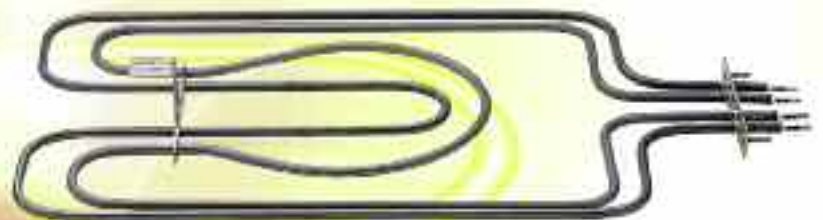
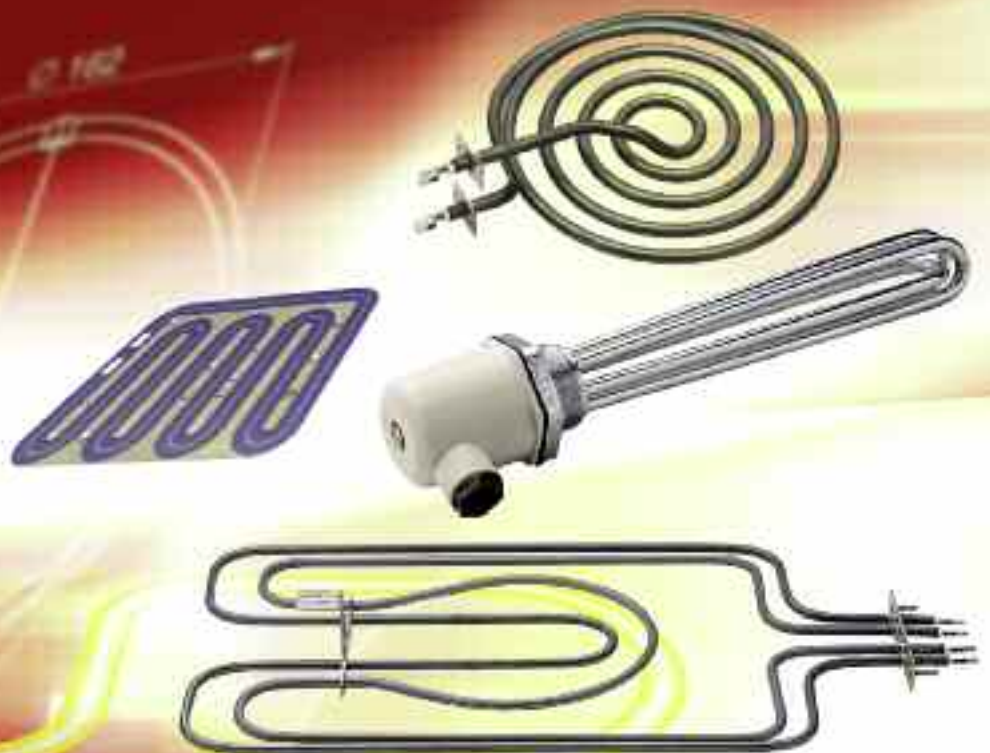




**Backer
Elektro CZ**

ELECTRICAL HEATING ELEMENTS



KEMA CERTIFICATE



Member of NIBE Group, Sweden

Backer Elektro CZ

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FIELD OF APPLICATION OF HEATING ELEMENTS

In comparison with other means of heating, the electrical heating elements have many advantages (lower dimensions, high efficiency, easy controllability and protection, safe handling, easy maintenance and quick exchange, high reliability and long life time) and thus can be considered as a general-purpose heating means for various media and environments, for electrical appliances as well as for parts of machines and devices.

Backer Elektro CZ produces a wide assortment of high quality sheathed tubular heating elements that can be, from the physical point of view, divided into elements intended for heating of gases (air and technical gases), liquids (water, solutions, oils, viscous liquids etc.) and contact heating of solid state materials (e.g. parts of electrical appliances, moulds for plastics, parts of industrial machines and devices, tramway and railway switches etc.).

New in our assortment: Electrical heating elements featuring a waterproof vulcanized rubber sealing covering the connection between the element and the connecting cables. These elements are intended for devices and areas with extremely high humidity, with intensive steam generation or in direct contact with water.

Recently, a special attention is dedicated to thick film heating elements, the most advanced and elegant method of heating in many of the above mentioned applications. Backer Elektro CZ has a wide know how in this field and the company is equipped with an advanced low series manufacturing technology equipment for production of these elements. The company is ready to enlarge the production capacity substantially in case of higher demand for these progressive heating elements.

Individual applications of electrical heating elements are given below at the respective product groups, including typical representatives for a given group. This catalogue is not intended (and it would have been also hardly achievable for practical reasons) to give information on the whole assortment of heating elements within Backer Elektro CZ, as this assortment includes several hundreds of types and models. Instead, the company intends to introduce here its capabilities and potentials built on long term know how and experience, while the specific requirements of a customer will be maximally satisfied after bilateral discussions and consultations of both parties.

For better understanding, we also specify basic technical parameters at the end of the catalogue, the combination of which will result in optimum characteristics of the heating element that will meet the expectations and requirements of the customer and that will serve reliably and satisfactorily. This is the main effort and aim of all employees of Backer Elektro CZ - your partner in electrical heating.



SHEATHED TUBULAR HEATING ELEMENTS – SEMIPRODUCTS



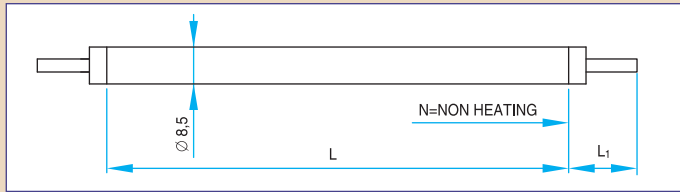
Field of application

- contact heating of plates and boards
- heating of steady and flowing air
- heating of liquids
- defrosting

Type and/or model specification (6 – 8 digit in the order type number) is indicated on the heating element. The heating elements meet the requirements of standard EN 60335-1 – Safety of electrical appliances. Please, observe local regulations for installation and connection to the electric network.

For specific applications of these heating elements, consultation with engineering department of Backer Elektro CZ is highly recommended.

TYPE 5904 heating of air, contact heating



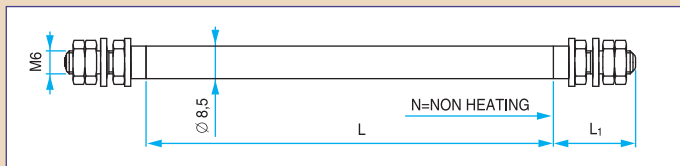
order type number	V	W	L	L ₁	N
590490050	230	1000	410	15	30
590490070	230	500	640	15	50
590490090	230	700	690	20	30
590490100	230	1500	1080	21	50
590490160	230	666	1060	13	75
590490190	230	1333	2060	13	75
590490220	230	1000	510	13	25
590490230	230	1000	595	15	50
590490240	230	1333	2060	25	60
590490250	230	700	2060	25	60
590490260	230	1500	1180	20	50
590490280	230	1200	1275	15	75
590490290	115	700	400	29	30
590490340	230	1000	1000	13	50
590490390	230	1000	1450	15	50
590490460	230	230	970	13	75
590490470	230	2000	2060	13	75
590490480	230	1000	2000	13	150/250
590490490	230	1700	1700	13	60
590490500	400	3000	2280	13	220

Straight sheathed heating elements are equipped with connector pins.

These heating elements are produced in many types that differ in parameters according to the particular application. They can be used, for example, for contact heating of plates, to which they can be either attached or mounted in grooves, as well as for heating of steady or flowing air etc. Under specific conditions, they can be used for heating of liquids, as well.

These elements are manufactured in lengths up to 8300 mm, for voltages 12 to 400 V and with power rating according to the heated environment. The heated environment also specifies the sheath of the heating element that can be made of steel, stainless steel or copper.

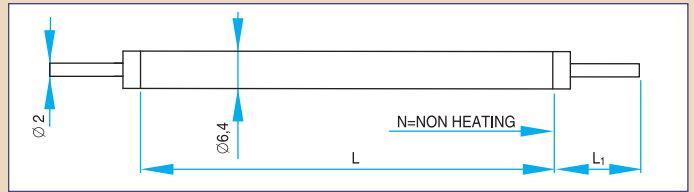
TYPE 4581 heating of air, contact heating



order type number	V	W	L	L ₁	N
458190010	240	1000	2295	25	100
458190150	230	1500	1620	26	70

These elements are manufactured in lengths up to 8300 mm, for voltages 12 to 400 V and power rating according to the heated environment and according to the sheath material (steel, stainless steel or copper).

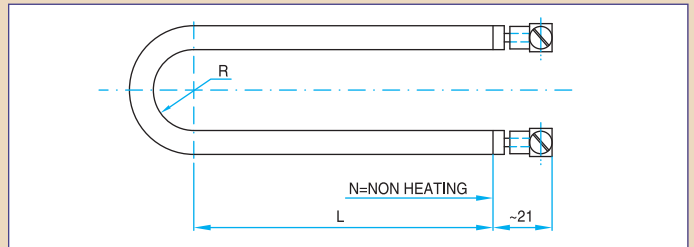
TYPE 4671 heating of air, contact heating



order type number	V	W	L	L ₁	N
467190060	230	1500	600	13	30
467190100	230	666	623 ⁺⁴⁰	13	45
467190160	230	520	560	10	35
467190260	230	1100	1620 ⁺⁶⁰	12	60
467190270	230	1100	1660	12	65
467190300	230	750	2000	8	50
467190320	230	500	1120	13	40
467190330	230	1400	1440	12	65
467190340	230	800	1120	12	55

These elements are manufactured in lengths L = 300 to 2400 mm, for voltages 12 to 400 V and power rating according to the heated environment and according to the sheath material (stainless steel).

TYPE 5982 heating of air, contact heating



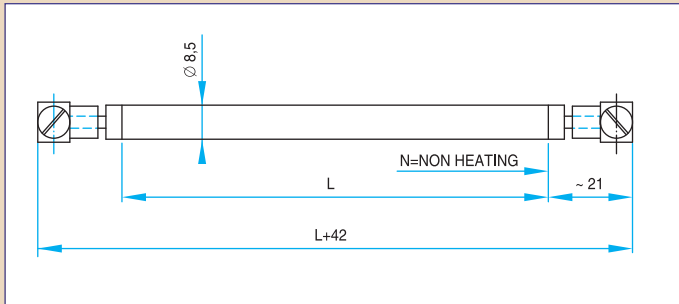
order type number	V	W	L	R	N
598290010	230	500	477	10.5	40
598290030	230	1700	362	14.0	50
598290040	230	800	130	16.5	30
598290060	230	1000	469	16.0	50
598290100	230	500	224	21.5	60
598290180	230	1000	755	12.5	75
598290240	230	1500	597	45	175
598290270	400	2000	795	8	50
598290320	400	5000	1120	8.0	220
598290420	230	1500	1028	10.0	225
598290480	230	2000	968	35.0	180
598290540	230	1200	630	15.0	50

These heating elements are U-shaped, being equipped with screw terminals with screws M4 or with connector pins.

These heating elements are produced in many types that differ in parameters according to the particular application. They can be used, for example, for contact heating of plates, to which they can be either attached or mounted in grooves, as well as for heating of steady or flowing air etc. Under specific conditions, they can be used for heating of liquids, as well.

These elements are manufactured in lengths from 130 to 1600 mm, for voltages 12 to 400 V and with power rating according to the heated environment. The heated environment also specifies the sheath of the heating element that can be made of steel, stainless steel or copper.

TYPE 5704 heating of air, contact heating



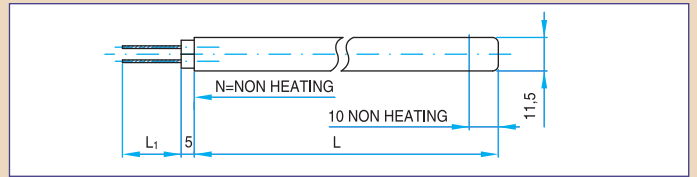
order type number	V	W	L	N
570490010	230	666	610	55
570490030	230	1500	1350	175
570490060	230	500	690	30
570490070	230	2000	2070	220
570490090	230	1500	1080	50
570490100	230	1500	1470	50
570490110	230	1000	2280	180
570490120	230	1500	1350	175
570490130	230	800	325	29
570490140	230	700	690	30
570490160	230	1333	2060	75
570490170	230	2000	2060	75
570490210	400	2500	1250	70
570490230	230	1000	1560	75
570490240	230	500	1000	40
570490270	230	1000	1000	50
570490280	230	1250	1080	45
570490290	230	500	528	60
570490310	230	750	2550	80
570490400	230	1000	850	30
570490450	230	1000	730	50
570490630	230	1500	1350	50
570490640	230	1500	2160	80
570490660	230	630	800	50
570490790	230	600	2000	95
570490820	230	900	1030	60
570490830	400	2000	2070	100
570490910	230	700	740	50
570490920	230	1180	900	50
570491010	400	2000	2060	75
570491020	230	750	690	60

Straight heating elements with a metal sheath are equipped with screw terminals with screws M4.

These heating elements are produced in many types that differ in parameters according to the particular application. They can be used, for example, for contact heating of plates, to which they can be either attached or mounted in grooves, as well as for heating of steady or flowing air etc. Under specific conditions, they can be used for heating of liquids, as well.

These elements are manufactured in lengths up to 8300 mm, for voltages 12 to 400 V and with power rating according to the heated environment. The heated environment also specifies the sheath of the heating element that can be made of steel, stainless steel or copper.

TYPE 5567 heating of air, contact heating



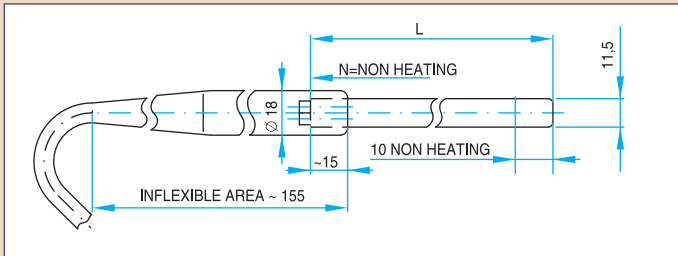
order type number	V	W	L	N	L ₁
556790410	230	245	300	30	150
556790440	230	250	400	90	100
556790770	230	400	450	40	100
556791020	230	500	1180	45	200
556791100	230	600	530	30	100
556791150	230	600	1280	50	100
556791300	230	750	1500	90	100
556791370	230	800	1090	50	150
556791510	230	1000	1500	50	150
556791690	230	1200	1180	140	100
556791840	400	1300	3450	90	100
556792330	230	1000	1750	185	110
556792460	230	400	650	150	45
556793140	230	400	950	40	500
556793150	230	500	1450	140	500
556793160	115	200	270	30	300
556793370	400	1000	2430	150	95

Straight heating elements with a metal sheath are equipped with connecting stranded wires.

These heating elements are produced in many types that differ in parameters according to the particular application. They can be used, for example, for contact heating of plates, to which they can be either attached or mounted in grooves, as well as for heating of steady or flowing air etc. Under specific conditions, they can be used for heating of liquids, as well.

These elements are manufactured in lengths from 300 to 3300 mm, for voltages 12 to 400 V and with power rating according to the heated environment. The heated environment also specifies the sheath of the heating element that can be made of steel, stainless steel or copper.

TYPE 5108 heating of air, contact heating, defrosting

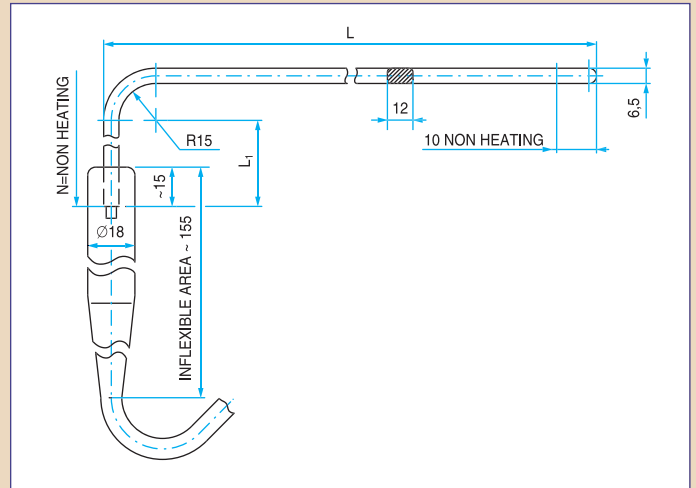


order type number	V	W	L	N	cable
510890120	230	155	600	100	CGLG-3x0.75x1000
510890350	230	300	1000	140	CGLG-3x0.75x3000
510891490	230	300	1000	140	CGSG-3x1.00x1500
510891640	230	250	1000	190	CGLG-3x0.75x2000
510891730	230	200	600	100	CGSG-3x1.00x2500

These heating units consist of a heating element and a connection cable, featuring a waterproof connection. They are produced in many types that differ in parameters according to the particular application. They can be used, for example, for contact heating of plates, to which they can be either attached or mounted in grooves, as well as for heating of steady or flowing air and for heating of liquids. They can be used for defrosting, as well.

These elements are manufactured in lengths from 300 to 3300 mm, for voltages 12 to 400 V and with power rating according to the heated environment. The heated environment also specifies the sheath of the heating element that can be made of steel, stainless steel or copper.

TYPE 5342 heating of air, contact heating, defrosting



order type number	V	W	L	L ₁	N	cable
534290430	230	500	2015	40	105	FLEXO-3x0.75x2200
534290770	230	300	675	65	65	CGSG-3x1x800
534290930	230	800	850	115	150	FLEXO-3x1x1500
534291060	230	250	1140	34	140	CSSS-3x1x700 without vulcanized rubber head
534291070	230	150	1140	34	140	CSSS-3x1x700 without vulcanized rubber head

These heating units consist of a heating element and a connection cable, featuring a waterproof connection. They are produced in many types that differ in parameters according to the particular application. They can be used, for example, for contact heating of plates, to which they can be either attached or mounted in grooves, as well as for heating of steady or flowing air and for heating of liquids. They can be used for defrosting, as well.

These elements are manufactured in lengths from 300 to 3300 mm, for voltages 12 to 400 V and with power rating according to the heated environment. The heated environment also specifies the sheath of the heating element that can be made of steel, stainless steel or copper.

ELEMENTS FOR HEATING OF LIQUIDS



Field of application

- heating of water, heating of swimming pools
- heating of galvanic and chemical bathes, solutions etc.
- heating of oils and various liquids
- heating of melts of low melting temperature metals, salts, honey, paraffin, tar etc.

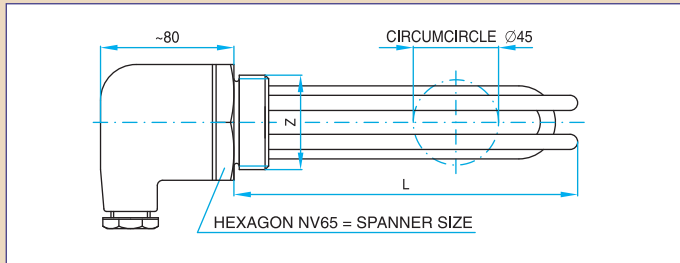
Application examples

- electrical household appliances - storage water heaters, washing machines, dishwashers, electrical boilers, oil radiators, hot water radiators, water boiling kettles, coffee makers, deep fat fryers
- food industry and gastronomy - water heaters, heating of cooking utensils, steam chambers, deep fat fryers
- transport - heating of cooling liquids and gearbox oils in motor vehicles in winter
- other industrial applications - heating of chemical bathes, galvanic bathes, solutions, high viscosity liquids, solid petroleum products etc.

Type and/or model specification (6 – 8 digit in the order type number) is indicated on the heating element. The heating elements meet the requirements of standard EN 60335-1 – Safety of electrical appliances. Please, observe local regulations for installation and connection to the electric network.

For specific applications of these heating elements, consultation with engineering department of Backer Elektro CZ is highly recommended.

TYPE 4206 heating of water and similar liquids



order type number	V	W	L
420690210	230	1500	270
420690220	230	2000	270
420690230	230	2400	290
420690240	230	3000	240
420690250	230	4000	315
420690260	230	4500	340
420690280	230	6000	440
420690500	400	7500	610

The sixth digit of the order type number indicates the type of thread, material of the flange and material of the sheath of heating branches (see table below)

number	thread Z	flange material	sheath material of heating branches
0	M48x2	brass	Cu-nickel plated
3	G 1 1/2"	brass	Cu-nickel plated
4	M48x2	stainless steel	stainless steel
5	G 1 1/2"	brass	Cu-pickled
7	M48x2	brass	Cu-pickled

Order example 420693210:

- electrical parameters and length according to the above mentioned table
- flange made of brass, with thread G 1 1/2"
- sheath material of heating branches - nickel plated copper

The heating element consists of three U-shaped heating branches, which are soldered into the head by means of an Ag solder.

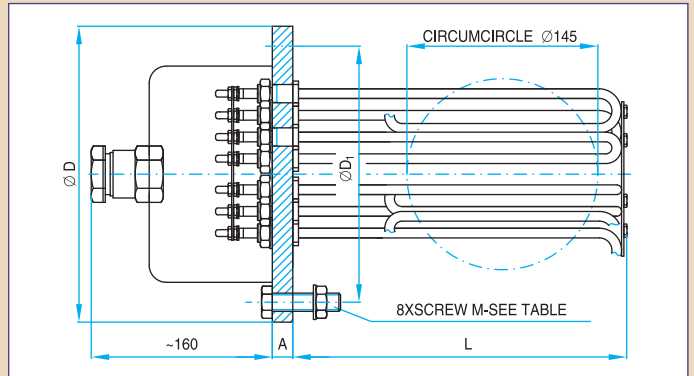
Each of the branches features one third of the total power. The head is equipped with a cover with gland AP 16/12, thus providing protection IP 54. Heating elements without cover are available on request. The head is equipped with a hexagon NV65 (spanner size) and a mounting thread M 48x2 or G 1 1/2" for easy installation. The heating elements are manufactured with brass or stainless steel head. The sheath of the heating branches is made of pickled copper, nickel plated copper or stainless steel.

The heating element is intended for direct heating of water and similar liquids, with an operation pressure up to 1.0 MPa. It must be permanently immersed up to the head during operation. In case of excessive deposition of lime scale (incrustations) on the sheath during operation, it is highly recommended to provide water treatment – this will contribute to a longer lifetime of the element.

Connecting options:

Each branch is designed for voltage 230 V, at the model with power of 7500 W for voltage 400 V. Models with 230 V branches can be connected on single phase or on 3x400 V Δ . Model with 400 V branches can be connected on 3x400 V Δ .

TYPE 4407 heating of water and similar liquids



order type number	V	W	L	D	D _i	A	Jt (MPa)	screw
440790010	Δ 3x400	15000	505	260	225	20	0.6	M 16x60
440790020	Δ 3x400	18000	575	260	225	20	0.6	M 16x60
440790050	Δ 3x400	24000	735	260	225	20	0.6	M 16x60
440790060	Δ 3x400	30000	870	260	225	20	0.6	M 16x60
440790110	Δ 3x500	15000	505	260	225	20	0.6	M 16x60
440790160	Δ 3x500	30000	870	260	225	20	0.6	M 16x60
440790210	Δ 3x400	15000	505	280	240	24	1.0	M 20x80
440790220	Δ 3x400	18000	575	280	240	24	1.0	M 20x80
440790250	Δ 3x400	24000	735	280	240	24	1.0	M 20x80
440790260	Δ 3x400	30000	870	280	240	24	1.0	M 20x80
440790310	Δ 3x500	15000	505	280	240	24	1.0	M 20x80
440790360	Δ 3x500	30000	870	280	240	24	1.0	M 20x80

The sixth digit of the ordering type number indicates the material of the sheath of heating branches:

- 0 – copper
- 3 – stainless steel

The heating element consists of six heating branches, which are mounted into a nickel-plated steel flange with eight fixing screws on a circumscribed circle D_i.

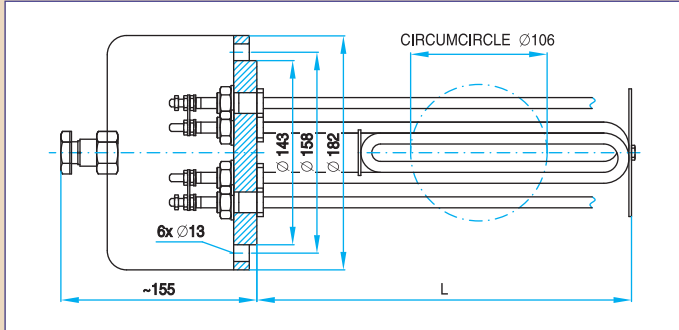
The flange with connectors is equipped with a cover with gland GP 36/28, thus providing protection IP 42. The outer surface of the cover is protected by fire lacquer.

The heating element is intended for direct heating of water and similar liquids.

It can be used for heating of water in storage heaters, boilers etc., with an operation pressure up to 0.6 or 1.0 MPa (refer to table). The heating elements must be permanently immersed in the liquid up to the flange during operation. For heating elements type 4407 models 005, 006, 016, 025, 026, 036 and models 305, 306, 316, 325, 326, 336 a support is recommended, due to their length. For this purpose, an opening of \varnothing 8.5 mm is provided at the centre of the rear sheet.

In case of excessive deposition of lime scale (incrustations) on the sheath during operation, it is highly recommended to provide water treatment – this will contribute to a longer lifetime of the element.

TYPE 4034 heating of water and similar liquids



order type number - sheath material copper				
without cover	with cover	V	W	L
403490010	403491010	Δ 3x400	7500	500
403490020	403491020	Δ 3x400	9000	500
403490050	403491050	Δ 3x400	12000	700
403490070	403491070	Δ 3x400	15000	800

order type number - sheath material stainless steel				
without cover	with cover	V	W	L
403492010	403493010	Δ 3x400	7500	500
403492020	403493020	Δ 3x400	9000	500
403492050	403493050	Δ 3x400	12000	700
403492070	403493070	Δ 3x400	15000	800

The heating element consists of three heating branches, which are mounted into a nickel-plated steel flange with six fixing openings $\varnothing 13$ mm on a circumscribed circle $\varnothing 158$ mm.

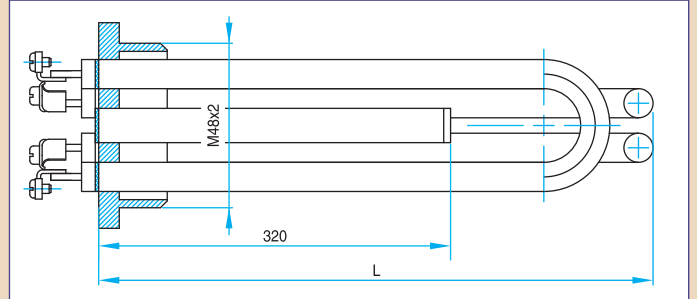
The flange at models 101 – 107 and 301 – 307 is equipped with a cover with gland GP 21/18, thus providing protection IP 42. The outer surface of the cover is protected by fire lacquer.

The heating element is intended for direct heating of water and similar liquids. The heating element must be permanently immersed in the liquid up to the flange during operation. Operation pressure up to 1.0 MPa.

For heating elements type 4034 models 007, 107, 207 and 307, a support is recommended, due to their length. For this purpose, an opening of $\varnothing 8.5$ is provided at the centre of the rear sheet.

In case of excessive deposition of lime scale (incrustations) on the sheath during operation, it is highly recommended to provide water treatment – this will contribute to a longer lifetime of the element.

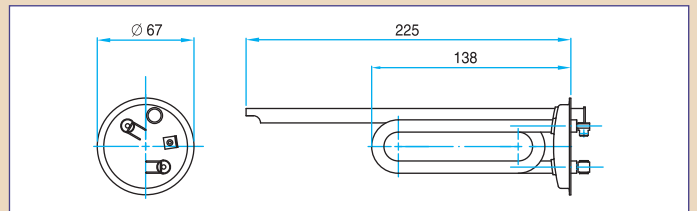
TYPE 6278 heating of water in swimming pools (chlorinated water)



order type number			
	V	W	L
627892000	3x400	6000	345
627892010	3x400	9000	435
627892020	3x400	12000	435
627892030	3x400	15000	548
627892040	3x400	18000	548
627892050	3x400	21000	605
627892060	3x230/400	6000	345
627892070	3x230/400	8000	435
627892080	3x230/400	10000	435
627892090	3x230/400	12000	435
627892100	3x230/400	14000	548
627892110	3x230/400	4000	345

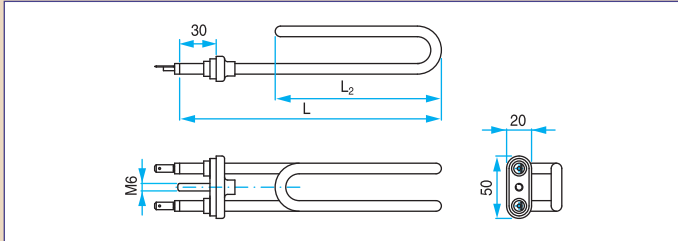
This is a special heating element that requires intensive cooling with high water flow.

TYPE 6306 heating of water in storage water heaters



order type number		
	V	W
630690000	230	2000

TYPE 6124 for storage water heaters

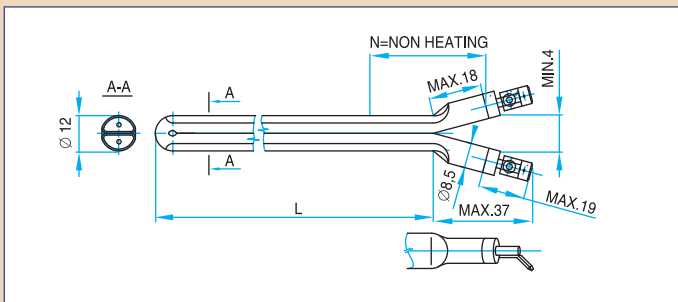


order type number	V	W	L	L ₂
612490000	230	1350	230	146
612490010	230	1600	330	236
612490020	230	2400	400	313
612490030	230	1000	205	121
612490040	230	850	170	94
612490050	230	1750	290	213
612490060	230	2000	325	208

The sixth digit of the ordering type number indicates the surface finish of the heating element:

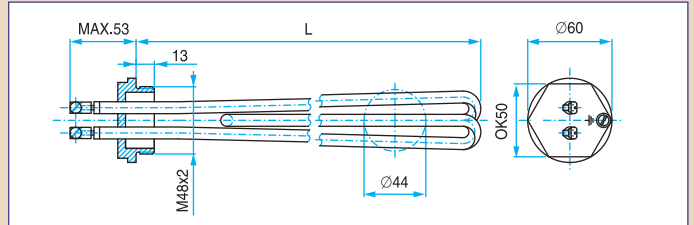
- 0 – without surface finish
- 1 – nickel coated

TYPE 6353 heating of water in storage water heaters



order type number	V	W	L	N
635390000	230	1000	400	40
635390010	230	800	320	50
635390020	230	900	390	50
635390030	230	1200	390	75
635390040	230	700	320	75
635390050	230	600	260	50
635390060	230	1500	520	50

TYPE 4633 heating of water, storage water heaters



order type number	V	W	L
463390000	230	2400	408
463390010	230	1600	340
463390020	230	1000	230

The sixth digit of the ordering type number indicates the surface finish of the heating element:

- 0 – without surface finish
- 1 – nickel coated

The heating element consists of one shaped heating branch, which is mounted into a brass head. The heating branch is equipped with connecting terminals with screws M4 for cable connection. The head is equipped with a hexagon OK 50 for easy installation.

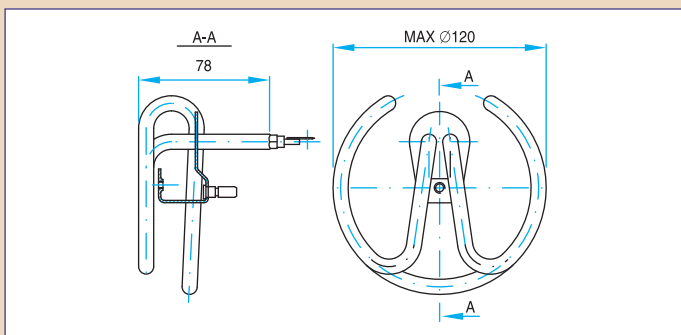
The heating element is intended for direct heating of water and similar liquids (e.g. for storage water heaters type OUV III/160L and OUV III/200L).

The heating element must be permanently immersed up to the head during operation.

Operation pressure up to 0.6 MPa.

In case of excessive deposition of lime scale (incrustations) on the sheath during operation, it is highly recommended to provide water treatment – this will contribute to a longer lifetime of the element.

TYPE 4032 heating of water in washing machines

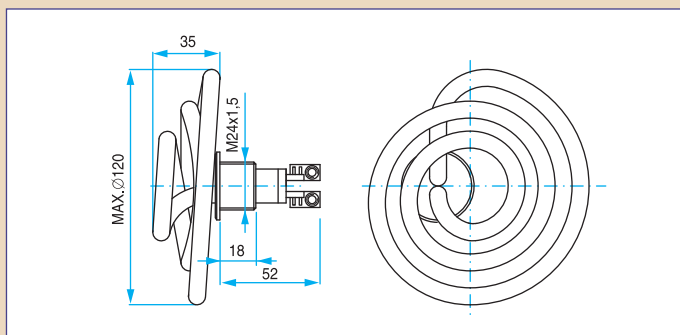


order type number		
	V	W
403290110	230	1700
403290120	230	2000

The heating element consists of a stainless steel heating branch, which is fixed to a holder. It is equipped with connecting flat terminals width 6.3 mm.

The heating element is intended for direct heating of water in washing machines. It is installed by means of a holder and a special rubber sealing. It must be permanently immersed during operation.

TYPE 4032/004 heating of water in washing machines

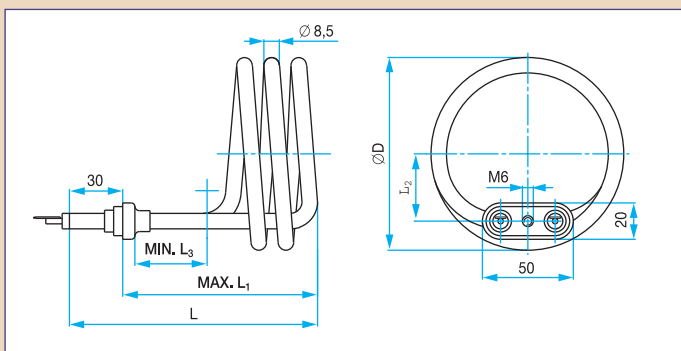


order type number		
	V	W
403290040	230	1700

The heating element consists of a copper heating branch, which is mounted into a flange. The flange has a thread M 24x1.5. The element is equipped with connecting terminals with screws M4.

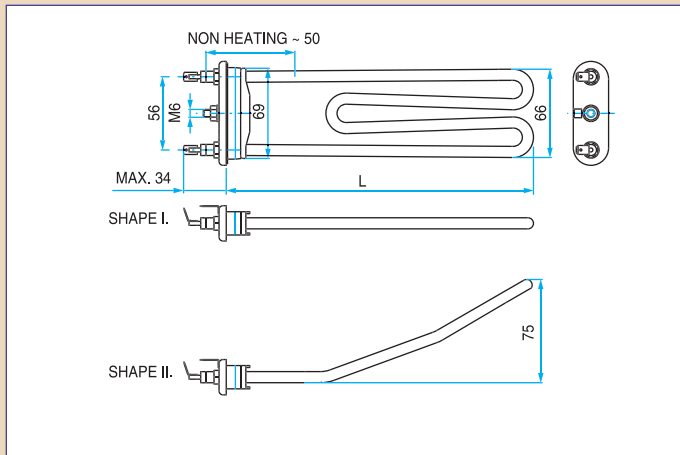
The heating element is intended for direct heating of water in washing machines. It can be used for heating of water or similar liquids in other appliances as well, provided that these liquids do not adversely influence the sheath surface. It must be permanently immersed up to the flange bearing surface during operation.

TYPE 6126 heating of water in storage water heaters



order type number							
	V	W	D	L	L ₁	L ₂	L ₃
612690010	230	2000	106	132	100	35	40
612690020	230	2000	106	192	160	30	98

TYPE 6015 heating of water in automatic washing machines

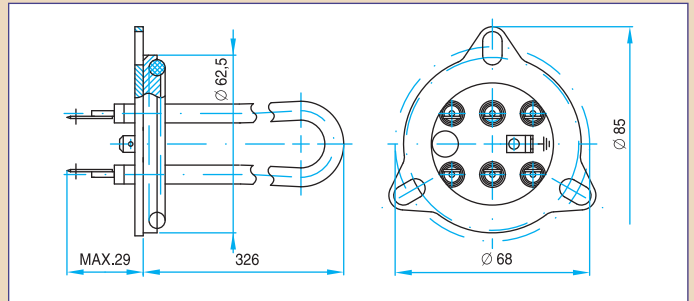


order type number	V	W	L	tvar
601590010	230	2000	225	I.
601590020	400	3000	370	I.
601590030	230	1950	205	II.
601590040	230	1950	220	I.
601590050	400	3000	345	I. (Cu - Ni)
601590060	230	1750	190	I.
601590070	240	2000	225	I.
601590080	400	4000	370	I.
601590090	230	2800	300	I.
601590100	230	2500	180	I.
601590110	230	3000	180	I.

The heating element consists of a heating branch, which is inserted into a support with a bolt, a rubber sealing and a flange. It is equipped with connecting flat terminals width 6.3 mm.

The heating element is intended for direct heating of water in automatic washing machines. It is installed into an oval opening. A proper sealing is achieved by tightening the nut M6. The heating element must be permanently immersed during operation up to the rubber sealing.

TYPE 4520 water heating in high capacity dishwashers

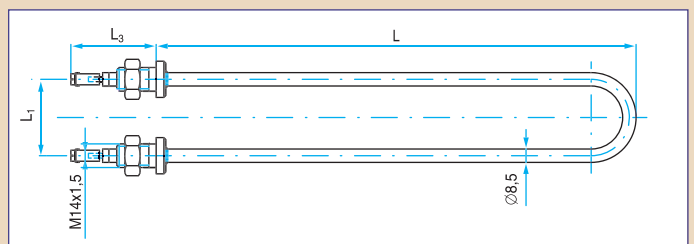


order type number	V	W
452090000	230	3x2000
452090010	230	3x1333
452090090	∧ 3x230/400	6000
452090100	∧ 3x230/400	4000

The heating element consists of three heating branches, which are fixed to a flange. It is equipped with flat terminals. The delivery includes a sealing ring and a support.

The heating element is intended for direct heating in high capacity dishwashers or similar. It must be permanently immersed into the liquid up to the flange during operation. Fixing to the appliance is performed by means of bolts or screws.

TYPE 4786 water heating, air heating

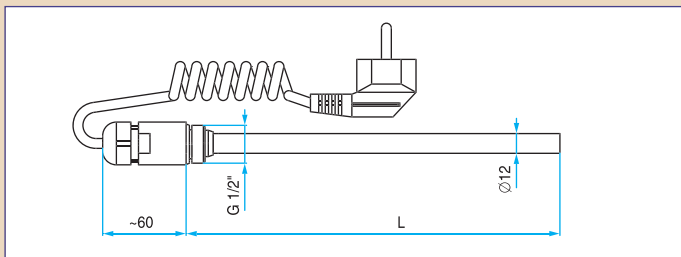


order type number	V	W	L	L ₁	L ₃
478690000	400	2 000	1685 ⁴⁵	28.0	53
478690010	230	1 750	365	34.5	53
478690020	230	2 500	461	34.5	53
478690040	400	3 000	880	30.0	50
478690060	230	1 700	730	38.0	50

The heating element consists of a heating branch and two fixing flanges with nuts. It is equipped with screw terminals with M4 screws. The sheath is made of stainless steel.

Models 001 to 006 are intended for water heating. The entire heating element must be permanently immersed in the liquid up to the flange seating face during operation. Model 000 is intended for air heating.

TYPE 6248 part of tubular bathroom heaters - dryers, also applicable as an auxiliary heat source in hot water radiators



order type number	V	W	L
624893010	230	300	390
624893020	230	400	440
624893030	230	500	540
624893040	230	600	590
624893050	230	700	690
624893060	230	800	740
624893070	230	900	840
624893080	230	1000	890
624893090	230	1200	1050

The sixth digit of the order type number indicates the type of the temperature limiter:

- 3 – temperature limiter 95 °C
- 4 – temperature limiter 70 °C

TYPE TH-810T electronic temperature control



- intended for electrical tubular bathroom heaters
- on/off switching according to room temperature with accuracy ± 1 °C
- range +5 °C to +30 °C
- optional cooling/heating mode
- max current 16 A (3500 W)
- stand-by mode max 100 hours
- displays set and current room temperature
- no time programming available
- degree of protection IP 20

T - shaped fitting for installation of the heating element to the radiator



order type number	thread
624800080	G 1/2"

T-shaped fitting is an optional part that must be ordered separately.

Heating element type 6248 is intended for heating of water in radiators for heating of rooms. It is suitable for heating of water in tubular heaters, especially in bathrooms, that can be used for drying of towels or other textiles as well. They can also be used for heating of water in stand-alone radiators that are not connected to the central heating. Moreover, they can be used as an auxiliary heating source in radiators of central heating, especially in that period when it is not effective to heat up the whole building with a central heating.

The heating element consists of a sheath made of high quality stainless steel, a flange with a thread G 1/2" and with an O-ring sealing, and a flexible cord with a plug or with a space thermostat.

The heating element is equipped with Y-type cord connection, so that in case of damage the cord can be replaced.

The heating element is designed as a Class I appliance, degree of protection IP44.

Is it equipped with a self-resetting temperature limiter (70 °C or 95 °C) that assures safety in case of failure. The temperature limiter features long lifetime (up to 10 000 cycles).

The element should be mounted either in a vertical position with the connecting flange always oriented downwards, or in a horizontal position (the heating element must be always in the bottom part of the radiator).

The electric network installation must meet the local requirements and regulations and should be installed by qualified personnel only. For installation of the heating element, please, refer to safety standards for household and similar electrical applications EN 60335-1 and EN 33 2000-7-701.

The elements meet the requirements for installation in zone 2 and 3 according to EN 33 2000-7-701.

Application examples

1. For tubular bathroom heaters.

Power of the electrical heating element must be in accordance with the power of the tubular radiator heater, as specified by the manufacturer (it is not allowed to install a higher power than specified).

- a) Combined performance

The input valve must be closed during operation. The heating element should be installed by means of the T-shaped fitting, through which it is connected to the tubular radiator heater and to the central heating system. The heating element does not obstruct the normal operation of the hot water heating during the ordinary heating period.

- b) Stand-alone operation

The heating radiator should be filled with an antifreeze liquid up to 95% of its volume. This is important due to thermal expansion of the mixture during operation.

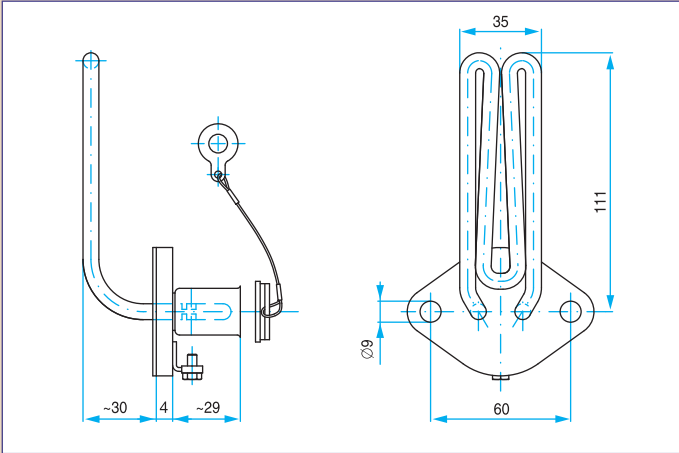
2. For central heating radiators.

The heating element should be mounted so that it replaces the bottom plug of the radiator. In case that the radiator is not fitted with a G 1/2" plug, a reducing adapter G 1" or G 1 1/4" should be used.

The upper control valve of the electrical central heating radiator should be closed during operation. In case that a lower control valve is used as well, it should be open. Venting of the system should be checked and performed regularly. The heating element does not obstruct the normal operation of the hot water heating during the ordinary heating period.

Please, refer to the attached instruction manual for correct installation into the radiator.

TYPE 4098 heating of cooling liquid in motors of tractors

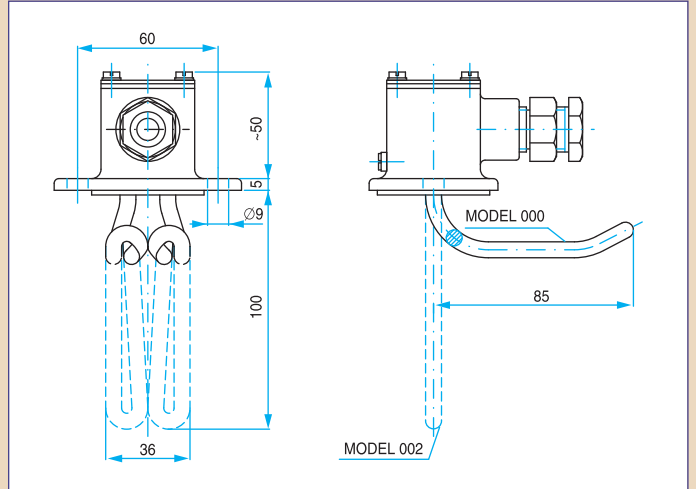


order type number	V	W
409890010	230	1000

The appliance consists of a heating element that is fixed to a flange. The element is equipped with terminal pins that are covered with a protective sleeve and a lid. The electrical input is adapted to an appliance coupler type 5553-2206 that is (as well as the cover and the flange sealing) a part of the delivery.

The heating element is intended for heating of the cooling liquid in motors of tractors Zetor type UR II, for facilitating the start in the winter period, at temperatures below $-10\text{ }^{\circ}\text{C}$. It is intended for Zetor 8011; 10011; 12011; 16045 and other models. Time required for heating up the cooling liquid from $-5\text{ }^{\circ}\text{C}$ to the optimum temperature $+40\text{ }^{\circ}\text{C}$ is approx. 1 hour. Please, refer to the attached instruction manual for installation.

TYPE 4826 heating of cooling liquid in motors of lorries



order type number	V	W
482690000	230	1000
482690020	230	1000

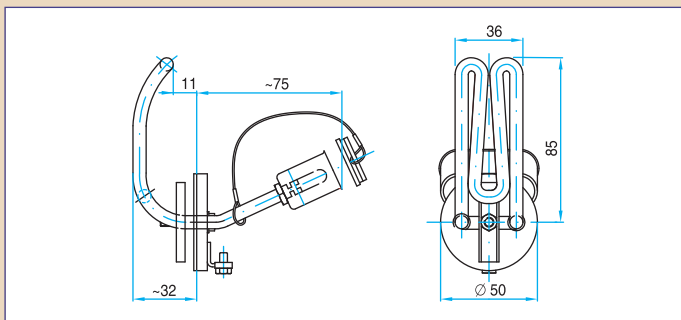
The appliance consists of a heating element that is fixed to a head made of steel and cast iron, covering the terminals of the heating element. The head is equipped with a double cable gland AP 16x12 and AP 13.5x12 and with a lid that protects the head against splashing water.

The heating element is intended for heating of the cooling liquid in motors of buses and industrial vehicles with motors series M 1.2, for facilitating the start in the winter period, at temperatures below $-10\text{ }^{\circ}\text{C}$. It is intended for motors Liaz M, MS 630; M, MS 634; M, MS 635; M, MS 636; M, MS 637; M, MS 638; M, MS 640; M, MS 640F; ML 634.

The individual models of the heating element should be used as follows:
482690000 – for motors produced after 1988 (riser on the side of the motor block)
482690020 – universal for all motors (rear lid of the cylinder head).

Time required for heating up the cooling liquid from $-5\text{ }^{\circ}\text{C}$ to the optimum temperature $+40\text{ }^{\circ}\text{C}$ is approx. 1 hour. Please, refer to the attached instruction manual for installation.

TYPE 4619 heating of cooling liquid in motors of tractors and lorries

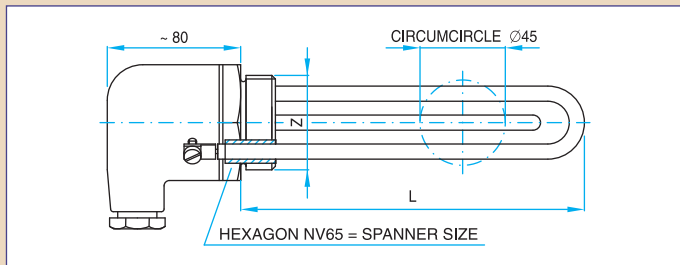


order type number	V	W
461990020	230	1000

The appliance consists of a heating element that is fixed to a flange. The element is equipped with terminal pins that are covered with a protective sleeve and a lid. The electrical input is adapted to an appliance coupler type 5553-2206 that is (as well as the cover and the sealing) a part of the delivery.

The heating element is intended for heating of the cooling liquid in motors of tractors type Zetor series I (UR 1), for facilitating the start in the winter period, at temperatures below -10°C . It is intended for Zetor 5011; 5911; 6011; 6911; 7011 and other models. The element can be further used for motors Liaz M 630; M 634; M 635; M 636; M 637; M 638; M 640, provided that the motors are not placed below the bus floor. Time required for heating up the cooling liquid from -5°C to the optimum temperature $+40^{\circ}\text{C}$ is approx. 1 hour. Please, refer to the attached instruction manual for installation.

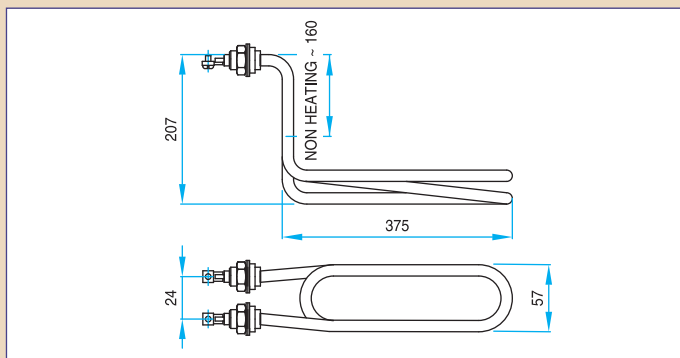
TYPE 6262 heating of alkaline and acid solutions



order type number		V	W	L
with cover	without cover			
626290010	626290210	230	1500	270
626290020	626290220	230	2000	270
626290030	626290230	230	2400	290
626290040	626290240	230	3000	240
626290050	626290250	230	4000	315
626290060	626290260	230	4500	340
626290070	626290270	230	6000	440
626290080	626290280	400	7500	610

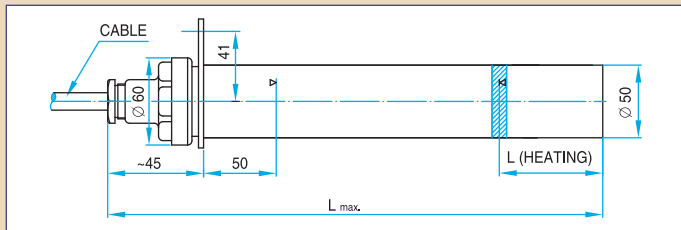
The sixth digit of the order type number indicates the type of thread:
 0 – thread M 48x2
 1 – G 1 1/2"

TYPE 4976 heating of oil in deep fat fryers



order type number	V	W
497690000	230	2000

TYPE 4153 indirect heating of bathes, solutions and liquids



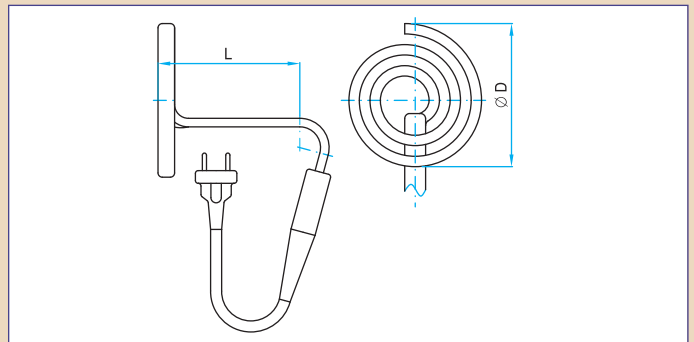
order type number	V	W	L _{max}	L	W/cm ²
material - nickel plated steel					
415395030	↖ 3x400	1200	645	400	2.0
415395040	↖ 3x400	1500	645	400	2.5
415395060	↖ 3x400	2000	845	600	2.2
415395070	↖ 3x400	3000	845	600	3.3
415395090	↖ 3x400	3500	1315	1070	2.2
415395100	↖ 3x400	6000	1315	1070	3.8
material - stainless steel 1.4571					
415395130	↖ 3x400	1200	645	400	2.0
415395140	↖ 3x400	1500	645	400	2.5
415395160	↖ 3x400	2000	845	600	2.2
415395170	↖ 3x400	3000	845	600	3.3
415395190	↖ 3x400	3500	1315	1070	2.2
415395200	↖ 3x400	6000	1315	1070	3.8
material - titanium					
415395230	↖ 3x400	1200	645	400	2.0
415395240	↖ 3x400	1500	645	400	2.5
415395260	↖ 3x400	2000	845	600	2.2
415395270	↖ 3x400	3000	845	600	3.3
415395290	↖ 3x400	3500	1315	1070	2.2
415395300	↖ 3x400	6000	1315	1070	3.8
material - stainless steel. Teflon coated					
415395330	↖ 3x400	800	645	400	1.4
415395340	↖ 3x400	1200	645	400	2.0
415395360	↖ 3x400	1200	845	600	1.4
415395370	↖ 3x400	2000	845	600	2.2
415395390	↖ 3x400	2400	1315	1070	1.5
415395400	↖ 3x400	3500	1315	1070	2.2

cable 4Bx4x7000 at all models

The heating element consists of a heating insert, a protective tube, a lid and a cable. The lid is equipped with a gland screw with P 16 thread, featuring protection IP 54. The heating insert is made of stainless steel tubes. The protective tubes can be made of nickel plated steel, stainless steel, titanium or Teflon coated stainless steel. The lid is made of a material that is resistant to all galvanizing bathes. The appliance is fitted with a cable CYSY 4Bx4 of 7 000 mm length. The heating element is equipped with a holder for easy hanging on the tank.

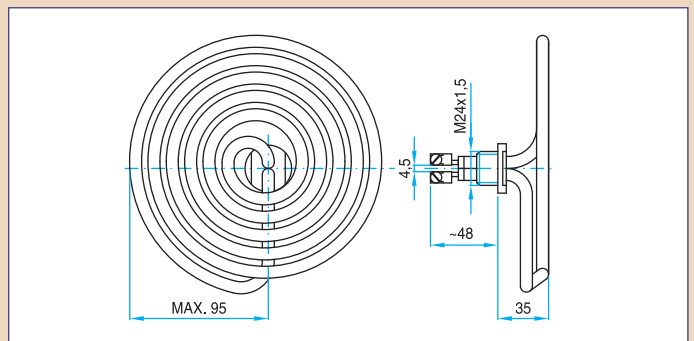
These heating elements are intended for heating of bathes and liquids up to maximum temperature of 90 °C. The sheath material should be in accordance with the bath composition. The heating elements should be immersed up to maximum 5 cm below the holder and not less than to the immersion marking.

TYPE 5230 heating of water, viscous liquids, honey etc.



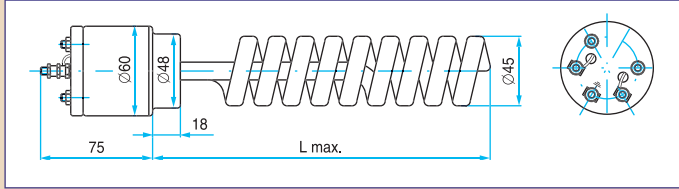
order type number	V	W	L	D
523090010	230	2000	300	130
523090040	230	1000	300	130
523090070	230	50	620	215
523090090	230	50	620	170

TYPE 4624 for steam sterilizers



order type number	V	W
462490000	400	3000
462490010	230	3000

TYPE 4344 for indirect heating of water and similar liquids



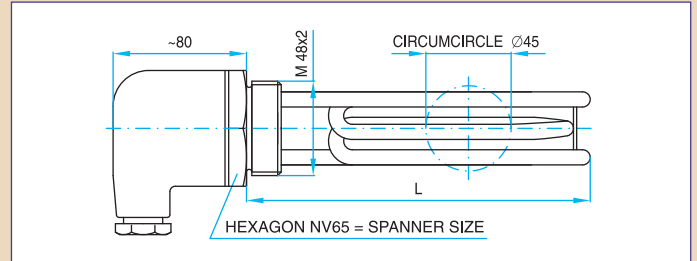
order type number	V	W	L _{max}	W/cm ²
434490010	230	500	250	1.3
434490020	230	750	320	1.4
434490030	230	1000	380	1.4
434490040	230	1200	400	1.5
434490050	230	1500	450	1.6
434490060	230	1750	550	1.4
434490070	230	2000	700	1.4
434490080	230	2250	700	1.4
434490110	400	500	250	1.3
434490120	400	750	320	1.4
434490130	400	1000	380	1.4
434490140	400	1200	400	1.5
434490150	400	1500	450	1.6
434490160	400	1750	550	1.4
434490170	400	2000	700	1.4
434490180	400	2250	700	1.4
434490190	400	2500	800	1.4

The heating element consists of steel heating branches that are fixed into a steel head. The head is fitted with a terminal block with bolts (2 + 1 protective). The terminal box is not covered. Fixing of the heating element is performed by means of a set-screw. The sheath surface is protected with a water-based paint or a silicone lacquer.

These heating elements are intended for indirect heating of water or similar liquids. The heating element must be inserted into a tube during operation and must not come into contact with the heated liquid.

These elements can substitute ceramic heating elements in storage water heaters. Maximum allowed surface temperature of the heating element sheath is 400 °C.

TYPE 4409 heating of various oils



order type number	V	W	L	W/cm ²
440990150	230	500	300	1.0
440990160	230	750	450	1.0
440990170	230	1000	580	0.8
440990180	230	1250	680	0.9
440990190 *	230	2250	980	1.5
440990200	Δ 400	1800	820	2.1
440990210	250	500	300	1.0
440990220	250	750	450	1.0
440990230	250	1000	580	0.8
440990240	250	1250	680	0.9

* three phase star-connection possible

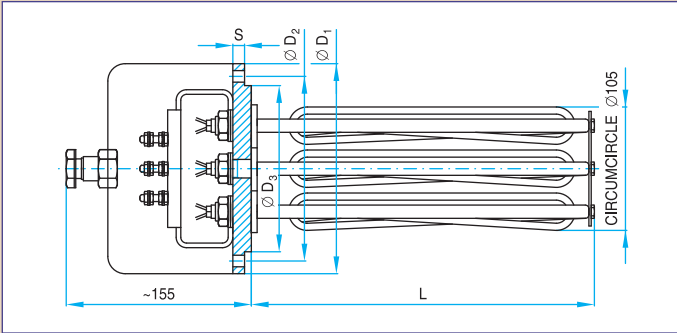
The heating element consists of a steel heating branch, which is fixed to a steel head. The head is covered by a lid with gland AP 16/12, thus providing protection IP 54.

The head is equipped with a hexagon NV65 for easy installation.

The element is protected by a preservative oil or Lukoil H for protection during transport and storage.

The heating element is intended for heating of oils that do not adversely influence the sheath surface. Its surface temperature is designed so as to prevent oil carbonisation. The heating element must be permanently immersed into the liquid up to the head during operation. The temperature and quantity of oil into which the element is immersed must be such that the element temperature does not exceed the value of oil inflammation point minus 10 °C. When being removed from oil, the heating element must be turned off and cooled down. The sheath surface status must be checked for corrosion within half year period minimum. Maximum operational pressure is 0.6 MPa.

TYPE 4411 heating of various oils



The heating element consists of six steel heating branches, which are mounted into a nickel-plated steel flange with fixing openings and a terminal plate. Number and diameter of the openings corresponds to the number and diameter of the fixing screws – see table. The flange with terminal plate is equipped with a cover with gland GP 21/18, thus providing protection IP 42. The element is protected by a preservative oil or Lukool H for protection during transport and storage. The outer surface of the cover is protected by fire lacquer.

The heating element is intended for direct heating of oils that do not adversely influence the sheath surface. Its surface temperature is designed so as to prevent oil carbonisation. The heating element must be permanently immersed in the liquid up to the flange during operation. The temperature and quantity of oil in which the element is immersed must be such that the element temperature does not exceed the value of oil inflammation point minus 10 °C. When being removed from oil, the heating element must be turned off and cooled down.

order type number		V	W	L	Pn (MPa)	W/cm ²
without cover	with cover					
441190010	441191010	Δ3x400	2500	400	0.6	1.10
441190020	441191020	Δ3x400	3500	400	0.6	1.40
441190040	441191040	Δ3x400	4000	600	0.6	1.10
441190050	441191050	Δ3x400	5500	800	0.6	1.10
441190060	441191060	Δ3x400	6000	700	0.6	1.25
441190070	441191070	Δ3x400	7000	950	0.6	1.10
441190080	441191080	Δ3x400	8000	1075	0.6	1.10
441190090	441191090	Δ3x400	12500	1250	0.6	1.80
441190110	441191110	Δ3x400	2500	400	1.0	1.10
441190120	441191120	Δ3x400	3500	400	1.0	1.40
441190140	441191140	Δ3x400	4000	600	1.0	1.10
441190150	441191150	Δ3x400	5500	800	1.0	1.10
441190160	441191160	Δ3x400	6000	700	1.0	1.25
441190170		Δ3x400	7000	950	1.0	1.10
	441191190	Δ3x400	12500	1250	1.0	1.80
441190210		Δ3x400	2500	400	2.5	1.10
441190220	441191220	Δ3x400	3500	400	2.5	1.40
441190240	441191240	Δ3x400	4000	600	2.5	1.10
441190250	441191250	Δ3x400	5500	800	2.5	1.10
441190260		Δ3x400	6000	700	2.5	1.25
441190270	441191270	Δ3x400	7000	950	2.5	1.10
441190280	441191280	Δ3x400	8000	1075	2.5	1.10
441190290	441191290	Δ3x400	12500	1250	2.5	1.80
441190340		Δ3x400	4000	600	6.4	1.10
	441191410	Δ3x500	2500	400	0.6	1.10
	441191420	Δ3x500	3500	400	0.6	1.40
441190440	441191440	Δ3x500	4000	600	0.6	1.10
441190460	441195460	Δ3x500	6000	700	0.6	1.25
441190470		Δ3x500	7000	950	0.6	1.10
441190480		Δ3x500	8000	1075	0.6	1.10
441190490	441191490	Δ3x500	12500	1250	0.6	1.80
	441191520	Δ3x500	3500	400	1.0	1.40
441190560	441195560	Δ3x500	6000	700	1.0	1.25
	441191590	Δ3x500	12500	1250	1.0	1.80

Flange dimensions according to nominal pressure

Pn	D ₁	D ₂	D ₃	S	screw - pcs	nom. in. diam.	testing pressure
0.6 MPa	182	158	143	14	M 10 - 6	110	0.78 MPa
1.0 MPa	182	158	143	14	M 12 - 8	110	1.30 MPa
2.5 MPa	270	220	175	22	M 24 - 8	125	3.25 MPa
6.4 MPa	295	240	175	30	M 27 - 8	125	8.30 MPa

The heating element can be connected on one phase or on 400 V or on 500 V; however, when star-connected, only 1/3 of power will be achieved.

ELEMENTS FOR AIR HEATING



Field of application

- heating of steady and flowing air and technical gases
- heating of buildings and air conditioning
- heating of cabs and interiors of vehicles
- drying (including explosive environment)
- sterilizing devices
- infrared heating

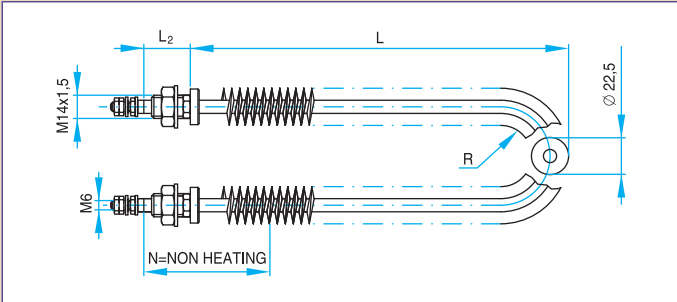
Application examples

- electrical household appliances - baking ovens, grills, clothes dryers, fruit dryers, convector heaters, storage heaters, infrared heaters
- food industry and gastronomy - confectioner's and baker's ovens, food dryers, smoke-chambers, baking ovens, defrosting of food and meals in high capacity kitchens
- transport - heating of interiors of vehicles (tramways, trolley buses, railway vehicles), building machine cabs, escalators
- other industrial applications - drying of raw materials and other substances (also suitable for explosive environment), drying of paints, lacquers and films, sterilizing devices, heating of rooms, air conditioning, hot air shields etc.

Type and/or model specification (6 – 8 digit in the order type number) is indicated on the heating element. The heating elements meet the requirements of standard EN 60335-1 – Safety of electrical appliances. Please, observe local regulations for installation and connection to the electric network.

For specific applications of these heating elements, consultation with engineering department of Backer Elektro CZ is highly recommended.

TYPE 4656 air heating

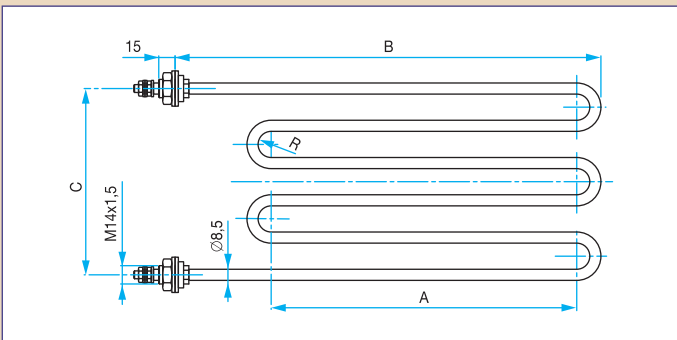


order type number	V	W	L	L ₂	R	N
465690000	230	1500	475	25	17.5	75
465690010	230	500	405	22	28	50
465690020	230	1000	850	25	28	50
465690030	230	1500	850	25	28	50
465690040	230	2000	850	25	28	50
465690050	230	2000	810	25	17.5	50
465690060	230	1000	420	25	17.5	70
465690110	400	3000	730	25	17.5	50
465690120	400	3000	1230	25	17.5	50
465690130	400	2000	810	25	17.5	50
465690140	400	4000	1640	25	28	100
465690150	400	2000	730	25	17.5	50
465690160	400	2000	1230	25	17.5	50
465690170	230	2000	600	25	28	50
465690190	400	2000	600	25	28	50

The heating unit consists of a heating element with two flanges. The heating part of the element is wrapped with a strip for better transfer of heat to the environment. The heating element is equipped with bolt terminals and nuts M6. The fixing flanges are fitted with a nut and a washer. The active part of the heating element is made of stainless steel, the flanges are made of steel with zinc-chromate surface treatment.

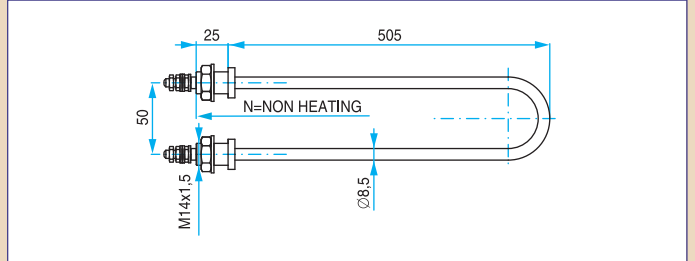
The heating element is intended for air heating. The design of the equipment, in which the heating elements shall be applied, must ensure a natural air circulation – to facilitate heat transfer. For higher efficiency of the heating elements, a forced circulation is recommended.

TYPE 6422 air heating



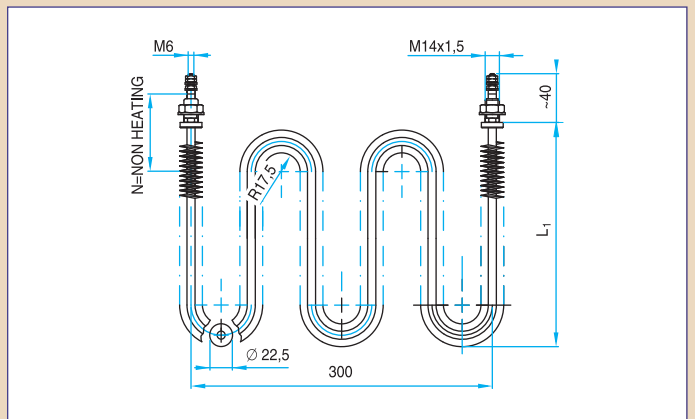
order type number	V	W	A	B	C	R
642290010	400	1500	258	347	140	10
642290030	230	2225	458	551	190	14

TYPE 4086 air heating



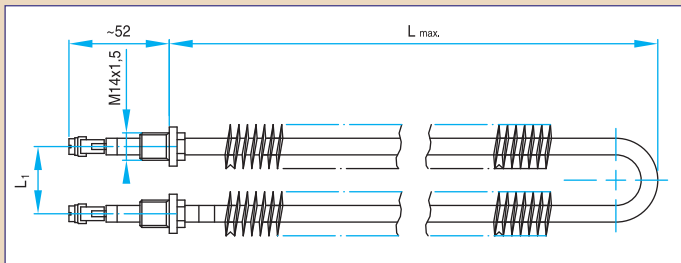
order type number	V	W	N
408690020	230	1200	70

TYPE 4665 for air conditioning devices



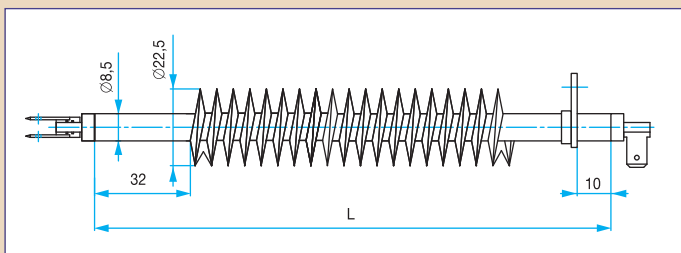
order type number	V	W	L ₁	N
466590000	230	1500	156	75
466590010	230	1400	156	75
466590020	230	1500	210	120
466590030	230	1400	161	75
466590040	230	1500	156	84

TYPE 6195 for air conditioning devices



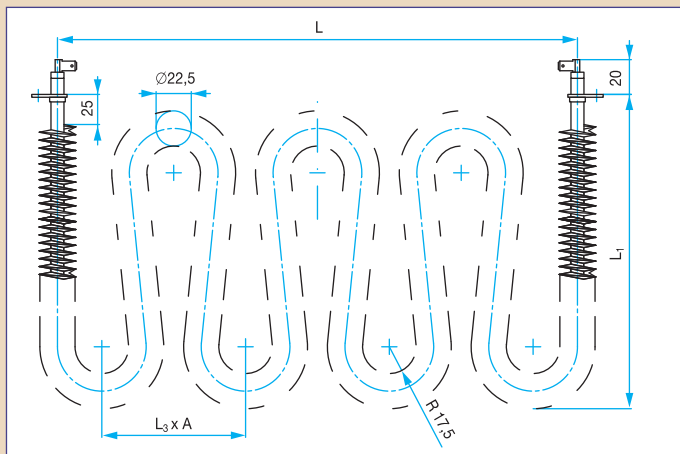
order type number	V	W	L _{max}	L ₁
619590000	230	1230	650	28
619590020	230	1670	650	28
619590030	230	1630	950	28
619590050	230	2030	950	28
619590070	230	2060	1400	28
619590080	230	1500	805	56
619590090	230	1270	500	28
619590100	230	690	350	28
619590110	230	840	452	28
619590160	230	870	350	28
619590170	230	1950	800	28
619590180	230	2070	1100	28
619590190	230	1400	800	28

TYPE 6355 for air conditioning devices



order type number	V	W	L
635590010	400	1500	750
635590020	400	2250	1250
635590030	400	3000	1750
635590040	230	1500	750
635590050	230	2250	1250
635590060	230	3000	1750
635590070	230	2000	750
635590080	230	3000	1250
635590090	230	4000	1750
635590100	240	1000	430

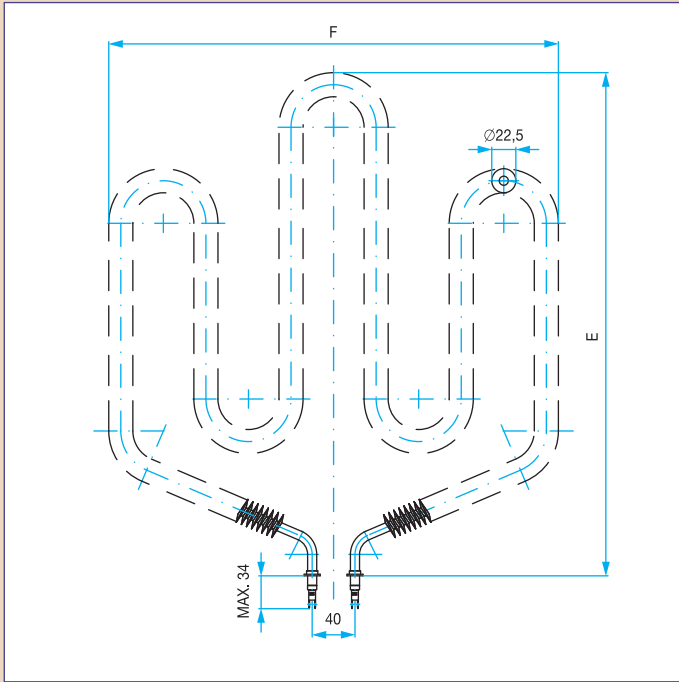
TYPE 6333 for air conditioning devices



order type number	V	W	L	L ₁	L ₃	A
633390010	400	2250	340	190	94	3
633390020	400	4500	450	265	98	4
633390030	400	5000	450	320	98	4
633390040	400	3300	340	190	94	3
633390050	400	6000	450	265	98	4
633390060	400	4200	450	320	98	4
633390070	230	3300	340	190	94	3
633390080	230	2200	340	190	94	3

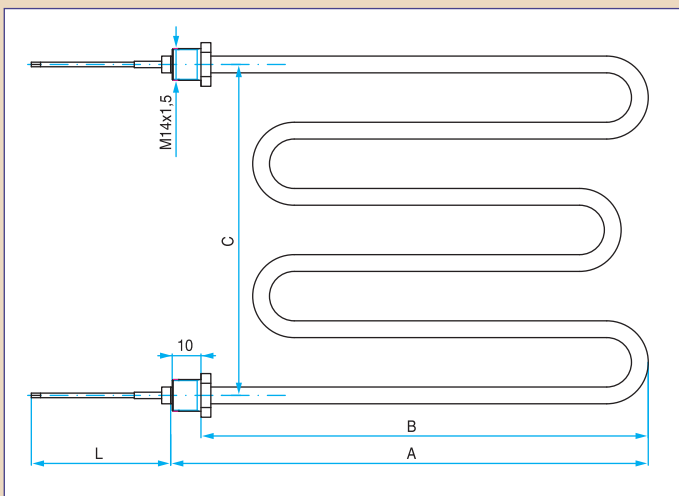
The heating unit consists of a heating element with two metal sheet flanges. The heating part of the element is wrapped with a strip for better transfer of heat to the environment. The heating element is equipped with flat double-pin terminals width 6.3 mm. The fixing flanges are fitted with openings \varnothing 4.5 mm.

TYPE 6346 for air conditioning devices



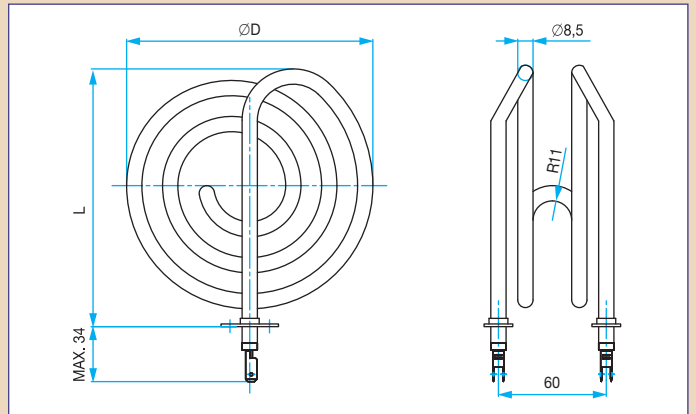
order type number	V	W	E	F
634690010	400	5000	420	310
634690020	230	4000	530	420
634690030	230	3000	420	310
634690040	230	4000	420	310
634690050	230	3000	470	420
634690060	230	3000	530	420
634690070	230	4000	600	420

TYPE 6350 for air conditioning devices



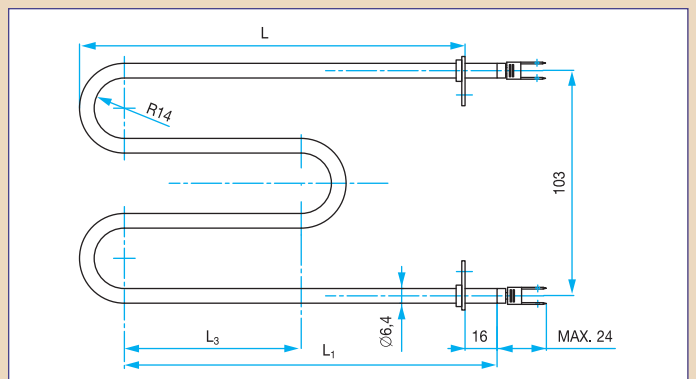
order type number	V	W	A	B	C	L
635090010	230	2000	382	370	150	200
635090020	230	2500	482	470	200	250
635090030	230	2500	582	570	250	250
635090040	230	2500	682	670	250	300

TYPE 6347 air conditioning devices



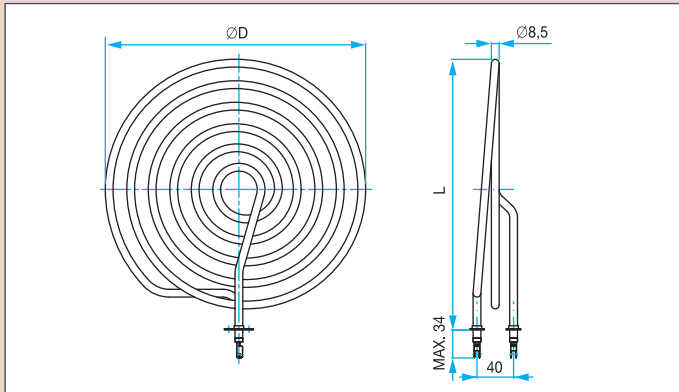
order type number	V	W	D	L
634790010	230	2000	160	185
634790020	400	2500	160	185
634790030	400	1700	160	185
634790040	400	3000	200	230
634790050	230	2000	200	230
634790060	400	1700	120	130
634790070	400	2000	160	185

TYPE 6351 for air conditioning devices



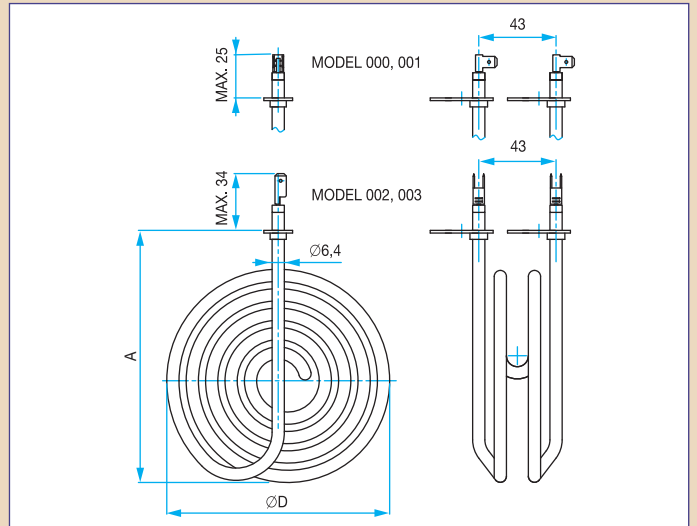
order type number	V	W	L	L ₁	L ₃
635190010	230	1000	384	380	310
635190020	230	1300	484	480	410
635190030	230	1600	564	560	465

TYPE 6348 air conditioning devices



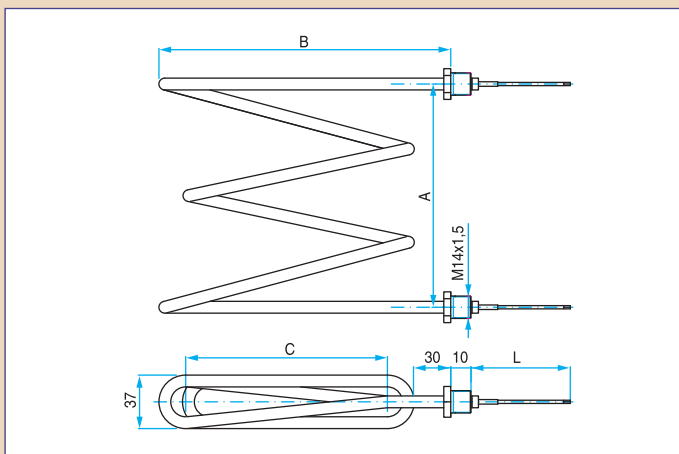
order type number	V	W	D	L
634890010	230	2000	350	380
634890020	400	2500	350	380
634890030	400	3000	350	380
634890040	400	3000	275	295
634890050	400	2500	275	295
634890060	230	1000	215	230
634890070	230	1500	215	230
634890080	230	1000	275	295
634890090	230	1500	275	295
634890100	230	2000	275	295

TYPE 6357 air conditioning devices



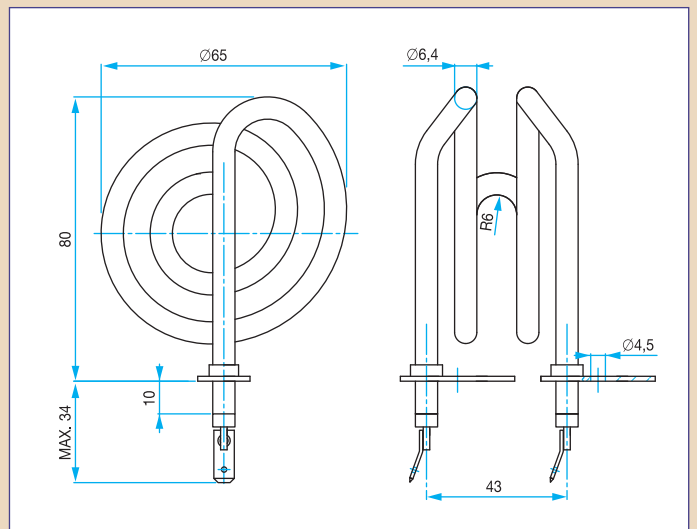
order type number	V	W	D	A
635790000	230	500	104	115
635790010	230	800	96	105
635790020	230	1200	120	130
635790030	230	800	120	130

TYPE 6349 for air conditioning devices



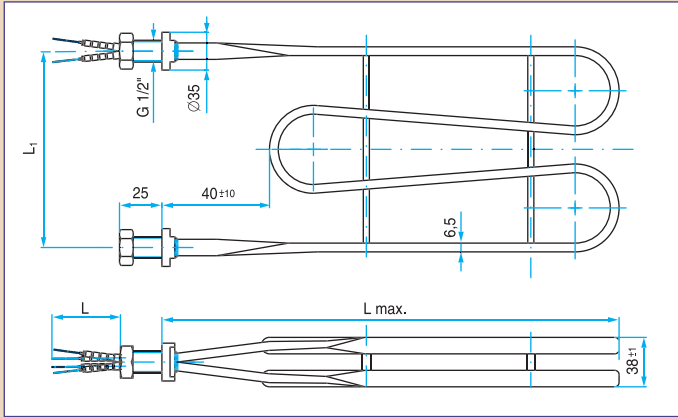
order type number	V	W	A	B	C	L
634990000	230	1500	110	245	178	300

TYPE 6364 air conditioning devices



order type number	V	W
636490000	230	400

TYPE 4334 air heating



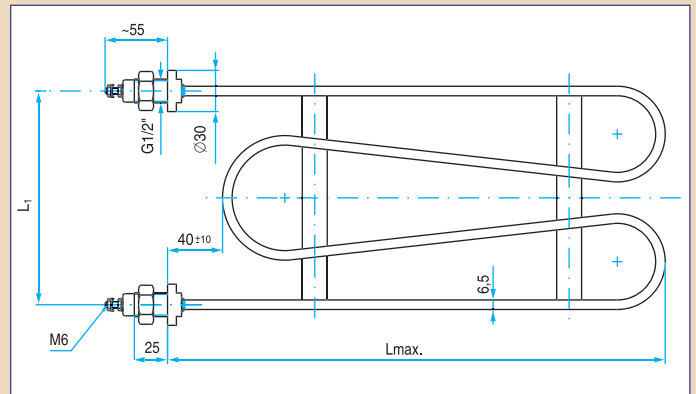
order type number	V	W	L _{max}	L ₁	L	W/cm ²
433490040	230	1000	300	80	300	1.4
433490060	230	1500	450	80	300	1.4
433490070	230	1750	500	80	150	1.5
433490080	230	2000	600	80	300	1.4
433490090	230	2500	720	80	100	1.4
433490130	400	750	300	80	100	1.1
433490140	400	1000	300	80	300	1.4
433490160	400	1500	450	80	300	1.4
433490170	400	1750	500	80	150	1.5
433490180	400	2000	600	80	300	1.4
433490190	400	2500	720	80	100	1.4
433490200	400	3000	975	80	100	1.3
433490390	400	2500	720	240	100	1.4
433490400	400	3000	975	240	100	1.3

The heating unit consists of steel heating branches that are equipped with stranded wire terminals insulated with beads and of two fixing flanges with threads G 1/2" and nuts.

The sheath surface is protected with a water-based paint or a silicone lacquer.

These heating elements are intended for heating of air. The surface temperature (at environment temperature of 20 °C) reaches approx. 350 °C. Maximum allowed surface temperature of the heating element sheath is 400 °C.

TYPE 4336 air heating

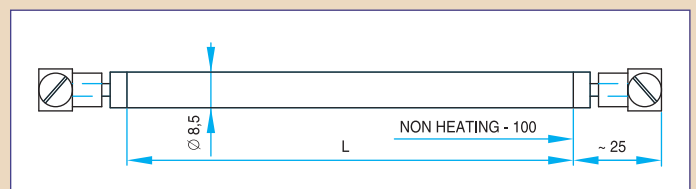
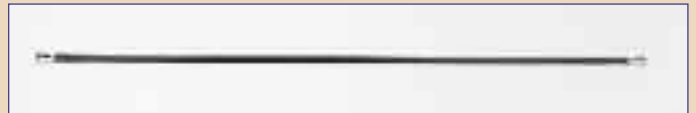


order type number	V	W	L _{max}	L	W/cm ²
433690020	230	500	300	80	1.4
433690030	230	750	450	80	1.4
433690040	230	1000	600	80	1.4
433690050	230	1250	720	80	1.4
433690130	400	750	450	80	1.4
433690140	400	1000	600	80	1.4
433690150	400	1250	720	80	1.4
433690160	400	1500	975	80	1.2
433690220	230	500	300	240	1.4
433690230	230	750	450	240	1.4
433690330	400	750	450	240	1.4
433690340	400	1000	600	240	1.4
433690350	400	1250	720	240	1.4
433690360	400	1500	975	240	1.2

The heating unit consists of a steel heating branch that is equipped with bolt terminals M6 and of two fixing flanges with threads G 1/2" and nuts. The sheath surface is protected with a water-based paint or a silicone lacquer.

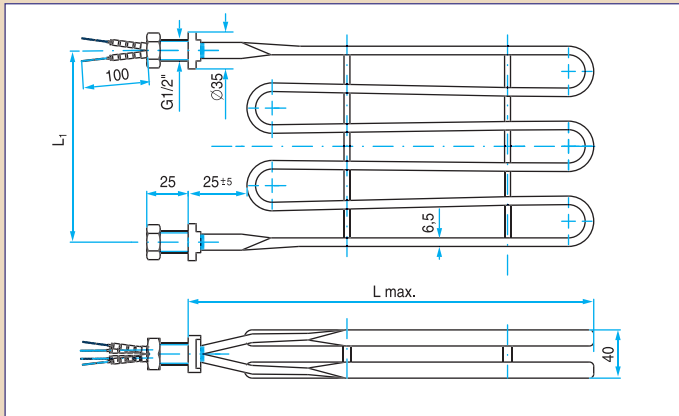
These heating elements are intended for heating of air. The surface temperature (at environment temperature of 20 °C) reaches approx. 350 °C. Maximum allowed surface temperature of the heating element sheath is 400 °C.

TYPE 4609 for storage room heaters



order type number	V	W	L
460990000	230	500	1052
460990010	230	666	1357
460990020	76	333	752
460990030	230	333	752

TYPE 4338 air heating



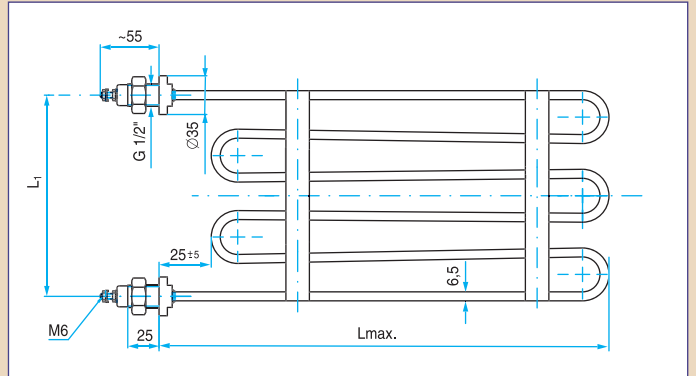
order type number	V	W	L _{max}	L	W/cm ²
433890010	230	1000	200	150	1.4
433890030	230	1500	300	150	1.4
433890050	230	2000	350	150	1.4
433890060	230	2500	450	150	1.5
433890130	400	1500	300	150	1.4
433890150	400	2000	350	150	1.4
433890160	400	2500	450	150	1.5
433890170	400	3000	550	150	1.5
433890230	230	1500	300	240	1.4
433890250	230	2000	350	240	1.4
433890260	230	2500	450	240	1.5
433890310	400	1000	200	240	1.4
433890330	400	1500	300	240	1.4
433890350	400	2000	350	240	1.4
433890360	400	2500	450	240	1.5
433890370	400	3000	550	240	1.5

The heating unit consists of steel heating branches that are equipped with stranded wire terminals insulated with beads and of two fixing flanges with threads G 1/2" and nuts.

The sheath surface is protected with a water-based paint or a silicone lacquer.

These heating elements are intended for heating of air. The surface temperature (at environment temperature of 20 °C) reaches approx. 350 °C. Maximum allowed surface temperature of the heating element sheath is 400 °C.

TYPE 4339 air heating

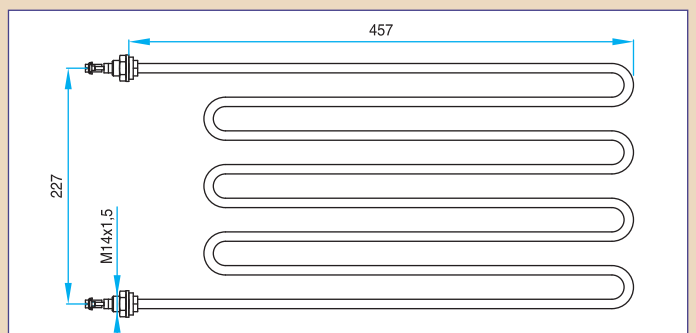


order type number	V	W	L _{max}	L	W/cm ²
433990010	230	500	200	150	1.4
433990020	230	750	300	150	1.4
433990030	230	1000	350	150	1.6
433990040	230	1250	450	150	1.5
433990050	230	1500	550	150	1.5
433990120	400	750	300	150	1.4
433990130	400	1000	350	150	1.6
433990140	400	1250	450	150	1.5
433990150	400	1500	550	150	1.5
433990220	230	750	300	240	1.4
433990240	230	1250	450	240	1.5
433990320	400	750	300	240	1.4
433990350	400	1500	550	240	1.5

The heating unit consists of a steel heating branch that is equipped with bolt terminals M6 and of two fixing flanges with threads G 1/2" and nuts. The sheath surface is protected with a water-based paint or a silicone lacquer.

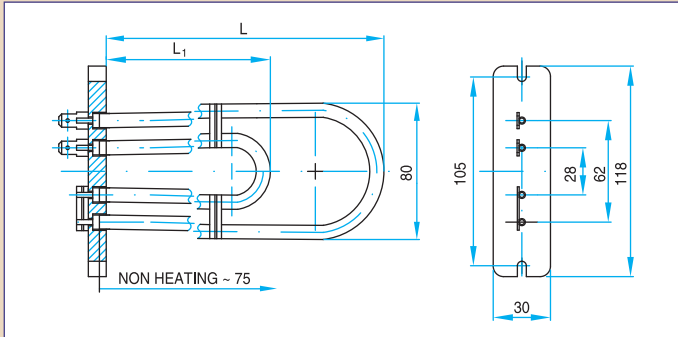
These heating elements are intended for heating of air. The surface temperature (at environment temperature of 20 °C) reaches approx. 350 °C. Maximum allowed surface temperature of the heating element sheath is 400 °C.

TYPE 6293 saunas



order type number	V	W
629390000	400	3000

TYPE 4838 for storage room heaters

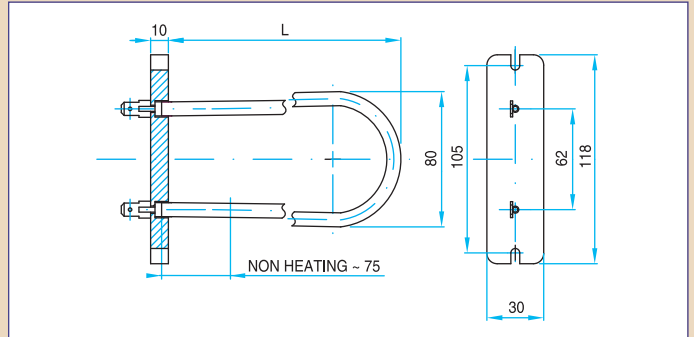


order type number	V	W	L	L ₁
	483890010	230	1333	761
483890020	230	666	401	340
483890030	230	1666	1011	949

The heating unit consists of two heating branches and a ceramic flange. It is equipped with a flat pin terminal width 6.3 mm. The elements are made of stainless steel.

The heating elements are intended for storage room heaters AD..D. For replacement of malfunctioned elements, please, refer to the manufacturer's instructions. The replacement should be performed by qualified personnel only.

TYPE 4165 for storage room heaters

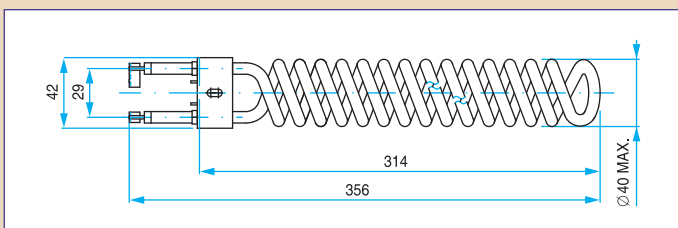


order type number	V	W	L
	416590080	230	750
416590090	230	833	761
416590100	230	1000	1011
416590110	230	1333	1011
416590120	230	666	511
416590130	230	1000	761
416590140	230	1000	635
416590150	230	1250	1011

The heating unit consists of a heating branch and a ceramic flange. It is equipped with a flat pin terminal and a flat double-pin terminal width 6.3 mm. The element is made of stainless steel.

The heating elements are intended for storage room heaters AD..D. For replacement of malfunctioned elements, please, refer to the manufacturer's instructions. The replacement should be performed by qualified personnel only.

TYPE 4901 for storage room heaters

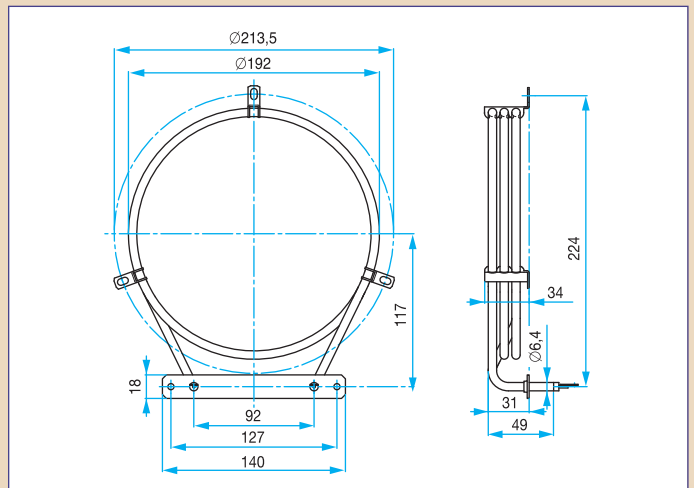


order type number	V	W
	490190010	230
490190020	230	2000

The heating unit consists of a heating branch and a metal sheet flange. It is equipped with a flat pin terminal and a flat double-pin terminal width 6.3 mm. The heating element is made of stainless steel.

The heating element is intended for storage room heaters AD..D, being employed as an auxiliary direct heating element for heating-up the room in case of higher heat demand. An intensive forced air circulation should be provided during its operation. For replacement of malfunctioned elements, please, refer to the manufacturer's instructions. The element can also be used for other devices, in which similar operation conditions should be provided.

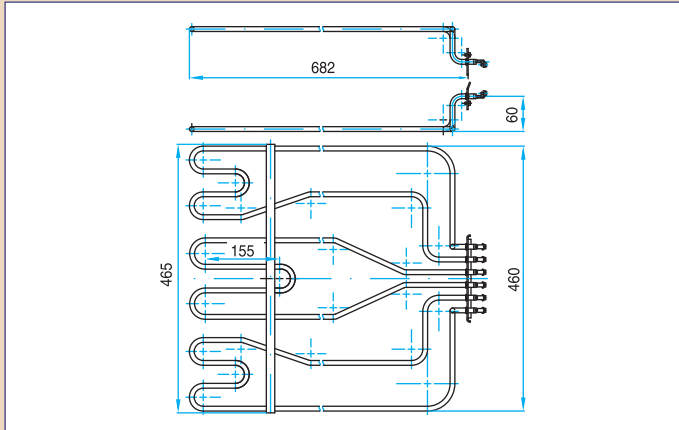
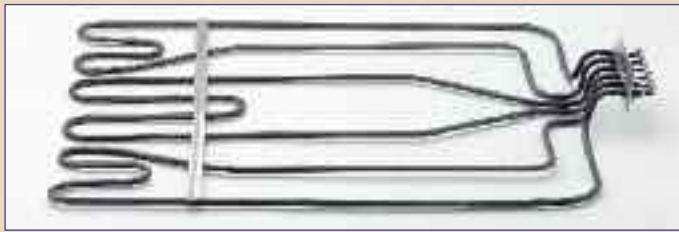
TYPE 6392 for hot-air ovens of kitchen ranges



order type number	V	W
	639290000	240
639290010	240	2000

The heating unit consists of a heating branch that is attached to a metal sheet flange. It is equipped with flat double-pin terminals width 6.3 mm. The sheath is made of stainless steel.

TYPE 4341 for baking devices of high capacity kitchens

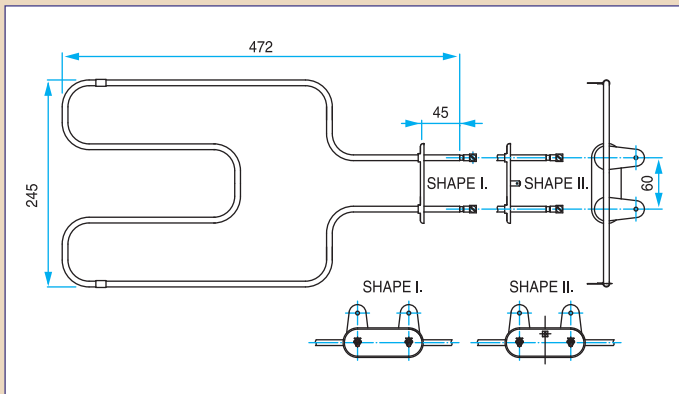


order type number	specification	V	W	material
434102019	bottom heating	230	3x670	stainless steel

The heating unit consists of three heating elements that are attached to a flange. It is equipped with screw terminals M4. The heating elements are made of stainless steel.

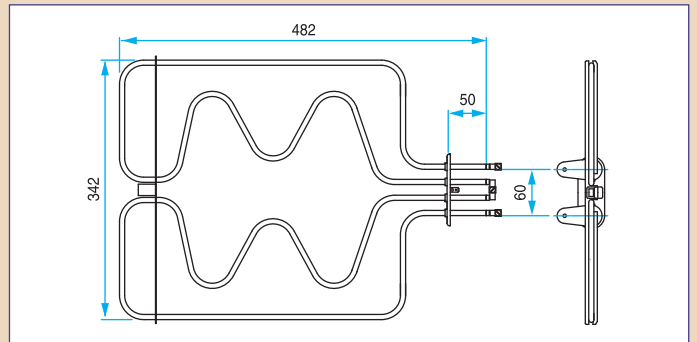
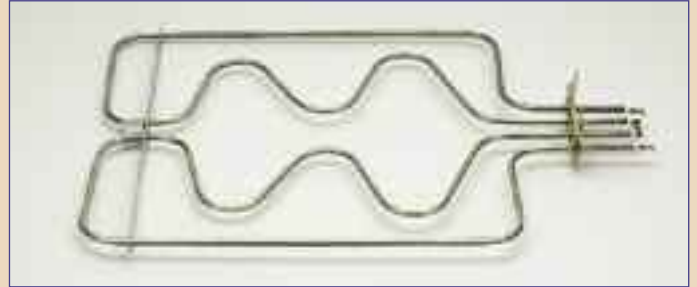
The heating element is intended preferably for baking devices of high capacity kitchens. For this application, an upper and a bottom heating elements with different flanges are used.

TYPE 4379 for baking ovens of kitchen ranges MORA (bottom heating element)



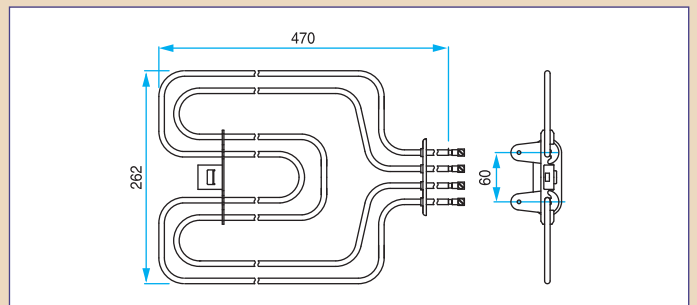
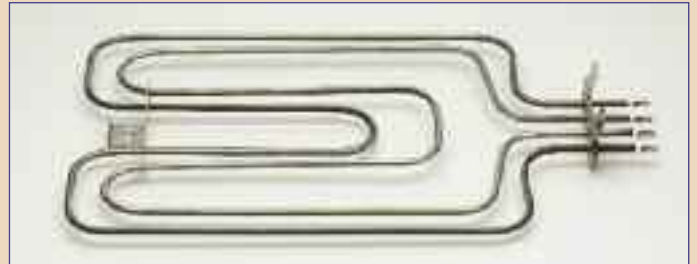
order type number	V	W	shape

TYPE 4380 for baking ovens of kitchen ranges MORA (upper heating element with a grill)



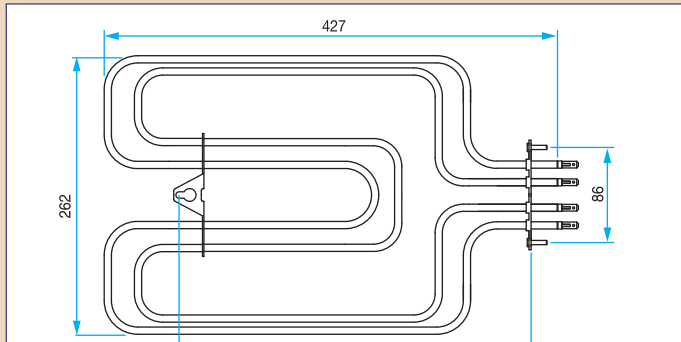
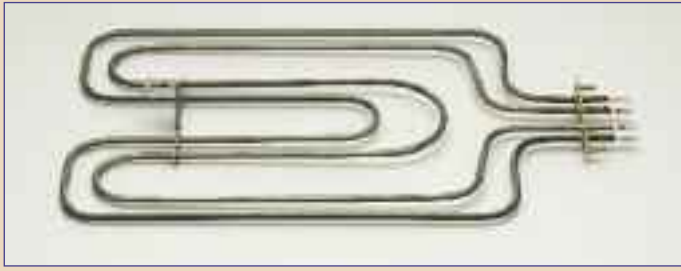
order type number	V	W

TYPE 4470 for baking ovens of kitchen ranges MORA (upper heating element with a grill)



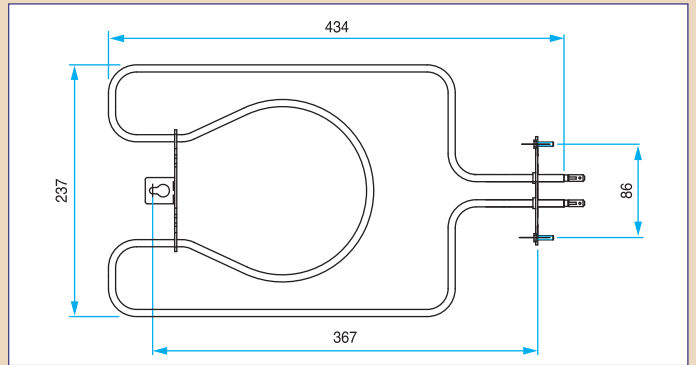
order type number	V	W

TYPE 6208 for baking ovens of kitchen ranges MORA
(upper heating element with a grill)



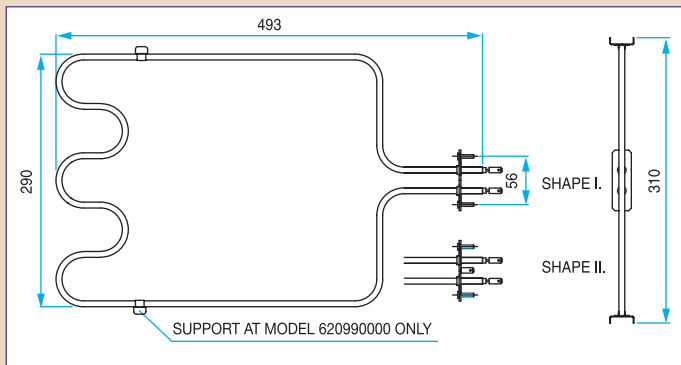
order type number	V	W
620891000	230	1850/750

TYPE 6288 for baking ovens of kitchen ranges MORA
(grill heating element)



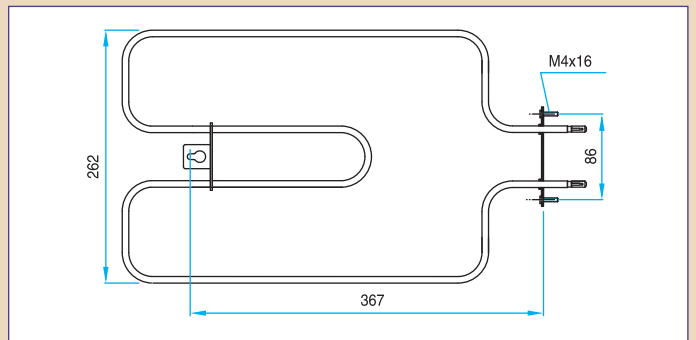
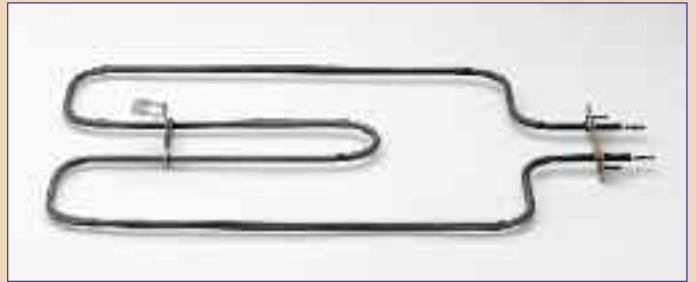
order type number	V	W
628890000	230	1850

TYPE 6209 for baking ovens of kitchen ranges MORA
(bottom heating element)



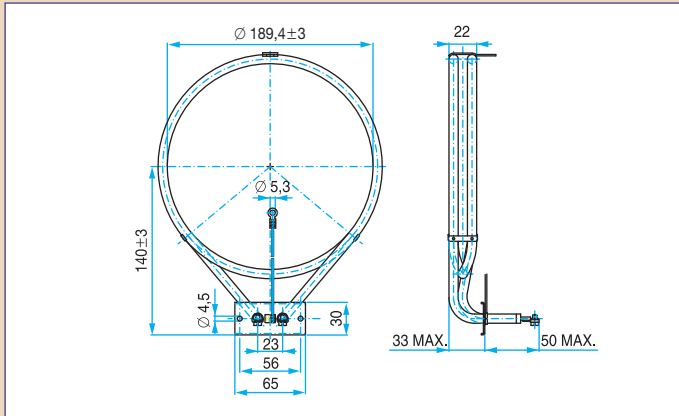
order type number	V	W	shape
620990000	230	1100	I.
620991000	230	1100	II.

TYPE 6280 for baking ovens of kitchen ranges MORA
(bottom heating element)



order type number	V	W
628090000	230	750
628090010	240	750

TYPE 4600 for hot-air ovens of kitchen ranges MORA

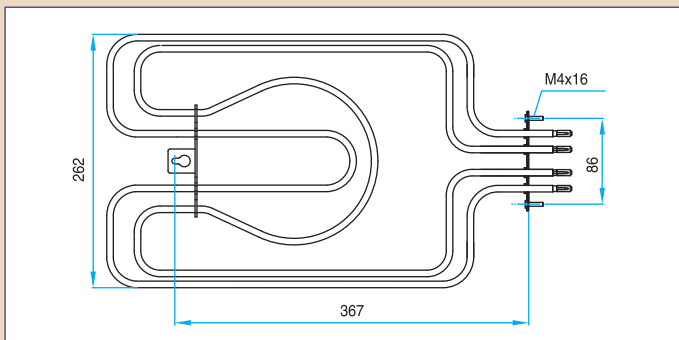


order type number	V	W
460090030	230	2500
460090040	230	2000

The heating unit consists of a heating branch that is attached to a metal sheet flange. It is equipped with screw terminals M4. The sheath is made of stainless steel.

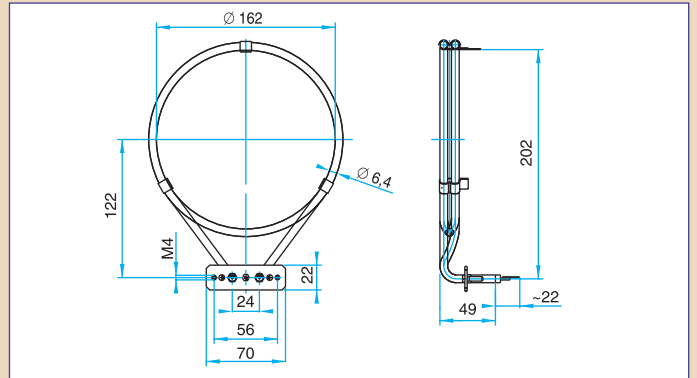
The heating element is intended for hot-air ovens of kitchen ranges. Forced air circulation should be provided during operation. The element can also be used for other devices, in which similar operation conditions should be provided.

TYPE 6287 for baking ovens of kitchen ranges MORA (upper heating element with a grill)



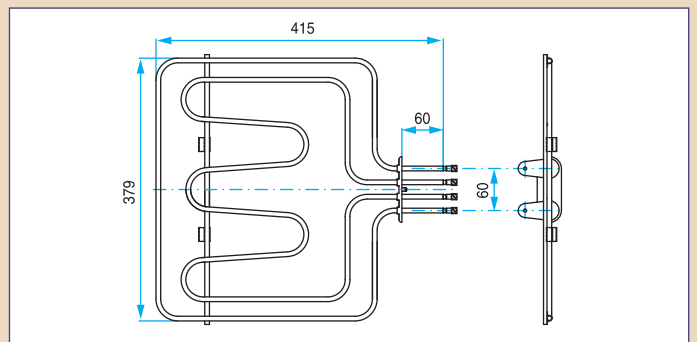
order type number	V	W
628790000	230	1850/750
628790010	240	1850/750

TYPE 6210 for hot-air ovens of kitchen ranges MORA



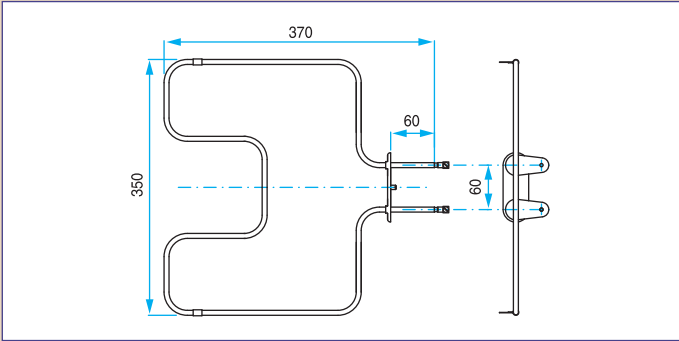
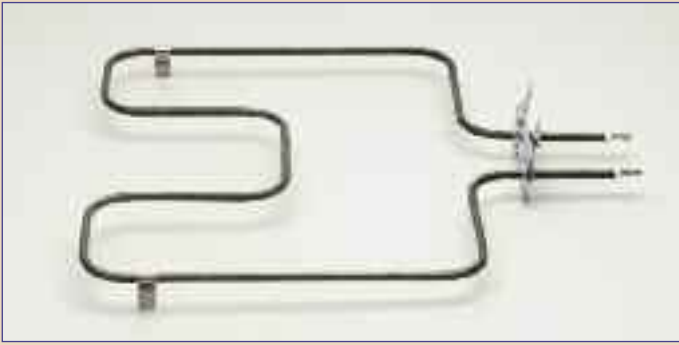
order type number	V	W
621090000	230	2000
621090010	240	2000

TYPE 4720 for baking ovens of kitchen ranges FIKO (upper heating element with a grill)



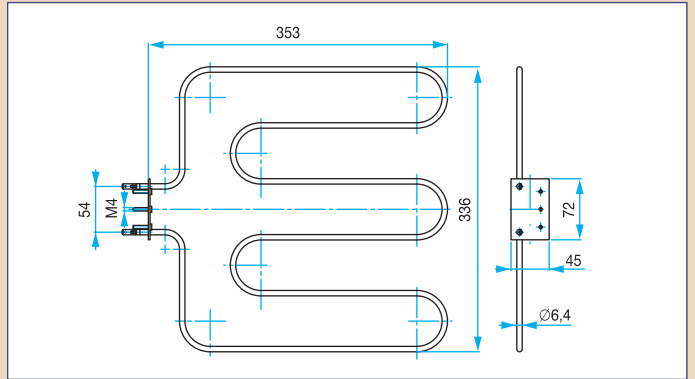
order type number	V	W
472090000	230	1000/2000

TYPE 4721 for baking ovens of kitchen ranges FIKO
(bottom heating element)



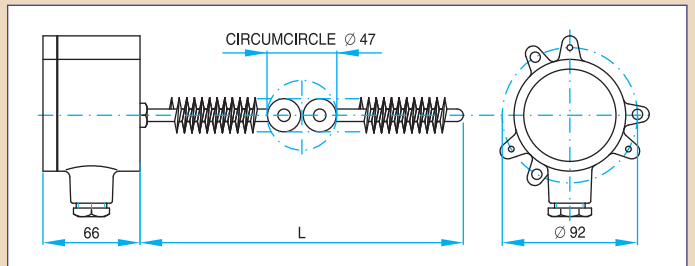
order type number	V	W
472190000	230	1200

TYPE 6416 for baking ovens of kitchen ranges KONCAR



order type number	V	W
641690000	230	1550

TYPE 4378 warming of electrical windings in apparatuses
(moisture condensation protection)

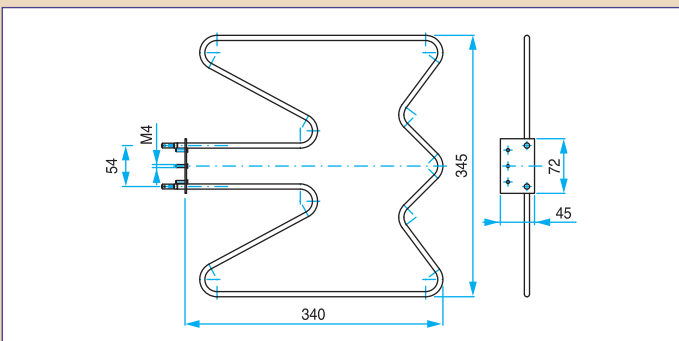
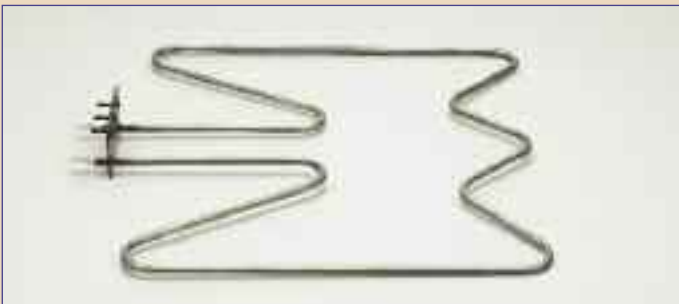


order type number	V	W	L
437895030	115	175	320
437895120	230	110	500
437895130	230	195	320
437895140	230	200	320
437895330	240	175	320

The heating element consists of a stainless steel heating branch that is equipped with ribs made of stainless steel. The heating branch is attached to a cast-iron box with a gland AP 16/10 and with a lid, thus providing protection IP 42. The outer surface of the box is protected by fire lacquer, the lid is nickel plated. Fixing of the heating element is performed by means of three fixing screws M5.

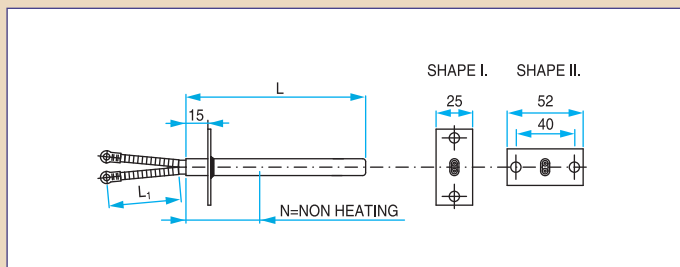
The heating element is intended for warming up of various electrical windings in apparatuses that operate in tropical areas, where moisture condensation is likely to occur.

TYPE 6030 for baking ovens of kitchen ranges KONCAR



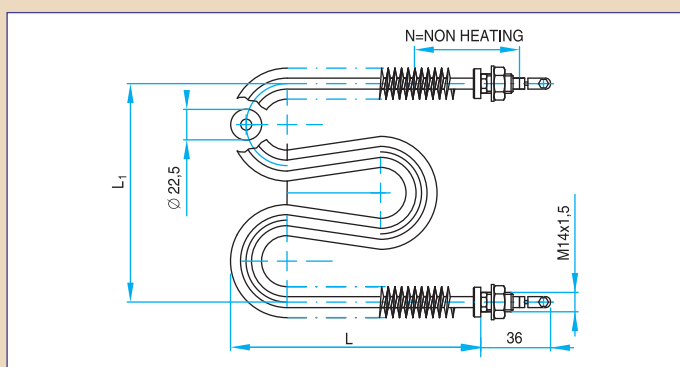
order type number	V	W
603090000	230	1550

TYPE 4914 for baker's ovens



order type number	V	W	L	L ₁	N	tvar
491490010	230	550	1400	120	170	I.
491490020	230	320	1400	120	170	I.
491490030	230	750	1900	120	200	I.
491490040	230	200	1400	120	170	I.
491490060	400	1000	1950	120	70	I.
491490080	230	1000	1900	120	200	II.
491490100	230	1000	1950	500	117	I.

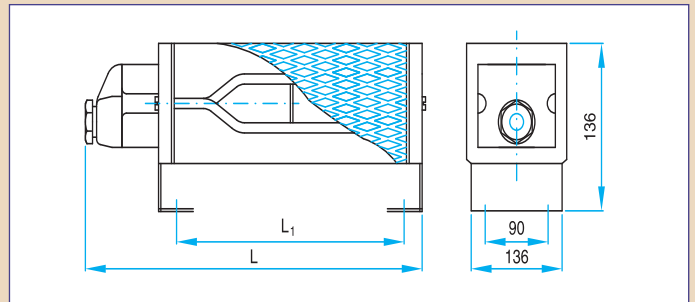
TYPE 4367 heating of tramways



order type number	V	W	L	L ₁
436790000	200	200	205	150
436790010	230	1500	300	150
436790020	230	1500	400	150
436790030	230	2000	480	150
436790040	230	2000	340	150

TYPE 4369 heating of machine cabs and similar small areas

TYPE 6553 brake resistance



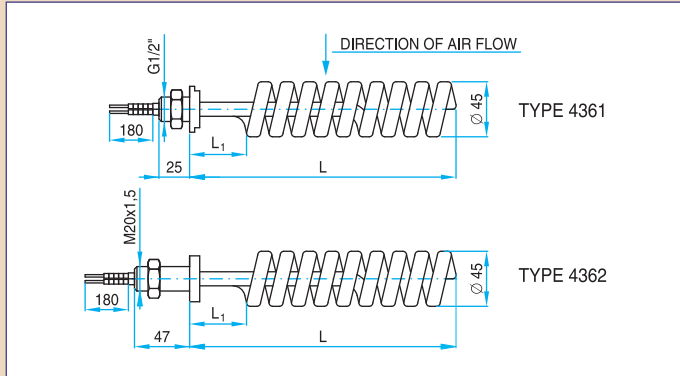
order type number	V	W	L	L ₁	W/cm ²
436990050	120	750	400	282	1.0
436990110	230	250	310	192	0.5
436990130	230	500	310	192	1.1
436990150	230	750	400	282	1.0
436990160	230	1000	400	282	1.0
436990170	230	1500	530	412	1.3
436990180	230	2000	580	462	1.5
436990190	230	2500	580	462	1.9
436990230	400	500	310	192	1.1
436990250	400	750	400	282	1.0
436990260	400	1000	400	282	1.0
436990270	400	1500	530	412	1.3
436990280	400	2000	580	462	1.5
436990290	400	2500	580	462	1.9
436990310	48	250	310	192	0.5
436990430	500	500	310	192	1.1
436990450	500	750	400	282	1.0
436990460	500	1000	400	282	1.0
436990470	500	1500	530	412	1.3
436990480	500	2000	580	462	1.5
436990490	500	2500	580	462	1.9

The heating element consists of steel branches, a supporting skeleton and a lid with a gland AP 16/12, thus providing protection IP 42. The heating branches are single-phase connected. Sidewalls made of zinc plated metal sheet and a cover made of lath mesh provide protection against inadvertent contact. The heating element can be fixed to a support by means of four screws M8. In case of installation on a flammable surface, a fireproof inflammable plate should be used between the heating element and the surface. The plate should exceed the boundary line of the heating element by 5 cm minimum.

The heating element is specially intended for environments where shocks can occur, such as excavators, crane cabs, air stowing machines etc.

Type 6553 brake resistance is identical to type 4369 heating element, although the specific dielectric strength is tested at 2000 V/60 sec.

TYPE 4361, 4362 for dryers with explosive environment



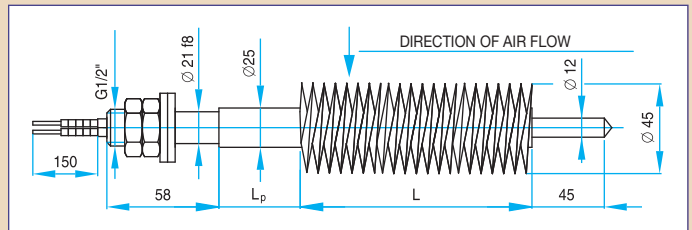
order type number	V	W	L	L _p	W/cm ²
436190440	76	500	590	75	0.50
436192210	230	165	310	75	0.33
436192240	230	500	590	75	0.50
436192260	230	1250	590	75	1.25
436192280	230	1200	460	75	1.41
436192610	400	165	310	75	0.33
436192650	400	1000	590	75	1.00
436192660	400	1250	590	75	1.25
436192680	400	1200	460	75	1.41
436192690	400	1250	1000	75	0.70
436197210	230	165	310	75	0.30
436197680	400	1200	460	75	1.40
436198480	500	1200	460	75	1.40

order type number	V	W	L	L _p	W/cm ²
436292700	400	710	1000	75	0.38
436292710	400	1100	1000	180	0.61
436292720	400	1500	1000	75	0.83

The heating element consists of steel heating branches that are attached to a steel flange with a nut.
The heating element is either without any surface protection or it is protected by means of metal spraying (aluminium).

The heating elements are intended for dryers with explosive environment. For proper application, the parameters given in the table must be observed. The user of these heating elements should adapt its surface temperature to the operational environment. The proper temperature is achieved by providing an appropriate heat transfer by means of flowing air of adequate velocity and volume, to meet the requirements for non-explosive environment. The flow direction should be perpendicular to the spiral axis. The maximum surface operating temperature of the heating element is 400 °C, provided that it is permitted by the regulations for the given non-explosive environment. The complete device with installed heating elements must be submitted for an approval to the local approval authority for non-explosive environment.

TYPE 4349 for non-explosive heating



order type number	V	W	L	L _p	W/cm ²
434990010	230	500	250	150	0.521
434990020	230	500	250	600	0.521
434990030	230	750	300	150	0.657
434990050	230	1000	400	150	0.655
434990060	230	1000	400	600	0.655
434990070	230	1200	450	150	0.702
434990090	230	1500	550	150	0.717
434990100	230	1500	550	700	0.717
434990190	250	1500	550	150	0.717
434990210	400	500	250	150	0.521
434990220	400	500	250	600	0.521
434990230	400	750	300	150	0.657
434990240	400	750	300	600	0.657
434990250	400	1000	400	150	0.655
434990260	400	1000	400	600	0.655
434990270	400	1200	450	150	0.702
434990280	400	1200	450	600	0.702
434990290	400	1500	550	150	0.717
434990300	400	1500	550	700	0.717
434990310	400	900	550	150	0.430

L - length of the heating element
L_p - elongation of tube

The heating element consists of steel heating branches. To achieve an optimum heat distribution, the heating branches are imbedded in aluminium. The heating branches are attached to a steel flange with two nuts and washers. The heating element features an elongated tube L_p = 150 or 600 or 700 mm.

To achieve a non-explosive heater, the heating element must be fitted into a non-explosive junction box with firm closure according to applicable standards and regulations.

For proper application, the parameters given in the table must be observed. The user of the heating element should adapt its surface temperature to the operational environment. The proper temperature is achieved by providing an appropriate heat transfer by means of flowing air of adequate velocity and volume, to meet the requirements for non-explosive environment. The flow direction should be perpendicular to the heating element axis. The maximum surface operating temperature of the heating element is 350 °C, provided that it is permitted by the regulations for the given non-explosive environment. When used without appropriate heat sink, the aluminium ribs could melt. The complete device with installed heating elements must be submitted for an approval to the local approval authority for non-explosive environment.

Minimum ordered quantity: 10 pieces each model

ELEMENTS FOR CONTACT HEATING



Field of application

- heating of moulds for plastics and vulcanisation
- heating of moulds and core boxes for foundry industry
- heating of machine and device parts and accessories in industrial works
- warming of heating plates and boards
- heating of vessels with congealed materials
- heating of chemical reactors
- heating of tramway and railway switches
- defrosting of refrigerators and freezers

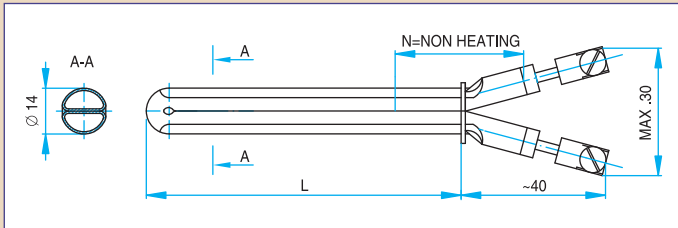
Application examples

- electrical household appliances - heating panels, contact grills, electrical frying pans, cookers, deep fat fryers
- transport - heating of tramway and railway switches in winter period
- food industry and gastronomy - cooking panels and cooking plates and warming-up devices, frying devices for restaurants
- other industrial applications - heating of moulds and heating of machine and device parts and accessories in plastics, rubber, wood, paper, shoemaking, foundry industry, as well as plastics welding machines, heating of chemical reactors, heating of vessels with various materials, heating of tubings, medicine and laboratory equipment

Type and/or model specification (6 – 8 digit in the order type number) is indicated on the heating element. The heating elements meet the requirements of standard EN 60335-1 – Safety of electrical appliances. Please, observe local regulations for installation and connection to the electric network.

For specific applications of these heating elements, consultation with engineering department of Backer Elektro CZ is highly recommended.

TYPE 4561 heating of moulds and hot core boxes

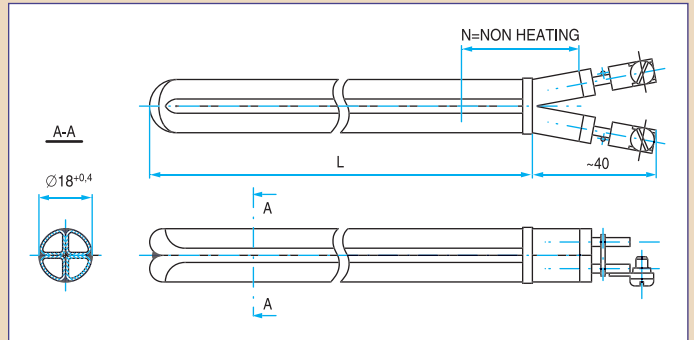


order type number	V	W	L	N	W/cm ²
456190010	115	400	150	50	7.95
456190020	115	600	200	50	8.30
456190030	230	800	250	50	8.50
456190040	230	900	300	50	7.75
456190050	230	1050	350	50	7.65
456190060	230	1250	400	50	7.80
456190070	230	1350	450	50	7.45
456190080	230	1500	500	50	7.35
456190090	230	1750	550	50	7.75
456190100	230	2000	600	50	8.05
456190110	230	2000	650	50	7.45
456190120	230	2000	700	50	6.85
456190130	230	2000	800	50	6.00
456190140	230	2500	900	50	7.10
456190150	230	2500	1000	50	6.35
456190160	400	3000	1100	50	6.45
456190170	400	3000	1200	50	5.85
456190180	230	2650	1730	215	3.70
456190190	230	1900	1480	215	3.70
456190210	230	2000	800	150	6.70
456190280	230	2000	800	120	6.10
456190300	230	500	250	50	5.00

A cylindrical heating element for heating of moulds is made of stainless steel, having an outer diameter $\varnothing 14 \pm 0.2$. The opening, into which the heating element is inserted, should have $\varnothing 14.2 \pm 0.2$. The heating element is equipped with screw terminals M4.

The cylindrical heating element is intended for heating of moulds, hot core boxes and injection moulds for plastics, up to maximum temperature of 300 °C.

TYPE 4562 heating of moulds, hot core boxes and injection moulds for plastics

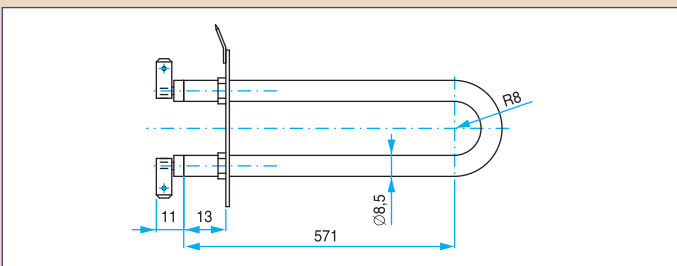


order type number	V	W	L	N	W/cm ²
456290010	115	2 x 400	150	50	12.3
456290020	115	2 x 600	200	50	13.0
456290030	230	2 x 800	250	50	13.1
456290040	230	2 x 900	300	50	12.0
456290050	230	2 x 1050	350	50	11.8
456290060	230	2 x 1250	400	50	12.2
456290070	230	2 x 1350	450	50	11.5
456290080	230	2 x 1500	500	50	11.5
456290090	230	2 x 1750	550	50	12.1
456290100	230	2 x 2000	600	50	12.5
456290110	230	2 x 2000	650	50	11.5
456290120	230	2 x 2000	700	50	10.6
456290130	230	2 x 2000	800	50	9.3
456290140	230	2 x 2500	900	65	10.4
456290150	230	2 x 2500	1000	65	9.3
456290160	400	2 x 3000	1100	50	10.1
456290170	400	2 x 3000	1200	50	9.2

A cylindrical heating element is made of stainless steel, having an outer diameter $\varnothing 18 \pm 0.4$. The opening, into which the heating element is inserted, should have $\varnothing 18.6 \pm 0.2$. The heating element is equipped with screw terminals M4.

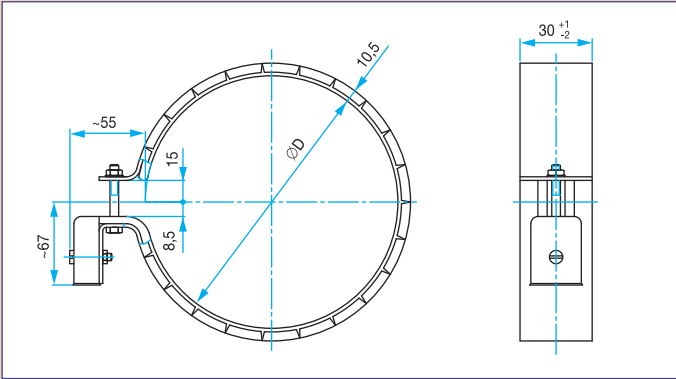
The cylindrical heating element is intended for heating of moulds, hot cores and injection moulds for plastics, up to maximum temperature of 300 °C.

TYPE 4909 for high capacity kitchens



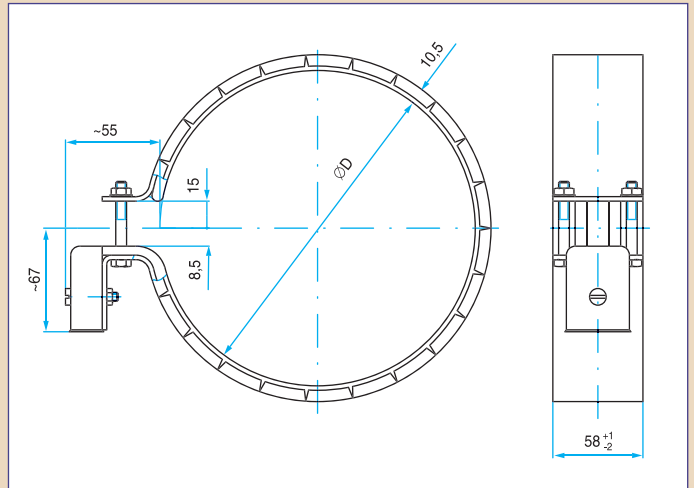
order type number	V	W
490990000	230	375

TYPE 4320 heating of injection moulds for plastics



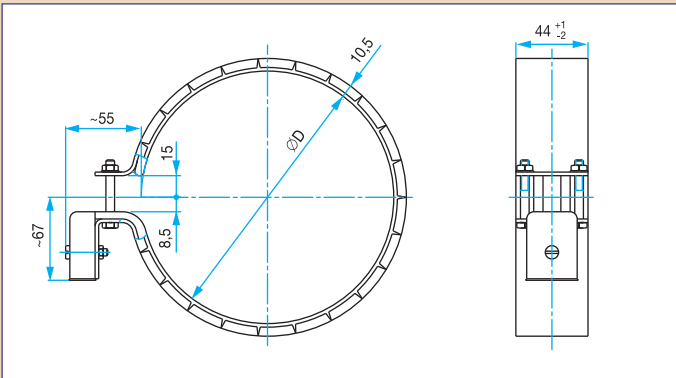
order type number	V	W	D	W/cm ²
432090010	230	375	125	1.6
432090020	230	420	140	1.6
432090030	230	450	160	1.5
432090040	230	525	180	1.6
432090050	230	600	200	1.6
432090060	230	700	220	1.7
432090090	230	1000	315	1.7
432090120	230	1550	500	1.6

TYPE 4322 heating of injection moulds for plastics



order type number	V	W	D	W/cm ²
432290010	230	525	125	1.5
432290020	230	575	140	1.5
432290030	230	600	160	1.3
432290040	230	700	180	1.4
432290050	230	850	200	1.5
432290060	230	1000	220	1.6
432290070	230	1150	250	1.6
432290080	230	1350	280	1.7
432290090	230	1450	315	1.6
432290110	230	1800	400	1.5
432290120	230	2200	500	1.5

TYPE 4321 heating of injection moulds for plastics



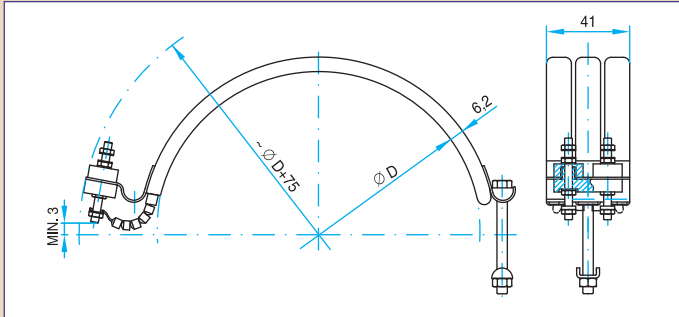
order type number	V	W	D	W/cm ²
432190010	230	450	125	2.0
432190030	230	525	160	1.7
432190040	230	600	180	1.8
432190050	230	700	200	1.8
432190060	230	800	220	1.9
432190090	230	1150	315	1.9
432190120	230	1800	500	1.9

The band heating units 4320, 4321 and 4322 for heating of moulds consists of heating elements that are mutually interconnected by means of contact pins and protected by a protective collar.

Connection to the electrical network is performed by means of a cable with an appliance coupler. The surface is protected with a water-based paint. For sake of better efficiency, the heating element surface is provided with an insulation material and an aluminium sheath.

The band heating elements are intended for heating of injection moulds for plastics up to maximum temperature of 180 °C.

TYPE 4810 heating of moulds, heating of injection press heads etc.

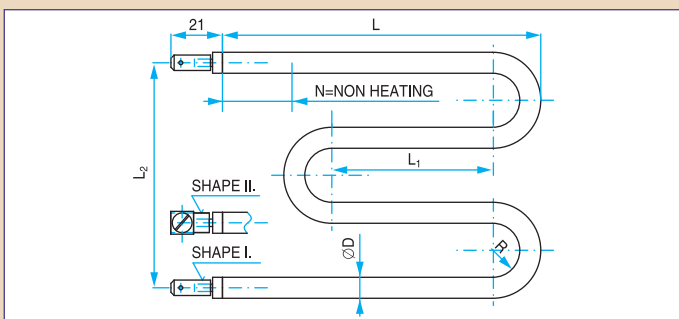


order type number	number of pieces forming a full circle			
	V	W	D	
481090010	115	100	80	2
481090020	230	175	95	2
481090030	230	200	110	2
481090040	230	250	110	2

The heating element consists of three heating rods that are mutually interconnected and equipped with connecting bolt terminals M4 with nuts. To fill the complete diameter $\varnothing D$, two heating elements should be used. The elements are interconnected by means of screws M5.

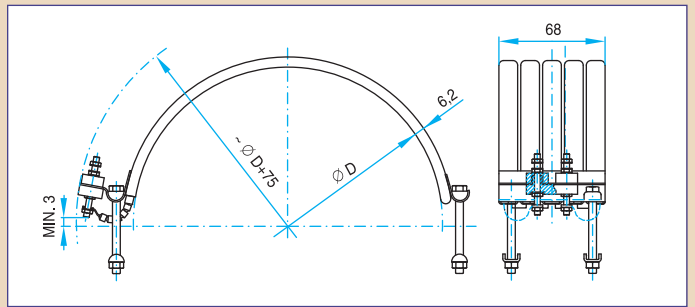
The heating element is intended for heating of moulds, heating of heads of injection presses etc. with controlled operating temperature in the range of 150 °C to 300 °C. Maximum operating surface temperature of the heating element sheath is 500 °C. The temperature control device is not a part of the delivery.

TYPE 4871 for high capacity kitchens



order type number	number of pieces forming a full circle									
	V	W	L	L ₁	L ₂	N	R	D	tvar	
487190000	230	700	385	270	180	50	26	8.5	I.	
487190010	400	2100	385	270	180	50	26	8.5	I.	
487190040	230	5000	650	512	72	90	8	8.5	II.	
487190050	230	1600	390	288	135	50	19	6.8	I.	
487190060	230	1000	425	310	215	55	32	8.5	I.	
487190090	230	300	425	310	215	55	32	8.5	I.	
487190100	230	700	425	310	215	55	32	8.5	I.	

TYPE 4808 heating of moulds, heating of injection press heads etc.

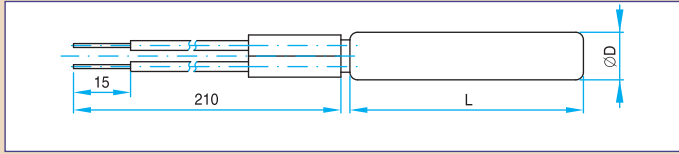


order type number	number of piece forming a full circle			
	V	W	D	
480890010	230	250	100	2
480890020	230	375	125	2
480890030	230	450	140	2
480890040	230	500	160	2
480890050	230	600	180	2
480890060	230	600	200	2
480890070	230	700	220	2
480890080	230	875	250	2
480890090	230	950	280	2
480890100	400	1050	315	2
480890110	400	1250	355	2
480890120	400	1375	400	2
480890130	400	1575	450	2
480890140	230	600	315	3
480890150	230	700	355	3
480890160	230	875	400	3
480890170	230	950	450	3

The heating element consists of five heating rods that are mutually interconnected and equipped with connecting bolt terminals. To fill the complete diameter $\varnothing D$, two heating elements should be used, with an exception at models 014 to 017, where three elements should be used. The elements are interconnected by means of screws M5.

The heating element is intended for heating of moulds, heating of heads of injection presses etc. with controlled operating temperature in the range of 150 °C to 300 °C. Maximum operating surface temperature of the heating element sheath is 500 °C. The temperature control device is not a part of the delivery.

TYPE 4776, 4777 heating of moulds



order type number	V	W	L	D
477690020	230	250	60	10
477690030	230	200	80	10
477690040	230	315	80	10
477690050	230	250	100	10
477690060	230	400	100	10
477690070	230	630	130	10

order type number	V	W	L	D
477790010	230	250	60	12.5
477790020	230	315	80	12.5
477790030	230	400	100	12.5
477790040	230	500	130	12.5
477790050	230	630	130	12.5
477790060	230	630	160	12.5
477790070	230	200	80	12.5

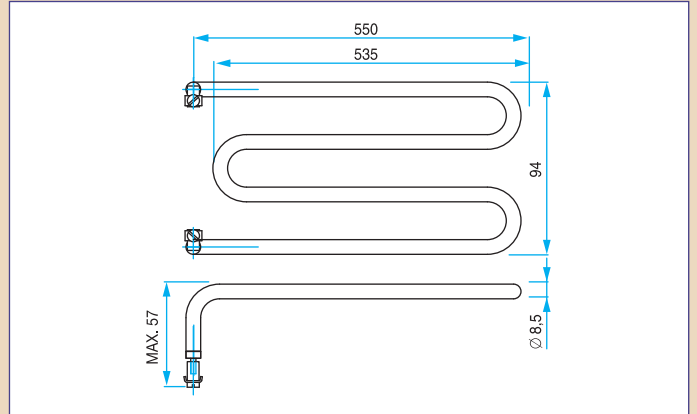
The heating unit of a cylindrical shape is made of stainless steel with a grinded surface. It is equipped with connecting leads CSA 1 mm².

The heating element is intended for heating of injection moulds for plastics up to maximum temperature of 325 °C.

Recommendations:

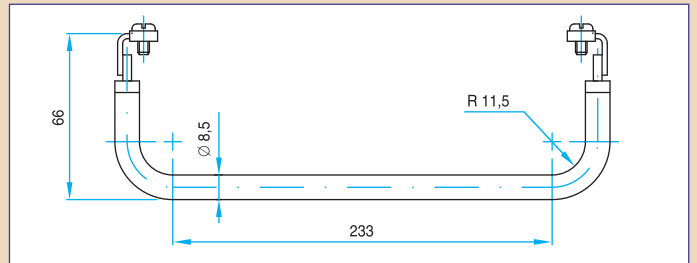
1. The opening for insertion of the heating element should be made within tolerance H7 and with surface roughness 0,4 µm maximum. The length of the opening should be 2 mm longer than the length of the element.
2. Do not operate the element at the maximum power. Allow a reserve about 20 – 30 %.
3. Use preferably a continuous temperature control. Repeated turning on and off could lower the lifetime of the element.

TYPE 6332 for high capacity kitchens



order type number	V	W
633290010	400	2000

TYPE 4778 heating of cooking and warming plates in high capacity kitchens

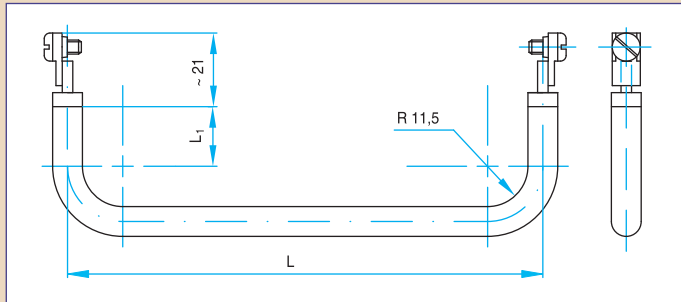
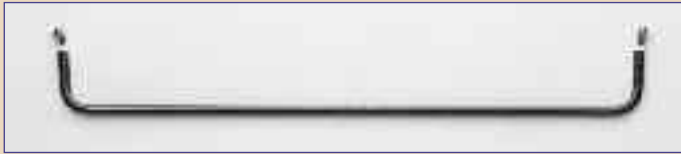


order type number	V	W
477890020	115	410

The heating unit consists of a heating element and of two footing terminals with screws M4 for mains connection.

The heating unit is intended for contact heating of cooking and warming plates in high capacity kitchens. To ensure a long lifetime of the element, it is essential to provide a good contact with the heated plate or with the plate grooves.

TYPE 5939 heating of cooking and warming plates in high capacity kitchens

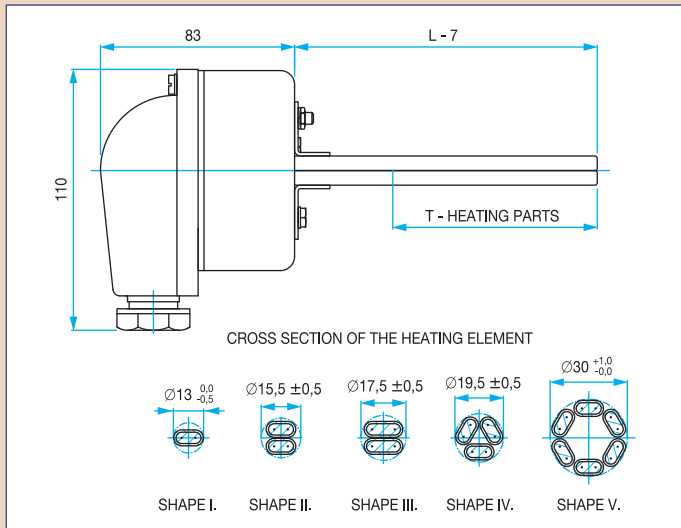


order type number	V	W	L	L ₁
593990000	230	666	562	16.5

The heating unit consists of a heating element and of two footing terminals with screws M4 for mains connection.

The heating unit is intended for contact heating of cooking and warming plates in high capacity kitchens. To ensure a long lifetime of the element, it is essential to provide a good contact with the heated plate or with the plate grooves.

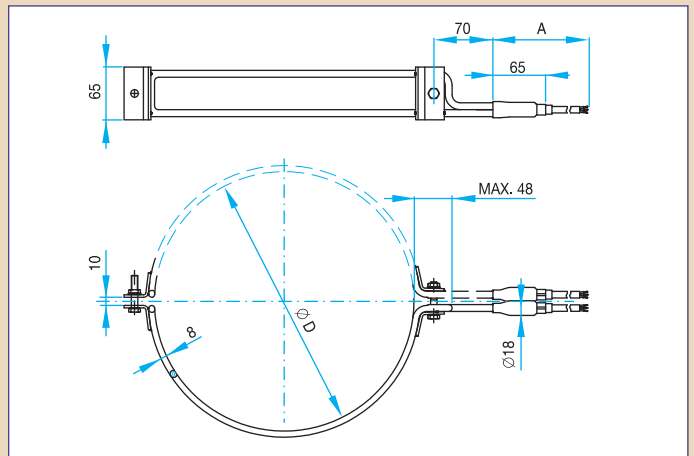
TYPE 6363 heating of screws for assembly of turbines, presses etc.



order type number	V	W	L	T	shape	W/cm ²
636390010	380	2500	690	530	V.	2.7
636390020	380	1800	800	640	IV.	3.2
636390030	380	1800	650	500	IV.	4.1
636390040	380	1200	500	350	IV.	3.9
636390050	380	1100	670	510	III.	3.0
636390060	400	1800	825	660	IV.	3.1
636390070	400	1000	580	430	II.	4.0

The heating unit consists of a stainless steel heating element of various diameters that is attached to a box with lid and a cable gland P16.

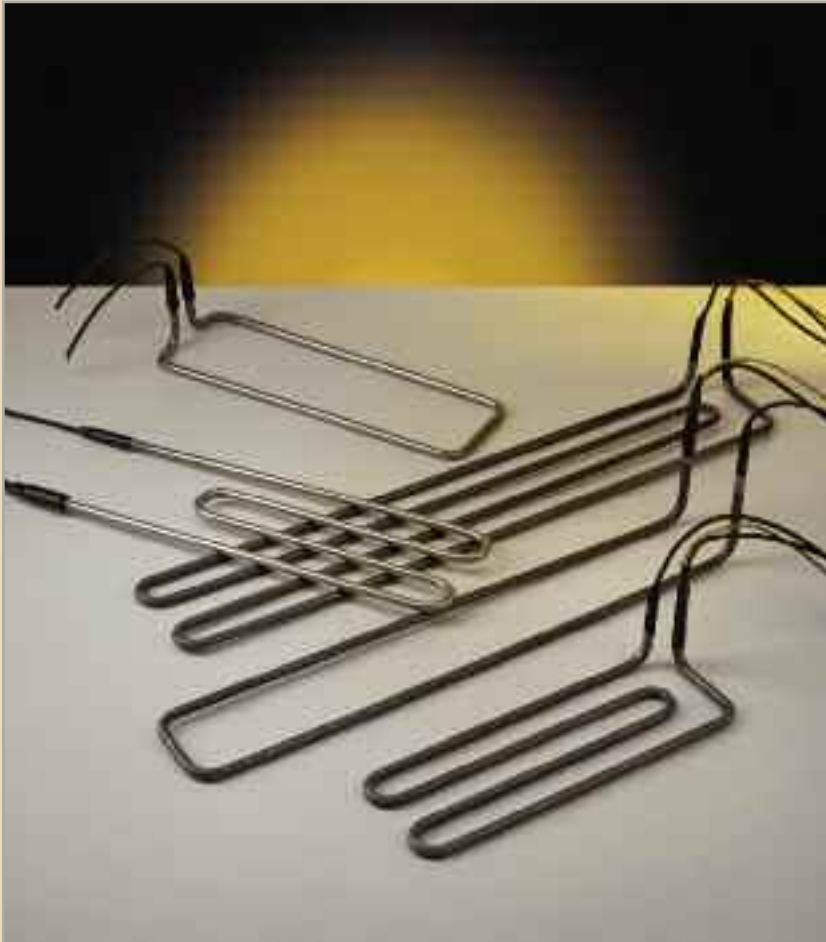
TYPE 6582 heating of parts of technological devices, vessels, reactors etc. of circular shape



order type number	V	W	D	A
658290010	400	800	318	3300
658290020	500	800	318	3300
658290030	400	800	464	3300
658290040	500	800	464	3300
658290050	400	1200	500	3500
658290060	500	1200	500	3500
658290070	400	800	318	1500
658290080	500	800	318	800
658290090	400	1200	500	800
658290100	400	800	440	3300

The heating element consists of heating branch \varnothing 8.5 mm dead-pressed to 8 mm in the contact point and from connecting silicone cable fixed to the heating branch. Pair of heating elements is used to cover the \varnothing D. They are connected by M8 screws. Maximum allowed surface temperature of the heating element sheath is 750 °C.

HEATING ELEMENTS FOR DEFROSTING



Field of application

- defrosting devices
- cooling devices
- air-conditioning units
- compressors
- electric motors
- outdoor appliances

New in our assortment: Electrical heating elements featuring a waterproof vulcanized rubber sealing covering the connection between the element and the connecting cables.

These elements are intended for devices and areas with extremely high humidity, with intensive steam generation or in direct contact with water.

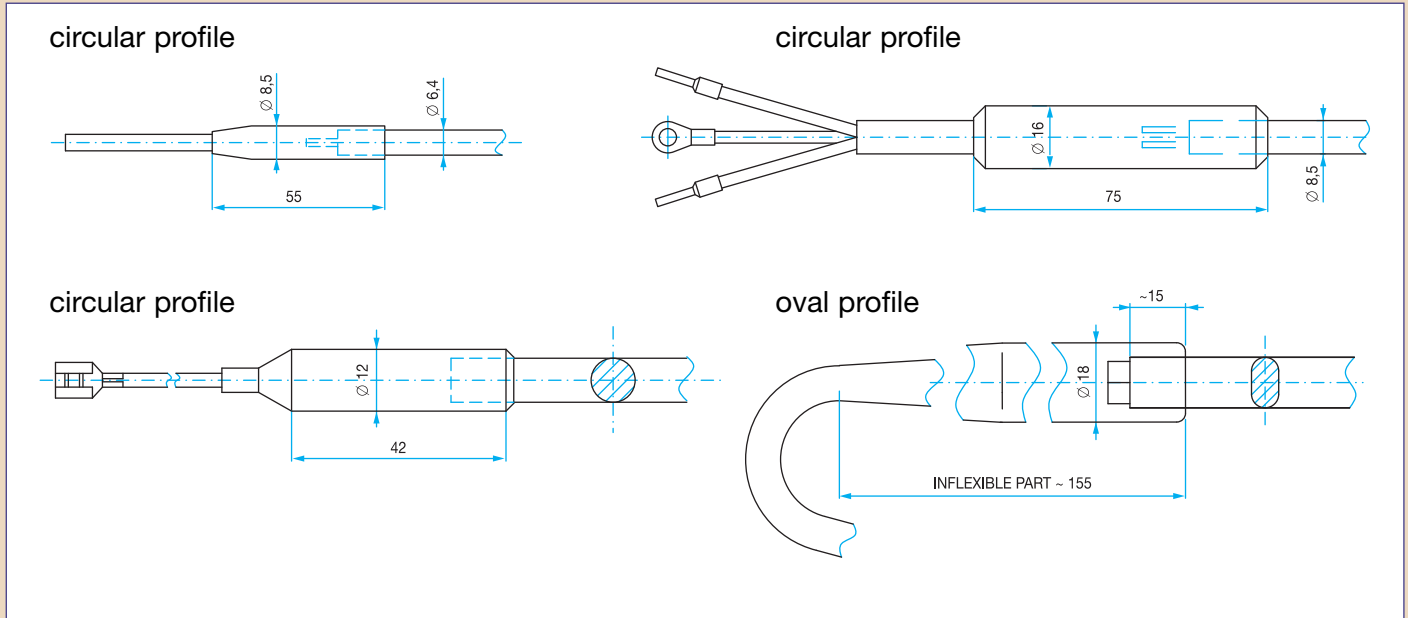
The quality of production process of heating elements for defrosting with vulcanized rubber sealing of \varnothing 8.5 mm has been approved by VDE certificate.

Type and/or model specification (6 – 8 digit in the order type number) is indicated on the heating element. The heating elements meet the requirements of standard EN 60335-1 – Safety of electrical appliances. Please, observe local regulations for installation and connection to the electric network.

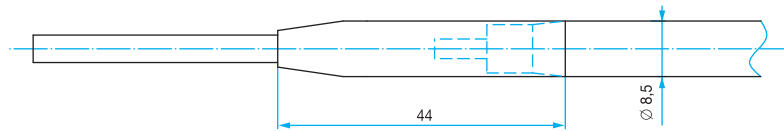
A waterproof connection of the heating element to the cable is performed as follows: The stranded wire terminal of the heating element is interconnected with individual strands of the cable. Then, a compact waterproof enclosure is provided by rubber vulcanization in a mould. The vulcanized rubber is inflammable, with thermal resistance in the range from $-40\text{ }^{\circ}\text{C}$ to $+120\text{ }^{\circ}\text{C}$. Dimensions and material of heating elements are specified in the following table.

Heating element dimension	\varnothing 6.4 mm	\varnothing 8.5 mm	\varnothing 8.5 mm BIFILAR	6.2 x 11.5 mm
Maximum length	4000 mm	8300 mm	4200 mm	3800 mm
Sheath material	DIN 1.4541, DIN 1.4404	DIN 1.4301, DIN 1.4876 (INCOLOY 800)		DIN 1.4435

OPTIONS AND DIMENSIONS OF RUBBER ENCLOSURE



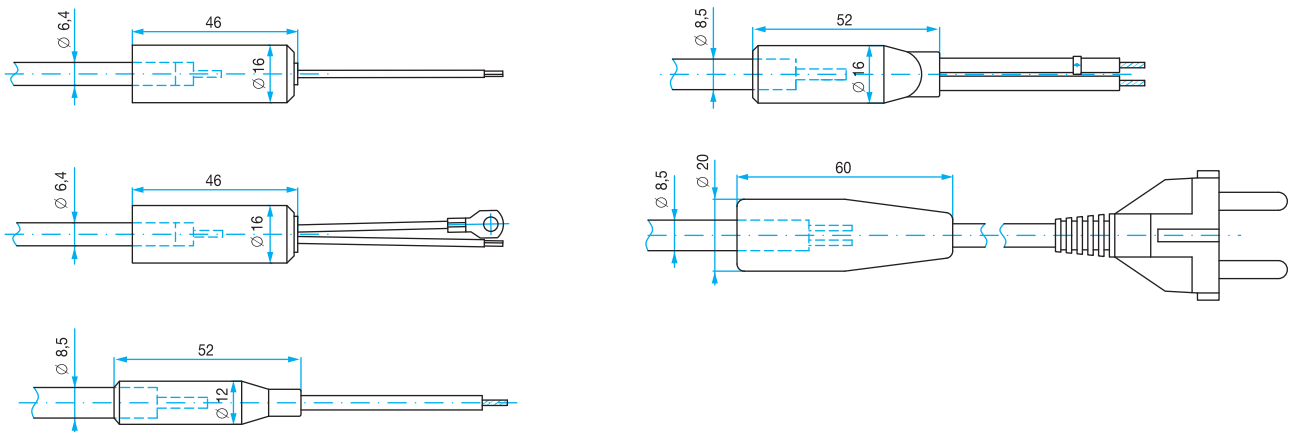
An unique design featuring the diameter of the vulcanized part equal to the diameter of the element, so that it does not limit the space for installation of the heating element.



OPTIONS AND DIMENSIONS OF PLASTIC ENCLOSURE

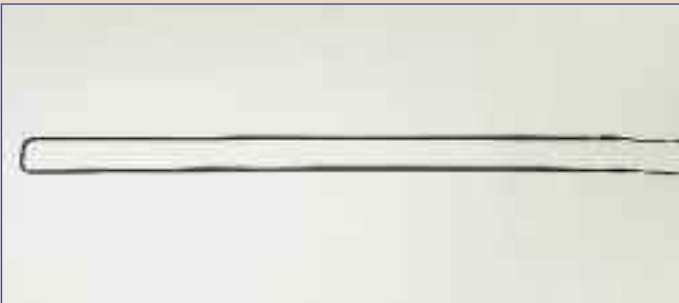
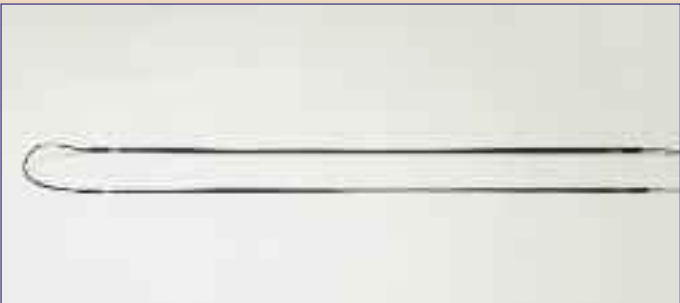
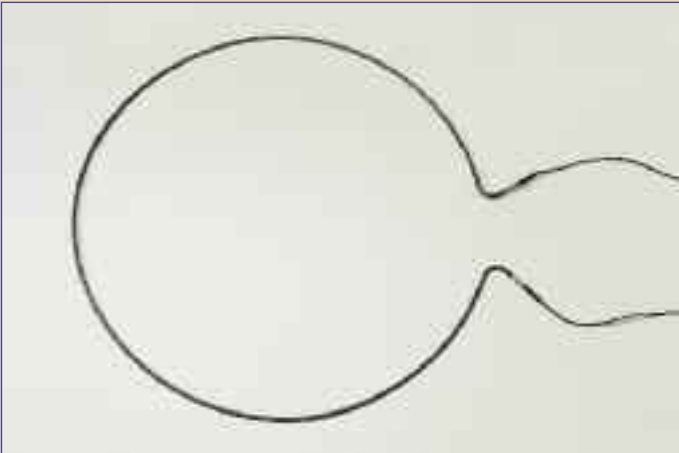
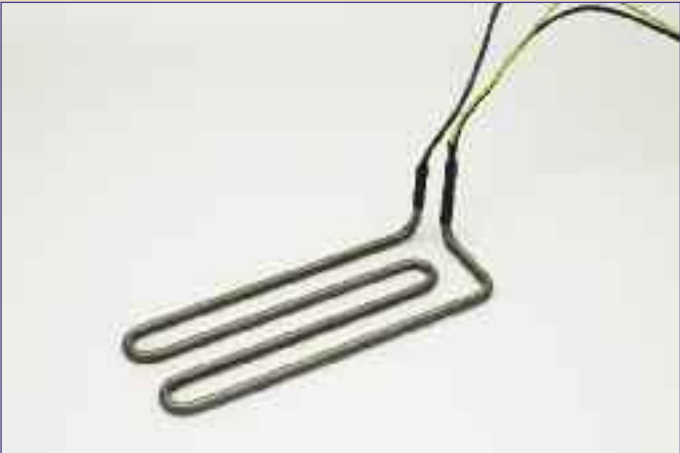
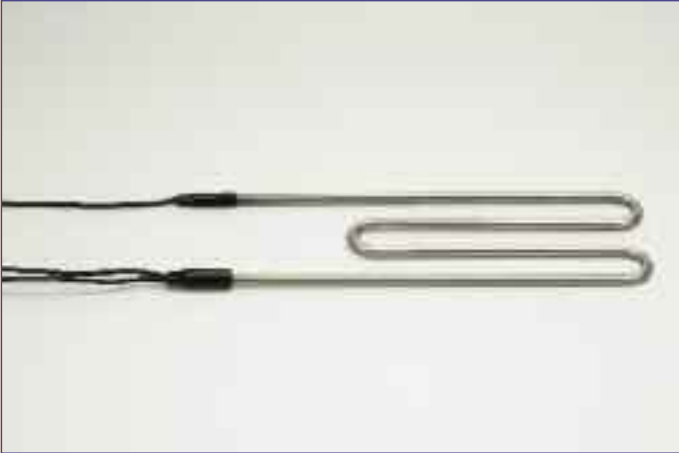
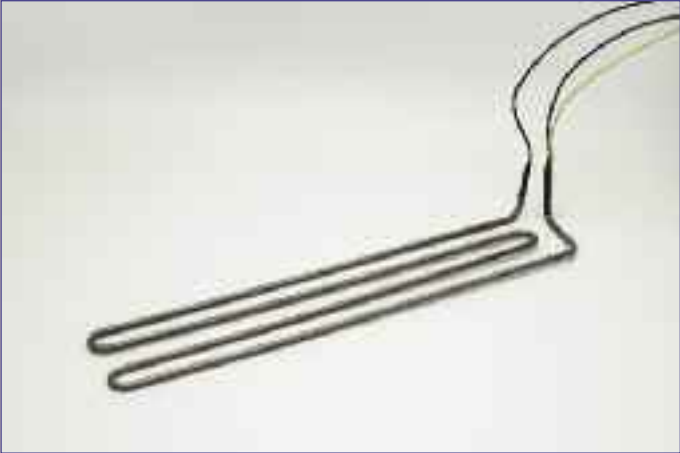
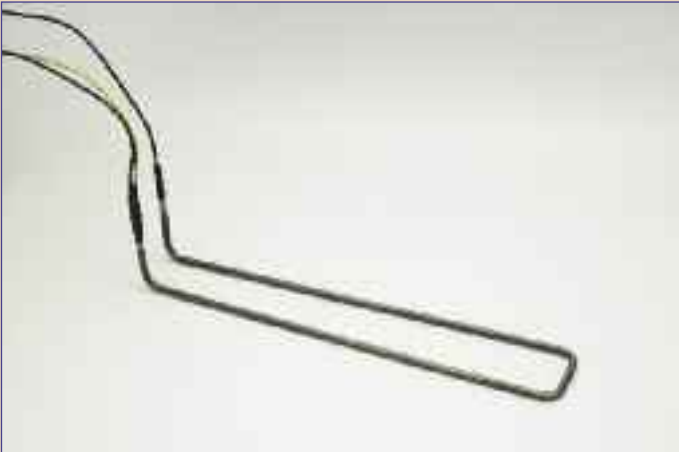
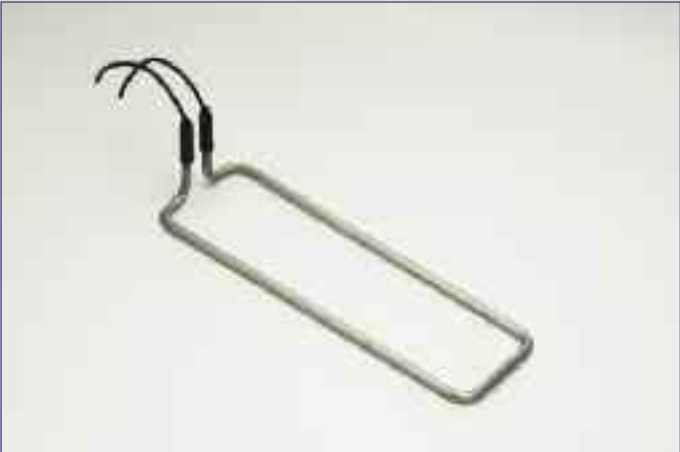
Another way for providing absolutely waterproof interconnection between the element and cable is overmolding with plastics. A plastic material is overmolded instead of rubber.

circular profiles



Examples of various shapes of heating elements for defrosting

In addition to standard models, shape and power of these heating elements can be tailored according to the customer's specification.



THICK FILM HEATING ELEMENTS



Field of application

- various kinds of contact heating
- cooking plates and boards
- electrical household appliances
- water heating in storage and instantaneous water heaters
- water heating in washing machines
- water boiling kettles, deep fat fryers
- irons, cookers

These heating elements are intended for contact heating of flat surfaces and for heating of liquids through a flat wall. Compared with an ordinary tubular heating element, a heating element on a sheet metal provides substantially better heat transfer into a flat wall. These elements can also be of benefit in applications, where low thickness of the heating element is important.

Considering the application of thick film elements, a consultation with the Technical Department of Backer Elektro CZ is highly recommended for detailed specification of particular requirements. For better understanding of the specific features of thick film heating elements, an Application List with customer's references has been issued; it can be e-mailed on request.

The heating elements meet the requirements of standard EN 60335-1 – Safety of electrical appliances. Please, observe local regulations for installation and connection to the electric network.

Thick film heating elements are manufactured in a completely different way than ordinary tubular heating elements. A thick film heating element consists of a stainless steel or ceramic substrate (plate), on which an insulation layer (meets the requirements for dielectrical strength) is printed, then a layer of resistive paste, followed by a contact and connective layer, and finally all these layers are covered with top enamel layer (providing just protection against mechanical damage, does not meet the requirements for dielectrical strength). The individual layers are applied by screen printing and each layer is dried and fired afterwards. Maximum protection from dirt and dust is essential through the whole production process. Production runs in air-conditioned areas meeting the requirements for rooms with high air purity class.

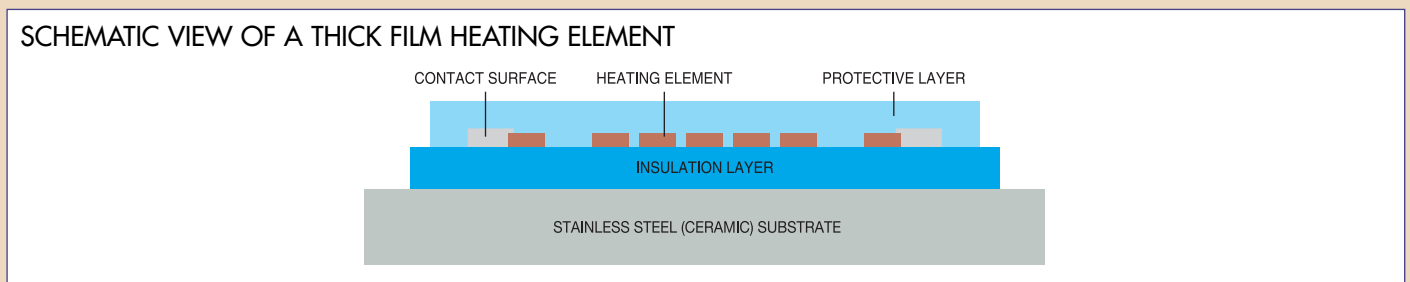
Thus precisely manufactured thick film heating elements feature a quick temperature rise, an extremely low thermal capacity and minimum temperature fluctuations. Their high efficiency of 70 - 95% depends on the mode of operation (direct or indirect heating).

At Backer Elektro CZ, substrates made of stainless steel according to standards AISI 430, DIN 1.4016 are used. Test with stainless steel AISI 304, DIN 1.4301 were carried out as well. The substrate (printing area) must be flat, but can be of various shapes and can contain openings manufactured in advance (before the printing process).

The elements operate at standard line voltage (up to 400 V). Thick film heating elements feature very high surface power density (up to tens W/cm²). Nevertheless, their operation conditions should be adjusted according to the particular application - adequate heat transfer should be provided so that the surface temperature does not exceed 300 °C.

Thick film heating elements feature a significant PTC effect (its resistance rises with rising temperature, so its power decreases consecutively). Thus, resistance at room temperature and nominal voltage are specified as technical parameters for thick film heating elements.

These elements are manufactured within 15 % tolerance of resistance (power).



Technical data required for specification of a new type of thick film heating element

Costs for manufacturing preparation of a thick film element with a new pattern are about 40000 to 50000 CZK, including production of test series (0-series).

The following technical specifications must be clarified and approved by the customer before starting the design of a new thick film element:

- operational voltage
- power rating at operating temperature or at room temperature
- operating temperature
- dimensions and shape
- fixing of the heating element onto the heated surface

Technical data required for manufacturing of a standard type of thick film heating element

When applying a standard heating element from our assortment, there are no costs for development of a new type.

The following technical specifications must be clarified and approved by the customer for optimisation of heating method for the particular application (eg. heating of hot plates, heating of vessels containing various substances etc.):

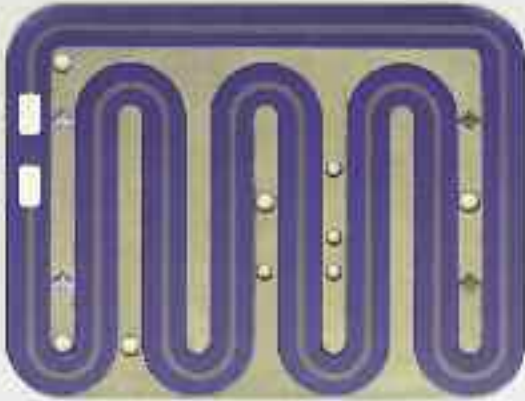
- dimensions of the area for fixing the heating element(s)
- operational voltage (230 V, 3 x 400 V star- or delta-connected, etc.)
- total power rating

In case that the total required power rating is not known, the following parameters must be specified:

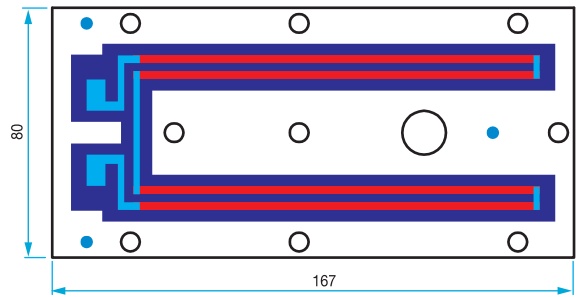
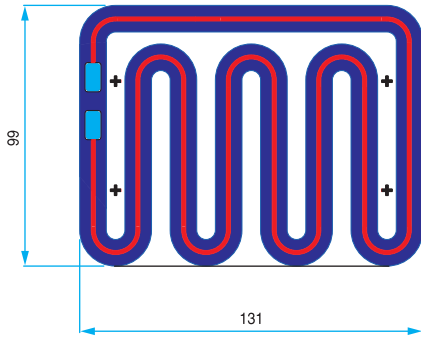
- operating temperature
- time for reaching the operating temperature (start-up time)
- type of heated material (eg. aluminium plate, stainless steel vessel with water)
- dimensions of heated material (eg. aluminium plate - length, width and thickness; stainless steel vessel - diameter, height, wall thickness, bottom thickness, volume of heated substance).

STANDARD TYPES OF THICK FILM HEATING ELEMENTS

Heating element No. 1



Heating element No. 2



input power at 230 V: 680 W (standard)
 input power range at 230 V: approx. 600 - 1200 W
 input power tolerance: +5/-10 %
 substrate outer dimensions: 131 x 99 mm
 substrate material: stainless steel
 DIN 1.4016, AISI 430
 substrate thickness: 1.5 mm

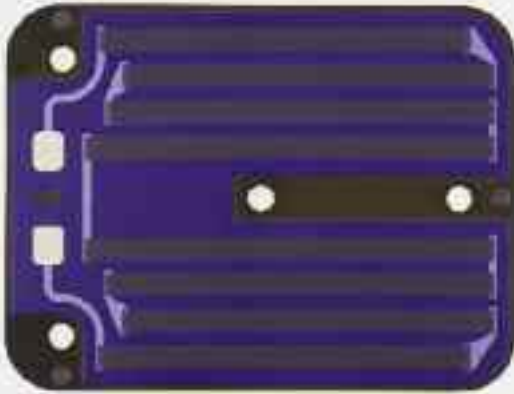
input power at 230 V: 1200 W (standard)
 input power range at 230 V: approx. 600 - 1200 W
 input power tolerance: +5/-10 %
 substrate outer dimensions: 167 x 80 mm
 substrate material: stainless steel
 DIN 1.4016, AISI 430
 substrate thickness: 2 mm

EXAMPLES OF APPLICATIONS

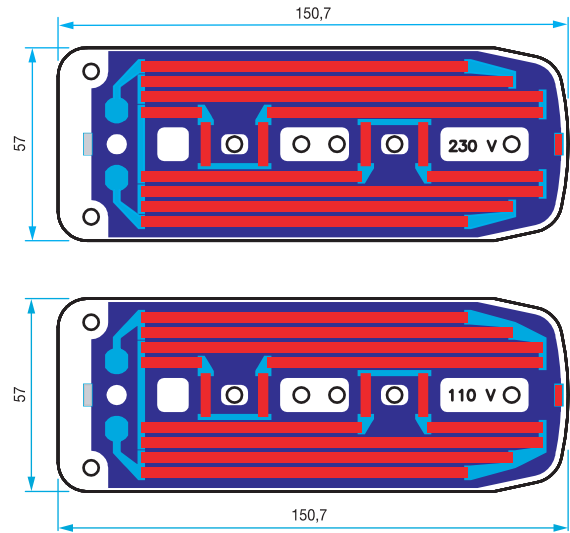
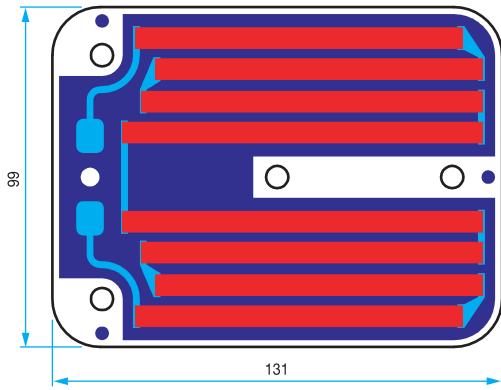
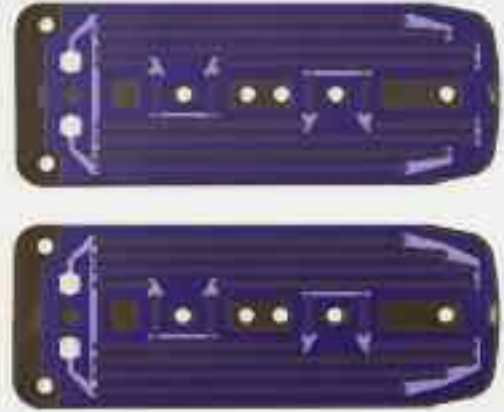


EXAMPLES OF POSSIBLE SOLUTIONS OF OTHER THICK FILM HEATING ELEMENTS APPLICATIONS (Not in standard production – special delivery conditions)

Heating element No. 3



Heating element No. 4



input power range at 230 V: 2000 - 4000 W
 input power tolerance: +5/-10 %
 substrate outer dimensions: 131 x 99 mm
 substrate material: stainless steel
 DIN 1.4016, AISI 430
 substrate thickness: 2 mm

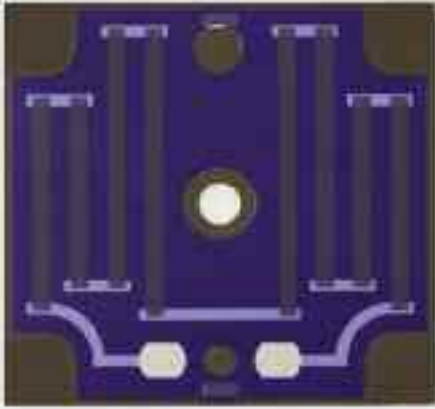
input power range at 230 V: 500 - 1000 W
 input power tolerance: +5/-10 %
 substrate outer dimensions: 151 x 57 mm
 substrate material: stainless steel
 DIN 1.4016, AISI 430
 substrate thickness: min 2 mm

EXAMPLES OF APPLICATIONS

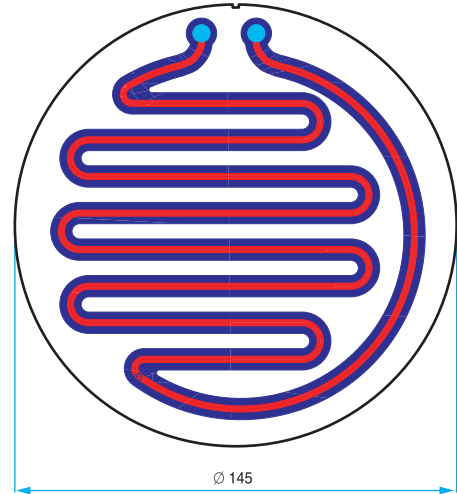
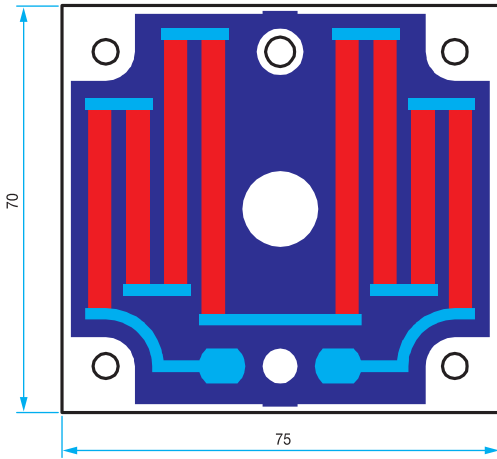


EXAMPLES OF POSSIBLE SOLUTIONS OF OTHER THICK FILM HEATING ELEMENTS APPLICATIONS (Not in standard production – special delivery conditions)

Heating element No. 5



Heating element No. 6



input power range at 12 - 48 V: 5 - 200 W
input power tolerance: +5/-10 %
substrate outer dimensions: 75 x 70 mm
substrate material: stainless steel
DIN 1.4016, AISI 430
substrate thickness: min 1 mm

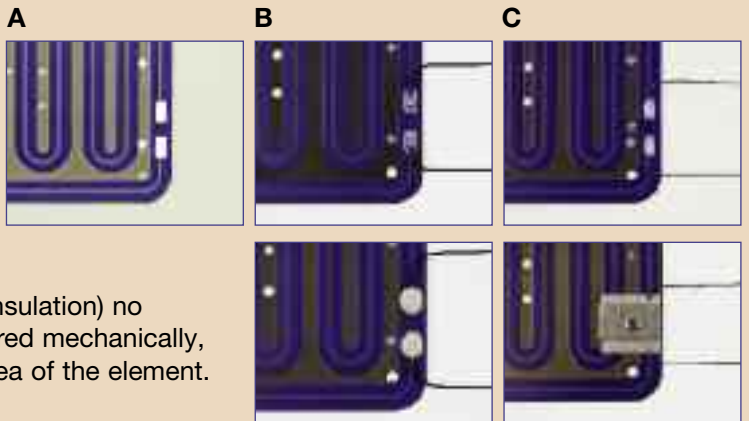
input power range at 230 V: 500 - 1000 W
input power tolerance: +5/-10 %
substrate diameter: 145 mm
substrate material: stainless steel
DIN 1.4016, AISI 430
substrate thickness: min 2 mm

STANDARD CONTACT SYSTEMS

A - without terminal leads (for customer specific spring contact system)

B - soldered terminal leads - insulated wires with temperature resistance up to 150 °C (at the soldering point), contact junction secured with epoxide resin, protrusion approx. 3 - 5 mm above the printed area of the element.

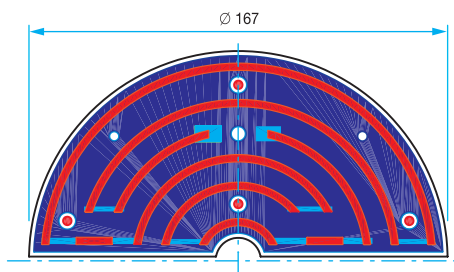
C - soldered terminal leads - (stranded wires without insulation) no temperature resistance limit, contact junction secured mechanically, protrusion approx. 8 - 10 mm above the printed area of the element.



Other contact systems to be discussed with the manufacturer.

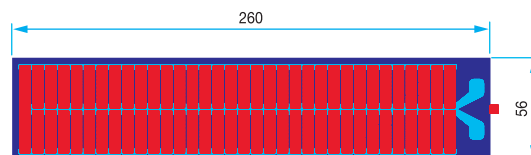
EXAMPLES OF POSSIBLE SOLUTIONS OF OTHER THICK FILM HEATING ELEMENTS APPLICATIONS (Not in standard production – special delivery conditions)

Heating element No. 7



input power range at 230 V:	1000 – 2000 W
input power tolerance:	+5/-10 %
substrate diameter:	167 mm a 200 mm
substrate material:	stainless steel DIN 1.4016, AISI 430
substrate thickness:	min. 1.5 mm

Heating element No. 8



input power range at 230 V:	1000 – 2000 W
input power tolerance:	+5/-10 %
outer tube diameter:	20 mm
substrate material:	stainless steel DIN 1.4301, AISI 304
tube wall thickness:	1 mm

DELIVERY CONDITIONS FOR SAMPLES AND LOW-VOLUME PRODUCTION

- standard element available in stock - immediately
- standard element not available in stock - 3 to 4 weeks
- other types - 2 to 3 month

Delivery conditions for higher volumes on request.

Consultations:

Phone: +420 463 030 610
 Fax: +420 463 030 649
 e-mail: ttt@backer-elektro.cz

HEATING CARTRIDGES



Field of application

- heating of moulds for plastics and vulcanization
- heating of moulds and core boxes for foundry industry
- heating of markers for thermal marking
- warming of heating plates and boards
- defrosting of refrigerators and freezers
- heating of laboratory equipment
- heating of liquids
- heating of machine and device parts and accessories

Application examples

- industrial applications - heating of moulds and heating of machine and device parts and accessories in plastics, rubber, wood, paper, shoemaking, foundry industry and others
- welding machines for plastics, medicine and laboratory equipment
- in general, at various applications, where intensive contact heating and rapid exchangeability are of primary importance

Type and/or model specification (6 – 8 digit in the order type number) is indicated on the heating element. The heating elements meet the requirements of standard EN 60335-1. Please, observe local regulations for installation and connection to the electric network.

For specific applications of these heating elements, consultation with engineering department of Backer Elektro CZ is necessary.

Backer Elektro CZ has over twenty years experience in the field of high loaded heating cartridges. At present, we are expanding our capacity for production of wide range of heating cartridges in various types and models.

The heating cartridges are designed for high surface density loads - over 20 W/cm². The resistive wire made of a nickel-chrome alloy with a high thermal resistance is precisely wound around high quality ceramic parts and immersed in compacted ultra fine magnesium oxide powder. Accurately ground sheath of the heating

cartridge is made of stainless steel AISI 321(DIN 4541).

The heating cartridges are available in a wide range of powers from 300 W to 2000 W.

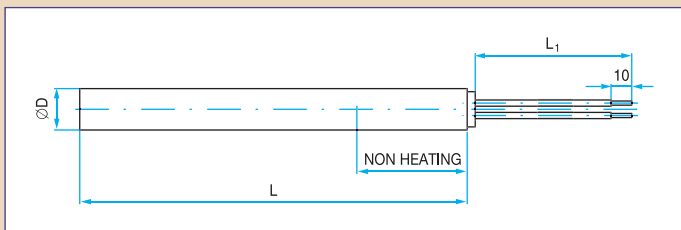
Tolerance of diameter D: - 0.02 to - 0.08 mm.

Tolerance of length L: ± 2 to ± 10 mm.

Recommended hole tolerance: H7.

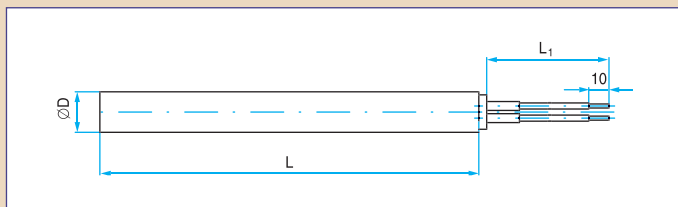
It is recommended to insert the cartridge in a hole longer than the length of the cartridge.

Heating cartridges with internal cable connection



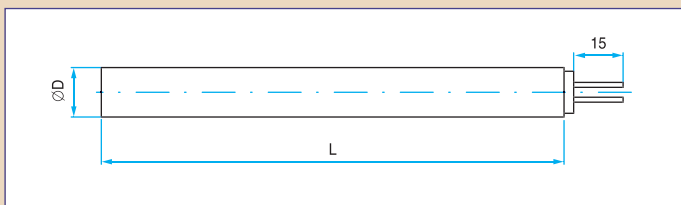
Cartridge heaters with internal cable connection are equipped with cables with a glass fibre insulation featuring enhanced thermal resistance. Standard lengths L: 200 and 1000 mm.

Heating cartridges with external cable connection



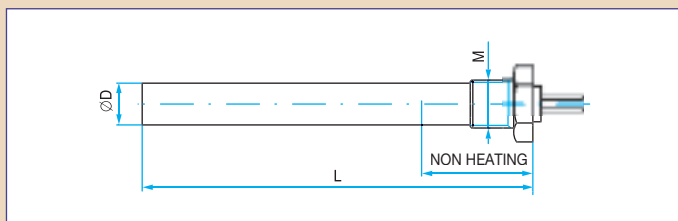
The most frequent type of a cartridge heater with external cable connection is equipped with cables with a silicone insulation in standard lengths L: of 200 mm. Cartridges with external cable connection can be optionally fitted with cables with glass fibre insulation with enhanced thermal resistance.

Heating cartridges – basic model



Basic type of heating cartridge is fitted with 15-20 mm wire terminals made of pure nickel

Heating cartridges with a flange



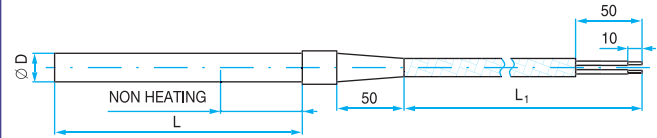
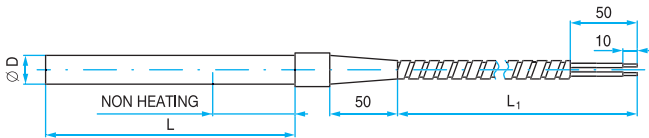
D	6.5	8	10	12.5	16	20
M	10x1	12x1.5	14x1.5	16x1.5	20x1.5	27x1.5

Cartridge heaters with flange are fitted at the terminal side with a threaded part for easy assembly and disassembly. Diameter D of the cartridge corresponds to thread dimension M on the flange, as indicated in the table.

Heating cartridges with cables protected by a flexible corrugated tube



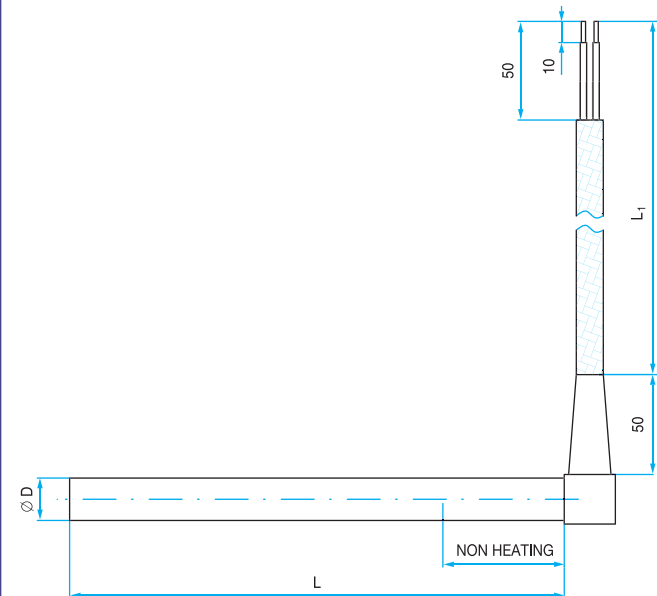
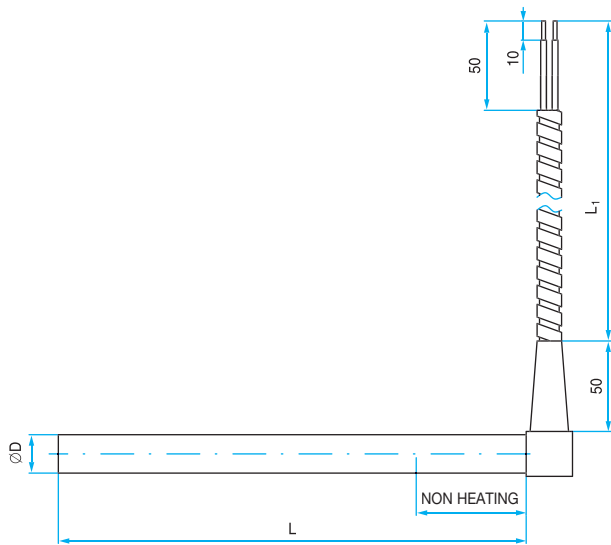
Heating cartridges with cables protected by a sheath of flexible metal braid



Heating cartridges with cables protected by a flexible corrugated tube



Heating cartridges with cables protected by a sheath of flexible metal braid



Cartridge heaters with either straight or right angle metal cable outlet with a flexible corrugated tube are fitted with wires with glass fibre insulation featuring enhanced thermal resistance. The metal tube provides an excellent protection against mechanical damage or potential splashing with hot liquids.

Cartridge heaters with either straight or right angle metal cable outlet with a flexible metal braid are fitted with wires with glass fibre insulation featuring enhanced thermal resistance. The metal braid protects the cables against mechanical damage and wear, especially at bends over edges.

Table of values – valid for all types of heating cartridges listed in the catalogue

diameter mm	length mm	Power W (at 230 V) for standard model								
		300	400	500	600	800	1000	1200	1500	2000
6.5	60	x								
	80	x	x	x						
	100	x	x	x						
8	60	x								
	80	x	x	x	x					
	100	x	x	x	x	x				
	130	x	x	x	x	x				
	160	x	x	x	x	x	x			
10	60	x	x							
	80	x	x	x						
	100	x	x	x	x	x				
	130	x	x	x	x	x	x			
	160	x	x	x	x	x	x	x		
	200	x	x	x	x	x	x	x	x	
	250	x	x	x	x	x	x	x	x	
12.5	60	x	x	x						
	80	x	x	x	x					
	100	x	x	x	x	x				
	130	x	x	x	x	x	x			
	160	x	x	x	x	x	x	x		
	200	x	x	x	x	x	x	x	x	
	250	x	x	x	x	x	x	x	x	x
	300	x	x	x	x	x	x	x	x	x
	400	x	x	x	x	x	x	x	x	x
16	60	x	x	x	x	x				
	80	x	x	x	x	x	x			
	100	x	x	x	x	x	x	x		
	130	x	x	x	x	x	x	x	x	
	160	x	x	x	x	x	x	x	x	x
	200	x	x	x	x	x	x	x	x	x
	250	x	x	x	x	x	x	x	x	x
	300	x	x	x	x	x	x	x	x	x
400	x	x	x	x	x	x	x	x	x	
20	80	x	x	x	x	x	x			
	100	x	x	x	x	x	x	x		
	130	x	x	x	x	x	x	x	x	
	160	x	x	x	x	x	x	x	x	x
	200	x	x	x	x	x	x	x	x	x
	250	x	x	x	x	x	x	x	x	x
	300	x	x	x	x	x	x	x	x	x
	400	x	x	x	x	x	x	x	x	x

The standard model is specified by dimensions and power ratings according to the table::

- heating cartridges shown as basic model are fitted with output terminals (pins) only
- heating cartridges with external cable connection are equipped with cables with a silicone insulation length 200 mm (optionally with longer cables)
- heating cartridges with cables protected by a flexible corrugated tube or by a sheath of flexible metal braid are fitted with wires with glass fibre insulation featuring enhanced thermal resistance (min 350 °C) - length of cables and length of protection means can be tailored according to customer's specification

Heating cartridges can be manufactured for various voltages; power ratings shown in the table refer to voltage 230 V. In case that a heating cartridge with power, voltage, length or diameter different from those specified in the table is required (non-standard model), consultation with engineering department of Backer Elektro CZ is necessary.

Our heating cartridges with new construction design and enhanced lifetime are manufactured in high quality, out of first-class materials and feature a high quality workshop processing.

Consultations:

Tel.: +420 463 030 610
 Fax: +420 463 030 649
 e-mail: patrony@backer-elektro.cz

WELDED TUBES



Field of application

- tubular heating elements
- heat exchangers
- cooling and freezing devices
- pumping of beverages

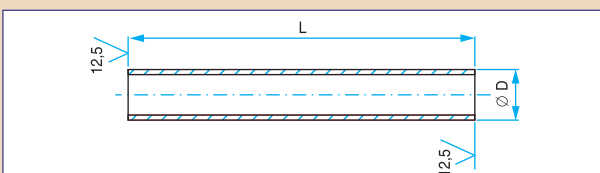
We manufacture our own stainless steel tubes for our production of electrical heating element at an advanced automatic production line. The below mentioned table specifies the material, dimensions and other parameters.

The material thickness is 0.4 to 0.7 mm.

We can also offer a production and delivery of stainless steel tubes of given parameters according to customer's specification, namely straight tubes of lengths up to 8000 mm.

For specific applications of these welded tubes, consultation with engineering department of Backer Elektro CZ is highly recommended.

TYPE 6205 welded tubes



STAINLESS STEEL LENGTHWISE WELDED TUBES

Material	Profiles Ø x thickness (mm)	Maximum length (mm)	Maximum surface temp. (°C)
DIN 1.4301 (AISI 304)	7.5 x 0.4	6000	750
	10.0 x 0.4	8000	
	10.0 x 0.5	8000	
DIN 1.4541 (AISI 321)	7.5 x 0.4	6000	750
	10.0 x 0.4	8000	
	10.0 x 0.5	8000	
	10.0 x 0.7	8000	
DIN 1.4876 (Incoloy 800)	7.5 x 0.4	6000	900
	10.0 x 0.5	6000	
DIN 1.4404 (AISI 316L)	7.5 x 0.5	6000	900
DIN 1.4828 (AISI 309)	10.0 x 0.6	8000	750
DIN 1.4571 (AISI 316Ti)	10.0 x 0.7	8000	900

TECHNICAL PARAMETERS OF HEATING ELEMENTS

The technical parameters of electrical heating elements mentioned in this chapter are to be considered as basic data only. They are intended for customer's orientation when discussing an order with the Sales Department of Backer Elektro CZ.

These parameters are essential when the customer's requirements cannot be satisfied with our offer of several hundreds types of heating elements from our assortment. In such a case, a consultation with the Technical Department of Backer Elektro CZ is necessary. Thus, a heating element with required characteristics for the given application can be designed and manufactured.

SHAPES AND TYPES OF HEATING ELEMENTS

An electrical heating element consists usually of one or more tubular heating rods, connecting means for electrical connection, and heads or flanges for mechanical fixing.

The heating rods can be of circular or flat-oval cross section. The sheath of the heating rod consists of a metal tube of specific dimensions that is made of a suitable material, according to the given application. The surface of this metal sheath can be further treated so that to increase its resistance against surrounding environment. To improve the heat transfer of elements for heating of air and other gases, these can be provided with ribbing made of a steel tape wound perpendicularly around the heating rod. Some heating elements intended for special purposes can be imbedded into a casting of required shape. For this purpose, mostly aluminium is used.

A resistive heating wire with output pins or output stranded wires is inserted inside the metal tube into an insulating material. The tube is then sealed and closed so that its inside active parts are thoroughly protected from all influences from the environment.

The heating rods, as the basic semi-product, can be processed in variety of shapes, meeting the requirements of the customer, depending on the final equipment where they are applied (up to a maximum operating pressure of 6.4 MPa).

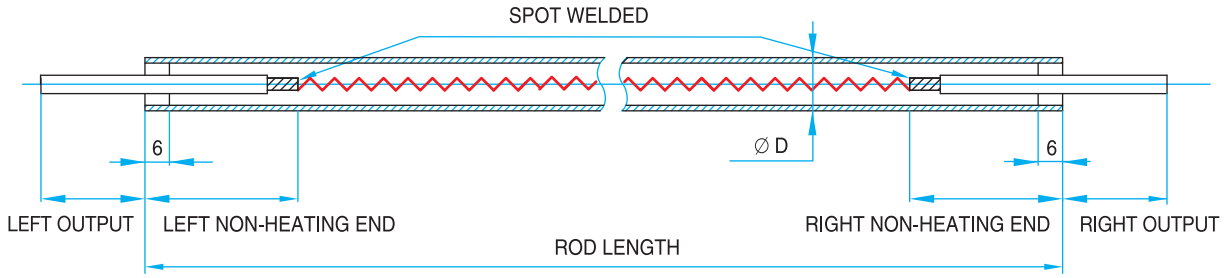
An electrical heating element can be optionally equipped with various types of heads or flanges for mechanical fixing at assembly. The heating element can also be equipped with suitable connecting means for connection to the electrical circuit.

All electrical heating elements manufactured by Backer Elektro CZ are designed and produced in accordance with standard EN 60335-1.

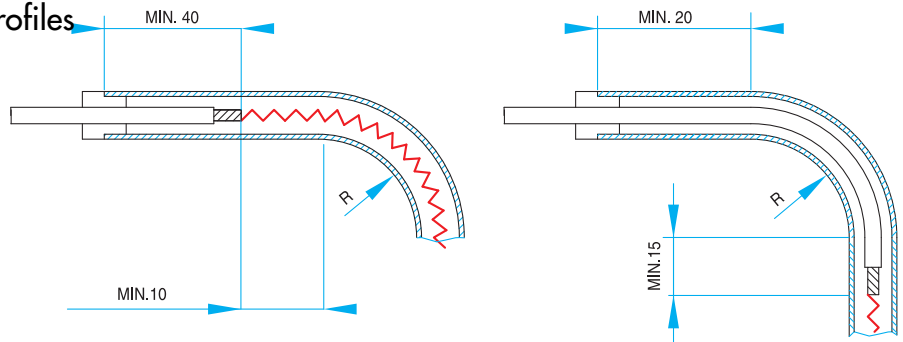
At Backer Elektro CZ, we are proud to have mastered the technology of thick film heating elements. This advanced technology process provides a perspective opportunity to use heating elements of this kind in ordinary areas of applications, as well as in brand new ones. For more information refer to chapter "THICK FILM HEATING ELEMENTS".

CIRCULAR PROFILES

Cross section of a circular rod

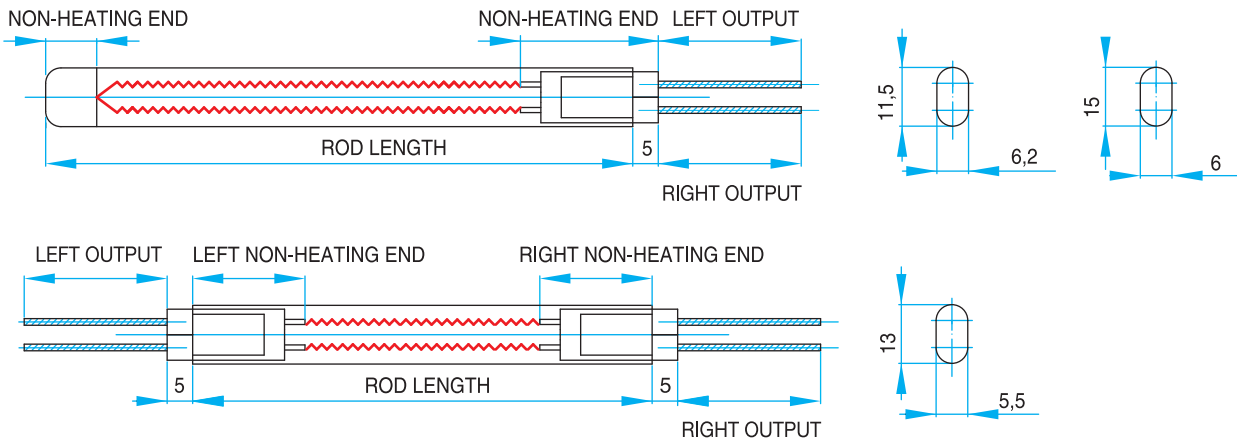


Bending conditions of circular profiles

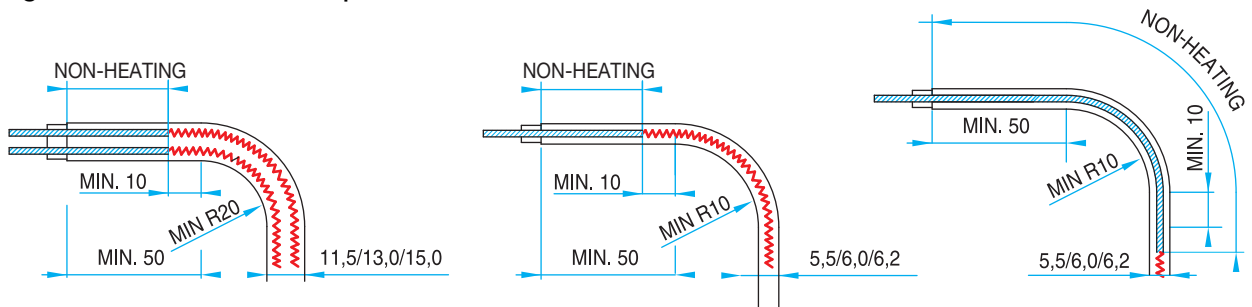


OVAL PROFILES

Cross section of an oval rod



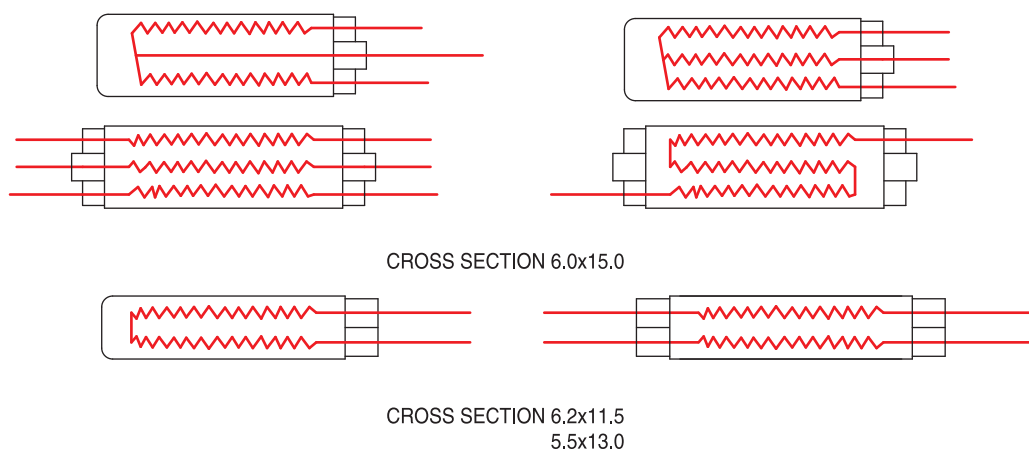
Bending conditions of an oval profile



Flat bends cannot be performed in the non-heating part

These bends can be performed in the heating as well as in the non-heating part

Schematic arrangement of resistive wire spirals in rods of oval cross section



SHEATH MATERIAL, CHARACTERISTIC FEATURES, FIELD OF APPLICATION

Material	Acc. to ČSN Acc. to DIN Acc. to ASTM	Max. surface temperature (°C)	Characteristic features	Field of application
Steel	11343 St 34-2 -	400		heating of air up to 400 °C, heating of oil, alkaline bathes, contact heating
Stainless steel	17240 1.4301 304	750		heating of air, gases, liquids, contact heating
Stainless steel	17246 1.4541 321	750	good corrosion resistance	heating of liquids, gases, contact heating, infrared heaters, grills
Stainless steel	17349 1.4404 316L	750	very good corrosion resistance	steam generation, wet-dry cycling, heating of highly chlorinated water
Stainless steel	- 1.4876 (Incoloy 800) -	900	high corrosion resistance, heat resistance	storage heaters, aggressive liquids
Stainless steel	17251 1.4828 309	900	heat resistance	storage heaters
Copper, nickel plated copper	- Cu-DHP -	200		water heating, water heaters, dishwashers, washing machines

Oval profiles can be used up to maximum surface temperature of 550 °C and they are, among others, also suitable for contact heating.

SPECIFICATIONS OF HEATING RODS

Profiles (mm)	Production lengths (mm)	Sheath material	Bend inner radius R
∅ 6.4	250 - 2300	steel ČSN 11343 stainless steel DIN 1.4301. 1.4404. 1.4541. 1.4828. 1.4876	minimum R 10
∅ 8.5	250 - 8300	steel ČSN 11343 stainless steel DIN 1.4301. 1.4404. 1.4541. 1.4828. 1.4876 copper Cu-DHP	minimum R 10 (depends on wall thickness)
6.2 x 11.5	150 - 4500	steel ČSN 11343 stainless steel DIN 1.4541 copper Cu-DHP	minimum R 10. flat bending R 20
5.5 x 13.0	150 - 4500	steel ČSN 11343 stainless steel DIN 1.4541 copper Cu-DHP	minimum R 10. flat bending R 20
6.0 x 15	150 - 4500	steel ČSN 11343 stainless steel ČSN 17248 copper Cu-DHP	minimum R 10. flat bending R 20
∅ 10.0 *	60 - 160	stainless steel DIN 1.4541	cannot be bent
∅ 12.5 *	60 - 160	stainless steel DIN 1.4541	cannot be bent
∅ 12.0 **	400 - 1100	stainless steel DIN 1.4541	cannot be bent

* Only heating cartridges for heating of plastics moulds, heating of machines and their accessories

** Only for heating of water in radiators and bathroom dryers.

SPECIFIC LOAD OF SHEATH SURFACE

Application	Maximum temperature of heated medium (°C)	Maximum surface specific load (W/cm ²)						
		steel 11343 St 34-2	steel 17240 1.4301 AISI 304	steel 17349 1.4404 AISI 316L	steel 17246 1.4541 AISI 321	steel 17251 1.4828 AISI 302B	steel Incol. 800 1.4876	copper Cu-DHP
Steady water	100	-	-	10	10	-	-	10
Spinning water (washing mach.)	100	-	14	14	14	-	14	14
Running water (instantaneous water heater)	60	-	-	25	30	-	-	25
Pressure water	200	-	-	10	10	-	-	10
Alkaline baths	100	6	-	8	8	-	-	-
Highly chlorinated water	100	-	-	10	-	-	10	-
Acid bathes	100	-	-	2	-	-	2.5	-
Phosphating baths	100	-	-	4	4	-	-	-
Light oil	250	2	2	-	2	-	-	-
Heavy oil	100	1.5	1.5	-	1.5	-	-	-
Frying oil	250	-	5	5	5	-	-	-
Oil radiators	80	6	6	-	-	-	-	-
Asphalt. tar	100	1	1	-	-	-	-	-
Glycerine	150	2	2	-	-	-	-	-
Lead	500	-	4	-	-	-	-	-
Air	50	1.5	5	-	5	6	6	-
	200 - 450	-	4	-	4	5	5	-
Flowing air 5 m/s	50	3	8	-	8	9	10	-
	200	1.5	5	-	5	7	7.5	-
Flowing air 10 m/s	50	5	10	-	10	10	10	-
	200	2	8	-	8	9	9	-
	450	-	4	-	4	6	6	-
Storage stove	600	-	-	-	4	4	4	-
Contact heating	300	2	4	-	4	6	6	-
Imbedded in castings	300	18	18	-	18	-	-	-

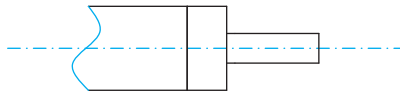
Maximum specific load of flat-oval profiles is limited to 3 W/cm². with an exception of imbedded elements (e.g. in aluminium). the specific load of which can be higher.

CONNECTING ELEMENTS

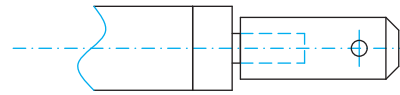
Elements for connection to an electrical circuit are important parts of every heating element. Their proper choice, in accordance to the heating element parameters and to the field of application, is essential for correct and safe operation of the element in a specific device or environment.

MOST COMMON CONNECTING MEANS FOR RODS WITH CIRCULAR CROSS SECTION

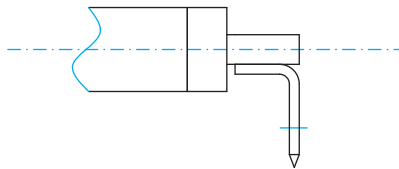
Output pin



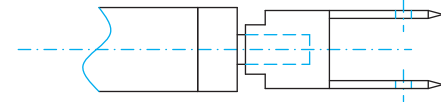
Flat pin, width 6.3 mm



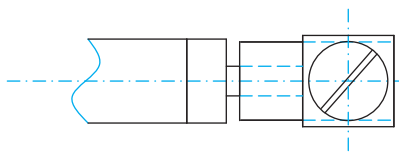
Flat pin, width 6.3 mm



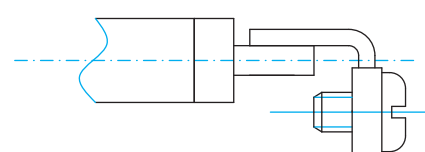
Flat double pin, width 6.3 mm



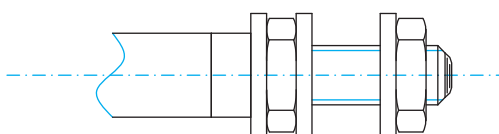
Connecting base with screw M4 or M5



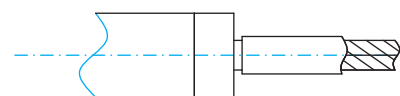
Connecting base with screw M4



Stud M4 or M6 with nuts and washers

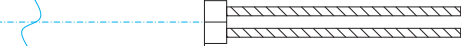


Output stranded wire



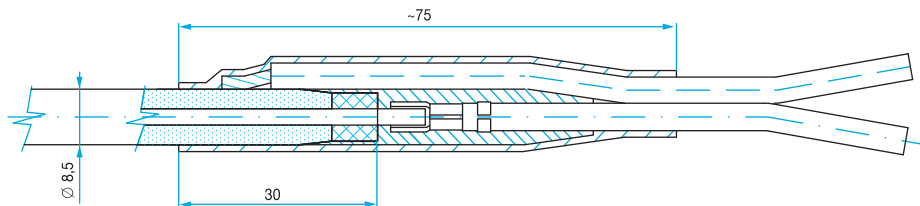
CONNECTING ELEMENTS FOR RODS WITH OVAL CROSS SECTION

Output stranded wires of suitable lengths are used as connection means at rods with flat-oval cross section. Depending on the operating temperature, brass or nickel stranded wires are used. The stranded wires can be equipped with suitable insulation material.

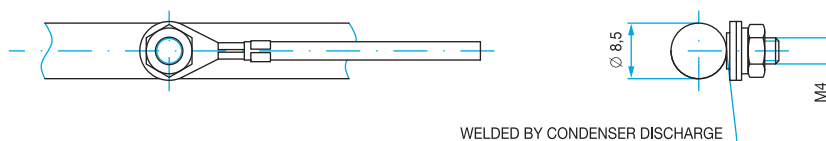
Output stranded wires	Stranded wire material	Insulation material	Max. operating temperature (°C)
	brass	-	180
	brass	silicone	180
	brass	PTFE (Teflon)	260
	brass	ceramic beads	260
	nickel	-	400
	nickel	glass fibre/silicone	350
	nickel	ceramic beads	400

CONNECTION OF PROTECTIVE EARTH CABLE

An earthing cable soldered on the heating element sheath can be optionally covered with shrink tube



An earthing cable connected on the heating element sheath by means of a welded bolt with a nut.



MOUNTING AND FIXING ELEMENTS

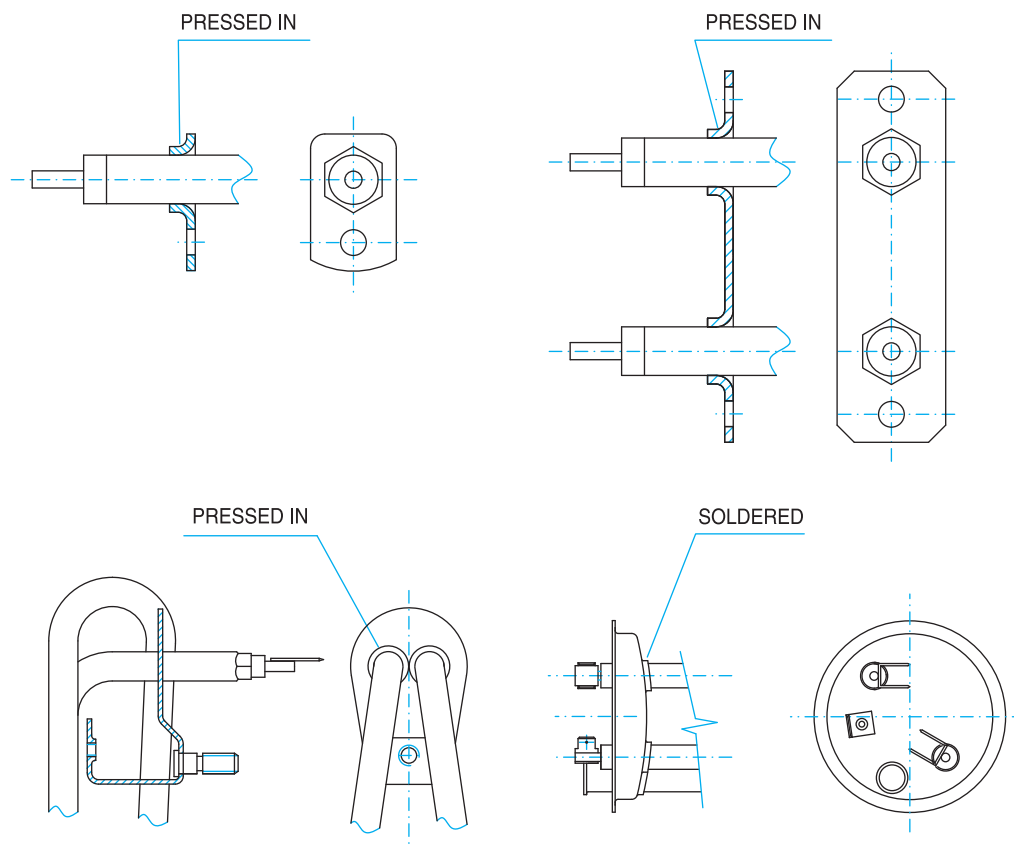
Most of the heating elements are equipped with various mounting and fixing elements for their correct fixing into the equipment, for holding the required spacing between individual rods of an element, or being engaged as supporting means preventing sagging of heating rods of long elements in the horizontal operating position.

For easy assembly into the devices, the elements are equipped with various types of flanges that can have a form of stampings or cuttings from steel or stainless steel sheets, or a form of machined steel or brass profiles of circular or hexagonal cross section. Their surfaces can be further treated by metal plating, e.g. with nickel.

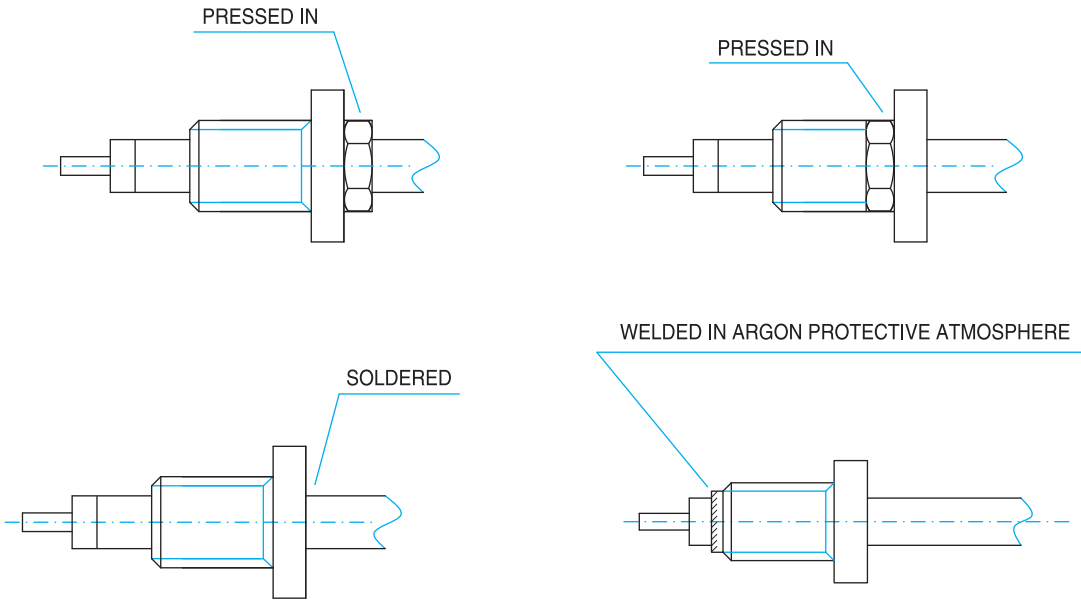
The heating rods are attached to the flanges by means of pressing, soldering, capillary soldering or welding in protective atmosphere. The flanges are equipped with necessary fixing elements (nuts, washers, screws, sealings etc.). Some flanges with terminals can be closed with suitable heads that provide required degree of protection in the given operational environment.

The following brief summary presents just the most common examples of flanges. A heating element can be equipped with any suitable flange from our assortment of several tens of types, according to the customer's requirements.

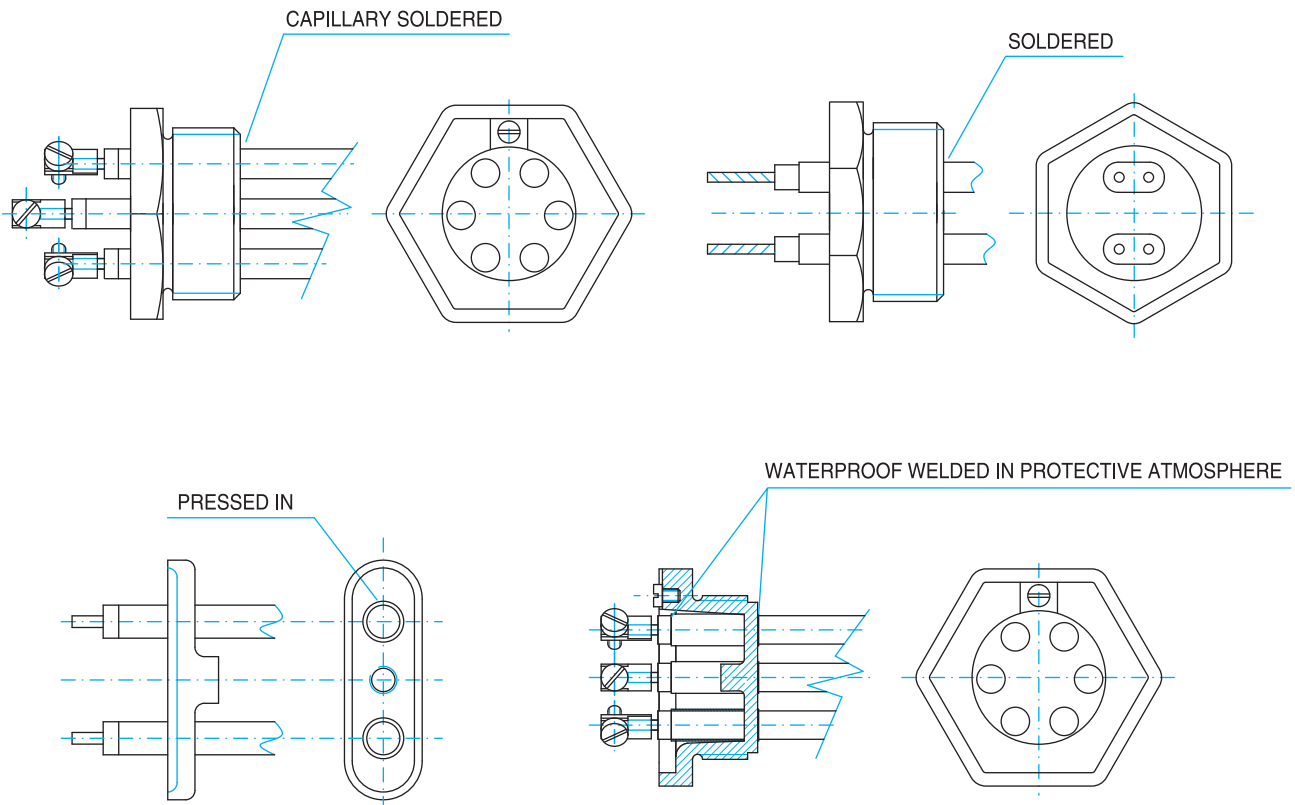
Examples of flanges made of sheet stampings



Examples of machined flanges



Examples of flanges made of forgings or castings



TECHNICAL SPECIFICATION OF ORDER

HEATING ELEMENTS

technical and sales
consultation

Backer Elektro CZ,

Poličská 444, 539 01 Hlinsko, Czech Republic
Telefon: +420 463 030 610, +420 463 030 620
Fax: +420 463 030 649
E-mail: obchod@backer-elektro.cz

Customer:
Address:
Contact person:
Tel.: Fax: E-mail:

Technical specification of ordered heating element:

Description of application of the heating element:
.....
.....

Heated medium: liquid
gas

Aggressivity of environment:
.....

Medium circulates in the equipment: yes no

Temperature (final):°C Pressure:

Voltage:V Control: yes no

Power:W Degree of protection: IP

Sheath material:

Element length:mm Non heating part:mm

Assembly position in the equipment: horizontal vertical other

Other important information:
.....
.....
.....

DRAWING OR SKETCH

If a drawing or a sketch is enclosed to the order, please, specify the following important data:

- dimensions of the heating elements with required tolerances
- mounting dimensions for fixing the heating element into the device (flanges etc.)
- diameter or profile of the heating rods, length of non heating ends of heating rods
- required method of electrical connection (screw connection, connectors, stranded wires)
- length of outputs for electrical connection, required material





COMMUNICATION

If you have any wishes or requirements, please,
do not hesitate to contact us at Backer Elektro CZ:

Orders of standard types of heating elements	Phone: +420 463 030 617, +420 463 030 620 Fax: +420 463 030 648
Enquiries of new types of elements and consultations	Phone: +420 463 030 615, +420 463 030 617 Fax: +420 463 030 648
Potential complaints	Phone: +420 463 030 621, +420 463 030 602 Fax: +420 463 030 647
Expedition of final products	Phone: +420 463 030 635, +420 463 030 607 Fax: +420 463 030 649

Headquarters of Backer Elektro CZ

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Secretary to the General Director	Phone: +420 463 030 612 Fax: +420 463 030 647
Commercial Director	Phone: +420 463 030 610 Fax: +420 463 030 649
Production and Technical Director	Phone: +420 463 030 604 Fax: +420 463 030 647
Financial Director	Phone: +420 463 030 605 Fax: +420 463 030 647
Purchasing Director	Phone: +420 463 030 653 Fax: +420 463 030 646
Quality Manager	Phone: +420 463 030 602 Fax: +420 463 030 647
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BACKER BHV AB
Div. CALESCO
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NORSKE BACKER A/S
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OY MEYER VASTUS AB
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LOVAL OY
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DANOTHERM ELECTRIC A/S
Rødovre, Dánsko

LUND & SORENSEN A/S
Veje, Dánsko

JEVI A/S
Veje, Dánsko

SAN ELECTRO HEAT A/S
Graested, Dánsko

BACKER OBR Sp. z o.o.
Pyrzyce, Polsko

ELTOP PRAHA s.r.o.
Mířetice, Česká republika

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Sant' Agostino, Itálie

BACKER FER S.r.l.
Div. REBA
Busto Arsizio, Itálie

BACKER FACSA, S.L.
Aiguafreda, Španělsko

HEATROD ELEMENTS Ltd.
Worsley, Velká Británie

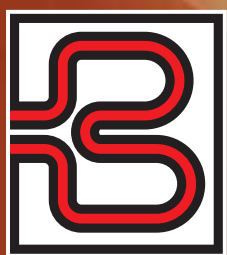
BACKER ELC AG
Aarau, Švýcarsko

SINUS-JEVI B.V.
Medemblik, Holandsko

SHEL NIBE MANUFACTURING
Co Ltd.
Shenzen, Čína

BACKER ALPE
Tlahuac, Mexiko

BACKER HEATING
TECHNOLOGY Inc.
Elgin, USA



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