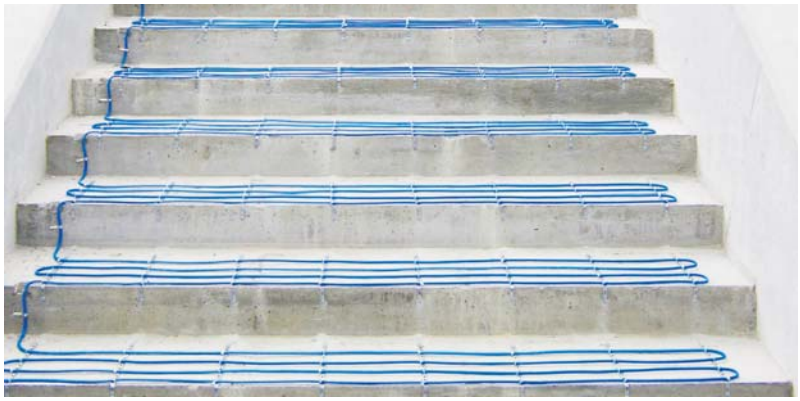
- If it is not possible to elevate the stairs level, chases need to be made in the steps for the cables to be placed in. ELEKTRA TuffTec™ cables are thinner but not so flexible like ELEKTRA VCD25.

Laying thermal insulation on the steps and landings of the stairs will increase efficiency and shorten the warm-up time of the heating system, which will decrease the system's operation costs.

Laying thermal insulation on the steps and landings of the stairs will increase the heating system's efficiency

ELEKTRA VCD25 heating cables are secured to the floor with ELEKTRA TME installation tape.

ELEKTRA VCD25 heating cable



Snow and ice protection systems' control

Properly selected control system will ensure adequate operation of the heating system only during snow and freezing rainfall.
A controller with a temperature and moisture sensor will automatically recognize the weather conditions. The heating system will be then kept on standby and only switched on when actually necessary. For this purpose, DIN-bus installed controllers ELEKTRA ETR2, ETO2 and SMC can be utilised.

Properly selected control system will ensure operation of the heating system only during snow- and freezing rainfall

Ground temperature and moisture sensor ETOG-56T and an installation tube ETOK-T
(for soil, concrete flagstones, paving cobbles), used for heating control of drives, traffic routes, etc.

Air temperature sensor ETF-744
(for outdoor installation) and **moisture sensor ETOR-55**
(for gutter bottom installation) used for heating control of roofs and gutters.

ELEKTRA ETR2 controller

(max. load up to 16 A, total output of installed cables must not exceed 3600 W), suitable for – depending on the sensor types – servicing one

- roof and gutter zone or
- one outdoor area (e.g. a single drive, stairs, etc.)

ELEKTRA SMC controller

(max. load up to 2 x 16 A) suitable for precise and remote control due to modification of the characteristics of the moisture's detector output power in the function of ambient temperature, one or two zones:

- two different zones, e.g. roof and gutters

or

- two outdoor areas (e.g. drive and stairs)

ELEKTRA ETO2 controller

(max. load up to 3 x 16 A), suitable for servicing one or two zones:

- two different roof and gutter zones or
- two outdoor areas (e.g. drive and stairs).

Controller & Sensor Kits

ELEKTRA ETR2G controller

for protection of outdoor areas. As standard, equipped with one integrated temperature and moisture sensor with installation tube.

ELEKTRA SMCG / ETOG2 controller

for applications in extended heating systems, for protection of outdoor areas. As standard, equipped with one integrated temperature and moisture sensor with an installation tube. Additional temperature and moisture sensor can be connected to this controller, which will enable protection of two outdoor areas.

ELEKTRA ETR2R controller

for protection of roofs and gutters. As standard, equipped with one temperature and one moisture sensor.

ELEKTRA SMCR / ETOR2 controller

for applications in extended heating systems, for protection of roofs and gutters. As standard, equipped with a temperature and a moisture sensor. Additional moisture sensor can be connected to this controller, which will enable protection of two separate roof zones.

Constant wattage
ELEKTRA VCDR heating cables
single-side supplied

Type	Length [m]	Power output [W]
VCDR 20/190	9.5	190
VCDR 20/235	12.0	235
VCDR 20/330	16.5	330
VCDR 20/380	19.0	380
VCDR 20/520	26.0	520
VCDR 20/600	29.0	600
VCDR 20/800	40.0	800
VCDR 20/1000	50.0	1000
VCDR 20/1140	57.0	1140
VCDR 20/1300	65.0	1300
VCDR 20/1560	78.0	1560
VCDR 20/1720	86.0	1720
VCDR 20/2050	102.0	2050
VCDR 20/2360	118.0	2360
VCDR 20/2710	135.0	2710
VCDR 20/3000	150.0	3000
VCDR 20/3450	175.0	3450

ELEKTRA TuffTec™ heating cables
single-side supplied

Type	Length [m]	Power output [W]
TuffTec™ 30/290	9.5	290
TuffTec™ 30/640	21.0	640
TuffTec™ 30/980	33.0	980
TuffTec™ 30/1230	40.0	1230
TuffTec™ 30/1580	53.0	1580
TuffTec™ 30/1920	64.0	1920
TuffTec™ 30/2110	70.0	2110
TuffTec™ 30/2520	83.0	2520
TuffTec™ 30/2710	90.0	2710
TuffTec™ 30/3030	100.0	3030
TuffTec™ 30/3320	110.0	3320
TuffTec™ 30/3900	130.0	3900

Self-regulating
ELEKTRA SelfTec®16 ready2heat heating cables

Type	Length [m]	Power output [W]
SelfTec® 16/1	1	16
SelfTec® 16/2	2	32
SelfTec® 16/3	3	48
SelfTec® 16/5	5	80
SelfTec® 16/7	7	112
SelfTec® 16/10	10	160
SelfTec® 16/15	15	240
SelfTec® 16/20	20	320
SelfTec® 16/X	up to 80m	at individual order

Self-regulating ELEKTRA SelfTec®PRO 20 heating cables

Type	Info
SelfTec®PRO 20	self-regulating heating cable for advanced applications, 20 W/m (+10°C)

ELEKTRA SelfTec®PRO accessories

EC-PRO

joint set

S-TWIN-PRO

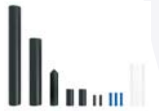
twin splice connection

ECM25-PRO

joint set
with M25 gland

KF 0404-PRO

Junction box with terminals
for three heating circuits,
with an M25 gland
for the power supply
conductor.



ELEKTRA VCD heating cables

single-side supplied 25 W/m

Type	Length [m]	Power output [W]
VCD 25/120	4.5	120
VCD 25/170	7.0	170
VCD 25/265	10.5	265
VCD 25/320	12.5	320
VCD 25/365	15.0	365
VCD 25/420	17.0	420
VCD 25/505	20.0	505
VCD 25/585	23.0	585
VCD 25/655	26.5	655
VCD 25/725	29.5	725
VCD 25/890	36.0	890
VCD 25/1120	44.0	1120
VCD 25/1450	58.0	1450
VCD 25/1740	70.0	1740
VCD 25/1910	77.0	1910
VCD 25/2270	92.0	2270
VCD 25/2480	98.0	2480
VCD 25/2730	110.0	2730
VCD 25/3030	120.0	3030
VCD 25/3300	130.0	3300
VCD 25/3550	142.0	3550

ELEKTRA SnowTec® heating mats
single-side supplied

Type	Dimen-sions [m x m]	Heating surface [m²]	Power output [W]
SnowTec® 300/2	0.6 x 2	1.2	400
SnowTec® 300/3	0.6 x 3	1.8	520
SnowTec® 300/4	0.6 x 4	2.4	670
SnowTec® 300/5	0.6 x 5	3.0	930
SnowTec® 300/7	0.6 x 7	4.2	1140
SnowTec® 300/10	0.6 x 10	6.0	1860
SnowTec® 300/13	0.6 x 13	7.8	2560
SnowTec® 300/16	0.6 x 16	9.6	2890
SnowTec® 300/21	0.6 x 21	12.6	3730

ELEKTRA SnowTec® heating mats
single-side supplied

Type	Dimen-sions [m x m]	Heating surface [m²]	Power output [W]
SnowTec® 300/3.1/0.4	0.4 x 3.1	1.24	370
SnowTec® 300/4.3/0.4	0.4 x 4.3	1.72	520
SnowTec® 300/5.0/0.4	0.4 x 5.0	2.00	590
SnowTec® 300/7.7/0.4	0.4 x 7.7	3.08	930
SnowTec® 300/9.6/0.4	0.4 x 9.6	3.84	1150
SnowTec® 300/12.5/0.4	0.4 x 12.5	5.00	1500
SnowTec® 300/15.0/0.4	0.4 x 15.0	6.00	1830
SnowTec® 300/16.5/0.4	0.4 x 16.5	6.60	2000
SnowTec® 300/20.0/0.4	0.4 x 20.0	8.00	2360
SnowTec® 300/24.0/0.4	0.4 x 24.0	9.60	2840

ELEKTRA SnowTec® heating mats
single-side supplied **400V**

Type	Dimen-sions [m x m]	Heating surface [m²]	Power output [W]
SnowTec® 300/2 400V	0.6 x 2.0	1.2	400
SnowTec® 300/3 400V	0.6 x 3.0	1.8	600
SnowTec® 300/4 400V	0.6 x 4.0	2.4	820
SnowTec® 300/5 400V	0.6 x 5.0	3.0	950
SnowTec® 300/7 400V	0.6 x 7.0	4.2	1360
SnowTec® 300/9 400V	0.6 x 9.0	5.4	1680
SnowTec® 300/11 400V	0.6 x 11.0	6.6	2100
SnowTec® 300/13 400V	0.6 x 13.0	7.8	2360
SnowTec® 300/15 400V	0.6 x 15.0	9.0	2650
SnowTec® 300/20 400V	0.6 x 20.0	12.0	3550
SnowTec® 300/25 400V	0.6 x 25.0	15.0	4600

ELEKTRA SnowTec®Tuff heating mats
single-side supplied

Type	Dimensions [m x m]	Heating surface [m²]	Power output [W]
SnowTec®Tuff 400/1.5	0.6 x 1.5	0.9	310
SnowTec®Tuff 400/3.0	0.6 x 3.0	1.8	730
SnowTec®Tuff 400/4.5	0.6 x 4.5	2.7	1100
SnowTec®Tuff 400/6.0	0.6 x 6.0	3.6	1350
SnowTec®Tuff 400/7.5	0.6 x 7.5	4.5	1800
SnowTec®Tuff 400/9.0	0.6 x 9.0	5.4	2150
SnowTec®Tuff 400/10.0	0.6 x 10.0	6.0	2350
SnowTec®Tuff 400/12.0	0.6 x 12.0	7.2	2800
SnowTec®Tuff 400/14.0	0.6 x 14.0	8.4	3400
SnowTec®Tuff 400/16.0	0.6 x 16.0	9.6	3650
SnowTec®Tuff 400/18.0	0.6 x 18.0	10.8	4400

ELEKTRA SnowTec®Tuff heating mats
single-side supplied **400V**

Type	Dimensions [m x m]	Heating surface [m²]	Power output [W]
SnowTec®Tuff 400/2.5 400V	0.6 x 2.5	1.5	560
SnowTec®Tuff 400/5.0 400V	0.6 x 5.0	3.0	1260
SnowTec®Tuff 400/8.0 400V	0.6 x 8.0	4.8	1940
SnowTec®Tuff 400/10.0 400V	0.6 x 10.0	6.0	2350
SnowTec®Tuff 400/13.0 400V	0.6 x 13.0	7.8	3100
SnowTec®Tuff 400/15.0 400V	0.6 x 15.0	9.0	3870
SnowTec®Tuff 400/17.0 400V	0.6 x 17.0	10.2	4150
SnowTec®Tuff 400/20.0 400V	0.6 x 20.0	12.0	4910
SnowTec®Tuff 400/22.0 400V	0.6 x 22.0	13.2	5310
SnowTec®Tuff 400/25.0 400V	0.6 x 25.0	15.0	5800
SnowTec®Tuff 400/27.0 400V	0.6 x 27.0	16.2	6480

Product selection guide

		Heating Cables					Heating Mats		
		Constant wattage			Self-regulating				
Application	Heating Power	VCD 25	VCDR 20	TuffTec™	SelfTec®16 ready2heat	SelfTec®PRO 20	SnowTec®	SnowTec®Tuff	Control
Driveways, paths, parking space	200-300 [W/m²]	+	—	+	—	—	+	+	SMCG* ETOG2* ETR2G
Ramps, bridges	250-300 [W/m²]	+	—	+	—	—	+	+	
Stairs	250-300 [W/m²]	+	—	+	—	—	—	—	
Roofs, roof troughs	200-300 [W/m²]	—	+	+	+	+	—	—	SMCR* ETOR2* ETR2R
Gutters, downpipes	20-60 [W/m]	—	+	+	+	+	—	—	

* An SMCG / ETOG2 or SMCR / ETOR2 controller may be used with an additional sensor for a second zone

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