Table of contents

Suitable for contact with foodstuffs/approved for use in potable water

EAC: Approval for the Russian market

FIMKO: Approval for the Finnish market

Certified according to VDE standards

Approval for the French market

SEMKO: Approval for the Swedish market

Certified according to DNV-GL

NEMKO: Approval for the Norwegian market

DEMKO: Approval for the Danish market

INMETRO: Approval for the Brazilian market

IECEx: Certified according to IECEx-scheme

Coil ware

ktl: Approval for the Korean market

Important information

Products marked with the ⟨Ex⟩-symbol can be used in hazardous areas. The temperatures allocated to the products are the maximum permissible exposure temperatures. Our project engineers will be glad to assist you to design and dimension electrical heating systems. A project design guide is included, helping you to collect operating data as well as marking correct dimensioning and allocation possible. You can use the tables and the example for application to make your own design.

All products listed in the catalogue are available ex stock (subject to prior sale).

Furthermore, please note:

- All products listed in this catalogue shall only be connected and commissioned by a qualified electrician.
- All applicable local electrical and safety regulations must be observed during installation and operation.
- For economic reasons and for precise maintenance of a constant temperature we recommend the use of a temperature control unit.
- According to EN 62395-1, respectively EN 60519-10 residual current devices (RCD's) shall be used to separate in time electrical heating from the mains and to prevent consequential damages.

Specifications and advertising messages in this products and services catalogue, irrespective of their nature, in particular descriptions, illustrations, drawings, samples, information pertaining to quality, condition, composition, performance, consumption and usability as well as dimensions and weights of the product range remain subject to change in as far as they are not expressly declared as binding. They do not denote any assurance or guarantee whatsoever. Minor deviations from the product specifications shall be deemed approved in as far as they are not unreasonable for the buyer.

We explicitly reserve the right to amend errors and alter technical data.

Self-regulating parallel heating cables

Attributes:

- Self-regulating with adaptable output
- Various temperature range applications
- Demand-orientated output grading
- High chemical resistance
- No temperature limitation required (important advantage as regards Ex-applications)
- Easy to lay and to install
- Can be cut to length off the roll
- Connection with plug-in connectors

Application:

The ELSR heating cable (eltherm®-self-regulating) can be used for frost protection and maintaining constant temperatures on vessels, pipes, valves, etc.. Except for the connections, the heating cable may be immersed to fluids. If used in an aggressive environment (the chemical or petrochemical industry), we lag the heating cable with a special chemically resistant outer jacket (fluoropolymer), option "BOT". A table of chemical resistances is available on our homepage www.eltherm.com.

Function:

Self-regulating heating cables consist of two parallel bus wires embedded in a networked plastic heating element, doped with surrounding carbon particles. If the temperature increases during operation, the plastic expands due to molecular expansion and the distance between the carbon particles increases. Resistance increases and output drops. When it cools down, this process is reversed and output increases.

This physical property not to exceed the specified temperatures also facilitates the cross-routing of self-regulating cables and managing without a temperature cut-out device.

ELSR
Application options

The application options for the ELSR heating cables range from frost protection to temperature maintenance on pipes and vessels. In addition to our classic ELSR-N, we offer further low-temperature range versions: the narrower LS and M variants as well as the round heating cable ELSR-R.

In the medium-temperature range, we can supply you the ELSR-W, and we have the high temperature cable ELSR-H for temperatures up to 210° C.

Matching accessories round out our program: connection and termination kits, mounting material and you can find plenty more in the extensive technical data sheets related hereto.

All eltherm® heating cables are approved by the VDE (German Association for Electrical, Electronic and Information Technologies). Moreover, selected ELSR heating cables are also **Ex-approved** and therefore approved for use in hazardous areas.

Design: 4 different options

Our heating cables provide you a wide selection: we offer the right design for every application, every problem and all areas of use.

AO: Aluminum foil with a thermoplastic outer jacket

The heating cables with this design are particularly easy to assemble. This design is available for all low-temperature and medium-temperature tapes.

BO: Protective braid with a thermoplastic outer jacket

This proven design provides a protective tin-plated copper braid. The BO design is available for all low and medium temperature tapes.

BOT: Protective braid with fluoropolymer outer jacket

This outer jacket made of fluoropolymer material makes the heating cable extremely robust: it even withstands aggressive chemicals, oil and fuel. You find a detailed list of the resistance to chemicals on our homepage. This outer jacket is available for various ELSR-heating cables.

BF: Protective braid with food approved outer jacket, approved for use in potable water

A heating cable of this design can be used directly inside potable water lines. This design is currently only available for the ELSR-M version.

We also offer heating cables with braid only, without outer jacket, upon request.

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Features

Type	Self-regulating	Moisture proof	UV-resistant	Highest chemical resistance	Physical contact with foodstuffs / use in potable water	Low temperature	Medium temperature	High temperature	Ex-approved for hazardous areas
ELSR-N-AO	■	■	■			■			■
ELSR-N-BO	■	■	■			■			■
ELSR-N-BOT	■	■	■	■		■			■
ELSR-LS-AO	■	■	■			■			■
ELSR-LS-BO	■	■	■			■			■
ELSR-M-AO	■	■	■			■			
ELSR-M-BO	■	■	■			■			
ELSR-M-BF	■	■	■		■	■			
ELSR-R-BOT	■	■	■	■		■			
ELSR-W-AO	■	■	■				■		
ELSR-W-BO	■	■	■				■		
ELSR-H-BOT	■	■	■	■				■	■

You can directly select the heating cable for your special application from this table. Technical details on the products are given in the respective data sheets.

Production at eltherm®

The matrix is the most important quality aspect for self-regulating heating cables. In order to be able to exercise the greatest possible influence on this production process, we manufacture the granulate for the matrix ourselves. As a result of this, eltherm® is one of the top manufacturers of self-regulating heating cables in the world. This is also influenced by the special pre-treatment of the components and our long-time experience with these parameters. We are therefore able to guarantee constant high quality.

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Heating cable
self-regulating

The versatile self-regulating heating cable ELSR-N is suited for frost protection and temperature maintenance in the low temperature range of industrial applications. Likewise it is approved for use in hazardous areas. The BOT version of this heating cable even withstands aggressive chemicals, oil and fuel and, thanks to this high chemical resistance, stands out for a long lifetime.

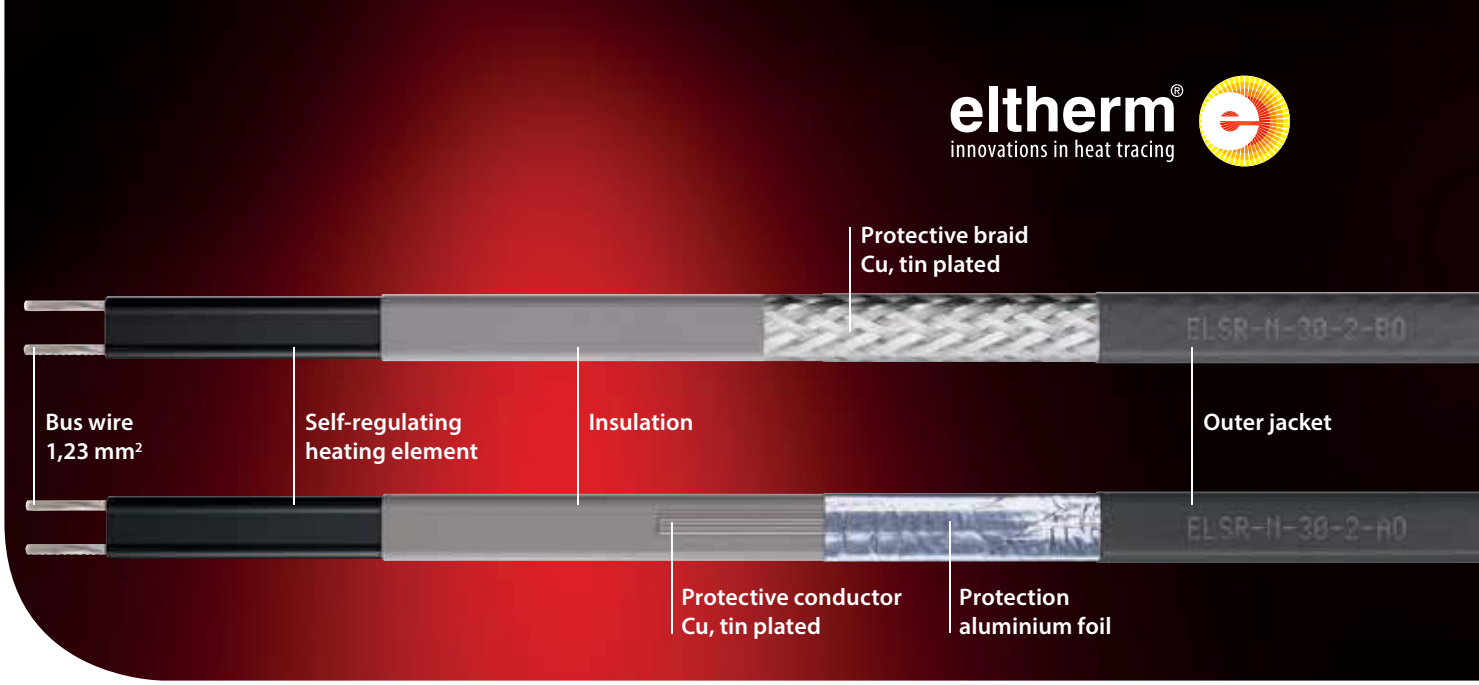
Advantages:

- Self-regulating
- Four nominal outputs
- Can be cut to length off the roll
- Moisture proof
- UV-resistant
- Approved for use in hazardous areas

Applications:

- Frost protection
- Heat tracing on level indicators
- Chemical & petrochemical industries
- Tank bottom heating of LNG storage tanks
- Pipe heat tracing
- Vessels and tanks
- Automotive
- Food processing industry

Type **ELSR-N up to 80 °C**



Technical information

Type ELSR-N up to 80 °C

Data

Outer jacket	TPE-O
Bus wire	nickel plated copper
Maximum exposure temperature (power off)	80 °C
Maximum exposure temperature (power on)	65 °C
Nominal voltage	230 V
Bending radius, min.	25 mm
Installation temperature, min.	– 45 °C
Classification	II 2G Ex e IIC Gb II 2D Ex tb IIIC Db
Certificates	IECEx EPS 12.0006U 12ATEX1431U

Heating circuit lengths ELSR-N-…-2 on the following conditions:
- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on the heating cable bus wire
- One (1) single end power input heating cable

Switch-on tempera-ture	Nominal cutout value (A)	Heating circuit length (m) for			
		ELSR-N-10-2	ELSR-N-20-2	ELSR-N-30-2	ELSR-N-40-2
10	10	128	68	52	36
	16	177	109	83	57
	20	177	129	104	71
	25	177	129	113	89
	32	177	129	113	94
0	10	106	57	45	31
	16	160	92	71	50
	20	160	115	89	62
	25	160	119	105	78
	32	160	119	105	88
-10	10	90	50	39	28
	16	144	79	63	44
	20	149	99	78	55
	25	149	111	98	69
	32	149	111	98	83
-20	10	78	44	35	25
	16	125	70	56	40
	20	139	87	69	50
	25	139	104	87	62
	32	139	104	87	78
-40	10	62	35	28	21
	16	99	56	45	33
	20	124	71	57	42
	25	124	88	71	52
	32	124	88	71	66

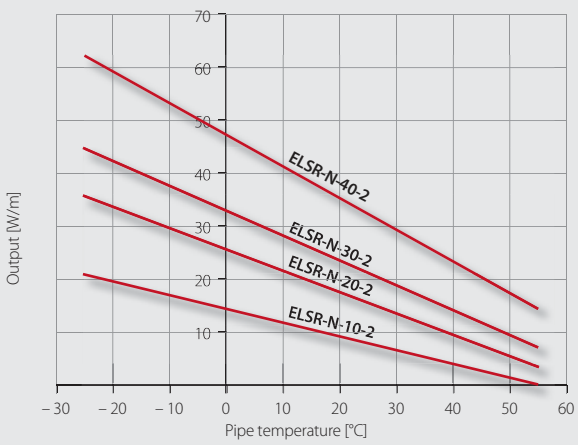
Design

BO	Protective braid and a thermoplastic outer jacket
AO	Aluminium foil and a thermoplastic outer jacket
BOT	Protective braid and a fluoropolymer outer jacket

Type	Nominal output	Dimen-sions approx. (mm)	Weight approx. (g/m)	Art. No.
ELSR-N-10-2-AO	10 W/m at 10 °C	13,6 x 5,5	91	B0200130
ELSR-N-10-2-BO	10 W/m at 10 °C	14,1 x 5,8	108	B0200110
ELSR-N-10-2-BOT	10 W/m at 10 °C	13,8 x 5,6	108	B0200119
ELSR-N-20-2-AO	20 W/m at 10 °C	13,6 x 5,5	91	B0200230
ELSR-N-20-2-BO	20 W/m at 10 °C	14,1 x 5,8	108	B0200210
ELSR-N-20-2-BOT	20 W/m at 10 °C	13,8 x 5,6	108	B0200219
ELSR-N-30-2-AO	30 W/m at 10 °C	13,6 x 5,5	91	B0200330
ELSR-N-30-2-BO	30 W/m at 10 °C	14,1 x 5,8	108	B0200310
ELSR-N-30-2-BOT	30 W/m at 10 °C	13,8 x 5,6	108	B0200319
ELSR-N-40-2-AO	40 W/m at 10 °C	13,6 x 5,5	91	B0200430
ELSR-N-40-2-BO	40 W/m at 10 °C	14,1 x 5,8	108	B0200410
ELSR-N-40-2-BOT	40 W/m at 10 °C	13,8 x 5,6	108	B0200419

ELSR-N-…-2 output

(on insulated metallic pipes in accordance with EN 62395-1)



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Heating cable Light 'super' self-regulating

The versatile self-regulating heating cable ELSR-LS is our 'light' version for temperatures up to 80 °C. This heating cable is also suited and approved for use in hazardous areas. Since eltherm® self-regulating cables can be cut off the roll to the desired length, the application cable is highly flexible to match our customer's needs. Its long life span guarantees for the efficient use in many industrial sectors.

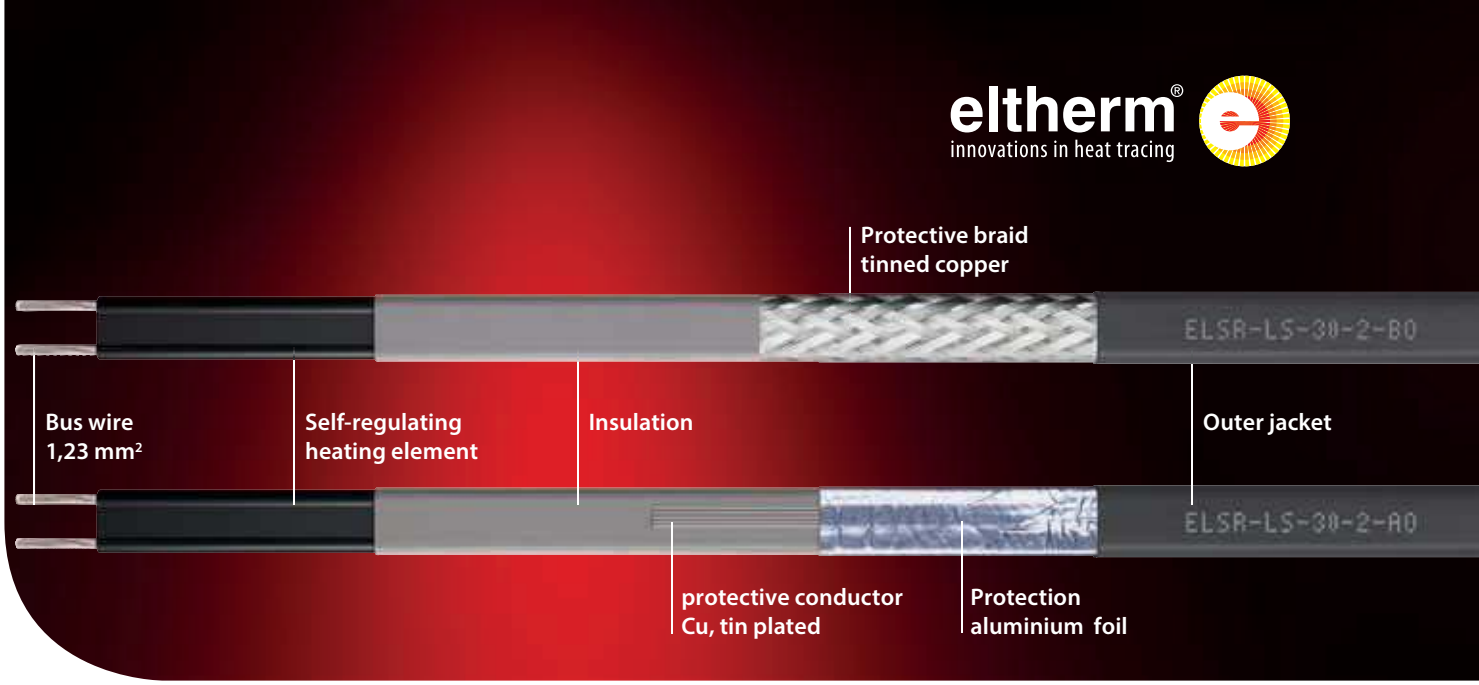
Advantages:

- Self-regulating
- Four nominal outputs
- Can be cut to length off the roll
- Moisture proof
- UV-resistant
- Small dimensions

Applications:

- Pipe heat tracing
- Frost protection for industrial applications
- Temperature maintenance for pipes and vessels
- Chemical & petrochemical industries
- Paints & varnishes
- Automotive
- Food processing industry

Type **ELSR- LS up to 80 °C**



Technical information

Type ELSR- LS up to 80 °C

Data

Outer jacket	TPE-O
Bus wire	1,23 mm² nickel plated copper
Maximum exposure temperature (power off)	80 °C
Maximum exposure temperature (power on)	65 °C
Nominal voltage	230 V
Bending radius, minimum	25 mm
Installation temperature, min.	– 50 °C
Classification	II 2G Ex e IIC Gb II 2D Ex tb IIIC Db
Certificates	IECEx EPS 12.0006U EPS 12ATEX1431U

Design

BO	Protective braid and a thermoplastic outer jacket
AO	Aluminium foil and a thermoplastic outer jacket

Type	Nominal output	Dimensions approx. (mm)	Weight approx. (g/m)	Art. No.
ELSR-LS-10-2-AO	10 W/m at 10 °C	10,3 x 5,5	78	B0223104
ELSR-LS-10-2-BO	10 W/m at 10 °C	10,8 x 5,6	98	B0223102
ELSR-LS-15-2-AO	15 W/m at 10 °C	10,3 x 5,5	78	B0223154
ELSR-LS-15-2-BO	15 W/m at 10 °C	10,8 x 5,6	98	B0223152
ELSR-LS-25-2-AO	25 W/m at 10 °C	10,3 x 5,5	78	B0223254
ELSR-LS-25-2-BO	25 W/m at 10 °C	10,8 x 5,6	98	B0223252
ELSR-LS-30-2-AO	30 W/m at 10 °C	10,3 x 5,5	78	B0223304
ELSR-LS-30-2-BO	30 W/m at 10 °C	10,8 x 5,6	98	B0223302

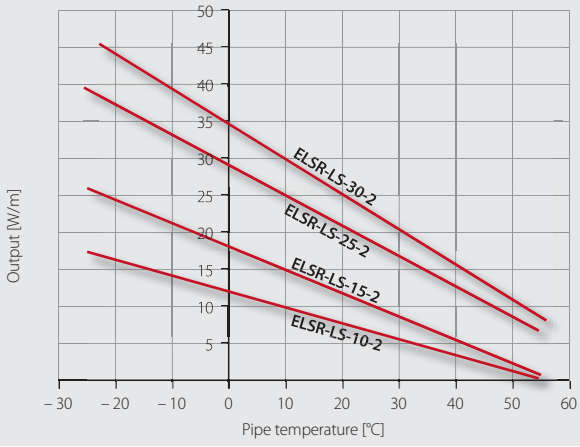
Heating circuit lengths ELSR- LS -…-2 on the following conditions

- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on the heating cable bus wire
- One (1) single end power input heating cable

Switch-on temperature (°C)	Nominal cutout value (A)	Heating circuit length (m) for			
		ELSR- LS - 10-2	ELSR- LS - 15-2	ELSR- LS - 25-2	ELSR- LS - 30-2
10	10	152,0	103,0	64,0	49,0
	16	196,0	160,5	103,0	78,0
	20	196,0	160,5	126,0	97,5
	25	196,0	160,5	126,0	112,5
0	10	141,0	84,0	54,0	44,0
	16	188,5	134,0	87,0	70,0
	20	188,5	145,0	108,0	87,5
	25	188,5	145,0	116,0	104,0
-10	10	119,0	71,0	47,0	38,0
	16	173,5	114,0	75,0	61,0
	20	173,5	133,0	94,0	76,0
	25	173,5	133,0	107,5	95,0
-20	10	103,0	62,0	37,5	33,0
	16	161,0	99,0	60,0	53,0
	20	161,0	124,0	75,0	66,0
	25	161,0	124,0	94,0	83,0

ELSR-LS-…-2 output

(on insulated metallic pipes in accordance with EN 62395-1)



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Heating cable Micro self-regulating

The heating cable ELSR-M is very flexible and is used for special applications where installation dimensions are needed to be kept small. It is particularly suited for short heating circuits. This heating cable can be used for frost protection and temperature maintenance up to 65 °C.

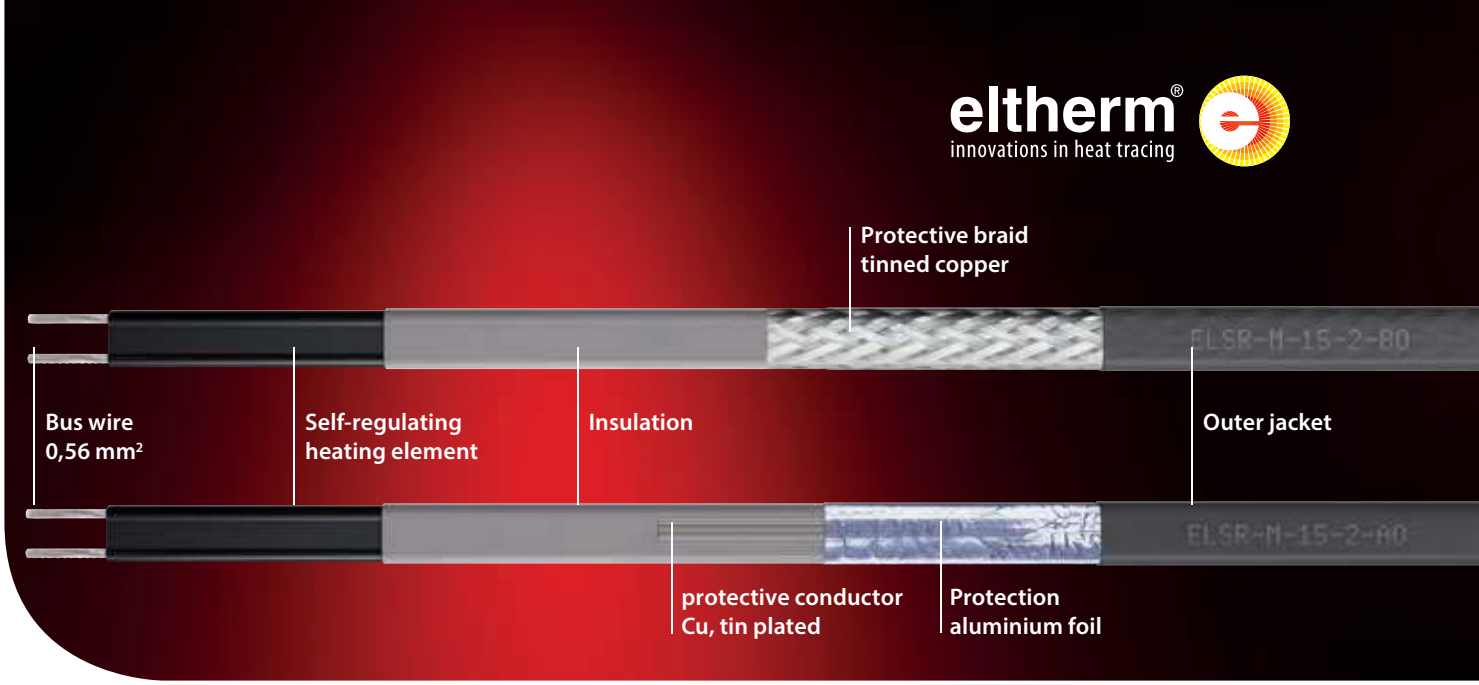
Advantages:

- Self-regulating
- Two nominal outputs
- Can be cut to length off the roll
- Moisture proof
- UV-resistant
- Small dimensions

Applications:

- Heat tracing on pipes, pumps and valves
- Food processing industry
- Automotive
- Heating of tube bundle cables for water analysis
- Heat tracing on vessels

Type **ELSR-M up to 65 °C**



Technical information

Type ELSR-M up to 65 °C

Data

Outer jacket	TPE-O
Bus wire	nickel plated copper
Maximum exposure temperature (power off)	65 °C
Maximum exposure temperature (power on)	65 °C
Nominal voltage	230 V
Bending radius, minimum	25 mm
Installation temperature, min.	– 45 °C

Design

BO	Protective braid and a thermoplastic outer jacket
AO	Aluminium foil and a thermoplastic outer jacket

Type	Nominal output	Dimensions approx. (mm)	Weight approx. (g/m)	Art. No.
ELSR-M-10-2-AO	10 W/m at 10 °C	8,0 x 5,5	53	B0225110
ELSR-M-10-2-BO	10 W/m at 10 °C	8,5 x 5,8	62	B0225102
ELSR-M-15-2-AO	15 W/m at 10 °C	8,0 x 5,5	53	B0225160
ELSR-M-15-2-BO	15 W/m at 10 °C	8,5 x 5,8	62	B0225152

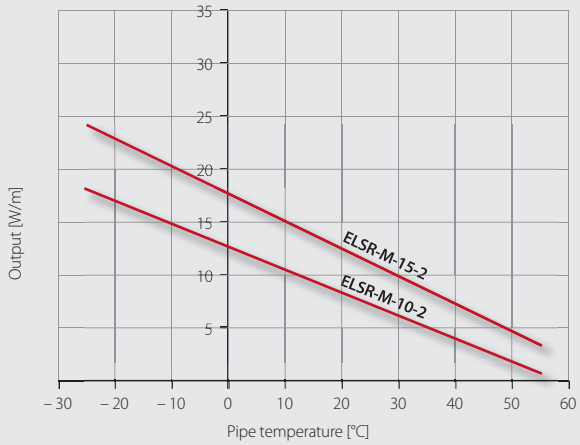
Heating circuit lengths ELSR-M-...-2 Heating circuit lengths ELSR-N-...-2 on the following conditions:

- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on the heating cable bus wire
- One (1) single end power input heating cable

Switch-on temperature	Nominal cutout value (A)	Heating circuit length (m) for	
		ELSR-M-10-2	ELSR-M-15-2
10	10	126,5	98,0
	16	126,5	105,5
	20	126,5	105,5
0	10	115,5	83,0
	16	115,5	97,5
	20	115,5	97,5
-10	10	100,0	72,0
	16	106,5	91,0
	20	106,5	91,0
-20	10	87,0	64,0
	16	99,5	85,5
	20	99,5	85,5
-40	10	69,0	52,0
	16	88,5	77,0
	20	88,5	77,0

ELSR-M-...-2 output

(on insulated metallic pipes in accordance with EN 62395-1)



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Heating cable Micro approved for use in potable water

ELSR-M-BF/AF is the light construction of a self-regulating heating cable featuring an outer jacket which is food-safe and approved for use in potable water. A typical application area is frost protection of potable water lines. Likewise it is suited to maintain temperatures, for instance in the food processing industry. The heating cable ELSR-M-BF/AF provides smallest dimensions and is highly flexible with special applications. It perfectly suits short heating circuits. Unlike other self-regulating heating cables, the ELSR-M-BF/AF can be installed **inside** a pipeline.

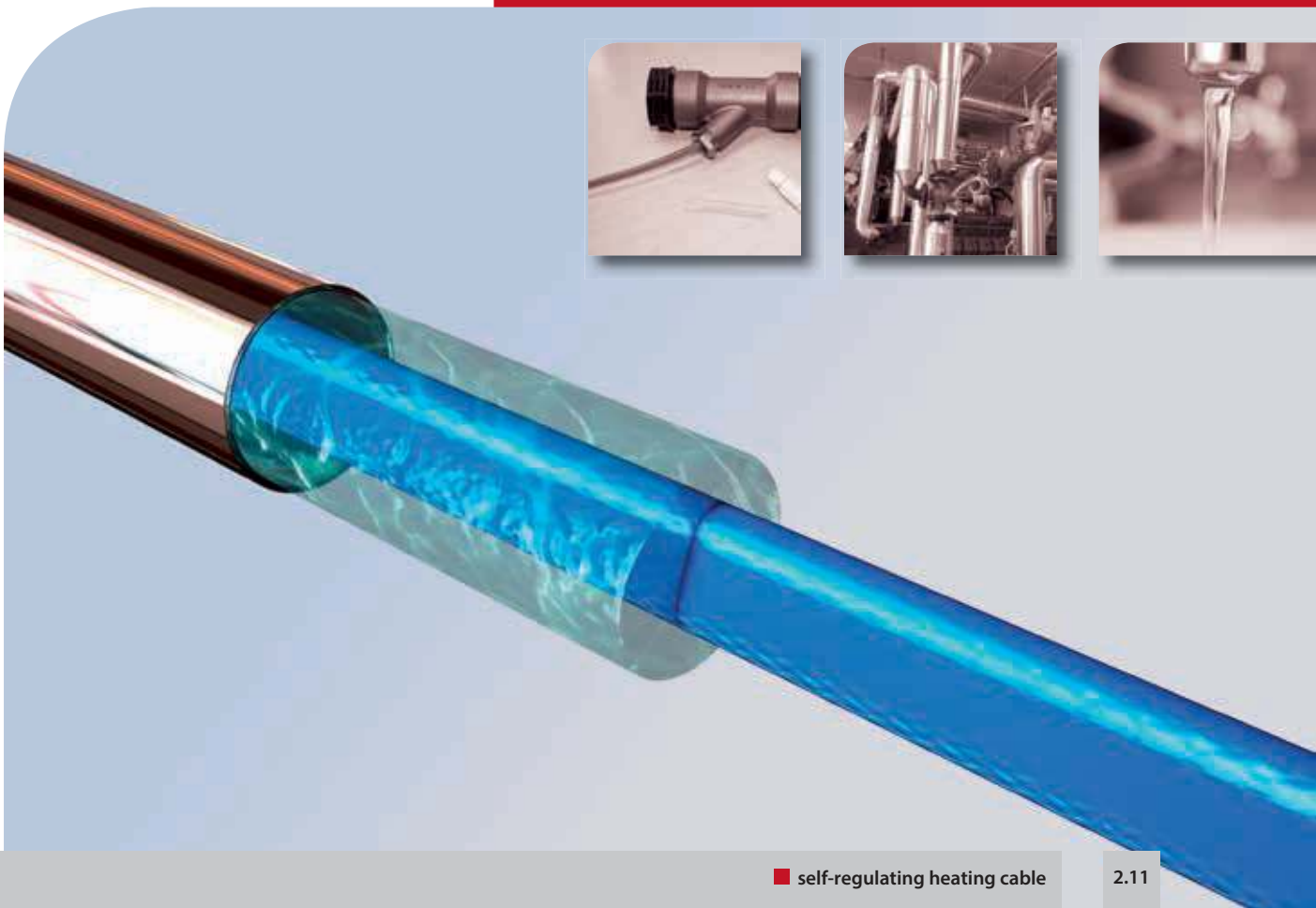
Advantages:

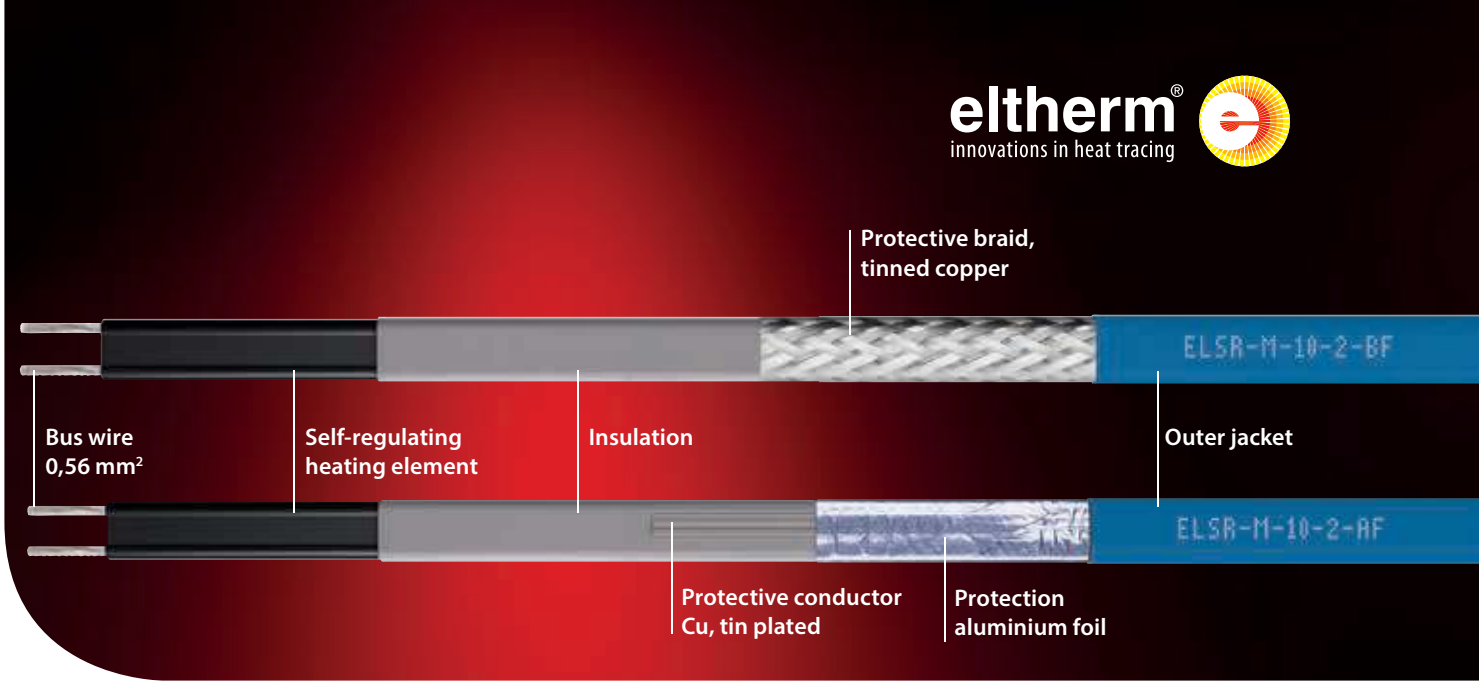
- KTW-approved, DVGW-approved
- Can be cut to length off the roll
- Moisture proof
- UV-resistant
- Small dimensions

Application:

- Internal trace heating for pipes and hoses

Type **ELSR-M-BF/AF up to 65 °C**





Technical information

Type ELSR-M-BF/AF up to 65 °C

Data

Outer jacket	polyethylene
Bus wire	nickel plated copper
Maximum exposure temperature (power off)	65 °C
Maximum exposure temperature (power on)	65 °C
Nominal voltage	230 V
Bending radius, minimum	25 mm
Installation temperature, min.	– 45 °C
Certificate	K-229437-13-Bs/st

Design

BF	Protective braid and food-safe outer jacket, suited for use in potable water (tested by the Hygiene Institut des Ruhrgebiets [Hygienic Institute of the 'Ruhrgebiet'])
AF	Aluminium foil and food-safe outer jacket, for use in potable water (tested by the Hygiene Institut des Ruhrgebiets [Hygienic Institute of the 'Ruhrgebiet'])

Type	Nominal output	Dimensions approx. (mm)	Weight approx. (g/m)	Art. No.
ELSR-M-10-2-BF	10 W/m at 10 °C	7,5 x 4,9	62	B0225104
ELSR-M-10-2-AF	10 W/m at 10 °C	7,0 x 4,6	53	B0225105

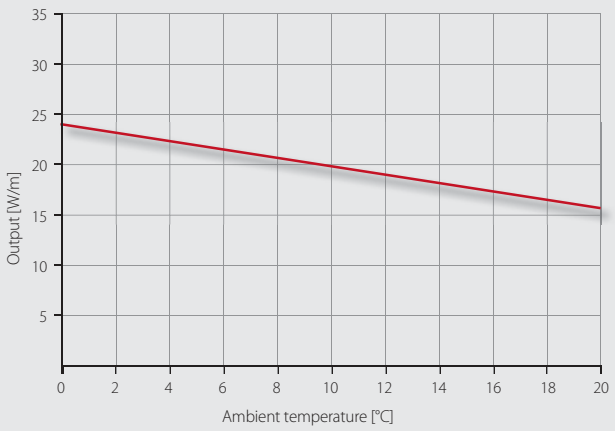
Heating circuit lengths ELSR- on the following conditions:

- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on the heating cable bus wire
- One (1) single end power input heating cable

Switch-on temperature	Nominal cutout value (A)	Heating circuit length (m) for ELSR-M-10-2-BF / AF
10	10	74,0
	16	89,5
	20	89,5
0	10	61,5
	16	89,5
	20	89,5
-30	10	61,5
	16	89,5
	20	89,5

ELSR-M-10-2-BF / AF output

(in a filled water pipeline)



Heating cable round self-regulating

The 'R' in the name of our self-regulating heating cable ELSR-R is an abbreviation for 'round'. This heating cable was specially developed to protect the doors and seals of refrigerating chambers against frost as well as for all applications requiring a round heating cable.

It is also often used in cooling water lines of breweries and drinks manufacturers (as frost protection). The maximum exposure temperature is 65 °C.

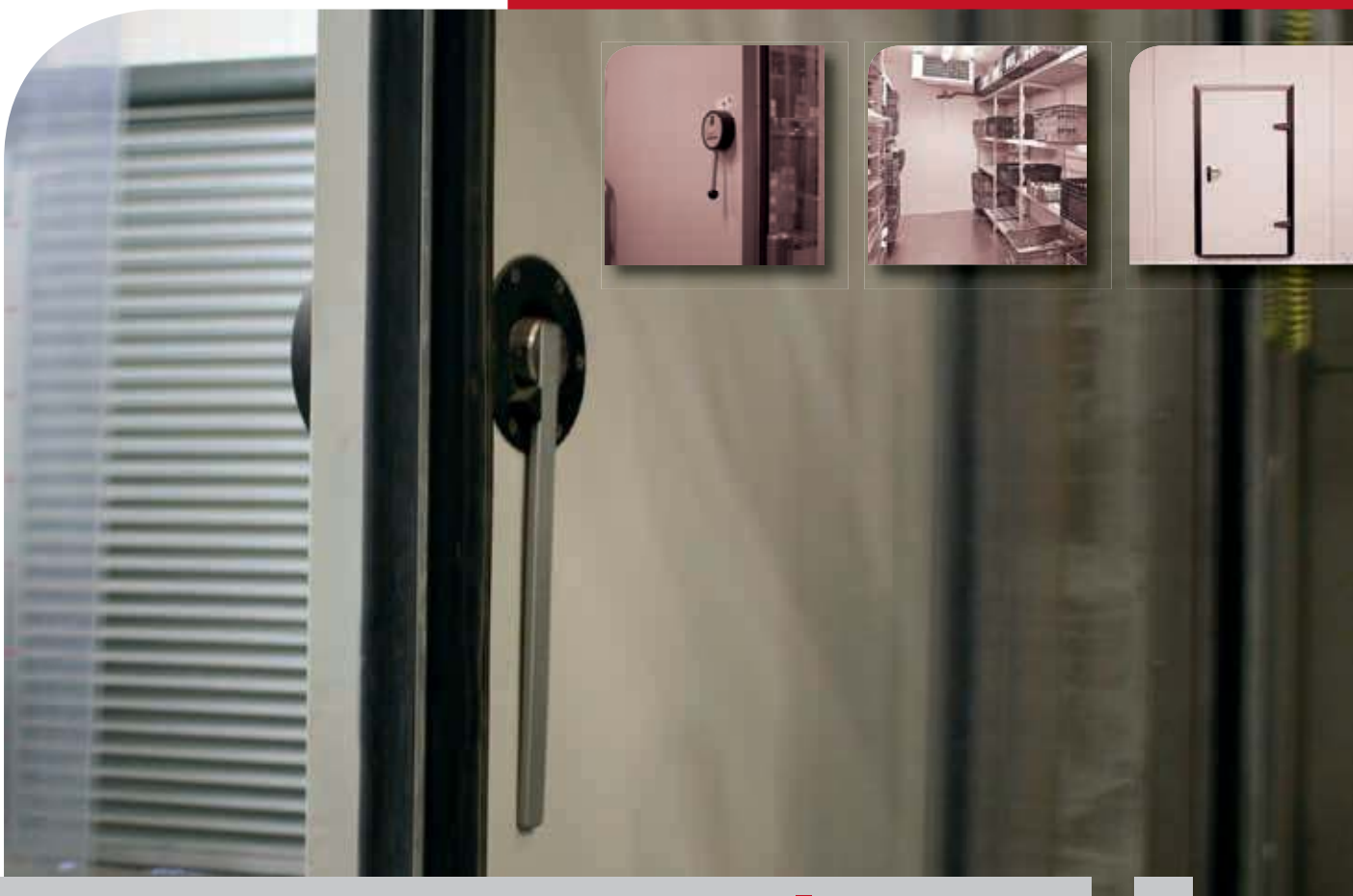
Advantages:

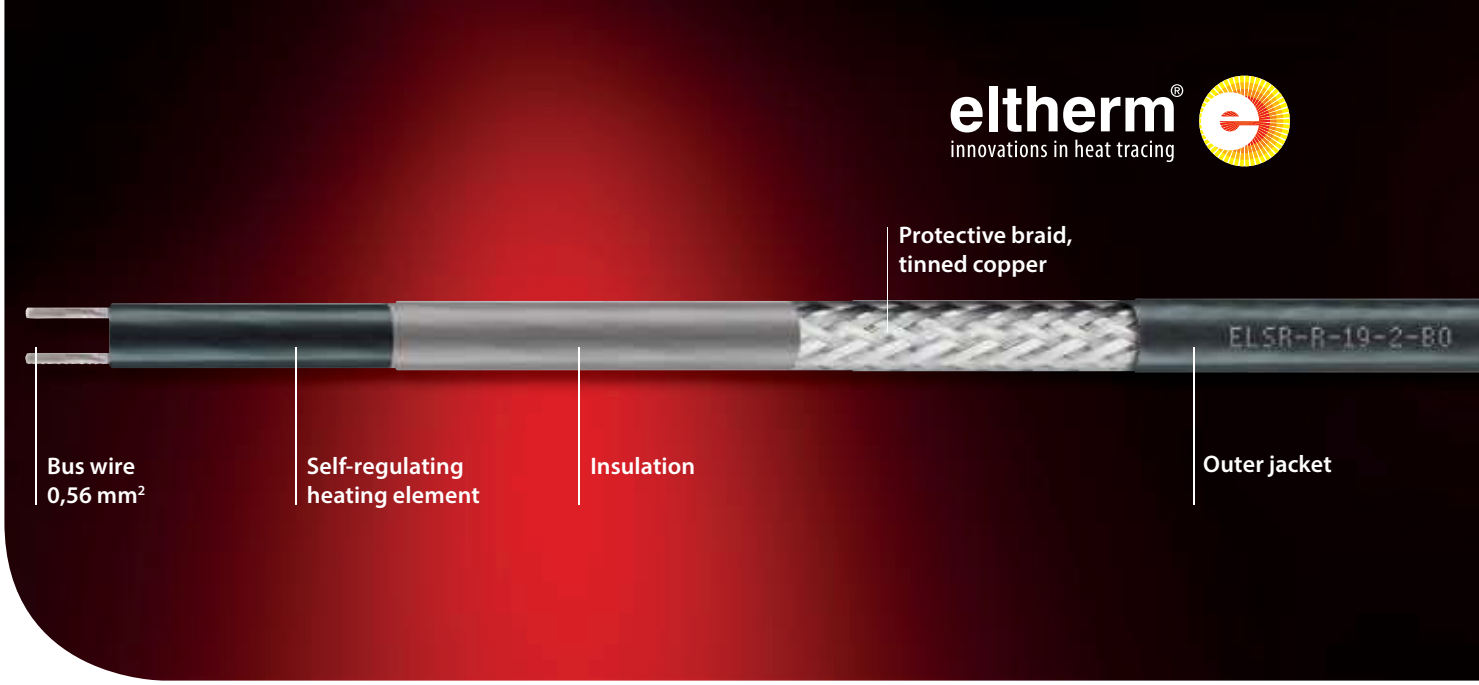
- Round design
- Self-regulating
- Can be cut to length off the roll
- Moisture proof
- UV-resistant
- Perfectly suited for installation with sections thanks to round shape

Applications:

- Frost protection for doors and seals of refrigerating chambers
- Usage in cooling water lines of breweries and drink manufacturers

Type **ELSR-R up to 65 °C**





Technical information

Type ELSR-R up to 65 °C

Data

Outer jacket	fluoropolymer
Bus wire	nickel plated copper
Maximum exposure temperature (power off)	65 °C
Maximum exposure temperature (power on)	65 °C
Nominal voltage	230 V
Bending radius, minimum	30 mm
Installation temperature, min.	– 30 °C

Design

BOT Protective braid and a fluoropolymer outer jacket

Type	Nominal output	Dimensions approx. (mm)	Weight approx. (g/m)	Art. No.
ELSR-R-19-2-BOT	19 W/m at 10 °C	7,3	77	B0200507
ELSR-R-27-2-BOT	27 W/m at 10 °C	7,3	74	B0200605

Other versions are available upon request.

This heating cable has specially been developed for the use with doors of refrigerating chambers. Please contact our engineers for more details on our ELSR-R.

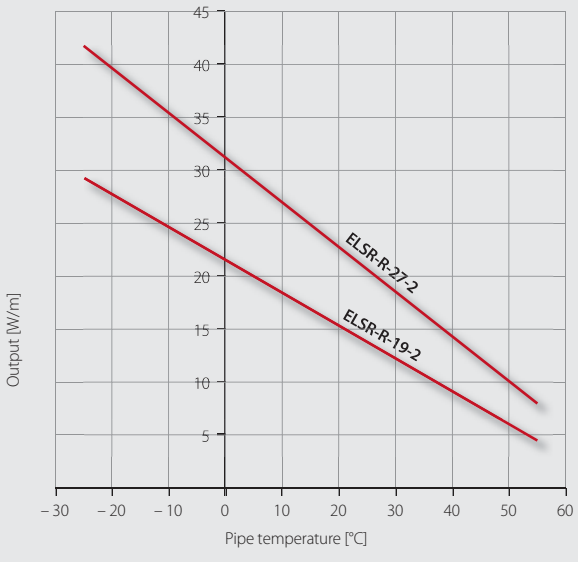
Heating circuit lengths ELSR-R-...-2-BOT on the following conditions:

- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on the heating cable bus wire
- One (1) single end power input heating cable

Switch-on temperature	Nominal cutout value (A)	Heating circuit length (m) for	
		ELSR-R-19-2	ELSR-R-27-2
10	10	75,0	20,0
	16	102,0	32,0
	20	102,0	40,0
0	10	62,0	16,5
	16	94,0	26,5
	20	94,0	33,0
-10	10	51,0	13,5
	16	81,5	21,5
	20	88,0	27,0
-20	10	41,0	11,0
	16	65,5	17,5
	20	82,0	22,0
-40	10	30,0	7,5
	16	48,0	12,0
	20	60,0	15,0

ELSR-R-...-2-BOT output

(on insulated metallic pipes in accordance with EN 62395-1)



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innovations in heat tracing

Heating cable Hot water self-regulating

The self-regulating heating cable ELSR-W (hot water) is used for vessels, pipes, valves and several other applications with processing temperatures between 30 °C and 80 °C approximately (power on) and 100°C (power off).The ELSR-W self-regulating heating cables are frequently used to heat oil and fat lines, for example in the food processing industry. But likewise its use for drainage lines in canteens and (large scale) kitchen makes good sense, avoiding fat and oil deposits by heating. Used for hot water supplies, it serves for frost protection, temperature maintenance and prevention of Legionella formation.

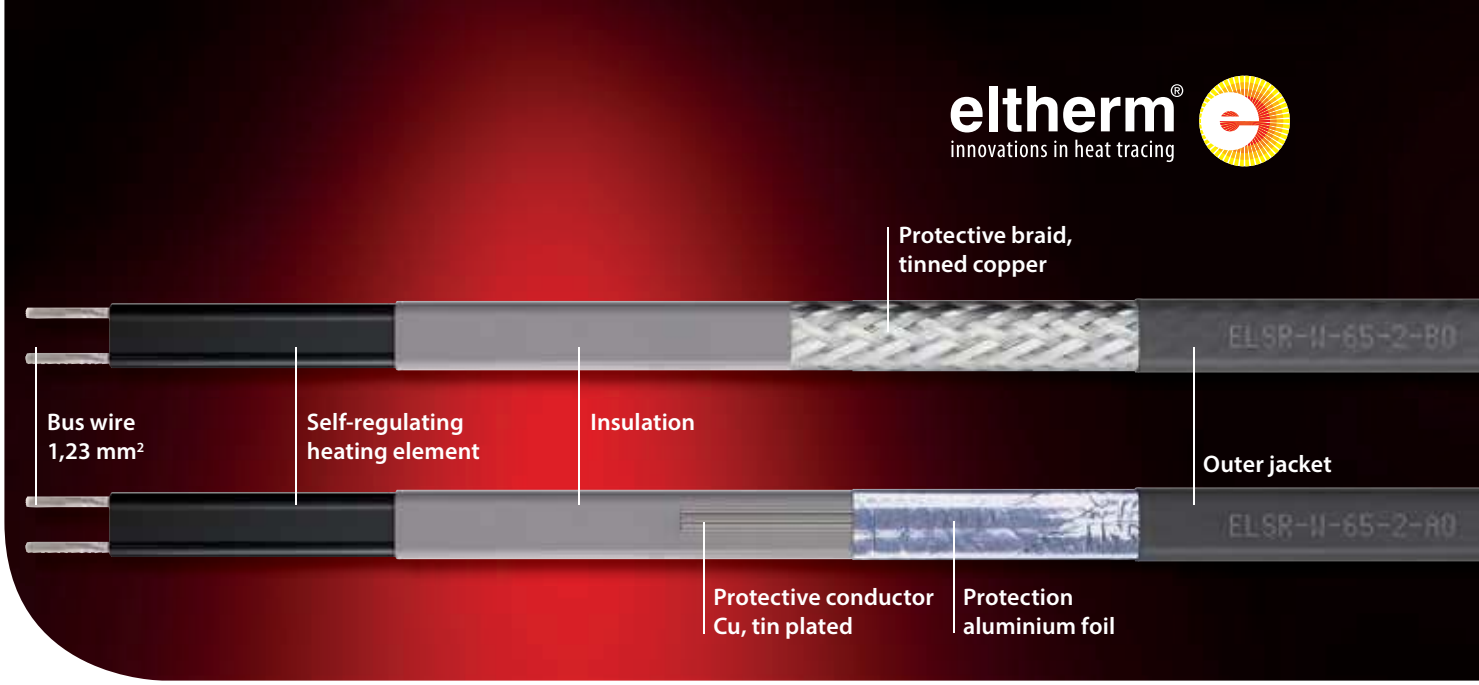
Advantages:

- Self-regulating
- Two nominal outputs
- Can be cut to length off the roll
- Moisture proof

Applications:

- Food processing industry
- Heat tracing on fat lines
- Drainage lines in canteens and large-scale kitchens
- Frost protection for heating lines
- Installation on hot water supplies to prevent Legionella formation

Type **ELSR-W up to 100 °C**



Technical information

Type ELSR-W up to 100 °C

Data

Outer jacket	TPE-O
Bus wire	nickel plated copper
Maximum exposure temperature (power off)	100 °C
Maximum exposure temperature (power on)	80 °C
Nominal voltage	230 V
Bending radius, minimum	20 mm
Installation temperature, min.	– 20 °C

Design

BO	Protective braid and a thermoplastic outer jacket
AO	Aluminium foil and a thermoplastic outer jacket

Heating circuit lengths ELSR-W-...-2-... on the following conditions:

- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on the heating cable bus wire
- One (1) single end power input heating cable

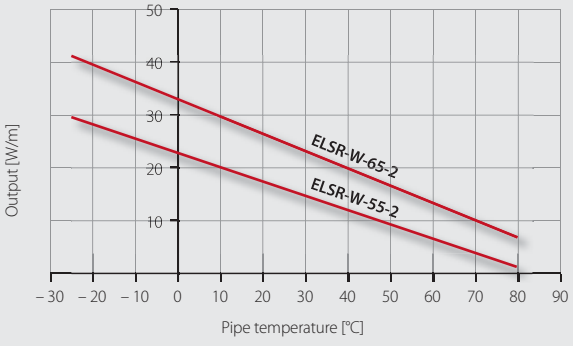
Switch-on temperature	Nominal cutout value (A)	Heating circuit length (m) for	
		ELSR-W-55-2	ELSR-W-65-2
10	10	70,0	45,5
	16	113,0	73,5
	20	131,0	92,0
	25	131,0	106,0
	32	131,0	106,0
0	10	63,0	41,5
	16	101,0	66,0
	20	123,5	83,0
	25	123,5	99,5
	32	123,5	99,5
-10	10	57,0	37,5
	16	91,0	60,0
	20	113,5	75,0
	25	117,0	94,0
	32	117,0	95,0
-20	10	52,0	34,0
	16	83,0	55,0
	20	104,0	69,5
	25	112,0	86,0
	32	112,0	90,5
-40	10	44,0	29,5
	16	70,0	48,0
	20	88,0	59,0
	25	103,0	74,0
	32	103,0	83,5

Type	Nominal output used for water supply lines	Dimensions approx. (mm)	Weight approx. (g/m)	Art. No.
ELSR-W-55-2-AO	9 W/m at 55 °C	12,9 x 5,0	86	B0200360
ELSR-W-55-2-BO	9 W/m at 55 °C	12,9 x 5,0	105	B0200350
ELSR-W-65-2-AO	13 W/m at 65 °C	12,9 x 5,0	86	B0200455
ELSR-W-65-2-BO	13 W/m at 65 °C	12,9 x 5,0	105	B0200450

Type	Nominal output used with fat/ oil lines	Dimensions approx. (mm)	Weight approx. (g/m)	Art. No.
ELSR-W-65-2-AO	22 W/m at 40 °C	12,9 x 5,0	86	B0200455
ELSR-W-65-2-BO	22 W/m at 40 °C	12,9 x 5,0	105	B0200450

ELSR-W-...-2-... output

(on insulated metallic pipes in accordance with EN 62395-1)



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Heating cable High temperature self-regulating

The versatile self-regulating heating cable ELSR-H is for high temperatures up to 210 °C in a large number of industrial applications. It also suited and approved for use in hazardous areas. The BOT version of this heating cable even withstands aggressive chemicals, oil and fuel and, thanks to this high chemical resistance, stands out for a long life span.

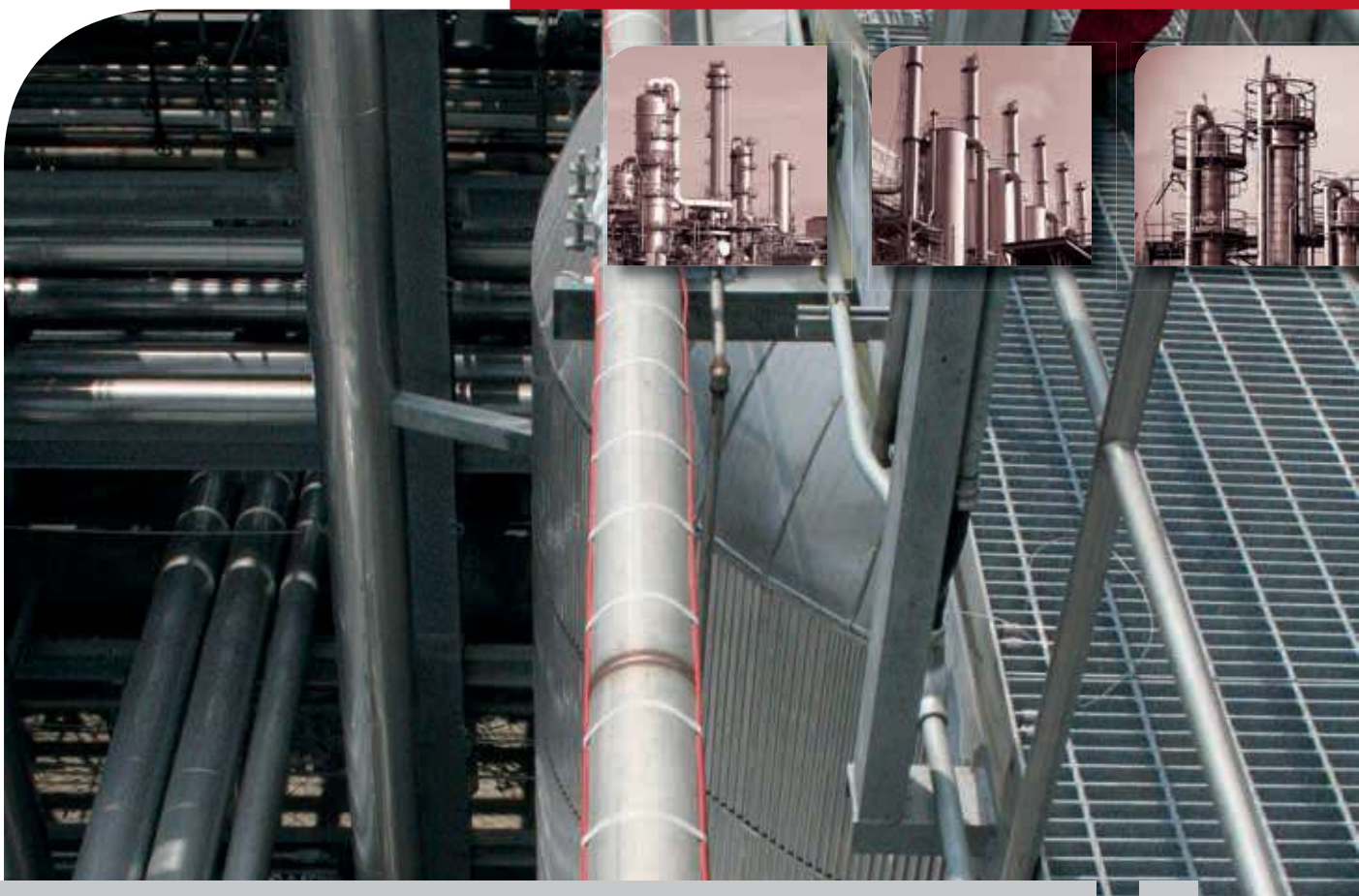
Advantages:

- Up to 120 °C/210 °C
- Self-regulating
- Six nominal outputs
- Can be cut to length off the roll
- Moisture proof
- Resistant to chemicals
- Approved for use in hazardous areas

Applications:

- Chemical & petrochemical industries
- Oil & gas industry
- Power plants
- Ex-areas
- Frost protection
- Water & sanitation utilities
- Temperature maintenance on vessels, pipes & valves

Type **ELSR-H up to 210 °C**



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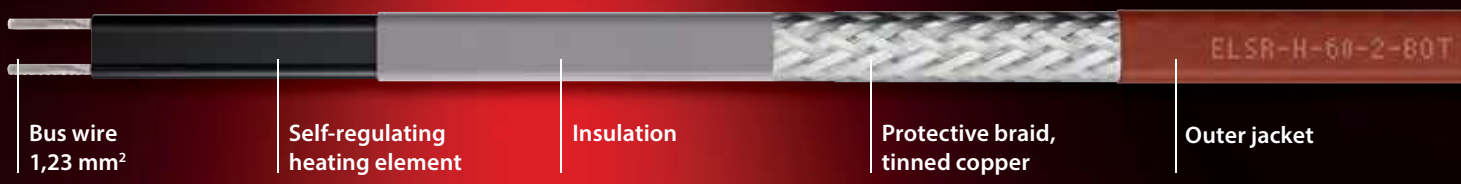


Bus wire 1,23 mm²

Self-regulating heating element

Insulation

Protective braid, tinned copper

Outer jacket

Technical information

Type ELSR-H up to 210 °C

Data

Outer jacket	Fluoropolymer
Bus wire	Nickel plated copper
Maximum exposure temperature (power off)	210 °C
Maximum exposure temperature (power on)	120 °C
Nominal voltage	230 V / 120 V*
Bending radius, minimum	25 mm
Installation temperature, min.	– 45 °C
Classification	II 2G Ex e IIC Gb II 2D Ex tb IIIC Db
Certificates	IECEx EPS 12.0004 12ATEX1429U

*upon request

Heating circuit lengths ELSR-H-...-2-BOT on the following conditions:

- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on the heating cable bus wire
- One (1) single end power input heating cable

Switch-on temperature	Nominal cutout value (A)	Heating circuit length (m) for					
		ELSR-H-10-2	ELSR-H-15-2	ELSR-H-20-2	ELSR-H-30-2	ELSR-H-45-2	ELSR-H-60-2
10	16	193,0	158,0	122,0	82,0	55,0	41,0
	20	193,0	158,0	136,0	102,0	68,0	51,0
	25	193,0	158,0	136,0	111,0	85,0	64,0
	32	193,0	158,0	136,0	111,0	91,0	79,0
0	16	189,0	153,0	116,0	77,0	52,0	39,0
	20	189,0	153,0	132,0	97,0	65,0	49,0
	25	189,0	153,0	132,0	108,0	81,0	61,0
	32	189,0	153,0	132,0	108,0	88,5	77,0
-10	16	184,0	146,0	110,0	73,0	50,0	37,0
	20	1840,	148,5	129,0	92,0	62,0	46,0
	25	1840,	148,5	129,0	105,5	77,0	58,0
	32	184,0	148,5	129,0	105,5	86,5	70,0
-20	16	180,0	139,0	104,0	70,0	47,0	36,0
	20	180,0	145,0	125,5	87,0	59,0	44,0
	25	180,0	145,0	125,5	103,0	74,0	56,0
	32	180,0	145,0	125,5	103,0	84,5	67,0
-40	16	173,0	126,0	95,0	64,0	43,0	33,0
	20	173,0	138,0	119,0	80,0	54,0	41,0
	25	173,0	138,0	120,0	98,0	68,0	51,0
	32	173,0	138,0	120,0	98,0	81,0	61,0

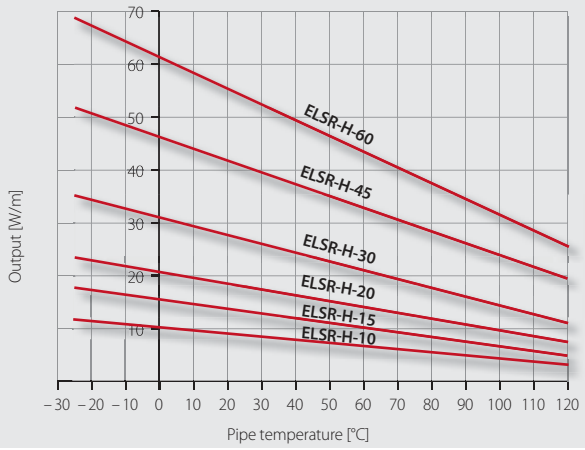
Design

BOT Protective braid and a fluoropolymer outer jacket

Type	Nominal output	Dimensions approx. (mm)	Weight approx. (g/m)	Art. No.
ELSR-H-10-2-BOT	10 W/m at 10 °C	12,4 x 5,0	120	B0221103
ELSR-H-15-2-BOT	15 W/m at 10 °C	12,4 x 5,0	120	B0221153
ELSR-H-20-2-BOT	20 W/m at 10 °C	12,4 x 5,0	120	B0221203
ELSR-H-30-2-BOT	30 W/m at 10 °C	12,4 x 5,0	120	B0221303
ELSR-H-45-2-BOT	45 W/m at 10 °C	12,4 x 5,0	120	B0221453
ELSR-H-60-2-BOT	60 W/m at 10 °C	12,4 x 5,0	120	B0221603

ELSR-H-...-2-BOT output

(on insulated metallic pipes in accordance with EN 62395-1)



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Concrete and ramp heating cable

for open space and ramp heating

This heating cable is designed for easy and safe installation of open-space heaters. Accidents due to frost and snow are prevented all over the heated space. To ensure a high mechanical load capacity in open space, the eltherm engineers developed this heating cable especially robust. Suited for installation in sand/cement mixtures.

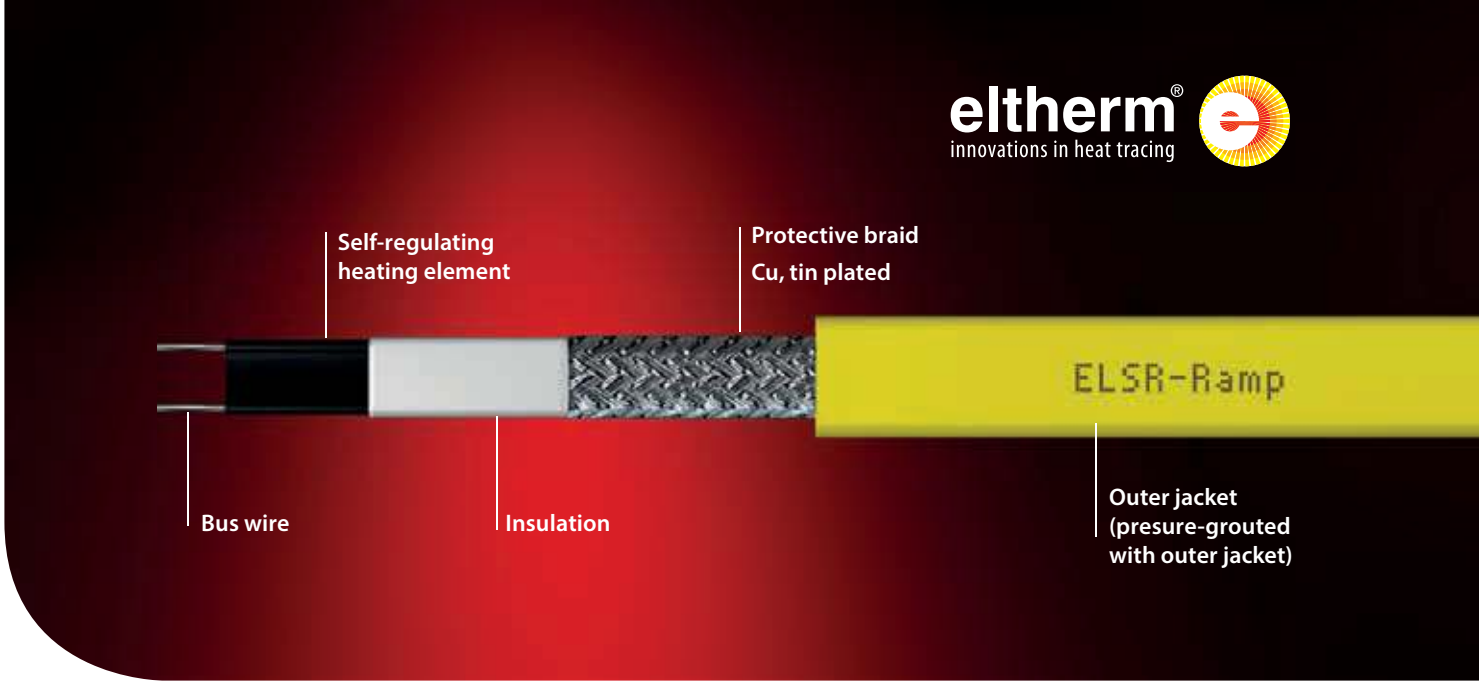
Advantages:

- Highly robust
- Suited for hardest installing conditions
- Flexible mounting
- Radially and longitudinally waterproof, outer jacket is strongly grouted with protective braid

Applications:

- Parking garages entrances and exits
- Helicopter landing sites
- Concrete ramps
- Stairs and footpaths

Type **ELSR-Ramp**



Technical information

Type ELSR-Ramp

Data

Outer jacket	TPE
Bus wire	nickel plated copper
Maximum exposure temp. (power off)	100 °C
Maximum exposure temp. (power on)	80 °C
Nominal voltage	230 V
Bending radius, minimum	50 mm
Installation temperature, min.	– 20 °C
Nominal output	approx. 50 W/m at 10 °C (110 W/m in concrete @ 5°C)
Dimensions approx.	17,2 mm x 9,5 mm
Weight approx. (g/m)	253

Heating circuit lengths ELSR-Ramp on the following conditions:
- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on the heating cable bus wire
- One (1) single end power input heating cable

Switch-on temperature	Nominal cu-tout value (A)	Heating circuit length (m) for ELSR-RAMP
-10	10	18
	16	28
	20	36
	25	45
	32	55

* Heating circuit lengths may vary in specific installation situations. Please contact our engineers for more details.

Type	Art. No.
ELSR-Ramp	B02RAMP0

Electrical protection

Maximum heating circuit length
- According to local standards and regulations.
- Take into account the conductor size and max. permitted voltage drop.
- A higher voltage drop can occur at start-up of heating.

Power at start-up
- To determine the installed power with the electrical system designer, the nominal current of the series connected fuse or the current value at the system start-up temperature must be taken into account (e.g. 32 A for 55 m ELSR-Ramp (–10°C).
- Residual current device (RCD) 30 mA required, max. 500 m heating cable per RCD.

Remark
- For the use of standard control cabinets, the maximum heating circuit length of 55 m at 32 A per heating circuit must not be exceeded.

Design guide

Table 1: Design guide frost protection +5 °C for self-regulating parallel heating cables, type series ELSR-N-10…40-2-BO(T)

Pipe size	Inches:	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	7	8	9	10	12
	DN	15	20	25	32	40	50	65	80	100	125	150	175	200	225	250	300
Insulation thickness (mm)	Ambient temperature, min. (°C)	Heating cable Type ELSR-N-10...40-2-BO(T)															
10	– 15	10	10	20	20	20	30	30	30	40	2x30	2x30	2x40	2x40	2x40	3x30	3x40
	– 20	10	20	20	20	30	30	40	40	2x30	2x30	2x40	2x40	3x30	3x40	3x40	4x40
	– 25	10	20	20	30	30	40	40	2x30	2x30	2x40	2x40	3x40	3x40	3x40	4x40	4x40
20	– 15	10	10	10	10	10	20	20	20	30	30	30	40	40	40	2x30	2x30
	– 20	10	10	10	10	20	20	20	30	30	30	40	2x30	2x30	2x30	2x30	2x40
	– 25	10	10	20	20	30	30	30	30	40	40	2x30	2x30	2x30	2x30	2x40	2x40
30	– 15	10	10	10	10	10	10	10	20	20	20	20	30	30	30	40	40
	– 20	10	10	10	10	10	20	20	20	20	20	20	30	40	40	40	2x30
	– 25	10	10	10	10	20	20	30	20	30	30	30	40	40	2x30	2x30	2x30
40	– 15	10	10	10	10	10	10	10	10	20	20	20	20	20	30	30	30
	– 20	10	10	10	10	10	10	20	20	20	20	20	30	30	30	30	40
	– 25	10	10	10	10	10	20	20	20	20	20	20	30	30	40	40	2x30
50	– 15	10	10	10	10	10	10	10	10	10	20	20	20	20	20	20	30
	– 20	10	10	10	10	10	10	10	10	20	20	20	20	30	30	30	30
	– 25	10	10	10	10	10	10	20	20	20	20	20	30	30	30	30	40
60	– 15	10	10	10	10	10	10	10	10	10	10	20	20	20	20	20	20
	– 20	10	10	10	10	10	10	10	10	20	20	20	20	20	20	30	30
	– 25	10	10	10	10	10	10	10	20	20	20	20	20	30	30	30	30
80	– 15	10	10	10	10	10	10	10	10	10	10	10	20	20	20	20	20
	– 20	10	10	10	10	10	10	10	10	10	10	20	20	20	20	20	20
	– 25	10	10	10	10	10	10	10	10	20	20	20	20	20	20	20	30
100	– 15	10	10	10	10	10	10	10	10	10	10	10	10	10	20	20	20
	– 20	10	10	10	10	10	10	10	10	10	10	10	20	20	20	20	20
	– 25	10	10	10	10	10	10	10	10	10	20	20	20	20	20	20	20

Basis: Thermal conductivity of the insulation 0.04 W/mK; increased factor of safety 20 %

Table 2: Heating cable additions (m) for

DN	15	20	25	32	40	50	65	80	100	125	150	175	200	225	250	300
Pair of flanges	0,2	0,2	0,25	0,3	0,3	0,35	0,4	0,5	0,6	0,7	0,8	0,9	1,0	1,1	1,3	1,5
Flanged fitting	0,4	0,45	0,5	0,55	0,6	0,8	0,9	1,1	1,5	2,0	2,4	2,8	3,3	3,8	4,2	5,0
Pumps	1,5	1,5	2,0	2,0	2,5	2,5	3,0	4,0	5,0	5,0	6,0	6,0	6,5	6,5	7,0	8,0

For non-insulated pipe supports: Heating pipe allowance = **4 x support width**. Per heating pipe connection in the terminal box / thermostat: Heating pipe allowance **approx. 0.5 m**. **Attention:** If there is multiple laying of the heating pipes, the allowances above must be correspondingly multiplied.

Example 1:

Task: Frost protection for a **DN 100, 25 m** long pipeline with **2 pairs of flanges, 1 fitting, 1 pump, 4 supports 0.1 m wide**; at an ambient temperature of **– 25 °C** and with a **50 mm** thick **heat insulation**, 230 V.

Design:	from **table 1**:	Heating cable type ELSR-N-20-BO, single laying		
		Pipeline length: 25 m single laying = m	=	25,0 m
	from **table 2**:	Pair of flanges 2 x 0,6 m	=	1,2 m
		Fitting 1 off x 1,5 m	=	1,5 m
		Pump 1 off x 5,0 m	=	5,0 m
		Pipe support 4 off x 0,1 m x 4	=	1,6 m
		Connection 1 off x 0,5 m	=	0,5 m
			=	34,8 m = order 35 m ELSR-N-20-2-BO

Design guide

Table 3: Heat loss from pipelines in W/m at 10 K temperature difference

Pipe size	Inches: DN	1/2 15	3/4 20	1 25	11/4 32	1 1/2 40	2 50	2 1/2 65	3 80	4 100	5 125	6 150	7 175	8 200	9 225	10 250	12 300
Insulation thickness (mm)	DELTA T																
10	10	4,4	5,2	6,1	7,8	8,7	10,5	12,9	14,8	18,6	22,3	26,6	30,3	34,1	37,8	41,9	49,3
20	10	2,9	3,3	3,7	4,5	5,0	5,9	7,1	8,1	10,0	11,9	14,1	16	17,8	19,7	21,9	25,6
30	10	2,2	2,6	2,9	3,4	3,7	4,2	5,2	5,8	7,1	8,4	9,8	11,1	12,4	13,7	15,1	17,6
40	10	1,9	2,2	2,5	2,8	3,1	3,5	4,2	4,7	5,7	6,6	7,7	8,7	9,6	10,6	11,7	13,6
50	10	1,7	2,0	2,2	2,5	2,7	3,0	3,6	4,0	4,8	5,6	6,4	7,2	8,0	8,8	9,6	11,2
60	10	1,6	1,8	2,0	2,2	2,4	2,7	3,2	3,6	4,2	4,9	5,6	6,2	6,9	7,5	8,2	9,5
80	10	1,4	1,6	1,7	1,9	2,1	2,3	2,7	3,0	3,4	3,9	4,5	5,0	5,5	6,0	6,5	7,5
100	10	1,3	1,4	1,5	1,7	1,8	2,0	2,4	2,6	3,0	3,4	3,8	4,2	4,6	5,1	5,5	6,3
120	10	1,2	1,3	1,4	1,6	1,7	1,9	2,2	2,3	2,7	3,0	3,4	3,7	4,1	4,4	4,8	5,4

Basis: Thermal conductivity of the insulation 0.04 W/mK; increased factor of safety 20 %

If there are other thermal conductivity figures, the values must be multiplied by a corresponding factor.

Example: Thermal conductivity of the insulation 0.045 W/mK $\frac{0{,}045\ \text{W/mK}}{0{,}040\ \text{W/mK}} = 1{,}125$

Example 2:

Task: Temperature maintenance for 15 m **DN 50** pipeline at 20 °C (caustic soda solution) at minimum ambient temperatures of -10 °C (total DELTA-T of 30 K) and a **40 mm** thick **heat insulation**. Installations: 2 pairs of flanges, 2 fittings, 230V.

If the heating is designed using type ELSR-N self-regulating heating cables, please proceed as follows to select the correct nominal output:

Design (from table 3): DELTA-T 10 K heat loss = 3.5 W/m. As total DELTA-T is 30 K (that is to say is 3x higher than DELTA-T in the table), the value found is multiplied by 3: 3.5 W/m x a factor of 3 = 10.5 W/m.

In the temperature output diagram on the ELSR-N data sheet, the intersection of the two lines heating output W/m = 10.5 and temperature +20 °C is between the curves (ELSR-N-10) and (ELSR-N-20). Select the heating cable with the next highest power output (ELSR-N-20). You can now proceed with the heating pipe allowance for the installations as in Example 1.