
THE HEAT-TECHNOLOGY INSIDE
55 years
product
catalog 2016
BALÇIK ISI ELEMANLARI
SANAYİ TİCARET ANONİM ŞİRKETİ









HEATING ELEMENTS

STEM THERMOSTATS

WELDED TUBES

TUBE SHAPING & PROCESSING

FURNACE BRAZING

BRIGHT ANNEALING




















MAJOR HOME APPLIANCES

HEATING ELEMENTS FOR

OVEN
WASHING MACHINES

SMALL HOME APPLIANCES

HEATING ELEMENTS FOR

BBQ GRILL
TOASTERS
STEAM IRONS AND IRONING TABLES

LIQUID HEATING APPLICATIONS

HEATING ELEMENTS FOR

INSTANT WATER HEATERS
ELECTRIC WATER HEATERS WITH TANK
ELECTRIC WATER HEATERS 1.1/4' SCREW TYPE
ELECTRIC WATER HEATERS 48MM FLANGE TYPE
STEM TYPE THERMOSTAT WITH SAFETY
ELECTRIC WATER HEATERS AQUAHET TYPE
INDUSTRIAL IMMERSION WITH FLANGE
TOWEL RADIATOR

PROFESSIONAL KITCHEN

HEATING ELEMENTS FOR

COOKING APPLIANCES
INDUSTRIAL DISHWASHERS
TEA, COFFEE, HOT WATER VENDING APPLIANCES
INDUSTRIAL FRYERS
INDUSTRIAL DISTRIBUTION APPLIANCES

OTHER INDUSTRIAL APPLIANCES

HEATING ELEMENTS FOR

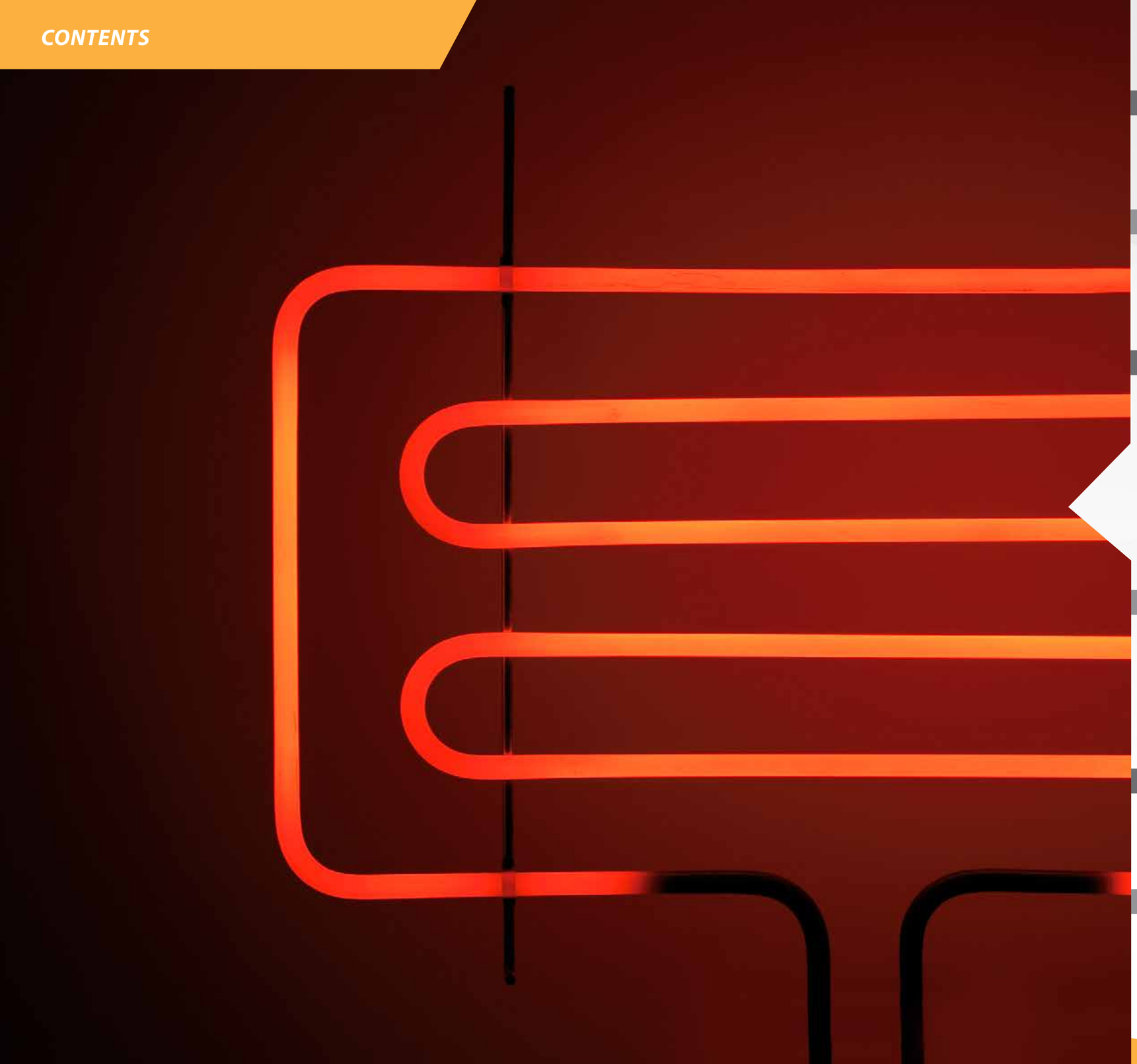
SAUNAS
VENTILATION SYSTEMS

INDUSTRIAL APPLICATIONS

HEATING ELEMENTS FOR

FINNED TYPE HEATING ELEMENTS
DEFROST TYPE HEATING ELEMENTS
STRAIGHT ROD TYPE HEATING ELEMENTS

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FINNED TYPE HEATING ELEMENTS
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MILESTONES

1959 Heating Element Division Founded
1959 First Branch in Ulus, Ankara
1970 First Workshop in Ostim, Ankara
1977 First Export to Europe
1994 Became the distributor of Kanthal
1996 First Branch in Karaköy, Istanbul
2000 First plant in Kazan, Ankara
2001 Heating Element Production Technology *Renovation*
2002 Tube Division Founded
2003 Company Managemental Ownership *Change*
2004 Corporate Organisational Restructuring
2005 Plant expansion in Kazan, Ankara
2006 Acquisition of Tormec s.n.c. from Italy
2007 Furnace Brazing and Furnace Bright *Annealing Technology*
2008 Metal Treating Division Founded
2009 Second Branch Bayrampasa, Istanbul
2010 Plant renovation in Kazan, Ankara
2011 Heating Element Production Technology *Renovation*
2012 Automation Production Technology Investments for Heating Elements of Cooking *Appliances*
2013 STF Sealing Technology
2014 Plant expansion in Kazan, Ankara
2015 Corporate Organisational Restructuring
2016 Double Safety Stem type Thermostat Technology Release

BALÇIK is one of the world's leading heating element manufacturer, which was founded in 1959 by the honorary president of our corporation, Mr. Süleyman BALÇIK in Ankara, Turkey. As being a family owned corporation managed by the third generation with over 50 years history, today we became the focus of experience, quality, trust and innovation within the heating elements industry by the brands of BALÇIK and TORMEC.

Beginning with the heating elements manufacturing, we have gradually expanded our activities. Our corporation is currently manufacturing and providing services with it's capabilities in it's four different divisions;

1) Heating Element Division; Production of Tubular Heating Elements for Domestic and Industrial Applications.
2) Thermostat Division; Production of Stem type Thermostats for Domestic Water Heating Appliances.
3) Tube Division; Production of Stainless Welded Tubes integrated with Tube Shaping, Processing, Assembling Capabilities.
4) Metal Treatment Division; Services of Furnace Brazing, Bright Annealing and Electroless Nickel Diffusion Coating.

Our success is driven by our difference in the industry, with our variety in product, production and service ranges. By high tech products - production abilities, we are aiming to provide added value to our products, our customers and also to our the country. We are currently continuing our manufacturing activities at our headquarters and production facility located in Kazan, Ankara with over 10 millions of pieces production capacity, 200 employees, on 6500sqm.

The acquisition of an Italian well known Water Heating Element and Stem type Thermostat manufacturer TORMEC in 2006 has strengthened BALÇIK's position as one of the leading manufacturer in the industry, by expanding the product range with Thermostats. Presently our products are reaching to our hundereds of customers in 5 continents / 45 countries, which is supported by our our sales offices and logistics warehouses in Istanbul, Turkey.

BALÇIK, identified it's brand with providing high quality products and services, has VDE, CE product quality and ISO 9001:2000 system quality certificates since 2001 and 2002 respectively and continually updated these in line with international standards over the years.

With more than half century history, BALÇIK aims to be a solution partner for our customers; develops special solutions and products with its unique production technology, provides logistics support with its flexible and fast production infrastructure and represents the technology, efficiency, quality and trust with its experienced staff.

VISION
For providing high tech, energy and cost efficient, long lifetime products to the industry, continuing to the research and development projects together with the new techological and automation investments.

MISSION
Partner for our customers; develops special solutions and products with its unique production technology, provides logistics support with its flexible and fast production infrastructure and represents the technology, efficiency, quality and trust with its experienced staff.

VALUES
Transparency
Innovativeness
Competitiveness
Customer Orientation

BALÇIK WITH NUMBERS
55 Years History
Two Brands
Ten Millions Production Capacity
Two Hundered Employees
6.000sqm Built, 20.000sqm Open Production Facility
Two Sales Offices and Logistic Warehouses
Export to 45 Countries in 5 Continents
Participated more than 25 International Exhibitions
Three Quality Certificatations
Hundreds of Business & Solution Partners Worldwide

BALÇIK ISI

Tormec THE HEAT

www.balcik.com.tr





SUPPORTING OUR CUSTOMERS
DURING EVERY STEPS OF THE PRODUCTION

BALÇIK supports and guides its customers during the entire development process of components as well as after sale:

- BALÇIK provides technical advises to its customers during designing of the product in order to ensure the best perfomance, reliability and safety.
- Cognizant of the fact that the basis of an optimized heating appliance is a well designed heating element, BALÇIK serves with a dedicated team of designers, project engineers and technical experts working in close collaboration with its sales managers and customers' designers in the development of new products and future solutions.
- During the designing phase, BALÇIK makes simulatons and controls of material properties by using state of art designing computer programs and its specialized laboratories.
- BALÇIK provides prototyping services to its customers for any type of components.
- We use optimum technology for each specified application.
- BALÇIK fulfills wide range of testing and validation on the products in accordance with the international standards.
- We apply various tests and validation methods to verify the key features of the heating element with the best performance adapted for consumer or industrial applications.
- BALÇIK offers after sales services through a 24h Customer Center to provide technical and logistic support to its customers inccluding technical support for field tests.

OVER 55 YEARS OF EXPERIENCE

BALÇIK was established in 1959 and since then, it has been producing electric heating elements and thermostats.
With a strong technical expertise improved over the years, BALÇIK experienced the pride of providing guaranteed product quality, safety and pure satisfaction our hundreds of customers in all over the world.
Partnering up with BALÇIK means obtaining more than 55 years of core experience from a wide range of technologies and product applications.
We are at your service with a deep knowledge and expertise.

REALIZING THE IDEAS WITH THE POWER OF TECHNOLOGY

Through a Research, Development and Validation Center embodied within our factory in Ankara, BALÇIK supports and guides its customers in all the steps of the production, starting from designing of the original idea, until the completion of the entire development and validation of the products.







A TECHNOLOGY-DEVELOPER AND AN INVESTOR CORPORATION FOR HEATING ELEMENTS

By having a specialized Research and Development Center , BALÇIK continues its intensive research, development and investment activies to invent new technologies and solutions for new applications and to fulfil its costumers' present and future demands.

To achieve this particular aim BALÇIK dedicates itself to develop

- reliable,
- safer,
- functional,
- wieldy,
- energy efficient,
- enviroment-friendly,

products

We are very proud of becoming the first and only manufacturer of these products in Turkey;
- Bipolar and Unipolar Mechanical Stem type Thermostat for Water Heaters
- Electronic Stem type Thermostat for Water Heaters
- Washing Machine Heating Elements with Thermal Fuse and Nickel Diffusion Coating



Quality Management System

BALÇIK, identified it's brand with providing high quality products and services, has VDE, CE product quality and ISO 9001:2000 system quality certificates since 2001 and 2002 respectively and continually updated these in line with international standards over the years.

The principles guiding our corporate quality management system with full reliability approach are as follows;

- Developing and manufacturing high quality products in order to fulfil the customer's needs and requirements.
- Manufacturing with a high quality perception starting from design and developing phase till the end of the manufacturing process.
- Basing relationships with customers on transperancy, innovativenes, customer orientation, consciousness of liability.
- Aiming to increase quality, the effectiveness and efficiency of our suppliers' performances in accordance with our purchasing policy.
- It is essential to use the best raw materials to provide highest quality products. BALÇIK has accumulated unique experience for over 55 years of manufacturing Tubular Heating Elements, and therefore knows a lot about the best raw materials; where to source it and how to get the best quality end product.
- Aiming to reach high levels of efficiency, safety, reliability to provide excellent quaility standards with competitiveness.
- Guaranteeing the product compliances and high quality on mass volume of production with flexilibilty and competitiveness by automated machinaries with redundant quality control systems integrated, which tests the product quality during the entire manufacturing process.
- Providing the best and constant quality by our product and process quality control systems even mass volumes of production with the highest automatetd manufacturing facility.
- In accordance with these policies, together with its Quality Lab, Research and Development Center and our experienced team, BALÇIK became a well-know brand in the sense of reliability, innovativeness and safety.

BALÇIK has a highly-equipped lab for designing, testing, validating the heating elements. In order to provide long-life heating elements, different control and cycling methods for different applications used in accordance with international norms and regulations.

- *ELECTRICAL TESTS*
- *POWER TEST*
- *HIGH VOLTAGE TEST (HOT – COLD)*
- *LEAKAGE CURRENT TEST*
- *ISOLATION TEST (HOT – COLD)*
- *HOMOGENEOUS HEATING TEST*
- *COLD AREA CONTROL*
- *GROUNDING RESISTANCE TEST*
- *HUMIDITY TEST*
- *CORROSION TEST*
- *THERMAL FUSE OPENING TEMPERATURE CONTROL*

- *PERFORMANCE TESTS*
- *LIFE TEST*
- *PYRO LIFE TEST*
- *K VALUE TEST*

- *PHYSICAL MEASUREMENTS*

- *MECHANICAL MEASUREMENTS*
- *METRIC CONTROL*
- *PLANARITY CONTROL*
- *FLANGE PRESSING CONTROL*
- *CLAMP BRACKET CONTROL*
- *SOCKET CENTRE CONTROL*
- *BEAD CONTROL*
- *MECHANIC SHOCK*
- *FUNCTIONAL CONTROL*

- *ANALYSIS*
- *CARBON SULPHUR ANALYSIS*
- *MATERIAL ANALYSIS*
- *METAL HARDNESS ANALYSIS*
- *COATING THICKNESS TEST*
- *SIEVE ANALYSIS*
- *DENSITY ANALYSIS*

CERTIFIED HEATING ELEMENTS

BALÇIK product range are in compliance with EN 60335-1 and meet current legislation regarding safety for electrical materials.

Our products are 100% tested during the production process and in case any additional tests or controls required by the customers, our quality department provides approval certificates and declarations accordingly.

In collaboration with our customers, we conduct life tests to our product prototypes both seperately and together with the final product of our customers.

BALÇIK TUBULAR HEATING ELEMENTS ARE COMPLY WITH THE FOLLOWING STANDARTS:

UNE-EN 60.335 Safety of household and similar electrical appliances General requirements
UNE-EN 60.335-2-9 Safety of household and similar electrical appliances Particular requirements for toasters, grills, boilers and similar appliances.
UNE-EN 60.335-2-15 Safety of household and similar electrical appliances Particular requirements for appliances for heating liquids.
UNE-EN 60.335-2-30 Safety of household and similar electrical appliances Particular requirements for room heaters.
UNE-EN 60.335-2-73 Safety of household and similar electrical appliances Particular requirements for fixed immersion heaters.
DIN EN 60335-1 – Electric tubular heating elements for use in household appliances
EU-guideline 1907/2006/EG – REACH





Custom-Made Production

Our catalogue includes BALÇIK's most common range of products and technologies for domestic and industrial applications.

We are manufacturing wide variety of heating elements which can be easily customized according to the customer's requirements regarding to application area, product performance and reliability.

Our products are suitable for diversed range of applications such as cooking, washing, water heating and many others.

We have the ability to design and manufacture in accordance with the technical and commercial specifications requested by the customers depending on our capacities and production technologies by complying with the required functional specifications such as performance, tolerances, safety, reliability, long life for reaching the best price and quality ratio.

While choosing the raw materials, production cycle and quality control including the suitable production equipment, the right electrical, thermal and mechanical features has to be considered.

During the designing and developing stage, state of art computarized technologies allows us to carry out feasibility studies, judge all possible manufacturing options as well as have the final result approved from a technical and standards point of view.

During the designing stage of the new products, we apply experimental tests to optimize the products' function and quality.

Thousands of different product codes developed and consolidated over the years are an indication of the wide range of voltages, power, specific loads, geometrical configurations, materials, sealing, assembly/ connection components and packages, as a further proof of our ability to manufacture heating functions customised according to customer requirements.

For reaching the quality and cost balance in terms of large-scale production, the products has to be adapted to the standardized manufacturing criterias.

You can find below the list of technical and commercial information required for designing the most cost-efficent heating element.

The following list should be taken into consideration when developing and offering new heating elements to guarantee the efficiency and precision of the proposal.

This catalouge includes only a limited number of most common heating elements and technologies in comparison to BALÇIK's wide-range of production capability. However, in case the exact product cannot be found within this catalouge, it would be our pleasure to examine the details to provide suitable solutions in accordance with your requirements and demands.

INFORMATION REQUIRED FOR THE DESIGN AND COST ANALYSIS OF A HEATING ELEMENT

- APPLICATION AREA (INTERNAL/EXTERNAL USABLE SPACE, HEAT INSULATION, VOLUMETRY, ETC.)
- POSITION AND INSTALLATION METHODS (MECHANICAL FASTENING, ELECTRICAL CONNECTIONS)
- EXPECTED FUNCTION OF THE HEATING ELEMENT
- SUPPLY VOLTAGE (ALTERNATING, THREE-PHASE) AND CONNECTION TYPE (IN SERIES, PARALLEL)
- OUTPUT POWER
- SHEATH SPECIFIC LOAD
- MAXIMUM OPERATING TEMPERATURE
- DIMENSIONED SHAPES, TOLERANCES, LENGTH OF COLD PARTS
- SPECIFICATIONS AND REFERENCE STANDARDS (ISO,ASTM, IEC, VDE, UL, ECC.)
- PACKING TYPE
- STORAGE CONDITIONS AND TIMES
- REQUIREMENT, ORDER BATCH QUANTITY

Inside the metal tube, a resistance coil is embedded and electrically isolated in highly compressed magnesium oxide. The optimized structure and very high density of the magnesium oxide form the basis for the excellent mechanical and thermal characteristics of the Tubular Heating Elements.

1.- Metal Sheath
The sheath of the resistance wire. Sheath material should be chosen according to application area conditions and also the surface temprature, power.

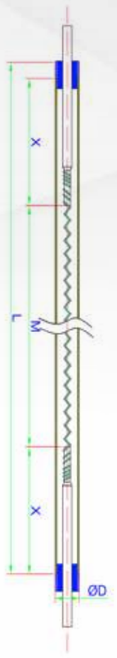
2.- Coiled Heating Wire
The heart and heat source of the heating element. The material of coiled heating wire could be Nickel Chrome or Chrome Aluminium Alloy depending to the application.

3.- Dielectric MgO
Magnesium oxide electrofused with the adequate characteristics, to provide electrical insulation between the coiled heating wire and the metal sheath.

4.- Sealing and Insulating Bush.
It protects the MgO getting effected from atmospheric conditions such as humidity, in order to keep the electrical insulation value high.

5.- Terminal Pin
Different types according to different electrical connection requirements.





SHEATH TIPOLOGIES					
Din	*% Ni*	*Material*	*Ø 6.40*	*Ø 8.50*	*Max. Temp. Without Excessive Assidation °C*
1,4301	8 ÷ 12	AISI 304	•	•	760
1,4828	12 ÷ 15	AISI 309	•		816
1,4404	10 ÷ 14	AISI 316L		•	760
1,4541	9 ÷ 12	AISI 321	•		760
1,4876	30 ÷ 35	INCOLOY 800		•	927
2,4858	38 ÷ 46	INCOLOY 825		•	593
1,4847	18 ÷ 22	INCOLOY 840		•	927
2,4816	≥ 72	INCONEL 600		•	982
1,4547	18	254 SMO		•	760
ST35		MILD STEEL	•	•	400
DHP 99.9%		COPPER		•	400
BT1-0 GOST		TITANIUM		•	320

SHEATH MATERIALS PROPERTIES					
	Materials				
	AISI 304	*INCOLOY 800*	*MILD STEEL*	*COPPER*	*TITANIUM*
Volume mass [Kg/dm^3]	7,9	8,1	***7,9***	***8,9***	4,5
Melting temperature [°C]	1450	1400	***1530***	1083	1660
Max. Working temperature [°C]	750	900	400	***180***	550
Annealing temperature [°C]	1050	1100	***850***	600	-
Average coeff. for linear heat expansion [10$^-$6/°K]	19,8	17,3	12,3	***16,9***	8,5
Conductivity at 20°C [W/ m K]	15,2	14	57	***387***	16,1
Surface load [J/g °K]	0,5	0,5	0,47	***0,39***	0,52
Thermal resistivty [Ω mm^2/m]	0,75	0,95	0,1	***0,02***	0,42
Aggregate breaking load [N/mm^2]	65	65	22	***21***	
Emission coefficient - Surface condition:					
Polished	0,15÷0,22	0.20	-	-	-
Partially oxidised	0.57	0.60	-	-	-
Highly oxidised	0.85	0.92	-	-	-
Heat capacity per unit of volume [cm^3] (specific heat for volume mass by volume)	3,95	4,05	3,71	***3,47***	2,34

SURFACE LOAD

Among other factors the functional life of an element depends on the surface load for different kind of heating purposes.
Surface Load is calculated as follows;

$$Y = \frac{P}{LxM} \qquad L = \frac{P}{MxY}$$

Y = Surface load in W/ cm^2
L = Active length of the element in cm
P = Output in W
M =
Diameter 6.4mm : 2.01 cm^2/cm
Diameter 8.5mm: 2.67 cm^2/cm

TOTAL LENGTH OF ELEMENT

The total length of the element is obtained by adding L to the total length of the inactive section.

Tube Diameter	*Sheath Total Length*
6.40mm	300mm - 5000mm
8.50mm	300mm - 5000mm

OHMS/METRE
In certain cases ohms/metre can be a limiting factor. The following limits apply:

Tube Diameter	*Ohm per Meter*
6.40mm	5.8 / 780
8.50mm	2.5 / 996

$$\text{Ohms / meter} = \frac{U^2}{PxL}$$

P = Power in W
U = Voltage in V
L = Active length of element in m

$$\text{Ohms/meter} = \frac{U^2}{PxL}$$

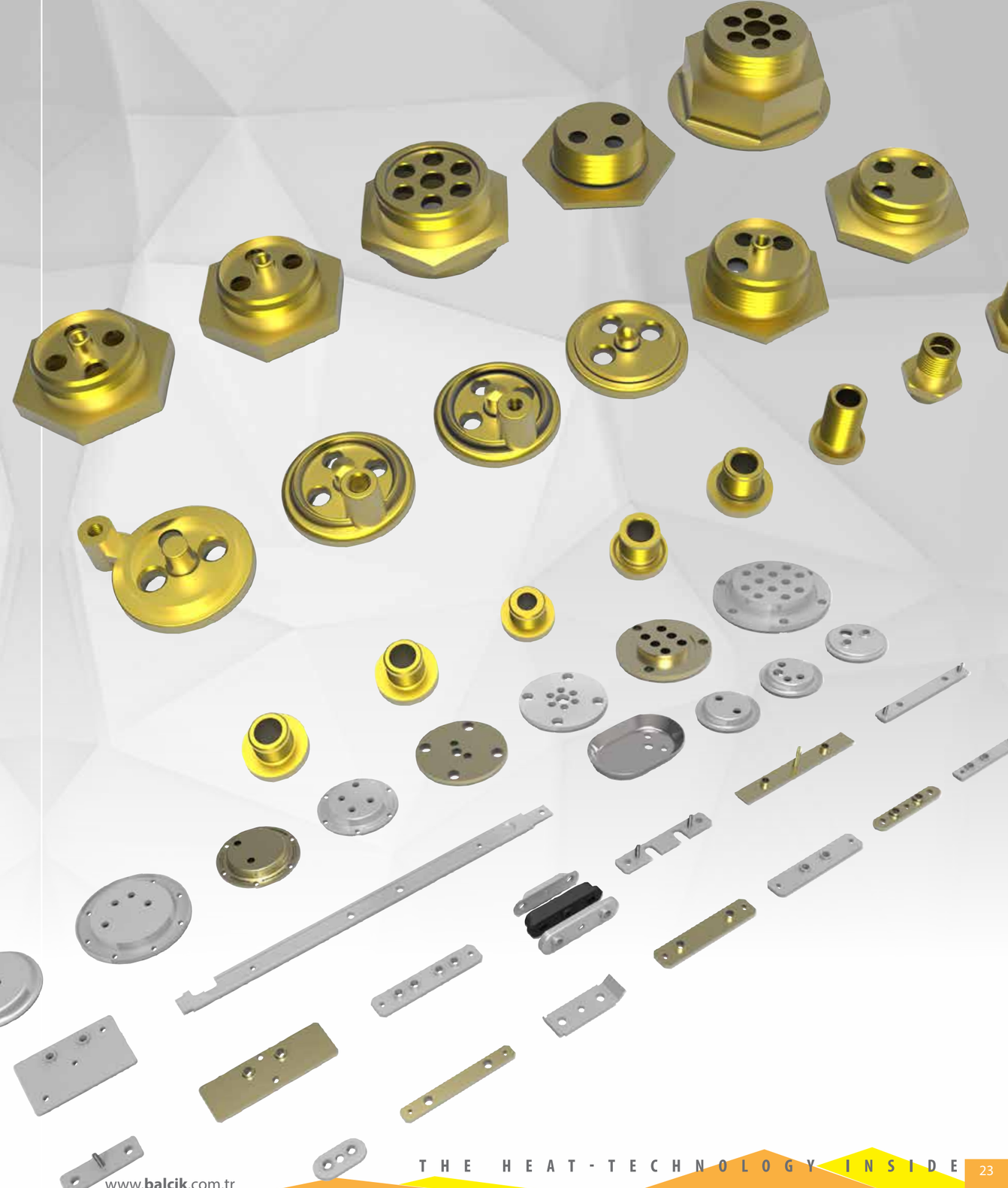
24V, 42V, 48V, 65V, 110V, 127V, 220V, 230V, 380V, 400V, 500V

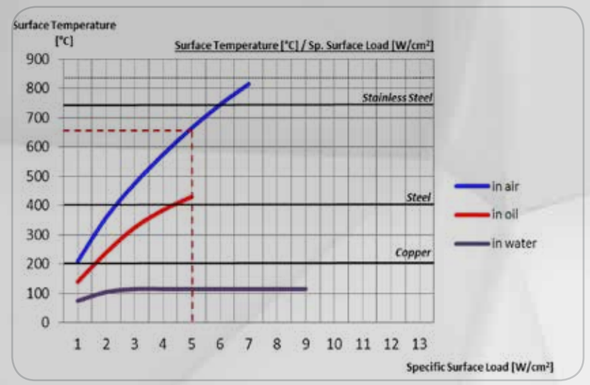


Designation	*Parameter*	*Symbol*	*Name*
P	POWER	W	WATT
U	VOLTAGE	V	VOLT
I	CURRENT	A	AMPERE
R	RESİSTANCE	OHM	

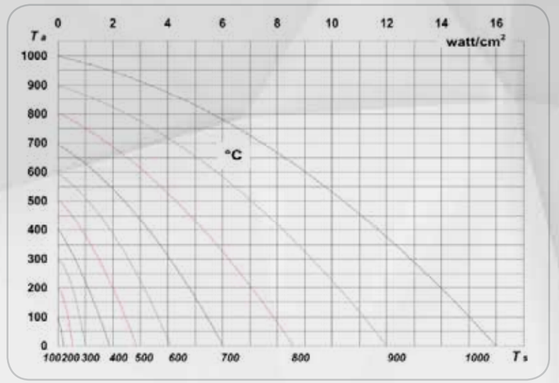
MAXIMUM RECOMENDED SURFACE LOADS WHEN HEATING DIFFERENT SUBSTANCES				
SUBSTANCE	*SURFACE EFFECT IN W/cm²*			
	TEMP °C	*STEEL*	*STAINLESS STEEL*	*COPPER*
Still air	50	1,7	***6***	
Still air	450	1,5	***4***	
air 3 m/s	200	2,5	5	
air 6 m/s	260	3,5	***7***	
air 10 m/s	200	1,5	10	
air 6 m/s	300		8	
air 10 m/s	450		4	
Alkaline solutions	100		6	
Thin oil	50		6	
Thin oil solutions	200		4	
Thin oil solutions	350		***2***	
Vegetable oil	200	5	4	
Heat transfer oil	200	12	5	
Heat transfer oil	300	0,95	2	
Tar	150	65	1	
Still water	100		10	10
Flowing water	80	0.20		15
Metallic surfaces for contact heating 400		0.60		
Metallic surfaces for contact heating 600	2	0.92	15	
Solid castings in aluminium	300	4,05	12	



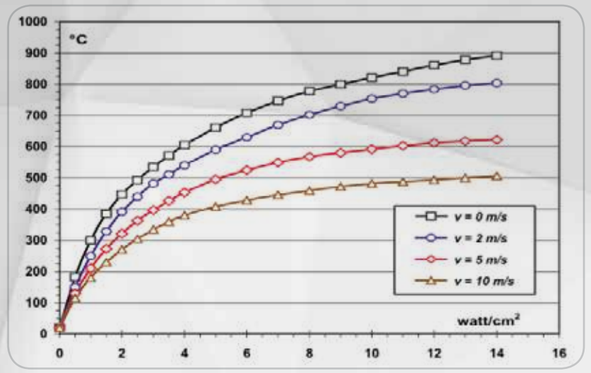




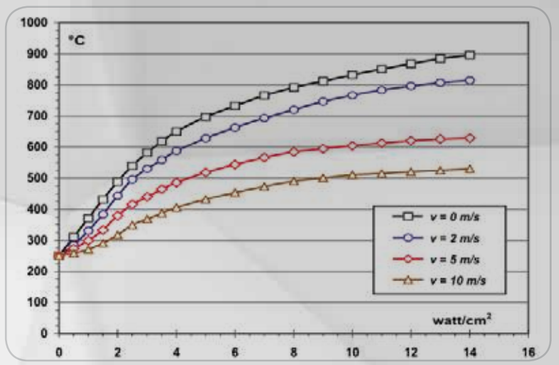
TEMPERATURE MAP
Sheath temperature as a function of specific surface load with different environment temperature .



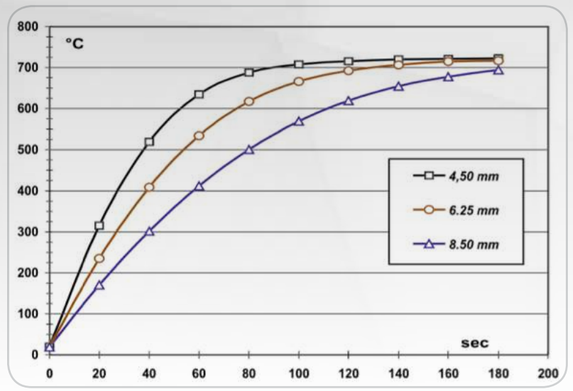
TEMPRATURE MAP
Sheath Temprature (Ts) as a function of specific surface load with different enviroment temprature (Ta).



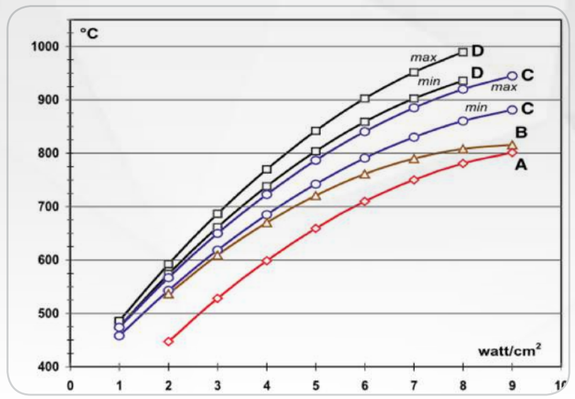
TEMPRATURE PROFILES IN FORCED AIR
Sheath temprature as a function of specific surface load by changing the air flow rate (v) at ambient temprature of 20C.



TEMPRATURE PROFILES IN FORCED AIR
Sheath temprature as a function of specific surface load by changing the air flow rate (v) at ambient temprature of 250C.



THERMAL TRANSIENTS
Sheath temprature vs. time plots by changing tube diameter at the same surface load (6.5 watt/cm2) and room conditions (free air, 20C)

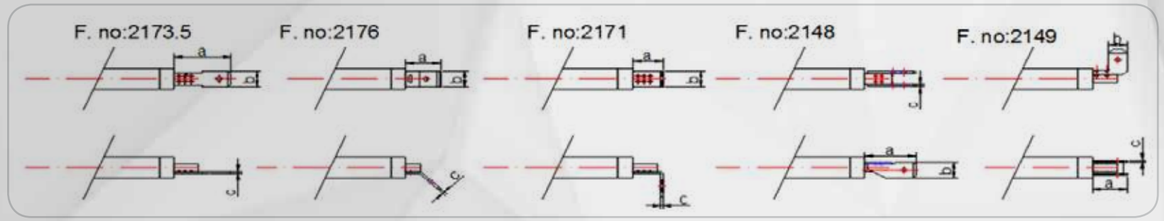


TEMPRATURE PROFILES IN STILL AIR
Sheath temprature as a function of specific surface load:
D bottom heater, middle oven temprature equal to 250C
C top heater, middle oven temprature equal to 250C
B element in free air (20C), bright sheath
A element in free air (20C), dark, fully oxidized sheath

TECHNICAL DATASHEET

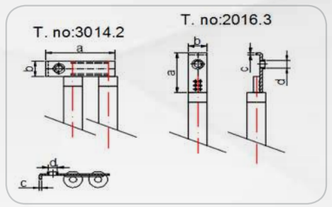
STANDARD COLD PART LENGTHS ALL TUBULAR ELEMENTS MUST BE PRODUCED WITH AN INACTIVE PART IN BOTH ENDS Cold part length in mm																					
Terminal Pin	30	35	45	60	70	85	100	110	130	145	175	190	200	205	235	245	275	325	375	425	475
	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

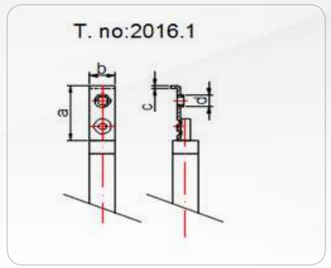
Max. Current Applicable to Terminals (With Compatible Connetions)		
Dimensions (mm)	Carbon Steel [A]	Stainless Steel [A]
Ø2.3	14	8
Ø3.0	18	10
M3	10	5
M4	16	8

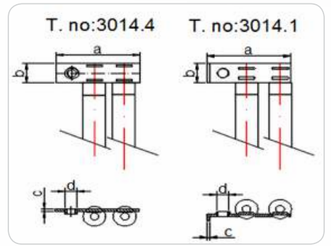


Type of Fastons	Length a[mm]	Width b[mm]	Thickness c[mm]	Material FeP0 Nic.	Material AISI 304	Material AISI 430	Max. Operating Current
2173.5 Straight Simple	19	6.3	0.8	•	•		15
2176 Simple at 45°	11.6	6.3	0.8	•		•	15
2171 Simple at 90°	10	6.3	0.8	•		•	15
2148 Straight Double	17	6.3	0.8	•			15
2149 Double at 90°	11.4	6.3	0.8	•			15

Type of Connec-tion Tabs	Length a[mm]	Width b[mm]	Thickness c[mm]	Screw d[mm]	Material FeP02 Nic.	Material Cu-Cr Covering
2016.1	20.5	8	1	M4	•	
2016.3	20	8	1	M4	•	
3014.1	30	8	1	M4	•	
3014.2	30	8	1	M4		•
3014.4	35	8	1	M4		•

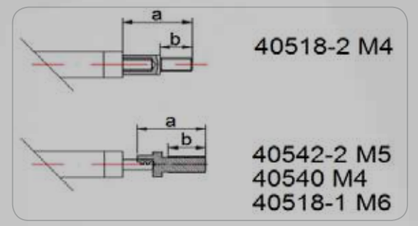


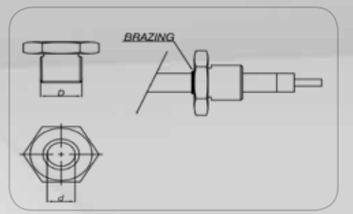


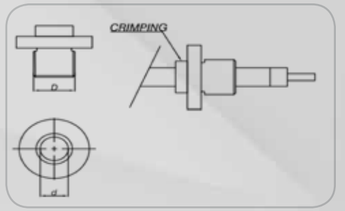


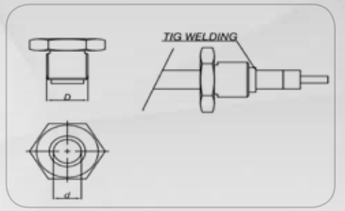
Type of Connec-tion Adapters	Sheath Diameter a[mm]	Length a[mm]	Width b[mm]	Screw d[mm]	Material FeP02 Nic.	Material AISI 304
40518-1	6.5	20	10	M6	•	
	8.1					
	8.5					
40518-2	6.5	18.5	8,5	M4		•
	8.1					
	8.5					
40542-2	6.5	25	15	M5	•	
	8.1					
	8.5					
40540	6.5	16.5	8,5	M4	•	
	8.1					
	8.5					

NIPPLES			
Sheath Diameter d [mm]	Fixing System	Thread D	Material
6.4		M10	
	Brazing	M12	Brass
	Crimping	M14	Nickel-Plated Brass
	TIG Welding	M24	Zinc-Plated Steel
		1/4" GAS	AISI 3XX
		3/8" GAS	
8.5		M12	
	Brazing	M14	Brass
	Crimping	M24	Nickel-Plated Brass
	TIG Welding	1/4" GAS	Zinc-Plated Steel
		3/8" GAS	Nickel Plated Steel
		1/2" GAS	AISI 3XX



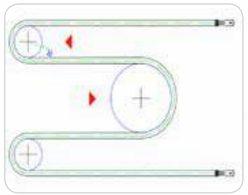


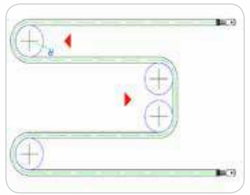




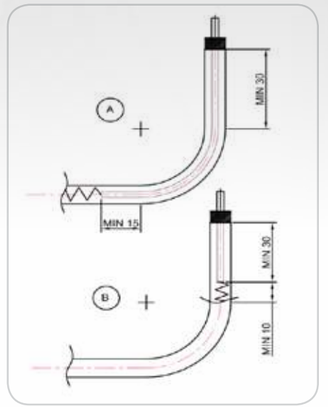
	Annealed Element Tube Material			STF Sealed Elements Tube Material (Not Annealed)	
Tube Diameter [mm]	AISI (201, 304, 309, 309S, 316, 316TI, 321)	INCOLOY 800 INCOLOY 840	Cu	AISI (201, 304, 309, 309S, 316, 316TI, 321)	INCOLOY 800 INCOLOY 840
6,1	13	-	-	20	-
6,4	13	14	-	24	24
8,1	15	-	-	-	-
8,4	15	18	28	-	30

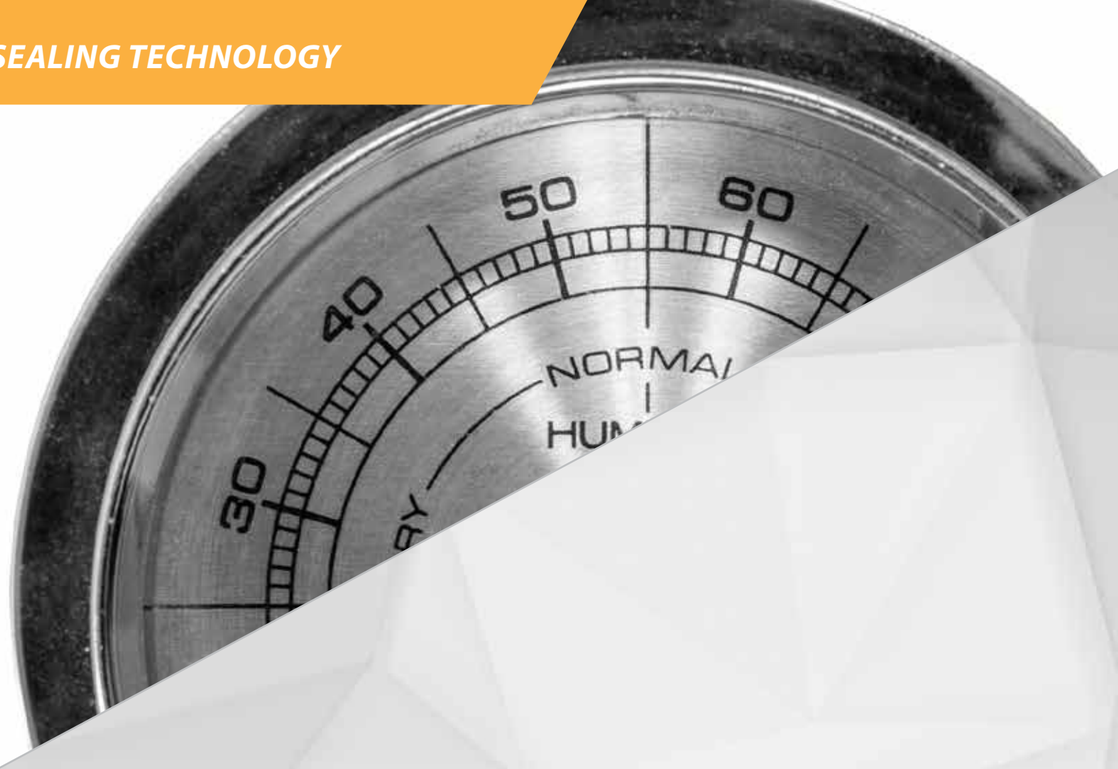
Special radiuses are avaliabe at extra cost.
Terminal pins must always choosed correctly in accordance to the extremity of a bend (see diagram).





In order facilitate bending, it is advisable to keep the bending radius uniform.
Same Radii, Easier Production
Different Radii, Make Production More Complex





Tubular heating elements for variety of applications are subject to high temperatures as well as to rapid and frequent thermal transient states (on-off), which seriously put their integrity and long life to the test.
In order to manufacture reliable, safe and consistent heating elements for such extreme conditions, the raw materials used in the heating elements has to be selected and processed with an advanced knowledge and state of the art production technologies.

The sealing on the heating element has the function of preserving as much as possible the electric insulation properties between the coiled heating wire and the tube. The insulation properties are guaranteed by the high purity and correct drying of the magnesium oxide layer.

These critical points plays an important role to guarantee the safety and satisfactory usage of the heating element.

Any damage or degradation of the sealing causes the dielectric layer to progressively absorb humidity from the atmosphere, thus causing an increase in its electrical conductivity, the ensuing earthing of the phase being powered and the immediate shutting off of power supply because of the intervention of a safety switch.

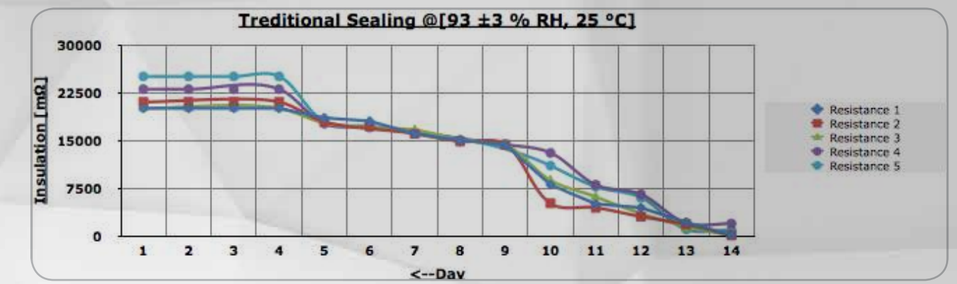
The technology that we provide allows us to offer different sealing options for tubular heating elements such as silicon, epoxy, teflon, which are all equivalent in terms of international safety standards, but offering different guarantee periods regarding to phase-earth electrical insulation.

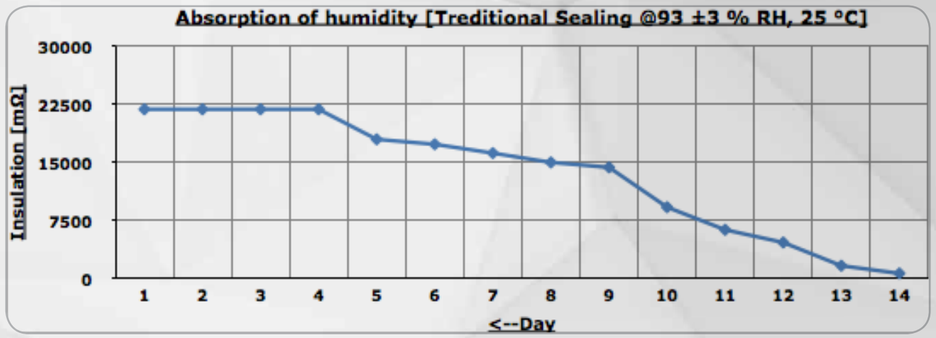
STF Sealing Technology is mainly used for the heating elements on cooking applications. For this technology, a conic cylinder with teflon material is pressed between the terminal pin and the sheath tube.

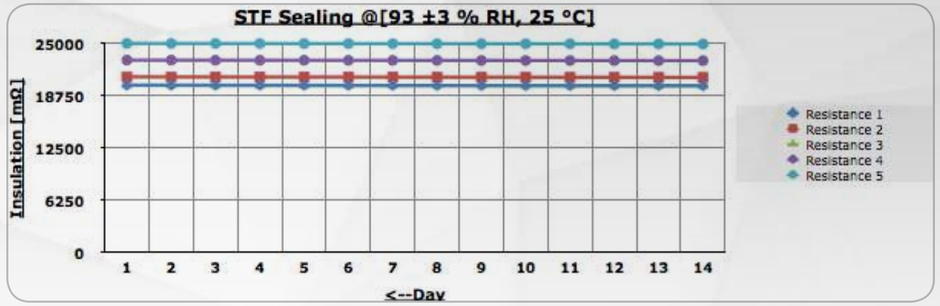
The teflon cylinder avoids the small pit which can hold humidity to effect magnesium oxide inside.

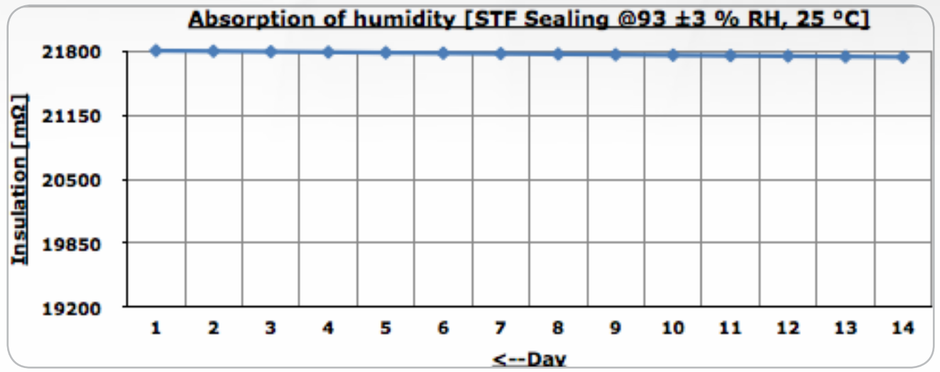
The graph indicates the significantly improved performance of the heating element against the humidity and absorption. The absorption of humidity is the main reason that cause the short circuit of the heating elements during the first ignition of the oven after long stocking time of the finished appliances.

STF sealing technology assures the heating elements to breathe by softening the sealing parts with heat in order to reach high performance and reliability during the life-time of the product.
This technology also increase the strength of the heating elements during the transportation, handling and assembly stages.











A highly technological heat treat process performed to our stainless steel heating elements by a carefully controlled furnace atmosphere resulting to a clean, smooth, scale free metal surface. During typical and traditional annealing process methodlogy for tubular sheathed heating elements, the heated sheath steel combines with oxygen in the air to form an oxide layer on the steels surface and gets a dark and black colour. In bright annealing, the difference is the stainless steel sheath of heating element is heated in a furnace filled with gases, such as hydrogen or nitrogen, to prevent oxide scale formation. The heating element comes out of the bright anneal furnace with the same surface as it had when it went into the furnace.

Bright annealing is carried out in a furnace full of Hydrogen (H2) at temperatures ranging between 1040 ° C and 1100° C and is followed by a rapid cooling. The Hydrogen is NOT an oxidising agent and therefore no surface oxidation is created and pickling is no longer required after the bright annealing. The main advantage of this technology, besides a bright and even surface that eases further processing of the tubes, is the improved corrosion resistance of the heating element sheath. Such treatment, carried out at the production process, ensures the complete solution of the possible carbides precipitated at the grain border, thus obtaining an austenitic matrix free of defects. This makes it possible to avoid the dangerous phenomena of intergranular corrosion.
The austenitic structure obtained through bright annealing, is homogeneous with regular grain size; the consequence is an improvement of stainless steel tensile properties, in particular traction and elongation, with an increase of plasticity and a decrease of residual stress.

Extensive tests by BALÇIK examined the difference of annealing processes on tubular heating elements. An atmospheric test was carried out in a marine environment. The environment was chosen for its high temperature, salt concentration and humidity, and the test period lasted 12 months.
Engineers compared tubes from two different production routes:
Conventional typical annealed and bright annealed. The aim of the study was to compare the corrosion resistance of the heating elements, in order to assess the impact of bright annealing technology on the quality of the tube surfaces.

After the test period, each tube was then split into two halves to examine the surface with optical microscopy. It is clear that the bright annealed heating element exhibited the best corrosion resistance. Its still bright and shiny even after one year of marine exposure.
The conventionally typically annealed heating element exhibited inferior corrosion performance, in comparison to the bright annealed tube.



TYPE OF TUBE SHEATH MATERIAL



Nickel Diffusion Coating Technology to be used in heating elements for washing machines and liquid heating applications.

Diffusion coating is a process in which heating elements that will be subjected to high temperature conditions and highly corrosive environments are coated with a non-corrosive material. The process is done at elevated temperatures in a controlled chamber.
As a result, the sheath metal develops extreme resistance to corrosion, oxidation and erosion in its severe working conditions.

The advantages and differences of Nickel Diffusion

- Exactly same coating thickness on all the surface of tube
- High corrosion resistance
- High resistance against chemicals
- High resistance to degradation
- Hard to stick surface
- Slickness on the surface

DEGRADATION OF NICKEL DIFFUSION COATING IN DIFFERENT ENVIROMENTS		
Enviroment	Temprature (ºC)	Degradation Ratio (Micron/Year)
SEA SALT WATER %3,5	95	NONE
ACETIC ASID	20	0.8
AMMONIUM SULFATE	20	5
ASCETONE	20	0.8
AMMONIA %25	20	16
AMMONIUM NITRATE %20	20	15
AMMONIUM SULFATE DILUTED	20	3
BENZENE	20	NONE
CALCIUM CHLORIDE %42	20	0.2
CARBON TETRA CHLORIDE	20	NONE
CITRIC ACID DILUTED	20	200
IRON CHLORIDE %1	20	200
FORMIC ACID %88	20	13
HYDROCHLORIC ACID %5	20	24
LACTIC ACID %85	20	1
LEAD ACETATE %36	20	0.2
NITRIC ACID %0,1	20	25
OXALIC ACID %10	20	3
PHENOL %90	20	0.2
PHOSPORIC ACID %85	20	3
POTASSIUM HYDROXIDE %50	20	NONE
SODIUM CARBONATE DILUTED	20	1
SODIUM HYDROXIDE %45	20	NONE
SODIUM HYDROXIDE %50	95	0.2
SODIUM SULFATE %10	20	0.8
SULFURIC ACID %65	20	9
ACIDIC WATER (Ph3.3)	20	7
DISTILLED WATER	100	NONE

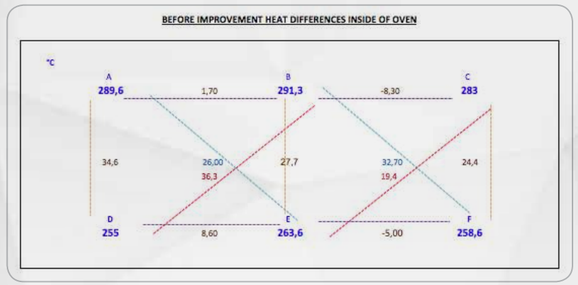


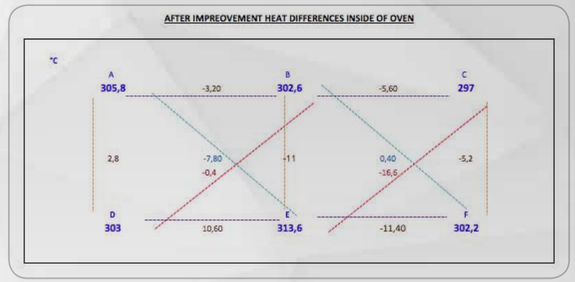
Thinking Green

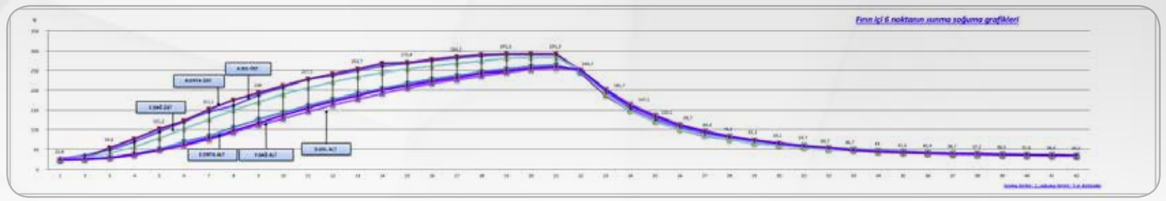
Sustainable energy solutions are the most important subject nowadays of our world more then ever. It is well recognised by BALÇIK and by our eco friendly approach from product designing, developing, till the manufacturing stages, our aim is to provide more efficient products to the market.
On different applications for domestic and industrial applications, the reduction of element power, control of element heating temperatures and actual element heating time, contribute to limiting the energy consumption and thus some of the effects on our environment.

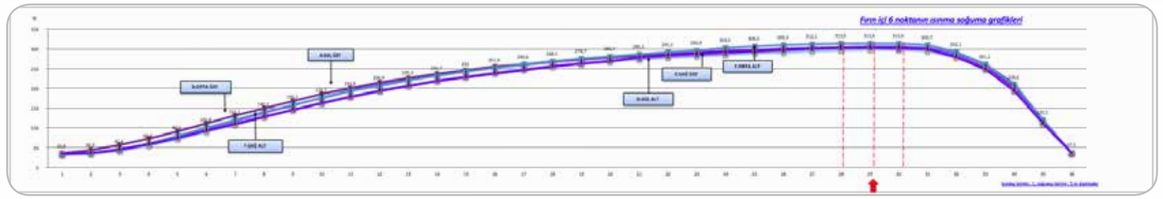
Low Cost with Same High Temperatures
Various raw material alternatives for the production of tubular heating elements are not only effecting the cost of a heating element, but also effecting the energy efficiency.
It's possible to increase the heating performances of a basic element, by choosing either one or a combination of raw materials for the production.

Product Development and Design for Saving Energy
Tubular heating elements has to be specially designed for the application area, in terms of efficiency and performance paramenters.
In collaboration with our customers, our technical team analyses the heating element and application area carefully, to design the most efficient and ideal heating element in terms of power, shape and material, to save from unneccesary usage and consumption on the final product.
Graph you can see below is showing the one of our efficiency improvement project, before imporement and after improvement energy efficiency of a heating element in application area, together with the heating values and heat differences inside.









1

MAJOR HOME APPLIANCES

HEATING ELEMENTS FOR

OVEN

WASHING MACHINES

2

SMALL HOME APPLIANCES

HEATING ELEMENTS FOR

BBQ GRILL

TOASTERS

STEAM IRONS AND IRONING TABLES

3

LIQUID HEATING APPLICATIONS

HEATING ELEMENTS FOR

INSTANT WATER HEATERS

ELECTRIC WATER HEATERS WITH TANK

ELECTRIC WATER HEATERS 1.1/4' SCREW TYPE

ELECTRIC WATER HEATERS 48MM FLANGE TYPE

STEM TYPE THERMOSTAT WITH SAFETY

ELECTRIC WATER HEATERS AQUAHET TYPE

INDUSTRIAL IMMERSION WITH FLANGE

TOWEL RADIATOR

4

PROFESSIONAL KITCHEN

HEATING ELEMENTS FOR

INDUSTRIAL DISHWASHERS

TEA, COFFEE, HOT WATER VENDING APPLIANCES

INDUSTRIAL FRYERS

INDUSTRIAL DISTRIBUTION APPLIANCES

5

OTHER INDUSTRIAL APPLIANCES

HEATING ELEMENTS FOR

SAUNAS

VENTILATION SYSTEMS

6

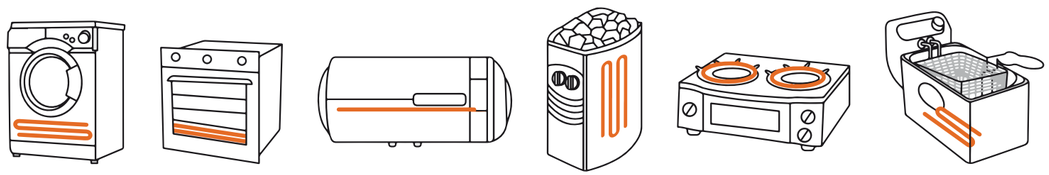
INDUSTRIAL APPLICATIONS

HEATING ELEMENTS FOR

FINNED TYPE HEATING ELEMENTS

DEFROST TYPE HEATING ELEMENTS

STRAIGHT ROD TYPE HEATING ELEMENTS





HEATING ELEMENTS FOR OVEN



Heating Elements for Oven

FIXED OVEN: TOP HEATER ELEMENT

Heater elements in the ovens are, as can also be seen once the oven doors are opened, located in the upper space and perform cooking functions through two ways: by convection or radiantly. First function is performed by the mentioned top heater elements with a moderate specific load which does not exceed 750°C. From this point of view and considering the shorter dimensions of the oven as well, we can say that the power is generally between 800 – 1100 Watt ranges. Therefore, the specific surface load corresponding to this power is 4 Watt / cm^2.

The second most typical way of radiating heat is through grill-type cooking elements which are generally known as the "grill resistances". The heater element in this type of cooking is around or higher than 800°C. Reaching that temperature, on the other hand, can be possible by the powers between 1500 and 2000 Watts. The specific surface load corresponding to this power range can be between 5 to 7 Watt / cm^2 range subject to the length of the element. Ovens are often manufactured in combinations where the top heater element and the grill element are used together. With regard to the most important grill resistance, we see that they are opposite to each other as to form with the top resistance + grill resistance combination.

It is known that each form and geometrical structure of the element gives out different thermal diffusion and cooking. Thermostat bars of appropriate form which are placed in a protective sheath are used to adjust and control the thermal hotness within the heated volume. General characteristic of this type of products is that they are fixed in the oven by means of one or more support bars.
Different types of heaters which are detachable and removable by retracting from top to facilitate cleaning of oven ceiling are also offered for use.

FIXED OVEN: BOTTOM HEATER ELEMENT

Lower heater elements are often mounted in the clearance under the inner space surface to ensure easy cleaning of oven cooking space. The protective sheath provided by the bottom of the oven and the electrical power designed with an average lower value function as a natural convection in ensuring the heat transfer. Under equal conditions, the convective heat transfer efficiency is higher in this and similar product groups compared to top heater elements, because locating the heater on the bottom ensures it to perform easier natural convection by circular movements.

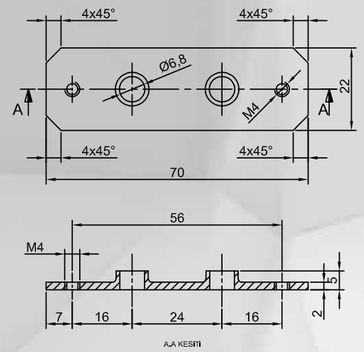
Heat flux direction and isothermal cooking environment depends on the shape of the heater which is designed according to the surrounding of the space to be heated. So that convective air flow is provided towards the center of the oven from its sides. Shapes provided herein are only some of the most renowned ones designed for this function. The required power is often between 1000 - 1300 Watt range. Specific surface load on the heated surface varies between 2 to 4 Watt / cm^2.

Anticipated typical configuration is usage of only one heater element. Furthermore, double-element serial or parallel solutions can be used for very special applications (e.g. pyrolytic). Resting of thermal performance requests at reasonable levels and wide geometrical tolerances allow using more limited heater elements and also drop the cost of the heating function.

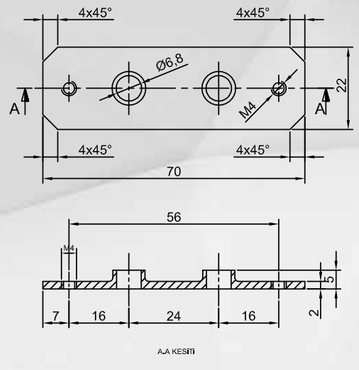
PROPELLER OVEN: ARTIFICIAL CONVECTION HEATERS

Propeller cooking function is generally characterized with high specific surface loads between 7 to 12 Watt / cm^2 range - this is a result of development of high power value and smaller dimension combination. The shape of the heater element is always circular which surrounds the fan that ensure air flow and it consists of one, two or three adjacent windings. According to the simple design specifications presented below, 6.1 and 6.40 mm pipe diameters are available in our production. Power level for double-winding heater is between 1500 and 2500 Watts and it can be up to 3500 Watt for triple winding heater.

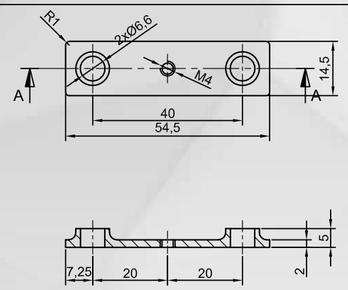
These elements are suitable for properly dimensioned, fixed applications generating heat through quenching, which provide air flow to all directions. This method also avoids resistance filament melting as a result of overheating.



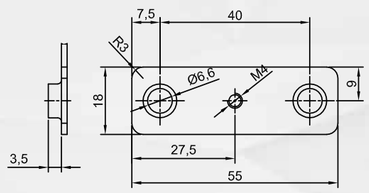
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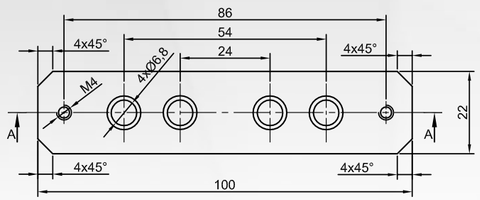
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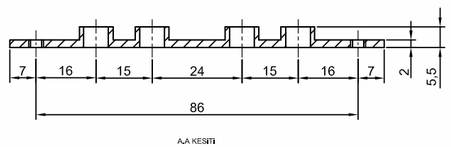


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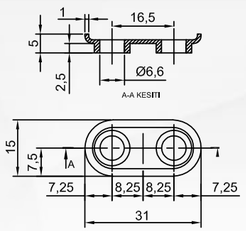


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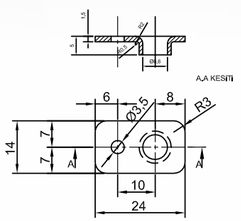




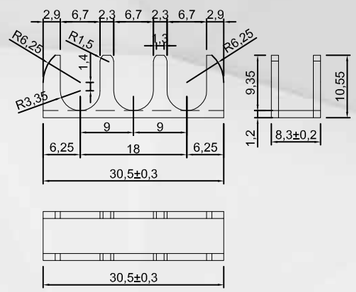
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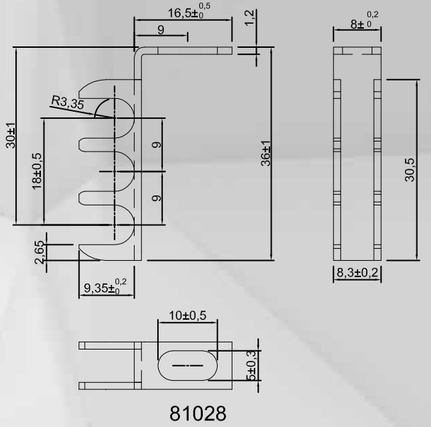
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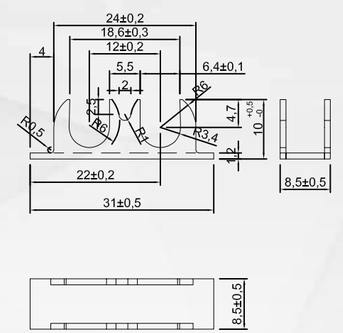
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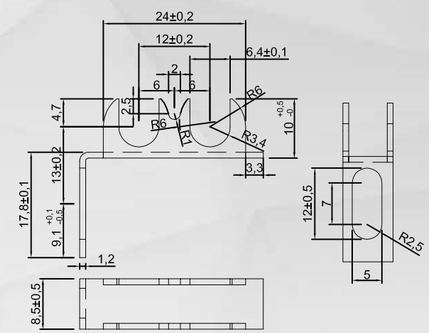
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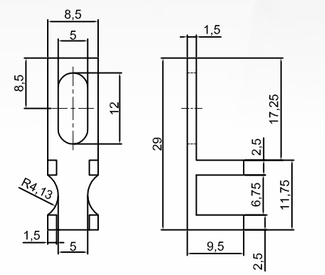
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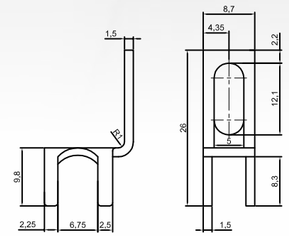
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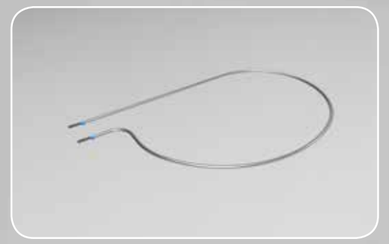
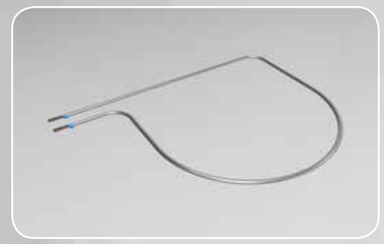
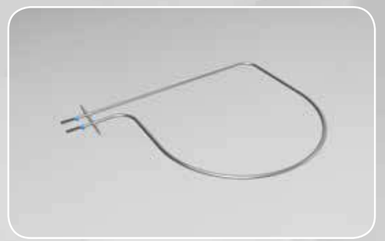
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81057



81057-1



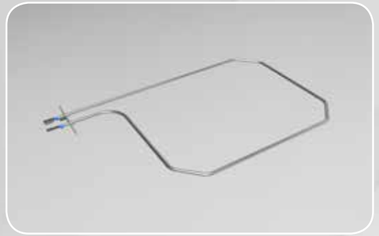
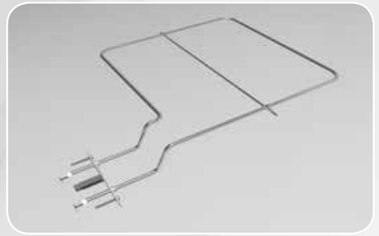
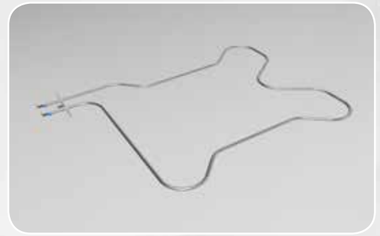




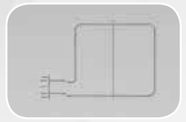
Code	Diameter	Volt	Watt
70055	6,5	220	600

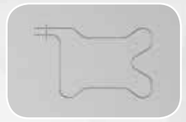
Code	Diameter	Volt	Watt
1151-1	6,5	220	650

Code	Diameter	Volt	Watt
1151	6,5	220	650



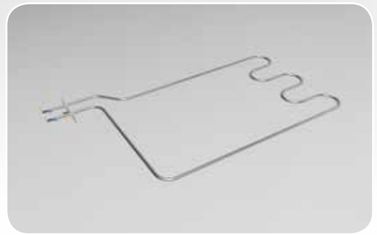
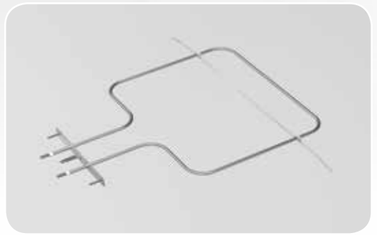
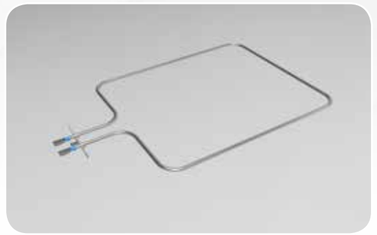


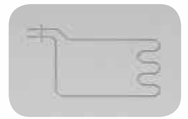


Code	Diameter	Volt	Watt
23414	6,5	230	750

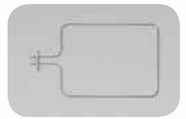
Code	Diameter	Volt	Watt
24073	6,5	230	900

Code	Diameter	Volt	Watt
23089	6,5	230	1300



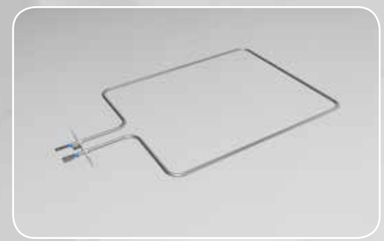
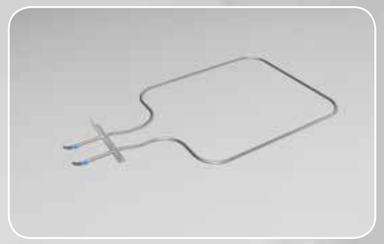
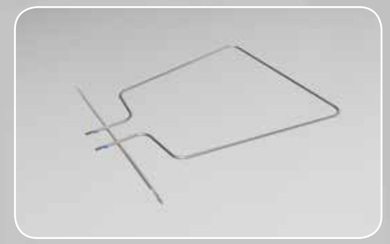




Code	Diameter	Volt	Watt
23091	6,5	230	1000

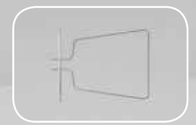
Code	Diameter	Volt	Watt
24085	6,5	230	900

Code	Diameter	Volt	Watt
23175	6,5	230	1100



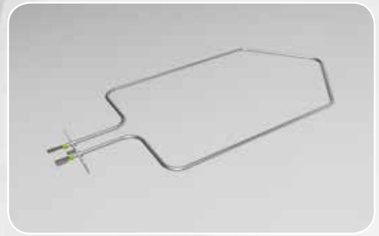
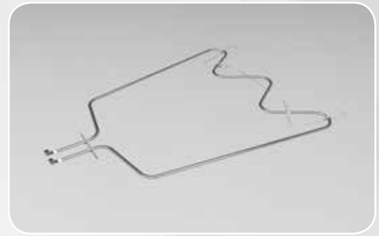
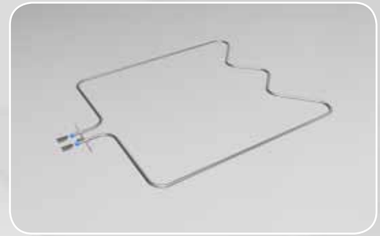




Code	Diameter	Volt	Watt
22796	6,5	220	1000

Code	Diameter	Volt	Watt
23706	6,5	230	700

Code	Diameter	Volt	Watt
22499	6,5	240	1000


Code	Diameter	Volt	Watt
22231	6,5	230	1100

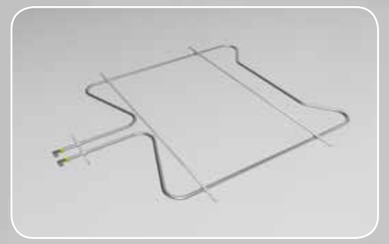
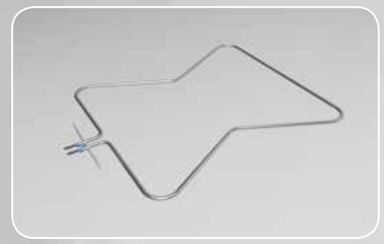
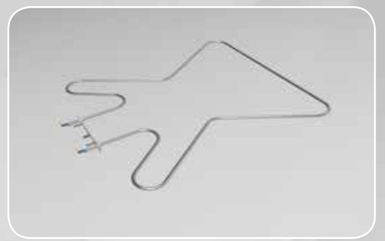
Code	Diameter	Volt	Watt
24081	6,5	230	2450

Code	Diameter	Volt	Watt
1159	6,5	220	2000

Code	Diameter	Volt	Watt
22253	6,5	230	1200

Code	Diameter	Volt	Watt
22841	6,5	230	1800

Code	Diameter	Volt	Watt
22204	6,5	230	1150



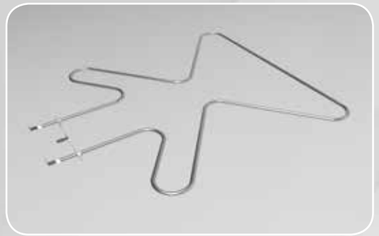
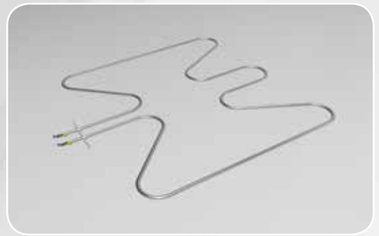
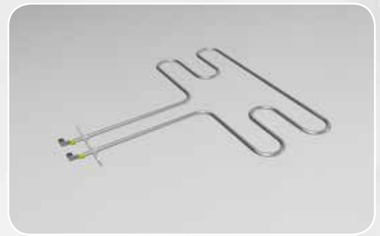




Code	Diameter	Volt	Watt
22245	6,5	230	1300

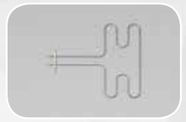
Code	Diameter	Volt	Watt
24282	6,5	230	1300

Code	Diameter	Volt	Watt
22804	6,5	230	1300



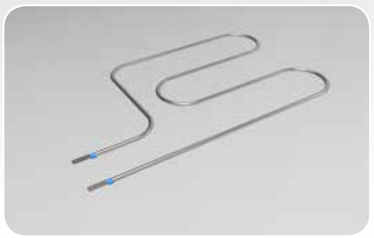
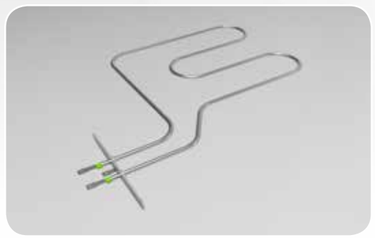
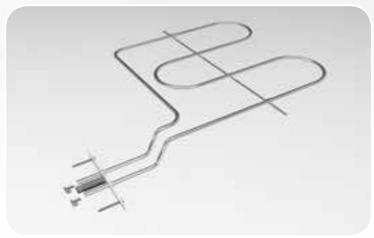




Code	Diameter	Volt	Watt
24067	6,5	400	1100

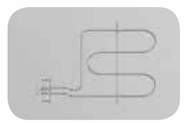
Code	Diameter	Volt	Watt
21564	6,5	230	1200

Code	Diameter	Volt	Watt
20744	6,5	230	1200



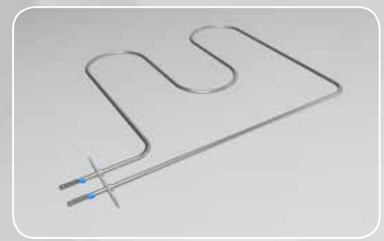
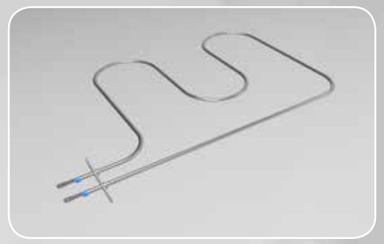
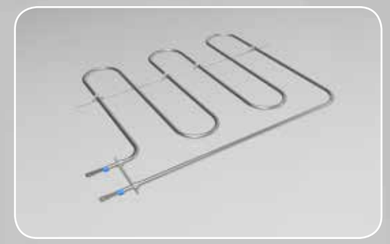




Code	Diameter	Volt	Watt
1040	6,5-8,5	220	650

Code	Diameter	Volt	Watt
23936	6,5	230	1200

Code	Diameter	Volt	Watt
24075	6,5	230	2000



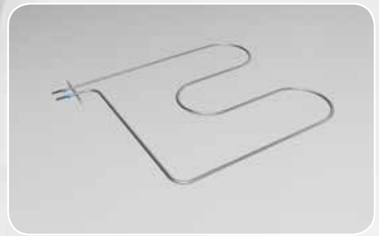
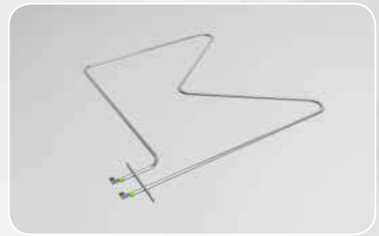
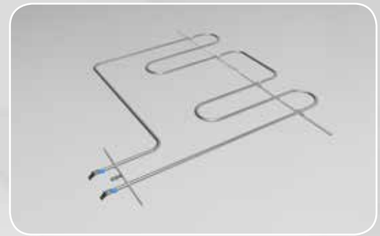




Code	Diameter	Volt	Watt
1157	6,5	220	750

Code	Diameter	Volt	Watt
22814	6,5	240	2500

Code	Diameter	Volt	Watt
1051	6,5	220	2000


Code	Diameter	Volt	Watt
1049	6,5	220	750

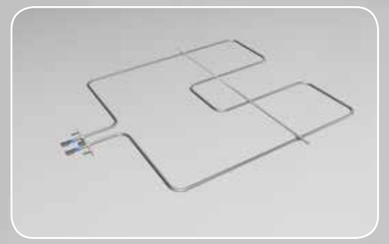
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20768	6,5	220	950

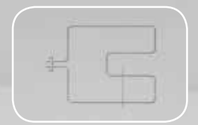
Code	Diameter	Volt	Watt
22489	6,5	230	2000

Code	Diameter	Volt	Watt
22725	6,5	230	1000

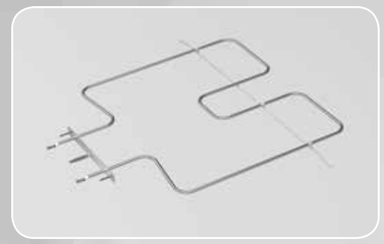
Code	Diameter	Volt	Watt
23177	6,5	230	2000

Code	Diameter	Volt	Watt
23533-1	6,5	230	1000



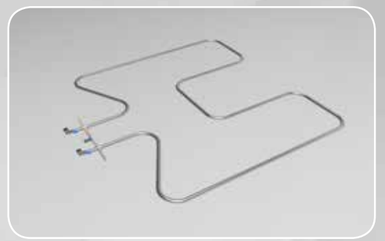


Code	Diameter	Volt	Watt
22802	6,5	230	1600



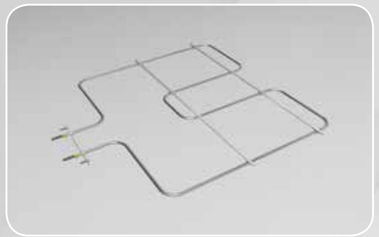


Code	Diameter	Volt	Watt
24089	6,5	230	1400



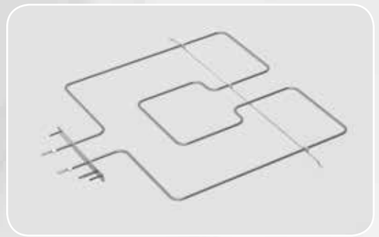


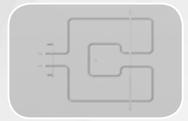
Code	Diameter	Volt	Watt
22257	6,5	230	1300



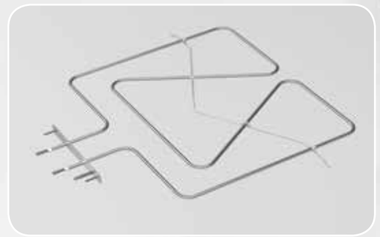


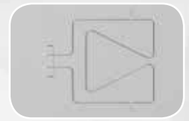
Code	Diameter	Volt	Watt
21720	6,5	230	1700



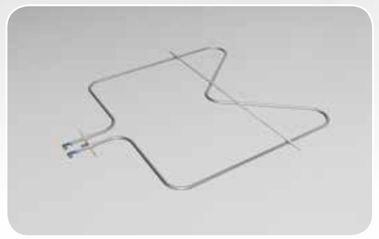


Code	Diameter	Volt	Watt
24090	6,5	230	1400



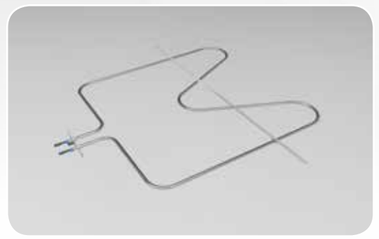


Code	Diameter	Volt	Watt
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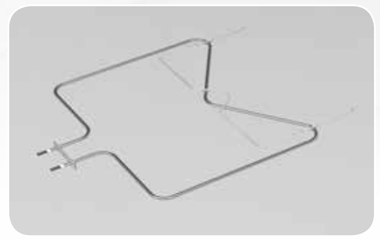


Code	Diameter	Volt	Watt
22724	6,5	230	1000



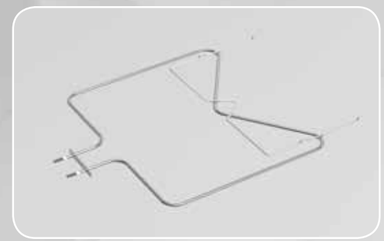


Code	Diameter	Volt	Watt
22797	6,5	230	1400



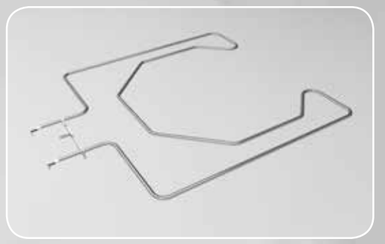


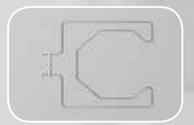
Code	Diameter	Volt	Watt
24091	6,5	230	1150



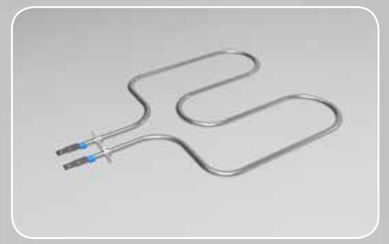


Code	Diameter	Volt	Watt
24092	6,5	240	1000



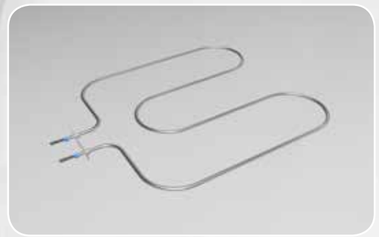


Code	Diameter	Volt	Watt
24072	6,5	230	1100



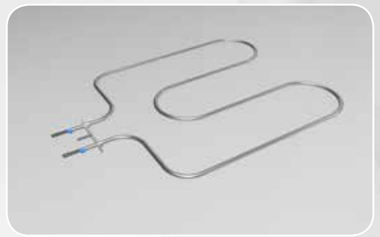


Code	Diameter	Volt	Watt
23183	6,5	230	800





Code	Diameter	Volt	Watt
1156	6,5	220	1200



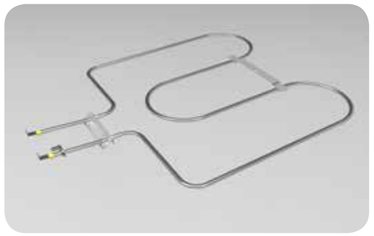
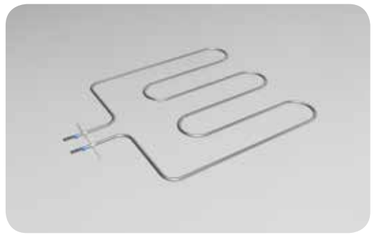
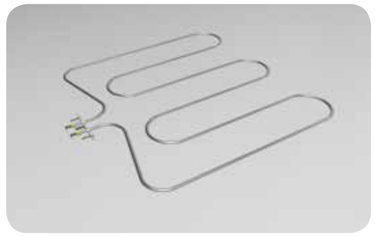
Code	Diameter	Volt	Watt
23176	6,5	230	1000

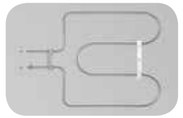
Code	Diameter	Volt	Watt
22212	6,5	230	1200

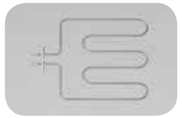
Code	Diameter	Volt	Watt
24097-B	6,5	230	750

Code	Diameter	Volt	Watt
23559	6,5	230	1800
23560	6,5	230	900

Code	Diameter	Volt	Watt
22747-1	6,5	230	1200



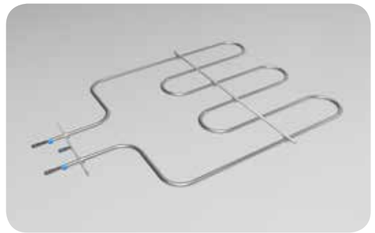
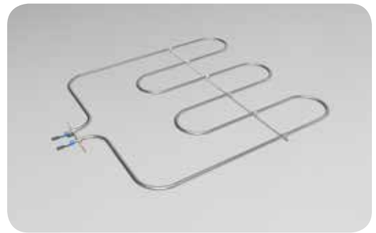
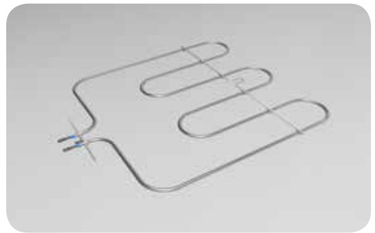


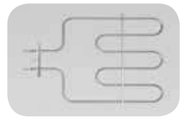


Code	Diameter	Volt	Watt
24064	6,5	230	1100

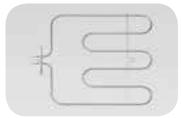
Code	Diameter	Volt	Watt
22256	6,5	230	1700

Code	Diameter	Volt	Watt
21063	6,5	240	1415



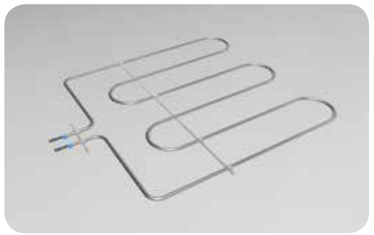
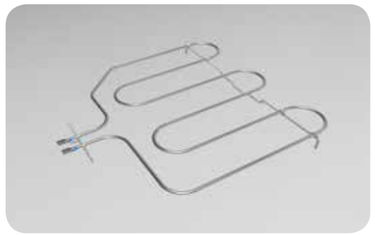
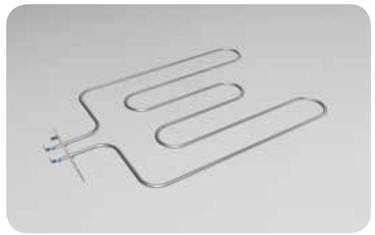


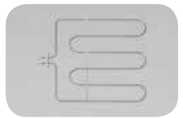


Code	Diameter	Volt	Watt
20313	6,5	220	1300

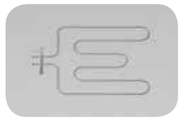
Code	Diameter	Volt	Watt
20704	6,5	220	1200

Code	Diameter	Volt	Watt
23286	6,5	230	1000



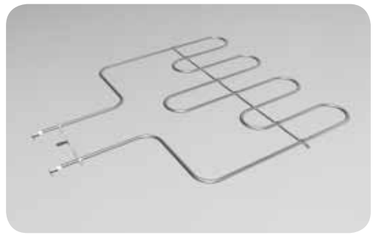
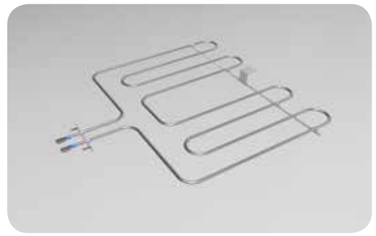
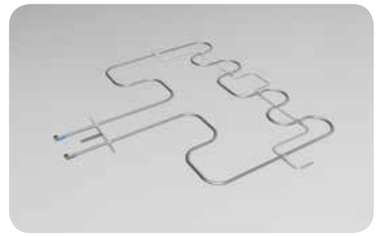


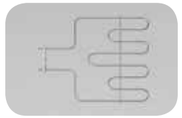


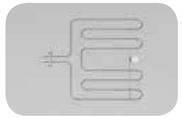
Code	Diameter	Volt	Watt
90621-2	6,5	220	2000

Code	Diameter	Volt	Watt
23433	6,5	220	850

Code	Diameter	Volt	Watt
22701	6,5	230	1530



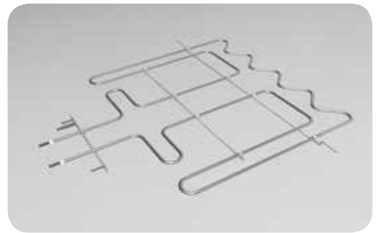
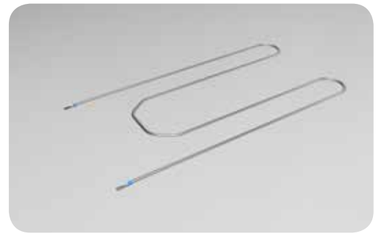
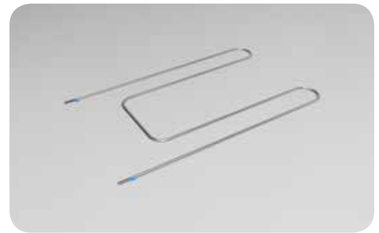




Code	Diameter	Volt	Watt
24078	6,5	230	1100

Code	Diameter	Volt	Watt
23053	6,5	230	2400

Code	Diameter	Volt	Watt
23206	6,5	230	2300


Code	Diameter	Volt	Watt
24080	6,5	230	2450

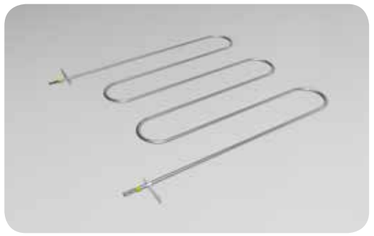
Code	Diameter	Volt	Watt
21503-1	6,5	220	1000

Code	Diameter	Volt	Watt
30381	6,5	220	1000

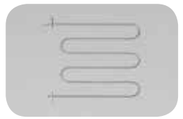
Code	Diameter	Volt	Watt
22247	6,5	230	1750

Code	Diameter	Volt	Watt
93009	6,5	230	700

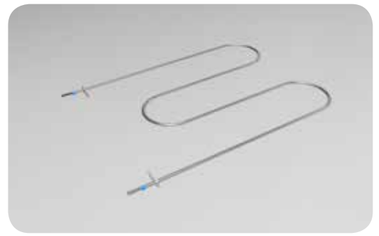
Code	Diameter	Volt	Watt
92642	8,5	230	900







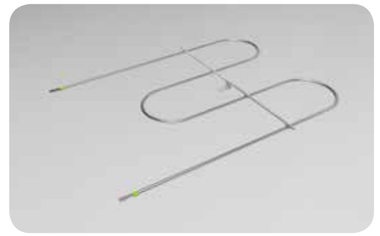
Code	Diameter	Volt	Watt
22254	6,5	230	1800







Code	Diameter	Volt	Watt
22777	6,5	230	1100



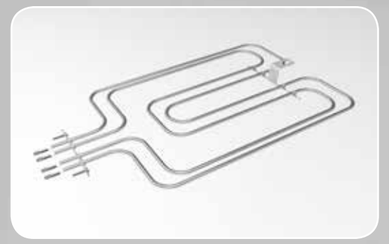
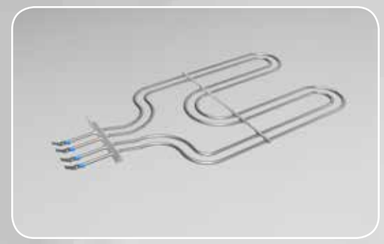
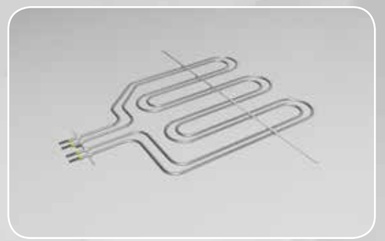


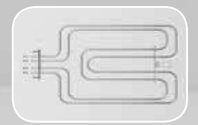


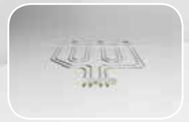
Code	Diameter	Volt	Watt
23310	6,5	230	800





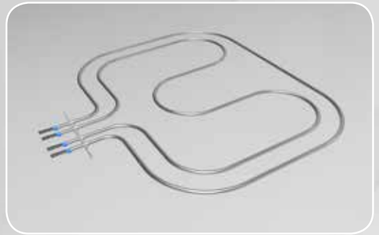
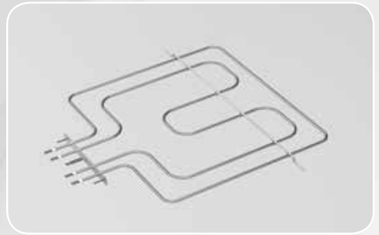
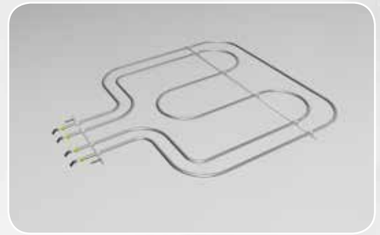



Code	Diameter	Volt	Watt
24097-A	6,5	230	750+1850

Code	Diameter	Volt	Watt
23707	6,5	230	700+1100

Code	Diameter	Volt	Watt
22234	6,5	230	1000+2500



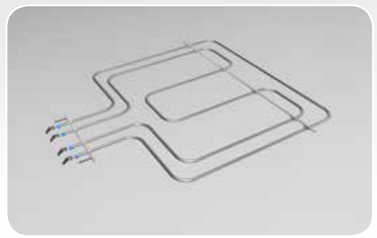
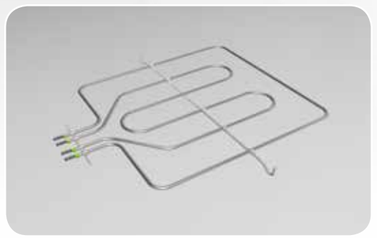
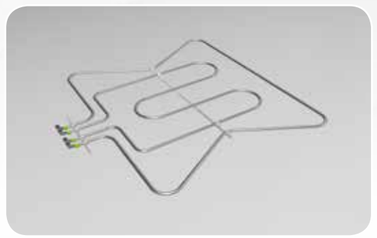


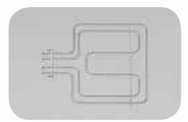


Code	Diameter	Volt	Watt
70600	6,5	220	1000+1500

Code	Diameter	Volt	Watt
24082	6,5	230	900+1600

Code	Diameter	Volt	Watt
22237	6,5	230	1000+1800



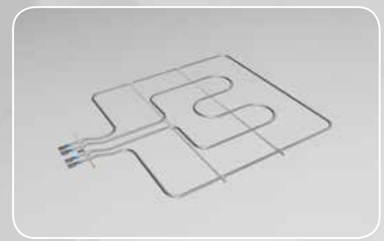
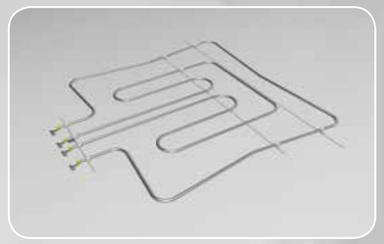
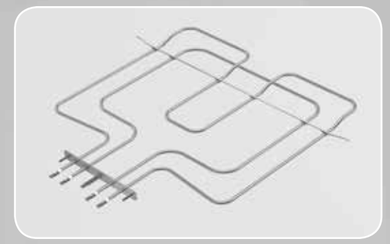




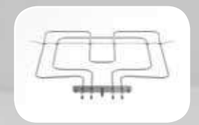
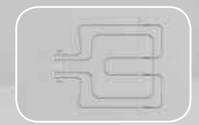
Code	Diameter	Volt	Watt
22500	6,5	230	800+1000

Code	Diameter	Volt	Watt
22235	6,5	230	860+1500

Code	Diameter	Volt	Watt
20701	6,5	240	1400+1200

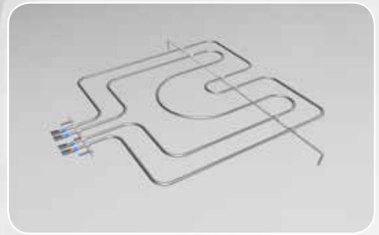
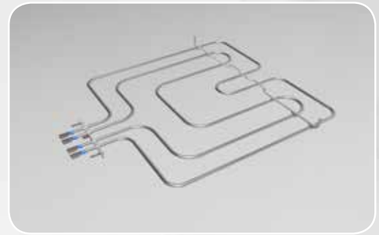
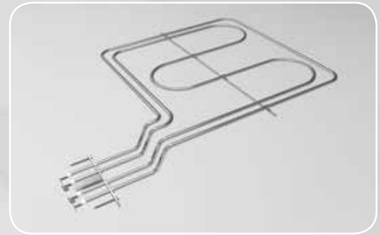


Code	Diameter	Volt	Watt
22723	6,5	230	1040+580

Code	Diameter	Volt	Watt
20496	6,5	220	1100+1800

Code	Diameter	Volt	Watt
24084	6,5	230	1600+900


Code	Diameter	Volt	Watt
20916	6,5	230	800+1050

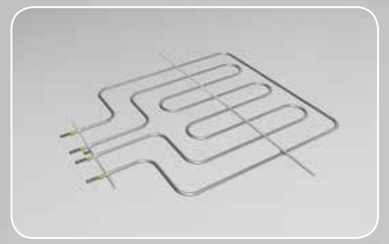
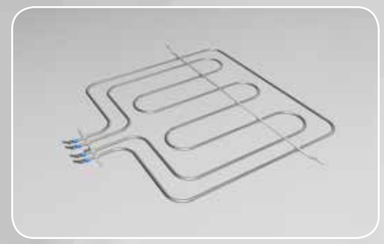
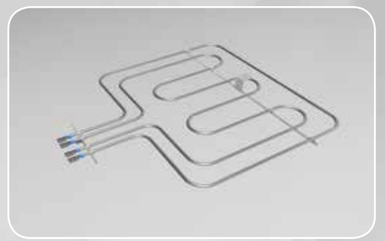
Code	Diameter	Volt	Watt
23432	6,5	230	850+1050

Code	Diameter	Volt	Watt
24076	6,5	230	2900

Code	Diameter	Volt	Watt
22798	6,5	230	1000+1500

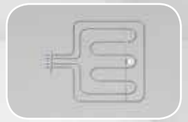
Code	Diameter	Volt	Watt
23934	6,5	230	800+1200

Code	Diameter	Volt	Watt
22233	6,5	230	950+2500



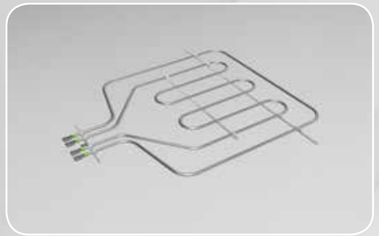
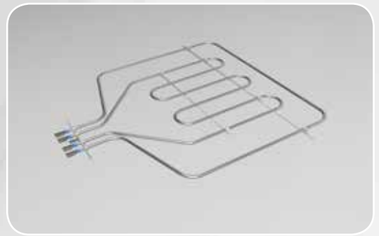
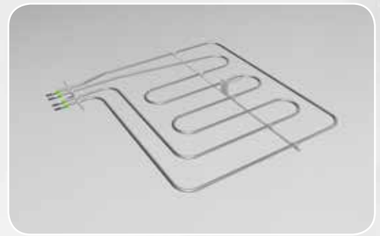




Code	Diameter	Volt	Watt
22238	6,5	230	900+1350

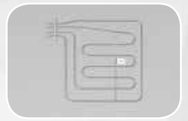
Code	Diameter	Volt	Watt
23561	6,5	230	900+2000

Code	Diameter	Volt	Watt
23052	6,5	220	700+1800



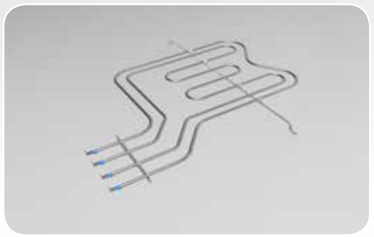
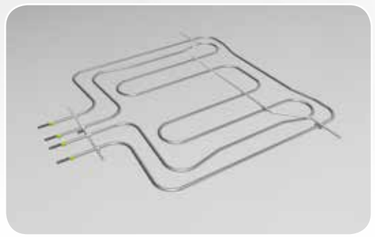
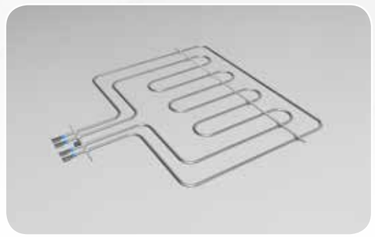




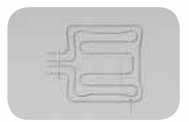
Code	Diameter	Volt	Watt
22236	6,5	230	900+2000

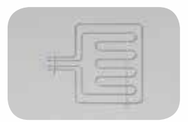
Code	Diameter	Volt	Watt
22722	6,5	230	900+2000

Code	Diameter	Volt	Watt
21565	6,5	230	800+2000



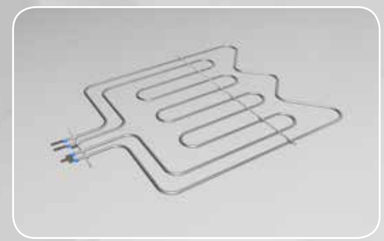
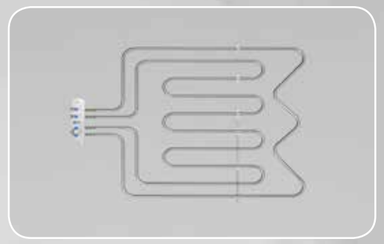
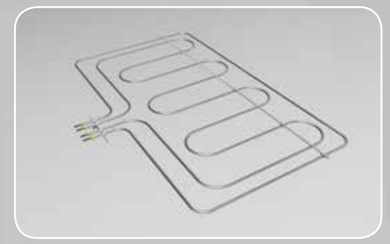




Code	Diameter	Volt	Watt
23090	6,5	230	700+2000

Code	Diameter	Volt	Watt
21568	6,5	230	1700+1000

Code	Diameter	Volt	Watt
22492	6,5	230	700+1800



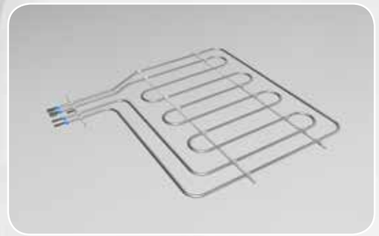
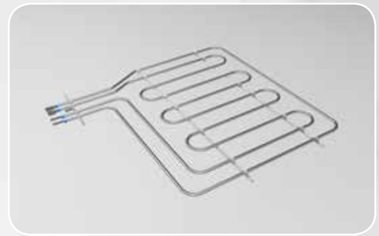
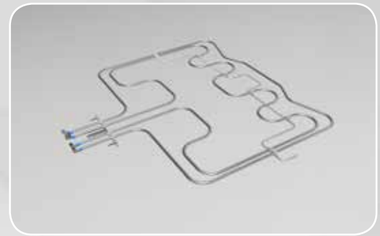




Code	Diameter	Volt	Watt
1160	6,5	220	2000+1500

Code	Diameter	Volt	Watt
1161	6,5	220	2000+1500

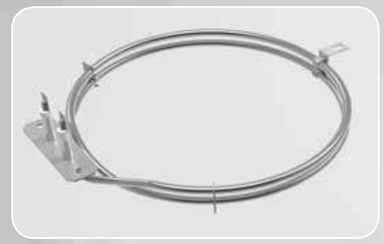
Code	Diameter	Volt	Watt
21572	6,5	230	1300+2800


Code	Diameter	Volt	Watt
22986	6,5	220	1200+2000

Code	Diameter	Volt	Watt
20314	6,5	230	2350+1150

Code	Diameter	Volt	Watt
23207	6,5	230	1000+1900



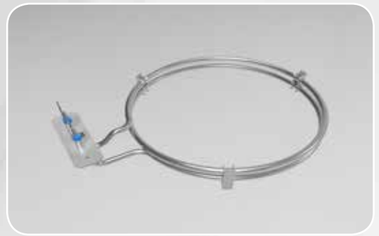


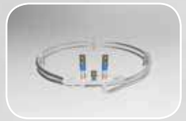



Code	Diameter	Volt	Watt
24086	6,5	230	2000

Code	Diameter	Volt	Watt
24087	6,5	230	2000

Code	Diameter	Volt	Watt
24083	6,5	230	2000





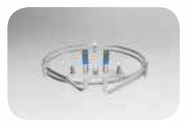


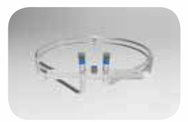

Code	Diameter	Volt	Watt
1048-B	6,5	220	2500

Code	Diameter	Volt	Watt
1048-A	6,5	220	2600

Code	Diameter	Volt	Watt
1048-C	6,5	220	2600








Code	Diameter	Volt	Watt
22269	6,5	230	2500

Code	Diameter	Volt	Watt
70601	6,5	220	2250

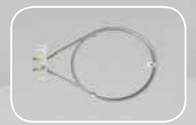
Code	Diameter	Volt	Watt
24070	6,5	230	2000











Code	Diameter	Volt	Watt
24098	6,5	230	750

Code	Diameter	Volt	Watt
22243	6,5	230	2500

Code	Diameter	Volt	Watt
24050	6,5	230	2000

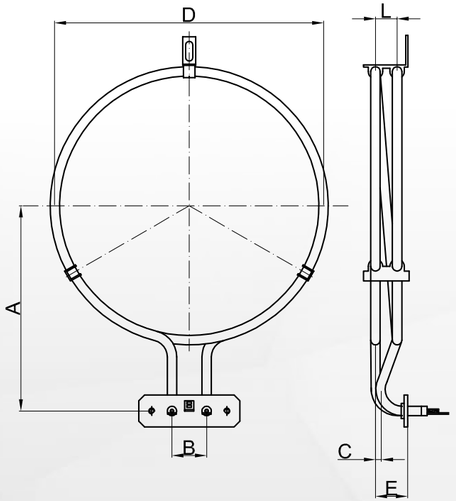





Code	Diameter	Volt	Watt
22514	6,5	220	2500

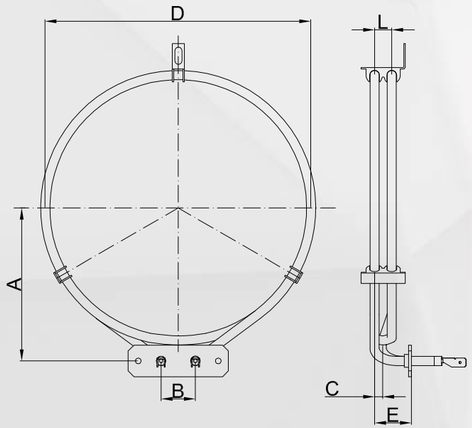
Code	Diameter	Volt	Watt
20813	6,5	220	2500

DOUBLE COIL ELEMENTS



PERPENDICULAR TERMINATIONS

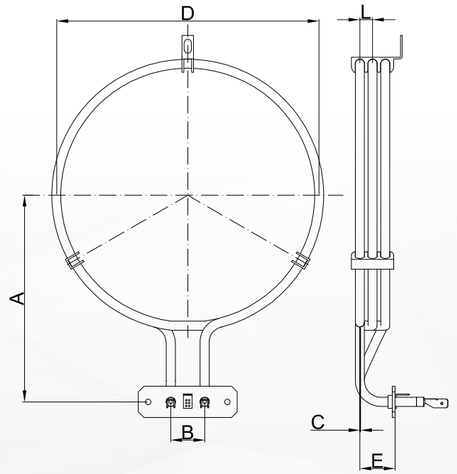
D (mm)	A (mm)	B (mm)	C (mm)	E (mm)	L (mm)
178	120	24	0	21	12
180	122	24	0	22	12
182	130	24	0	22	12
184	135	24	0	22	12
186	135	24	0	22	12
186	140	24	0	23	12
186	150	24	0	23	12
188	160	24	0	23	12



TANGENTIAL TERMINATIONS

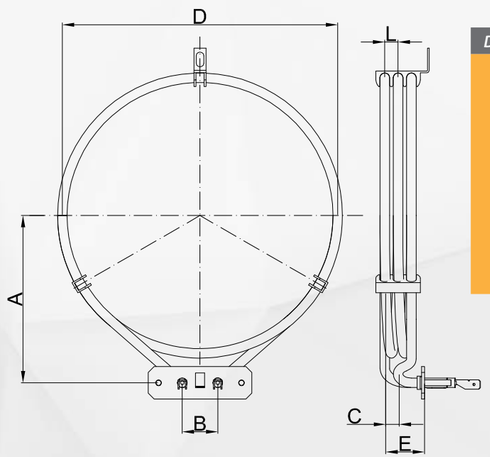
D (mm)	A (mm)	B (mm)	C (mm)	E (mm)	L (mm)
140	85	24	0	21	12
180	110	24	2	22	12
182	112	24	6	22	12
184	115	24	10	22	12
186	115	24	4	23	12
190	145	24	10	23	12
194	120	24	10	23	12
196	122	24	10	23	12
200	126	24	6	24	12

THREE COIL ELEMENTS



PERPENDICULAR TERMINATIONS

D (mm)	A (mm)	B (mm)	C (mm)	E (mm)	L (mm)
140	132	24	0	28	9
180	122	24	0	28	9
182	130	24	0	29	9
184	135	24	0	30	9
186	135	24	0	30	9
186	140	24	0	30	9
186	150	24	0	30	9
188	160	24	0	31	9
192	152	24	0	30	9



TANGENTIAL TERMINATIONS

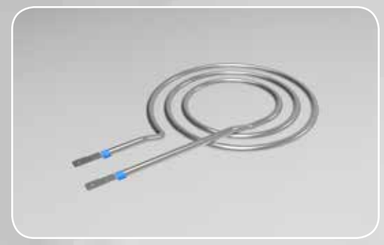
D (mm)	A (mm)	B (mm)	C (mm)	E (mm)	L (mm)
178	108	24	10	28	9
180	107	24	10	30	9
182	109	24	6	30	9
184	110	24	10	30	9
186	110	24	2	30	9
190	115	24	6	29	9
196	120	24	10	30	9
200	120	24	10	30	9
200	126	24	6	24	12







Code	Diameter	Volt	Watt
23693	6,5	220	1000







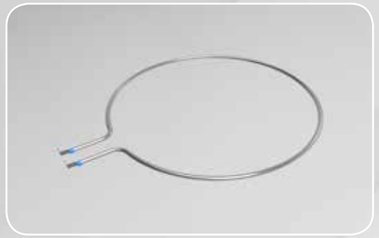
Code	Diameter	Volt	Watt
23483-1	6,5	220	1250



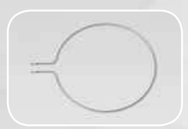




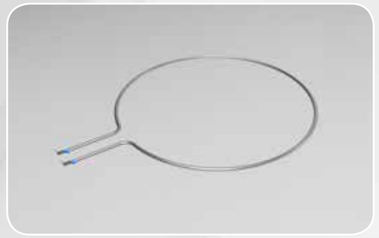
Code	Diameter	Volt	Watt
23483	6,5	220	1250







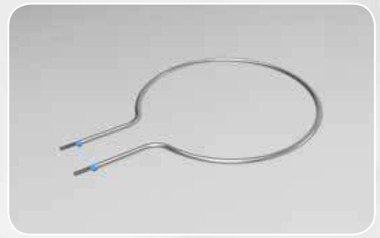
Code	Diameter	Volt	Watt
23241	6,5	220	650







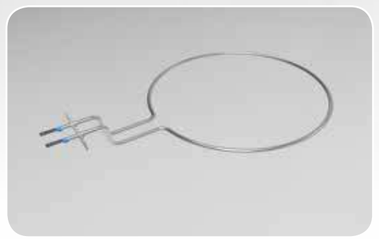
Code	Diameter	Volt	Watt
23242	6,5	220	750

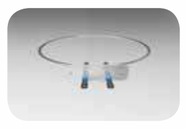


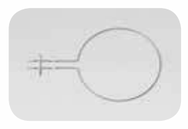




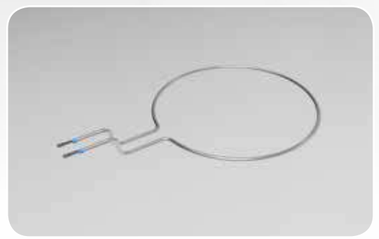
Code	Diameter	Volt	Watt
1004-Ç	11	220	750







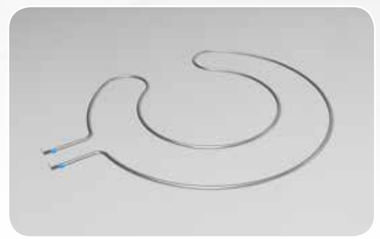
Code	Diameter	Volt	Watt
21670	6,5	220	550







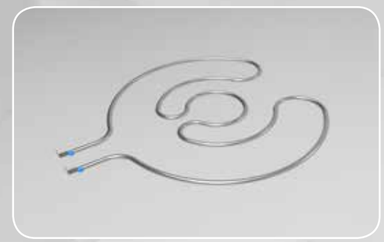
Code	Diameter	Volt	Watt
23225	6,5	220	550







Code	Diameter	Volt	Watt
23331-1	6,5	220	650







Code	Diameter	Volt	Watt
1152	6,5-8,5	220	1700







Code	Diameter	Volt	Watt
23574	6,5	220	2000

HEATING ELEMENTS FOR WASHING MACHINES



Heating Elements for washing machines

BALÇIK has offered a wide range of products to the market in order to meet the water heating needs of washing machines. The operational environment consists of a mixture of water and detergent at a temperature of 60 to 90°C. The humidity corrosion starts with the lime in the water precipitating and attaching to the heater housing, which affects the economic life of the heater.

Adding our experience to the knowledge that we gain by testing many different practices worldwide in our lab, we can easily determine which material should be used in our products, manner of use and the heating power for safe use for years.

BALÇIK has also made available additional safety application in order to allow a safer use. This application consists of single phase thermal fuses with different timers for shutting down depending on the type of pin that is used (iron or copper) and their different calibrations placed into the heater tube.

THERMAL FUSE

8.5 mm diameter BALÇIK tubular heating elements can be manufactured with thermal fuses integrated into them. Optionally, a thermal fuse can be placed on each end of the heating element. Preferred cutout temperatures for are 144 C or 152 C. Moreover, if requested, thermal fuses with different cutout temperatures can also be manufactured.
BALÇIK manufactures the entire range of tubular heating elements used in the white goods sector.

Thanks to the manufacture technologies that we have developed in close cooperation with our clients, BALÇIK always develops new products and is able to promptly meet the technical and commercial needs of the market.

In addition to being able to determine the best material according to need in the white goods sector, BALÇIK is also able to pick the best thermal fuse and NTC bars and to offer complete thermal solutions.

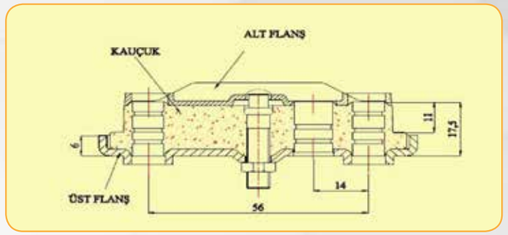
The standardized mass production line of the BALÇIK manufacture plant has certificate from VDE, one of the most prestigious institutes, and so the resulting products have perfect quality and safety.
The most important trait of our firm is the ability of picking and using the best measure and material in the sector of heating elements for washing machines.

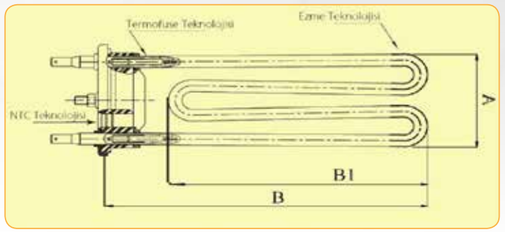
Owing to this trait, the material with the highest resistance to corrosion can be determined and the product with the highest quality in technical and electromechanical terms is ensured.
Accurate calculation of corrosion in hard and chlorinated water is among the most important factors in accurately designing and manufacturing submersed type electrical heaters.
These stainless steel and special nickel/chromium alloy heater elements used in the machines have single or double thermal fuses. Such fuses can be picked at different cutout temperatures depending on the desired cutout period. They can be connected serially to one or two phases of the heater.

In addition to all these, it is also possible to control the temperature through the NTC bar, which is aimed at ensuring protection on the outside.











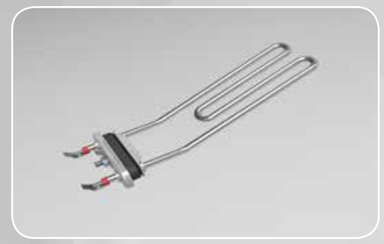
Thermal Fuses

Working Temprature °C
66°C, 72°C, 91°C, 98°C, 109°C, 128°C, 141°C, 152°C, 167°C, 184°C, 215°C, 228°C
Tolerance +0 /- 4°C
Max amperometric output (A)
16
The specifications of the thermal fuse must be agreed with the Technical Department.
To establish correct cut-off temprature, measurements have to be done under normal condition.
The cut-off temprature is recommended to be at least 25-30°C above the maximum temprature of the thermal fuse at normal operation.





Code	Diameter	Volt	Watt
20362	8,5	220	2000





Code	Diameter	Volt	Watt
20363	8,5	220	2000



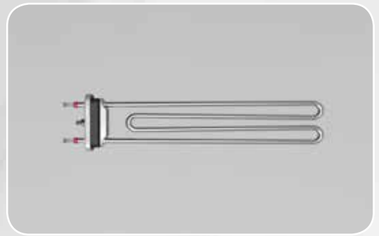


Code	Diameter	Volt	Watt
20364	8,5	230	2000





Code	Diameter	Volt	Watt
20365	8,5	220	2000




Code	Diameter	Volt	Watt
20366	8,5	220	2000



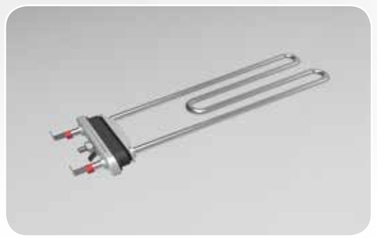


Code	Diameter	Volt	Watt
20367	8,5	230	4000



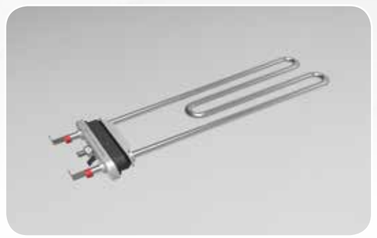


Code	Diameter	Volt	Watt
700394	8,5	220	2000





Code	Diameter	Volt	Watt
29037	8,5	230	2000





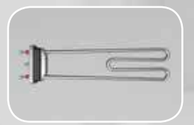
Code	Diameter	Volt	Watt
29036	8,5	220	2000



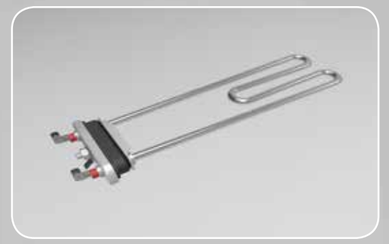


Code	Diameter	Volt	Watt
700345	8,5	230	1700



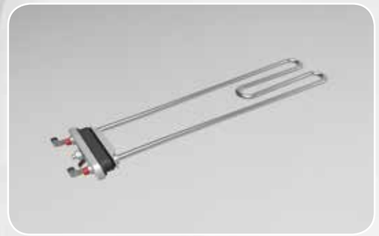


Code	Diameter	Volt	Watt
93031	8,5	230	1900



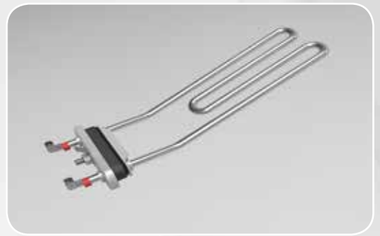


Code	Diameter	Volt	Watt
93032	8,5	230	1700





Code	Diameter	Volt	Watt
93033	8,5	230	2000



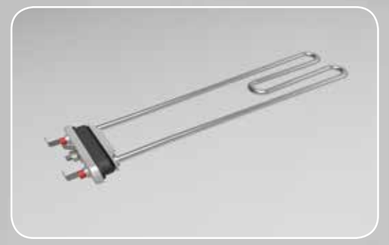

Code	Diameter	Volt	Watt
93035	8,5	230	1700

Code	Diameter	Volt	Watt
93036	8,5	230	1700

Code	Diameter	Volt	Watt
93037	8,5	230	1650

Code	Diameter	Volt	Watt
93038	8,5	230	1850

Code	Diameter	Volt	Watt
93039	8,5	230	1850



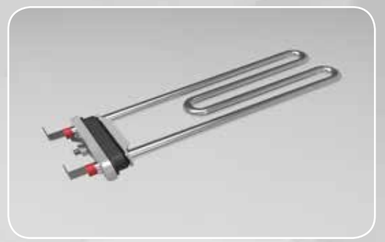


Code	Diameter	Volt	Watt
93040	8,5	230	1850





Code	Diameter	Volt	Watt
93041	8,5	230	1900





Code	Diameter	Volt	Watt
93042	8,5	230	1950





Code	Diameter	Volt	Watt
93043	8,5	230	1950



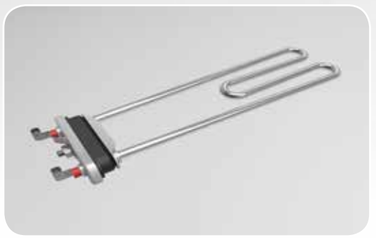


Code	Diameter	Volt	Watt
93044	8,5	220	1900



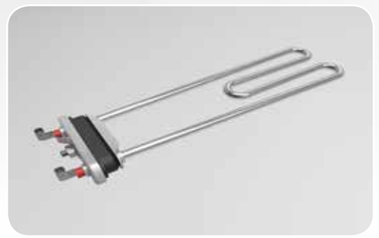


Code	Diameter	Volt	Watt
93045	8,5	230	2000



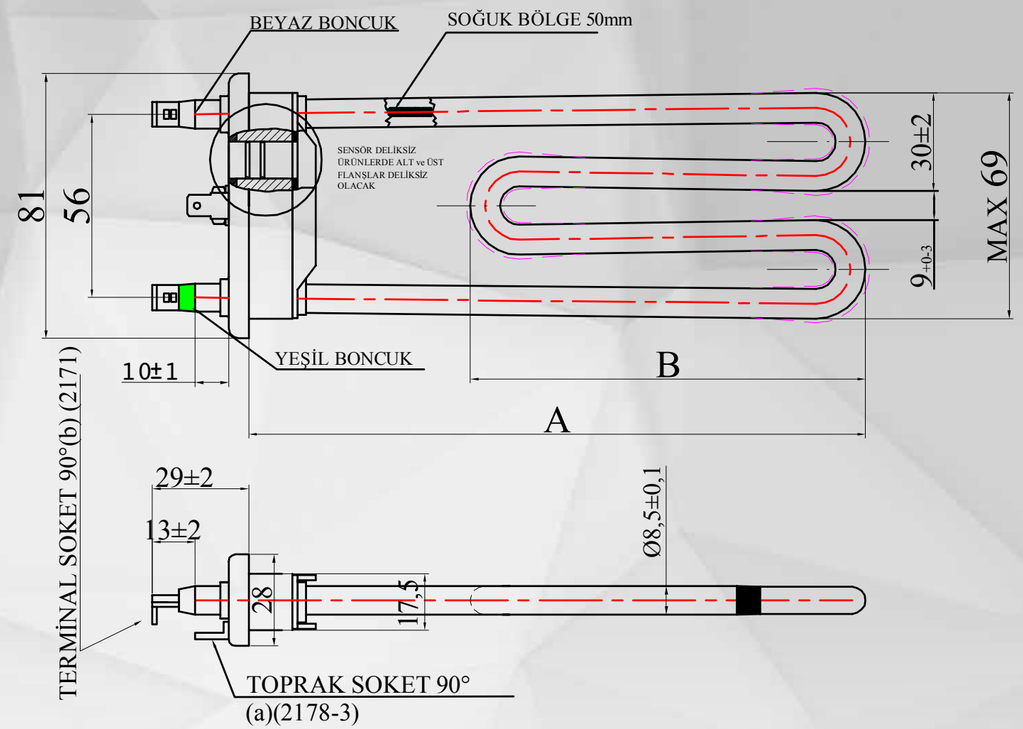


Code	Diameter	Volt	Watt
93046	8,5	220	1900

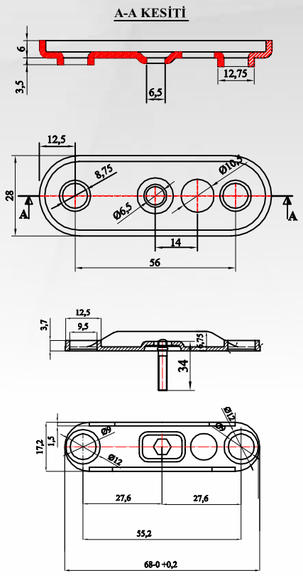




Code	Diameter	Volt	Watt
93047	8,5	230	1850



Product Code	VOLT	WATT	A	B	C
TM700430	220	1700	165	105	√
TM700431	220	1700	165	105	
TM700428	220	1800	170	110	√
TM700429	220	1800	170	110	
TM700426	220	1900	180	115	√
TM700427	220	1900	180	115	
TM700424	220	1950	185	120	√
TM700425	220	1950	185	120	
TM700422	220	2000	195	135	√
TM700423	220	2000	195	135	
TM20364-1	220	2000	235	175	√

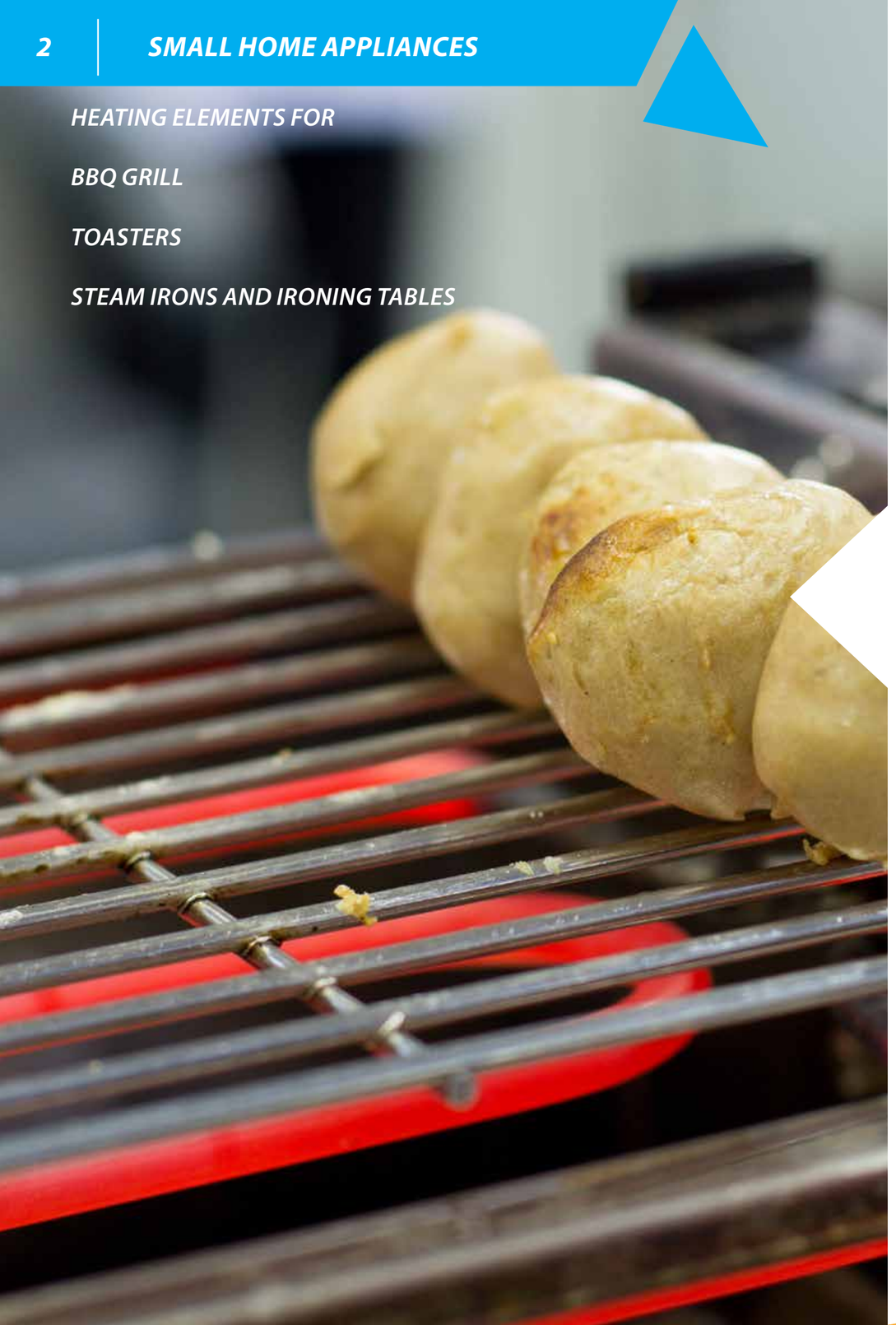


HEATING ELEMENTS FOR

BBQ GRILL

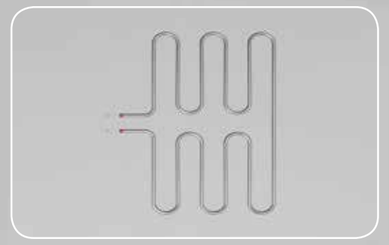
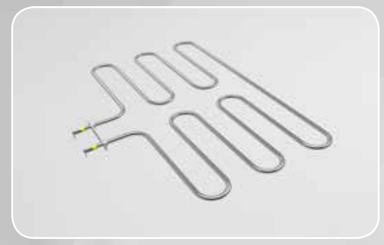
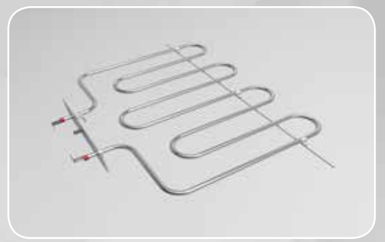
TOASTERS

STEAM IRONS AND IRONING TABLES





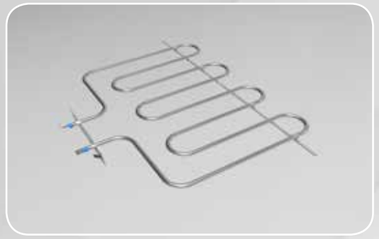
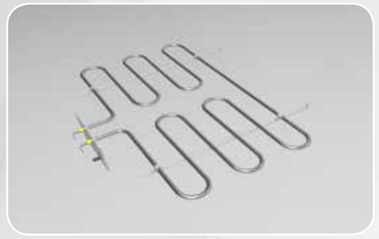
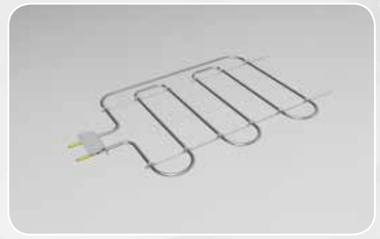


Code	Diameter	Volt	Watt
1150-2	6,5	220	2000
24106	6,5	220	1500

Code	Diameter	Volt	Watt
23888	6,5	220	2000
24096	6,5	220	1500

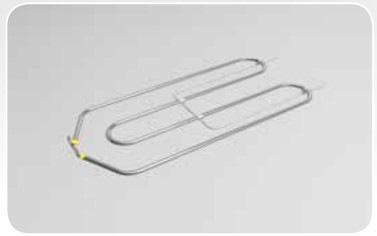
Code	Diameter	Volt	Watt
21142	6,5	220	1200

Code	Diameter	Volt	Watt
23489	6,5	220	1200

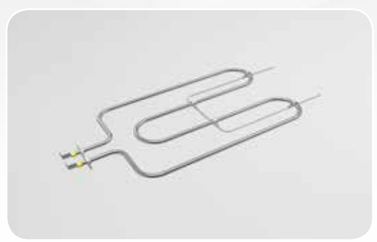
Code	Diameter	Volt	Watt
1150	6,5	220	2000

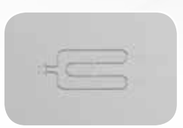
Code	Diameter	Volt	Watt
23827	6,5	230	1200



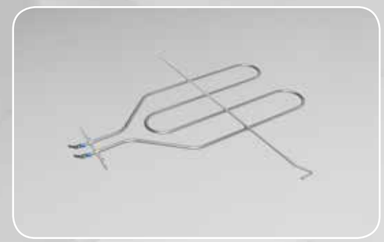
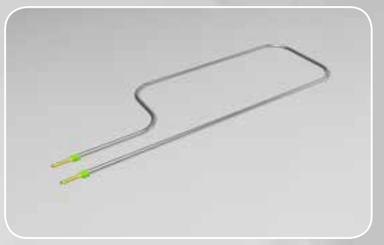
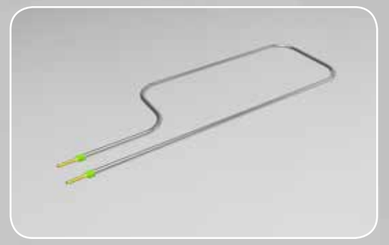


Code	Diameter	Volt	Watt
22775-1	6,5	220	1000
22776-1	6,5	220	1200
23523	6,5	220	1100





Code	Diameter	Volt	Watt
22781-1	6,5	220	1050
22782-1	6,5	220	1250
22783-1	6,5	220	1300

Code	Diameter	Volt	Watt
22721	6,5	230	1500

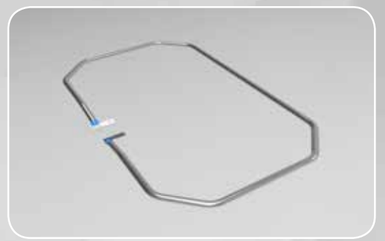
Code	Diameter	Volt	Watt
92268	8,5	220	1800

Code	Diameter	Volt	Watt
20726	6,5	230	2000











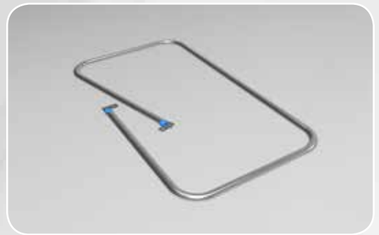
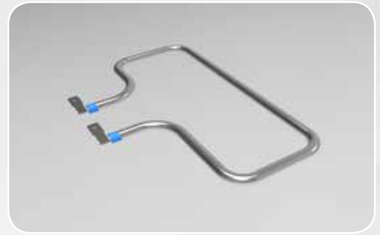




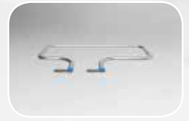
Code	Diameter	Volt	Watt
23730	6,5	110	400
23881	6,5	110	350

Code	Diameter	Volt	Watt
23351	6,5	115	800

Code	Diameter	Volt	Watt
23582	6,5	115	1000

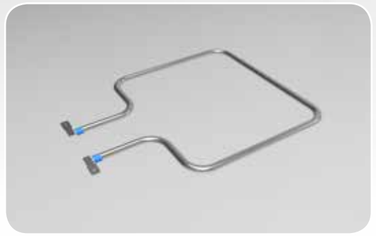
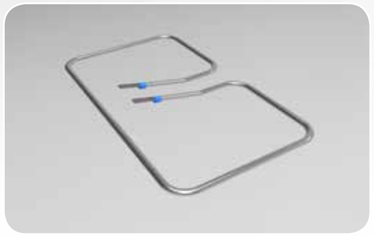
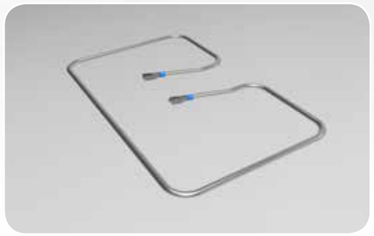


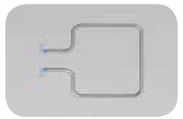
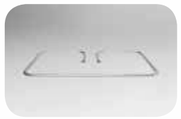



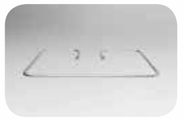

Code	Diameter	Volt	Watt
23675	6,5	110	750

Code	Diameter	Volt	Watt
92336	8,5	103,5	1000
92373	8,5	126,5	1000

Code	Diameter	Volt	Watt
23411	6,5	110	400
23882	6,5	110	350

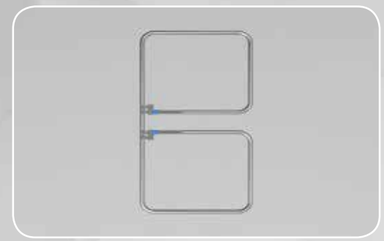
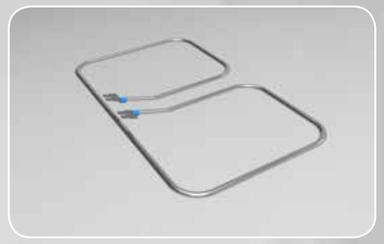
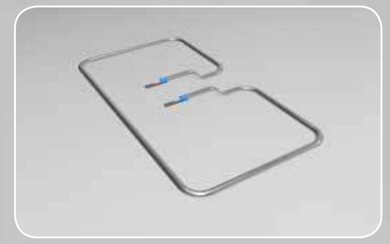
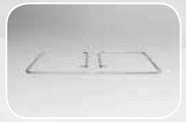






Code	Diameter	Volt	Watt
23729	6,5	110	400

Code	Diameter	Volt	Watt
1023-K	6,5	110	650

Code	Diameter	Volt	Watt
1023-B	6,5	110	800

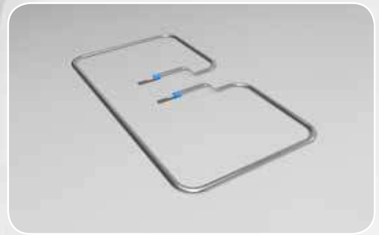
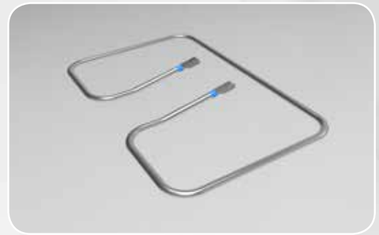




Code	Diameter	Volt	Watt
21110	6,5	115	900

Code	Diameter	Volt	Watt
23093	6,5	115	900

Code	Diameter	Volt	Watt
23352	6,5	230	800



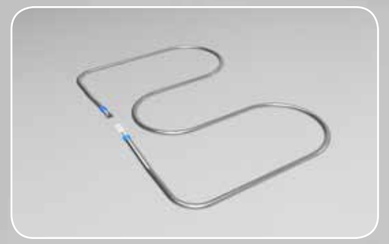

Code	Diameter	Volt	Watt
23731	6,5	115	1000

Code	Diameter	Volt	Watt
21619	6,5	115	800

Code	Diameter	Volt	Watt
1136	6,5	220	650

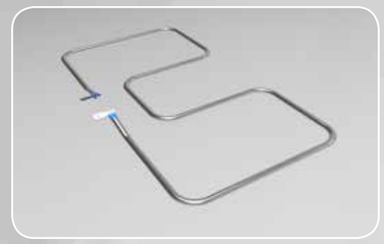
Code	Diameter	Volt	Watt
21669	6,5	115	900

Code	Diameter	Volt	Watt
23701	6,5	115	800



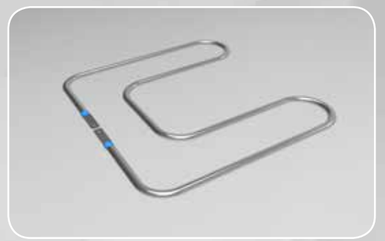


Code	Diameter	Volt	Watt
20261	6,5	110	1000
20261-1	6,5	220	1000



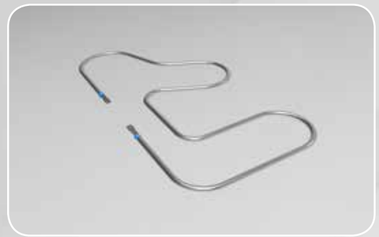


Code	Diameter	Volt	Watt
20248	6,5	220	900

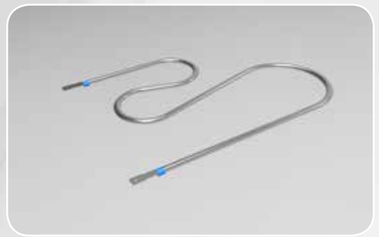




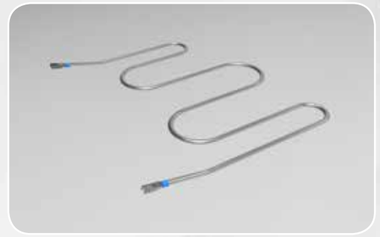
Code	Diameter	Volt	Watt
1138	6,5	220	650



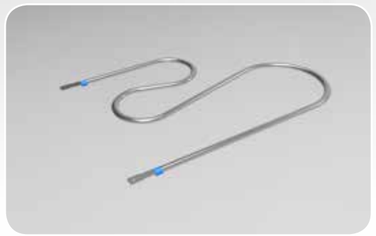
Code	Diameter	Volt	Watt
1141	6,5	110	800



Code	Diameter	Volt	Watt
1021	6,5	220	650

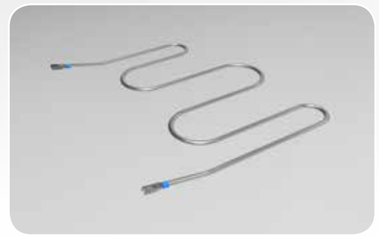


Code	Diameter	Volt	Watt
1139	6,5	110	750



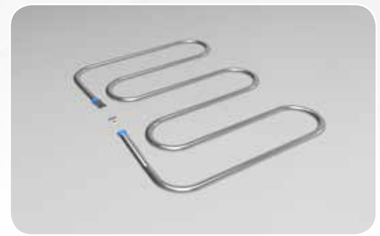


Code	Diameter	Volt	Watt
1021	6,5	220	650



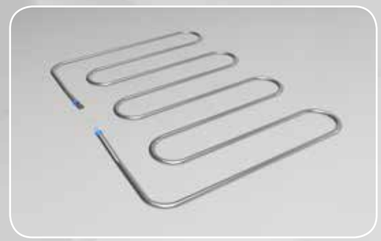


Code	Diameter	Volt	Watt
1139	6,5	110	750





Code	Diameter	Volt	Watt
1025	6,5	220	1000
1025-1	8,5		1000



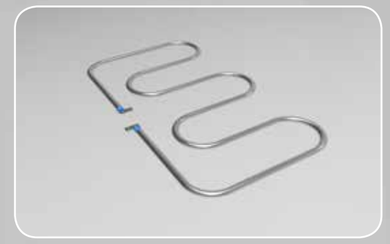


Code	Diameter	Volt	Watt
1026	6,5	220	1250
1026-1	8,5	220	1250



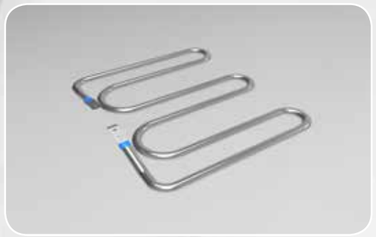


Code	Diameter	Volt	Watt
20027	6,5	110	1000





Code	Diameter	Volt	Watt
92338	8,5	126,5	1000
92339	8,5	103,5	1100



Code	Diameter	Volt	Watt
23482	8,5	230	650



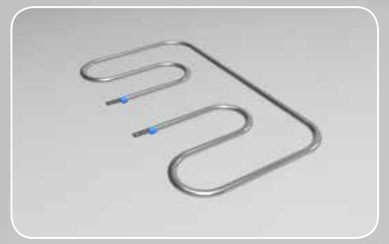
Code	Diameter	Volt	Watt
92421	8,5	230	1250

Code	Diameter	Volt	Watt
1026-2	8,5	230	900

Code	Diameter	Volt	Watt
20066	6,5	110	750

Code	Diameter	Volt	Watt
1024	6,5	110	800

Code	Diameter	Volt	Watt
1022	6,5	220	650















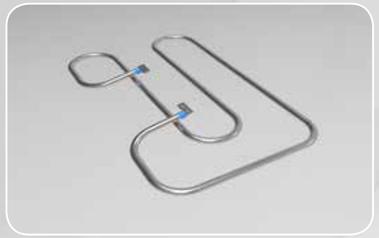


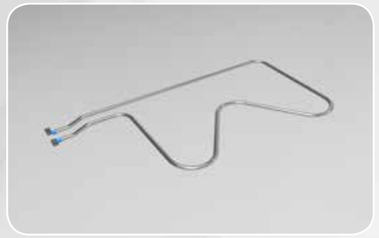


Code	Diameter	Volt	Watt
92337	6,5	126,5	1100
92372	8,5	103,5	1000

Code	Diameter	Volt	Watt
1149	6,5	220	750
1149-1	6,5	110	750

Code	Diameter	Volt	Watt
23669	6,5	110	1000













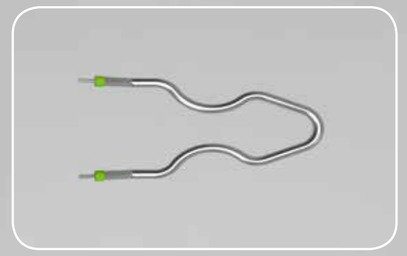
Code	Diameter	Volt	Watt
1135	6,5	220	750

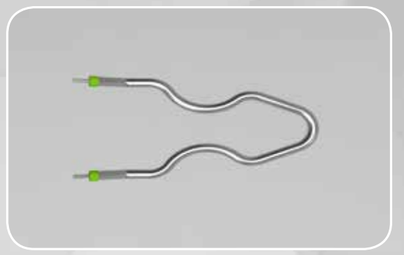
Code	Diameter	Volt	Watt
20192	6,5	110	900



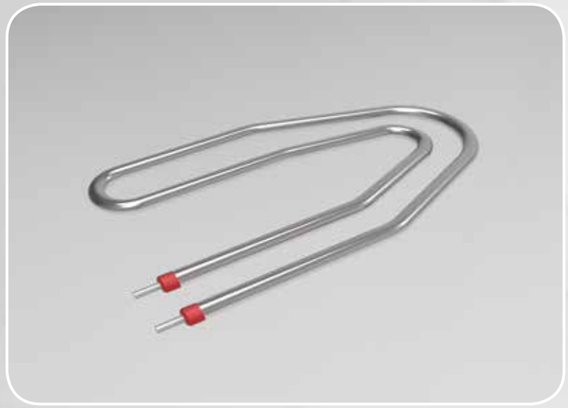


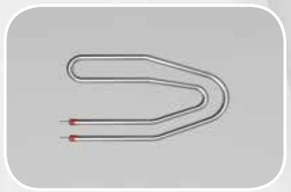






Code	Diameter	Volt	Watt
92465			



Code	Diameter	Volt	Watt
20256	6,5	230	1200
20085	6,5	220	800
21026	6,5	120	800

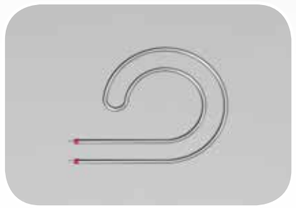


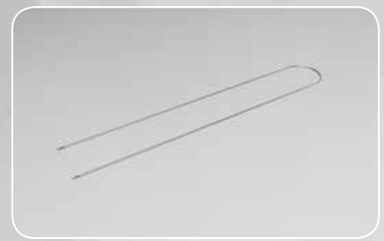
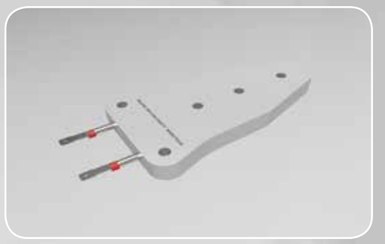
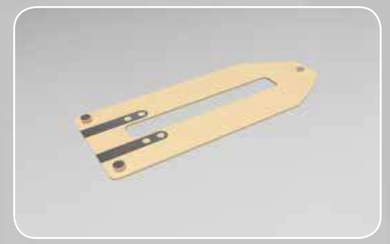


Code	Diameter	Volt	Watt
90351	6,5	220	1200



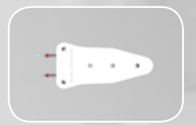
Code	Diameter	Volt	Watt
20087	6,5	220	1000
20088	6,5	220	1250
21027	6,5	120	1000
21028	6,5	120	1250



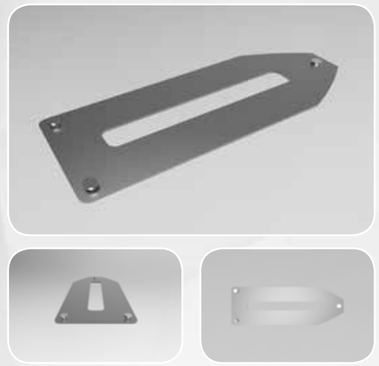
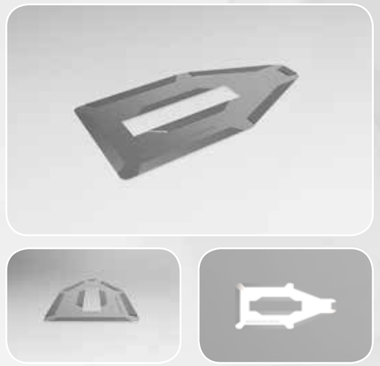

Code	Diameter	Volt	Watt
92270	6,5	220	1600

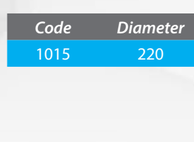
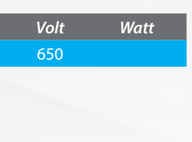



Code	Diameter	Volt	Watt
TM2010-1	6,5	220	600
TM2010	6,5	220	1200

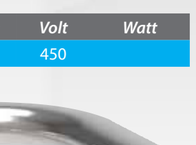



Code	Diameter	Volt	Watt
1011	220	450	

Code	Diameter	Volt	Watt
1015	220	650	

Code	Diameter	Volt	Watt
1008	220	450	

Code	Diameter	Volt	Watt
20050	6,5	230	1200





HEATING ELEMENTS FOR

INSTANT WATER HEATERS

ELECTRIC WATER HEATERS WITH TANK

ELECTRIC WATER HEATERS 1.1/4' SCREW TYPE

ELECTRIC WATER HEATERS 48MM FLANGE TYPE

STEM TYPE THERMOSTAT WITH SAFETY

ELECTRIC WATER HEATERS AQUAHET TYPE

INDUSTRIAL IMMERSION WITH FLANGE

TOWEL RADIATOR

IMMERSION TYPE HEATING ELEMENTS

Tubular heating elements are transforming the ele ctrical energy to the heat. There are various types and application areas for heating elements, however as BALÇIK, we are specialized in the production of Heating Elements for Liquid Heating Applications.

BALÇIK's Heating Elements are designed primarily for direct immersion in liquids such as water, oils, and other kinds of liquids. By generating all the heat within the liquid, these heating elements are virtually 100 percent energy efficient and easily monitored and controlled.

The use of electric immersion heating elements has been more popular since several decades as rising costs of fuels force individuals to select a more cost efficient way of heating their applications. Ecologically conscientious groups have long advocated for cleaner energies to help save the environment. Electric immersion heating elements have been known to use the cleanest form of energy, leaving no residual discharge and provide immediate heat transfer to any medium.

BALÇIK produces mono-phase and three-phase immersion heating elements in copper (99,9%), stainless steel and special alloys of chrome and nickel steel. The structure of the selected components ensures high technical, electromechanical and anticorrosive qualities. Furthermore, a good knowledge of corrosive phenomena in hard and/ or chloride water is essential to properly design immersion heaters.

Immersion type Heating Elements are constructed of one or more heaters brazed or welded into various types of mounting fittings. Standard and custom engineered designs are available for tailored solutions to your thermal application requirements.

A wide variety of connections, materials, electrical ratings and watt densities are available.

The goal is to optimize the heating element configuration to ensure the longest life possible, while minimizing overall product and life cycle costs. The general temperature, sheath material and power can aid in proper heating element selection for some common liquids.
With minimal maintenance requirements, immersion heating elements are an excellent solution to rapid heating in almost any domestic and industrial environment.





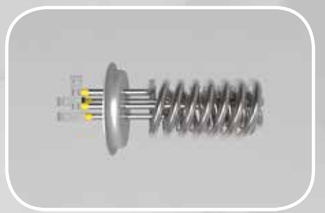




Code	Diameter	Volt	Watt
22821	6,5	220	4500



Code	Diameter	Volt	Watt
20187-10	6,5	220	7500
20187-17	6,5	220	8500
23874	6,5	240	7500











Code	Diameter	Volt	Watt
23783	6,5	220	5500







Code	Diameter	Volt	Watt
23398	6,5	230	7000







Code	Diameter	Volt	Watt
20223	6,5	220	7000







Code	Diameter	Volt	Watt
23541	6,5	230	5500



Code	Diameter	Volt	Watt
23302	6,5	220	7250
23697	6,5	220	9000
23875	6,5	240	7250











Code	Diameter	Volt	Watt
23416	6,5	220	7500







Code	Diameter	Volt	Watt
23378-K	6,5	220	3000







Code	Diameter	Volt	Watt
23378-B	6,5	220	3000







Code	Diameter	Volt	Watt
23783	6,5	220	7500







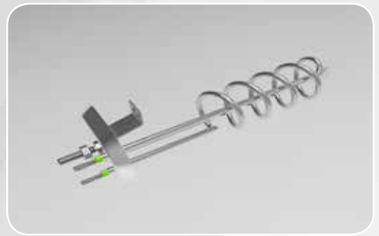





Code	Diameter	Volt	Watt
92949	8,5	230	1500

Code	Diameter	Volt	Watt
1031	8,5	220	2000

Code	Diameter	Volt	Watt
1031B	8,5	220	2000







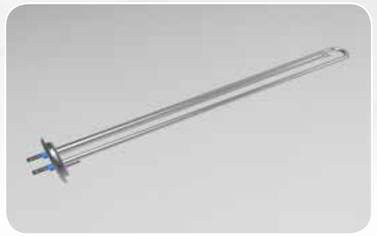


Code	Diameter	Volt	Watt
24043	6,5	230	1980

Code	Diameter	Volt	Watt
dmr	6,5	230	1980

Code	Diameter	Volt	Watt
92603	8,5	220	700







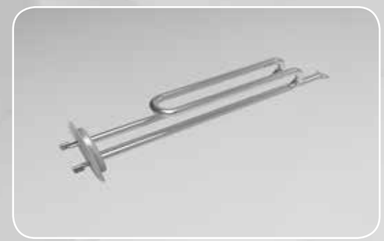





Code	Diameter	Volt	Watt
92602	8,5	220	700

Code	Diameter	Volt	Watt
92239	8,5	230	1980

Code	Diameter	Volt	Watt
91131	8,5	220	1950












Code	Diameter	Volt	Watt
92613	8,5	220	3510

Code	Diameter	Volt	Watt
92997	8,5	230	1500

Code	Diameter	Volt	Watt
92660	8,5	230	2000







Code	Diameter	Volt	Watt
92601	8,5	220	1300

Code	Diameter	Volt	Watt
92604	8,5	220	2000

Code	Diameter	Volt	Watt
1033	8,5	220	2000

Code	Diameter	Volt	Watt
1034	8,5	220	2000

Code	Diameter	Volt	Watt
1032	8,5	220	2000

Code	Diameter	Volt	Watt
1032-4	8,5	220	1950





Code	Diameter	Volt	Watt
1032-1	8,5	220	2000



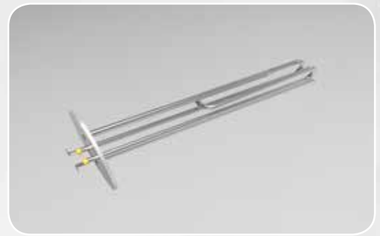

Code	Diameter	Volt	Watt
1032-5	8,5	230	1980





Code	Diameter	Volt	Watt
92090-2	8,5	220	1980











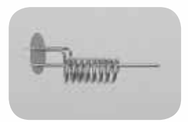
Code	Diameter	Volt	Watt
20180	8,5	220	1950

Code	Diameter	Volt	Watt
92616	8,5	230	2500

Code	Diameter	Volt	Watt
92431	8,5	220	1950







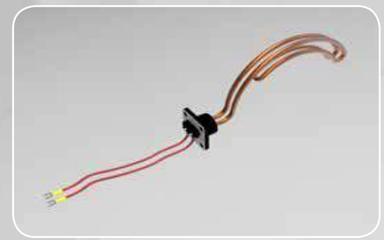




Code	Diameter	Volt	Watt
91901	8,5	230	3000

Code	Diameter	Volt	Watt
91902	8,5	230	1000

Code	Diameter	Volt	Watt
92961	8,5	230	4500





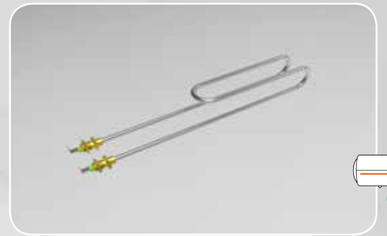
Code	Diameter	Volt	Watt
92732	8,5	230	3600



Code	Diameter	Volt	Watt
91863	8,5	230	6000
91864	8,5	230	4500











Code	Diameter	Volt	Watt
92962	8,5		

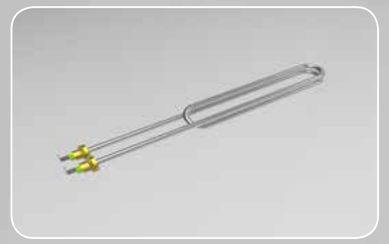
Code	Diameter	Volt	Watt
92963	8,5		

Code	Diameter	Volt	Watt
92645	8,5	230	2000

Code	Diameter	Volt	Watt
91860	8,5	230	1500

Code	Diameter	Volt	Watt
22903	6,5	230	1500

Code	Diameter	Volt	Watt
92439	8,5	230	2750



















Code	Diameter	Volt	Watt
92192	8,5	230	1900

Code	Diameter	Volt	Watt
91643-2	8,5	230	2500

Code	Diameter	Volt	Watt
92969	8,5	230	2000







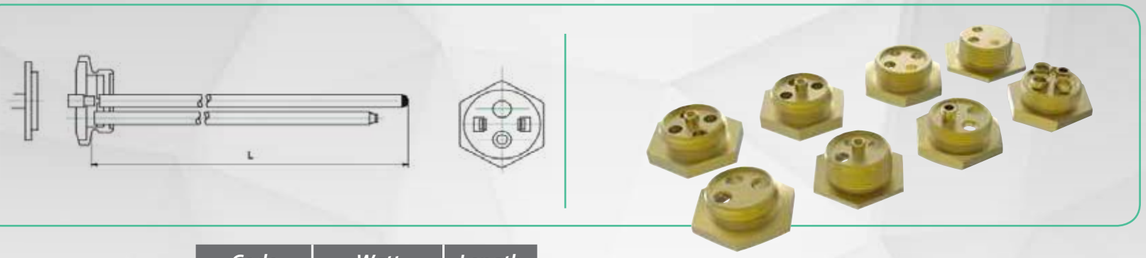
Code	Diameter	Volt	Watt
92601	8,5	220	1300
92602	8,5	220	1300
92603	8,5	220	1300
92604	8,5	220	1300
92605	8,5	220	1300
92606	8,5	220	1300
92782	8,5	220	1300

RTD



RTD





Code	Watt	Length
RTD10-28	1000	280
RTD12-28	1200	280
RTD15-28	1500	280
RTD20-28	2000	280
RTD20-35	2000	350
RTD20-40	2000	400
RTD20-40	2000	400
RTD25-40	2500	400
RTD30-40	3000	400
RTD25-45	2500	450
RTD30-25	3000	450
RTD20-60	2000	600
RTD30-60	3000	600
RTD20-90	2000	900
RTD30-90	3000	900

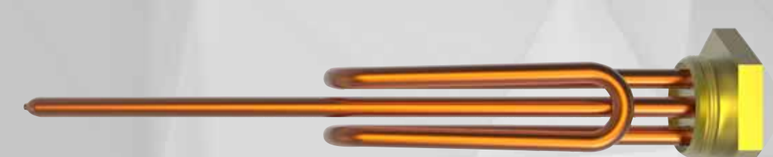
Working Conditions : **6 Bar / 95°C**
Voltage : **110V - 127V - 220V - 230V - 240V**

Flange Type : **1 "1/4 GAS UNI338 -**
Material : **Brass**

Tube Diameter : **8.50mm**
Thickness : **0.70mm**
Material : **Copper or Stainless Steel 304, 316L, Incoloy 800, 840.**

Thermostat Probe Length : **275mm**
Diameter : **8.00mm**
Thickness : **0.50mm**
Thermostat Probe Material : **Copper or Stainless Steel**

RTC



RTC





Code	Watt	Length	Length L1
RTC10-1612	1000	165	120
RTC12-1612	1200	165	120
RTC15-1612	1500	165	120
RTC20-1612	2000	165	120
RTC10-3010	1000	300	100
RTC15-3010	1500	300	100
RTC20-3010	2000	300	100
RTC25-3010	2500	300	100
RTC30-3014	3000	300	145

Working Conditions : **6 Bar / 95°C**
Voltage : **110V - 127V - 220V - 230V - 240V**

Flange Type : **1 "1/4 GAS UNI338 -**
Material : **Brass**

Tube Diameter : **8.50mm**
Thickness : **0.70mm**
Material : **Copper or Stainless Steel 304, 316L, Incoloy 800, 840.**

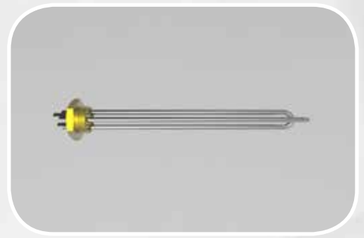
Thermostat Probe Length : **275mm**
Diameter : **8.00mm**
Thickness : **0.50mm**
Thermostat Probe Material : **Copper or Stainless Steel**





Code	Flange	Tube Diameter	Tube Material	Lenght	Volt	Watt
91079	1.1/4	8,5	Cr-Ni	180	220	1750





Code	Flange	Tube Diameter	Tube Material	Lenght	Volt	Watt
92588	1.1/4	8,5	Cr-Ni	190	220*2	3000



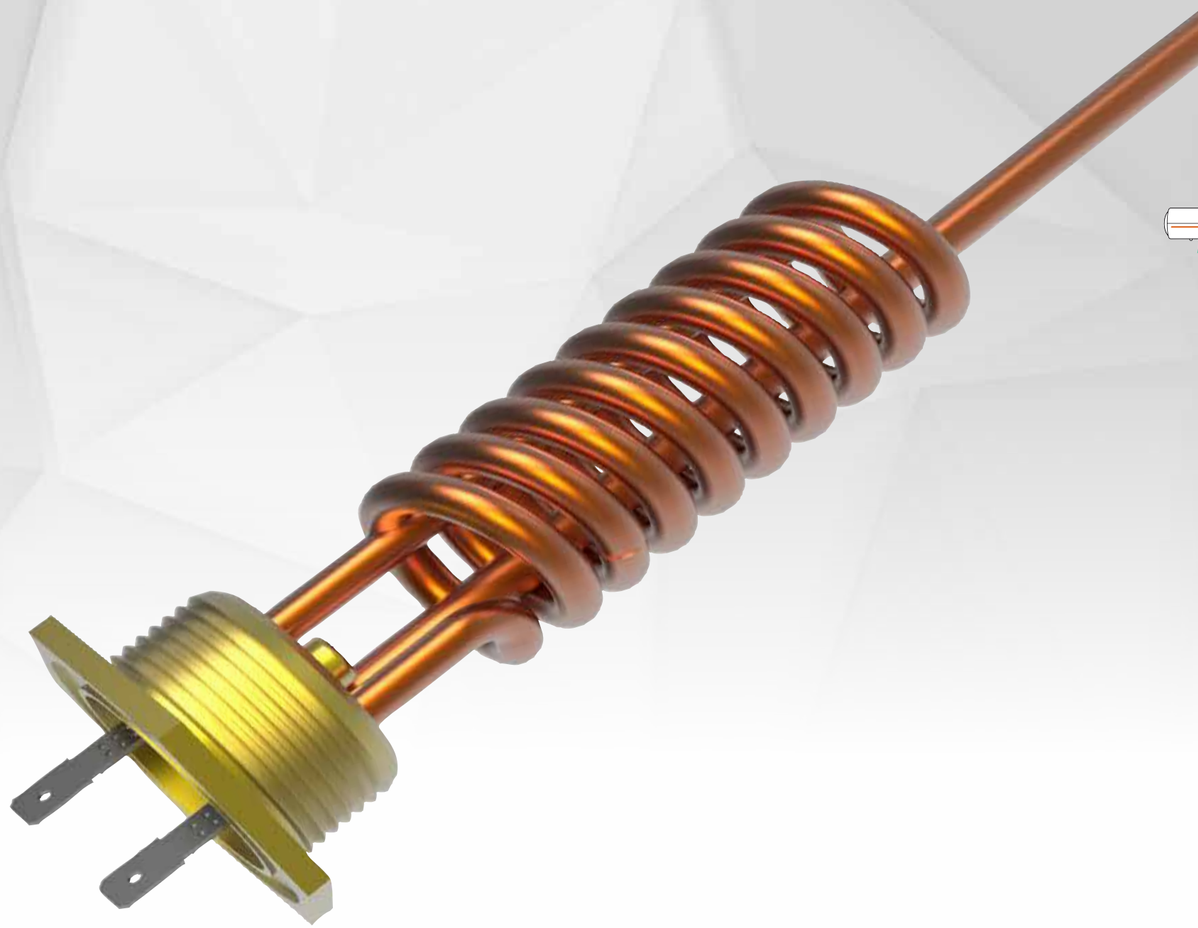


Code	Flange	Tube Diameter	Tube Material	Lenght	Volt	Watt
M1143	1.1/4	6,5	Cr-Ni	250	230	800+1200
M1144	1.1/4	6,5	Cr-Ni	250	230	500+2000





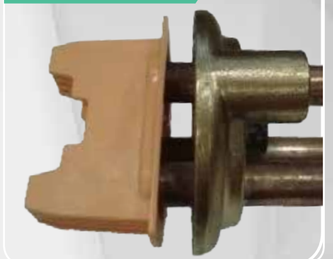
Code	Flange	Tube Diameter	Tube Material	Lenght	Volt	Watt
92022	1.1/4	6,5	Cu	129	230	1500

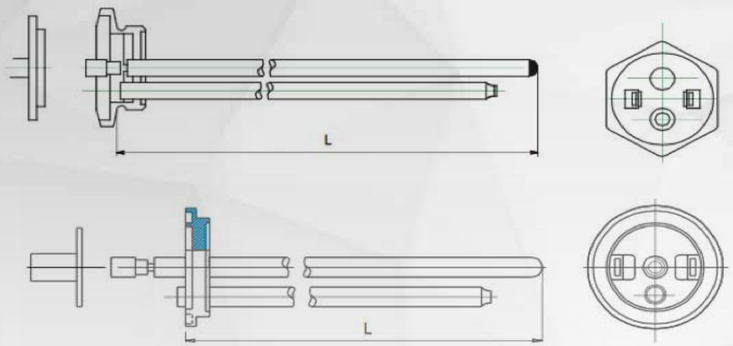


RFD



RFDA





Code	Watt	Length
RFD10-27	1000	275
RFD12-27	1200	275
RFD15-27	1500	
RFD20-27	2000	275
RFD12-27-H	1200	275
RFD15-27-H	1500	275

Code	Watt	Length
RFDA12-26	1200	260
RFDA15-26	1500	260

Working Conditions : **6 Bar / 95°C**
Voltage : **110V - 127V - 220V - 230V - 240V**

Flange Type : **Ø 48mm Round**
Material : **Brass**

Tube Diameter : **8.50mm**
Thickness : **0.70mm**
Material : **Copper**

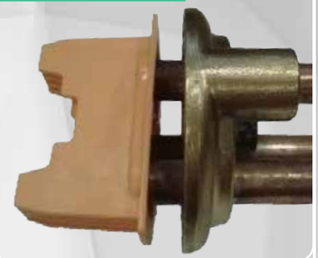
Thermostat Probe Length : **275mm**
Diameter : **8.00mm**
Thickness : **0.50mm**
Thermostat Probe Material : **Copper**



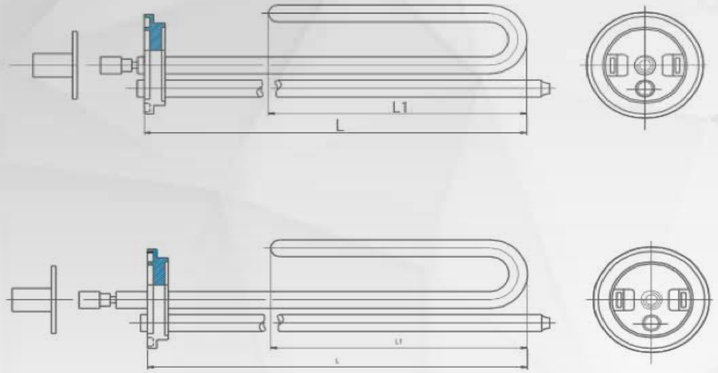
RFC



RFCA



Code	Watt	Length	Length L1
RFC10-1512	1000	155	120
RFC12-1512	1200	155	120
RFC15-1512	1500	155	120
RFC20-1816	2000	180	160
RFC20-2812	2000	280	120
RTC20-3010	2000	300	100
RTC25-3010	2500	300	100
RTC30-3014	3000	300	145



Code	Watt	Length	Length L1
RFCA12-1411	1200	140	110
RFCA12-1512	1200	150	120
RFCA15-1411	1500	140	110
RFCA15-1512	1500	150	120
RFCA20-1816	2000	180	160

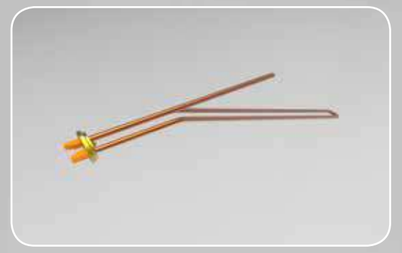
Working Conditions : **6 Bar / 95°C**
Voltage : **110V - 127V - 220V - 230V - 240V**

Flange Type : **Ø 48mm Round**
Material : **Brass**

Tube Diameter : **8.50mm**
Thickness : **0.70mm**
Material : **Copper**

Thermostat Probe Length : **275mm**
Diameter : **8.00mm**
Thickness : **0.50mm**
Thermostat Probe Material : **Copper**







Product Code	Flange	Tube Diameter	Tube Material	Length A	Length B	Volt	Watt
21951	48mm	8,5	Cu	407	220	230	1200





Product Code	Flange	Tube Diameter	Tube Material	Length A	Length B	Volt	Watt
21955	48mm	8,5	Cu	160	139	230	2000





Product Code	Flange	Tube Diameter	Tube Material	Length A	Length B	Volt	Watt
92035	48mm	8,5	Cu	217	150	230	1500





Product Code	Flange	Tube Diameter	Tube Material	Length A	Length B	Volt	Watt
92036	48mm	8,5	Cu	255	157	230	2000





Product Code	Flange	Tube Diameter	Tube Material	Length A	Length B	Volt	Watt
92461-1	48mm	8,5	Cu	288	145	230	2500
92461-2	48mm	8,5	Cu	288	145	230	2700
92461-3	48mm	8,5	Cu	288	145	230	3000



BALÇIK has always been synonymous of thermostat and it is well- known all over the world for the quality, safety and reliability of its products.
A specific know-how when experimenting materials, a long experience in producing and controlling heating matched with the most advanced laboratory in the research field enabled BALÇIK to achieve numerous technical solutions.
Standardised production, computerised process of thermostat calibration, as well as rigorous controls enable BALÇIK to produce the best possible product.

DESCRIPTION

Thermostat with single pole stem control and double pole safety limiter

OPERATION

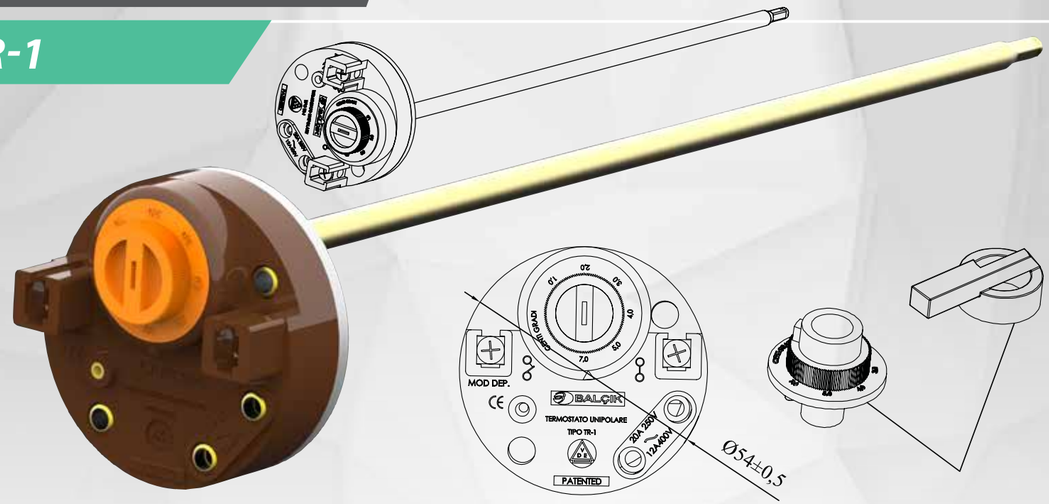
The differential expansion of the sensing element causes the opening of a snap-action switch in the thermostat head.
In case of abnormal temperature rise in the stem or traditional bimetal ensures double pole safety.
The limiter is manually resettable.

FEATURES

Combined control and safety function
Bimetal for independant non self resetting safety option
Direct plug-in to heating element to reduce wiring and mounting costs
Tamper proof housing
Factory pre-set fixed temperature, OEM adjustable or end-user adjustable temperature
Multiple control knob options
Connection for signal lamp

STEM TYPE THERMOSTAT, SINGLE SAFETY - TR-1

TR-1



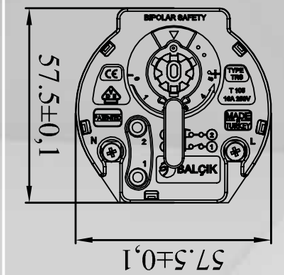
Code	Safety	Calibration Functional Value	Stem Tube Length	External Regulation
TR-1/7027	Single Safety	70C +-4	275mm	Without External Regulation
TR-1/7027L	Single Safety	80C +-4	275mm	With External Regulation
TR-1/8027	Single Safety	80C +-4	275mm	Without External Regulation
TR-1/8027L	Single Safety	80C +-4	275mm	With External Regulation

CHARACTERISTICS OF THERMOSTAT

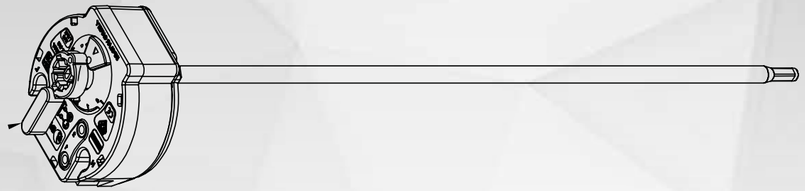
Unipolar Single Safety Stem type Thermostat Single Phase, till 20A 250V
Functioning Temprature **: 20°C - 90°C /** Thermic Differential : **8°C ± 4°C**
Stem Length on Request : **180mm, 220mm, 275mm, 350mm, 450mm**
Stem Tube Material : **Brass -** Stem Tube Diameter : **6.00mm x 0.40mm**
Electrical Connection : **Quick fast-on connection 6,3mm x 1,0mm**

STEM TYPE THERMOSTAT, DOUBLE SAFETY - TRS

TRS







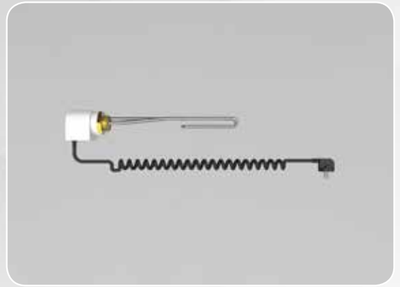
Code	Safety	Calibration		Stem Tube Length	External Regulation
		Functional Value	Safety Value		
TRS3/657527L	Doube Safety	65C +- 3	75C	275	With External Regulation
TRS3/657527	Doube Safety	65C +- 3	75C	275	With External Regulation
TRS3/659027L	Doube Safety	65C +- 3	90C	275	Without External Regulation
TRS3/659027	Doube Safety	65C +- 3	90C	275	With External Regulation
TRS3/708327L	Doube Safety	70 +- 3	83C	275	With External Regulation
TRS3/708327	Doube Safety	70 +- 3	83C	275	With External Regulation
TRS3/829227L	Doube Safety	82 +- 3	92C	275	Without External Regulation
TRS3/829227	Doube Safety	82 +- 3	92C	275	With External Regulation

CHARACTERISTICS OF THERMOSTAT

Bipolar Bimetallic Double Safety Stem type Thermostat with Manual Reset Single Phase, till 20A 250V
Functioning Temprature : **20°C - 90°C -** Security Temprature : **65°C - 120°C -** Thermal Differential : **8°C ± 4°C**
Stem Length on Request : **180mm, 220mm, 275mm, 350mm, 450mm**
Stem Tube Material : **Brass -** Stem Tube Diameter : **6.00mm x 0.40mm**
Electrical Connection : **Quick fast-on connection 6,3mm x 1,0mm**








Code	Watt	Length	Length L1
AQH10-1612	1000	165	120
AQH12-1612	1200	165	120
AQH15-1612	1500	165	120
AQH20-1612	2000	165	120
AQH10-3010	1000	300	100
AQH15-3010	1500	300	100
AQH20-3010	2000	300	100
AQH25-3010	2500	300	100
AQH30-3014	3000	300	145

Working Conditions : **6 Bar / 95°C**
Voltage : **110V - 127V - 220V - 230V - 240V**

Flange Type : **1 "1/4 GAS UNI338 -**
Material : **Brass**

Tube Diameter : **8.50mm**
Thickness : **0.70mm**
Material : **Copper or Stainless Steel 304, 316L, Incoloy 800, 840.**

Thermostat Probe Length : **275mm**
Diameter : **8.00mm**
Thickness : **0.50mm**
Thermostat Probe Material : **Copper or Stainless Steel**

Electrical Connection Cable: **OMY 3x0,75 Coiled Cable with Unischuko Plug**







Product Code	Flange	Tube Diameter	Tube Material	Length	Volt	Watt
1075K	1.1/2'	8,5	Cr-Ni	260	230	2000
1076K	1.1/2	8,5	Cr-Ni	260	230	2500
1077K	1.1/2	8,5	Cr-Ni	333	230	3000





Product Code	Flange	Tube Diameter	Tube Material	Length	Volt	Watt
20157K	1.1/2	8,5	Cr-Ni	203	220	4000
20157-2K	1.1/2	8,5	Cr-Ni	203	220	5000
20157B	1.1/2	8,5	Cu	203	220	4000





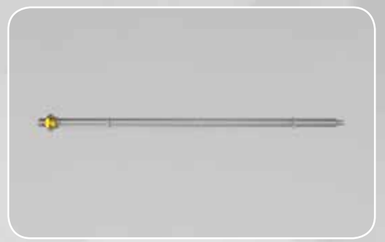
Product Code	Flange	Tube Diameter	Tube Material	Length	Volt	Watt
1080K	1.1/2	8,5	Cr-Ni/Cu	290	220/380	3000
1081K	1.1/2	8,5	Cr-Ni/Cu	290	220/380	4500
1082K	1.1/2	8,5	Cr-Ni/Cu	290	220/380	6000
1083K	1.1/2	8,5	Cr-Ni/Cu	290	220/380	7500
1084K	1.1/2	8,5	Cr-Ni/Cu	400	220/380	10000
92586	1.1/2	8,5	Cr-Ni/Cu	450	220/380	12000
92624	1.1/2	8,5	Cr-Ni/Cu	500	220/380	15000
1080B	1.1/2	8,5	BAKIR	290	220/380	3000
1081B	1.1/2	8,5	BAKIR	290	220/380	4500
1082B	1.1/2	8,5	BAKIR	290	220/380	6000
1083B	1.1/2	8,5	BAKIR	290	220/380	7500
1084B	1.1/2	8,5	BAKIR	400	220/380	10000
92586B	1.1/2	8,5	BAKIR	450	220/380	12000
92624B	1.1/2	8,5	BAKIR	500	220/380	15000





Product Code	Flange	Tube Diameter	Tube Material	Length	Volt	Watt
92632	1.1/2	8,5	Cr-Ni	300	230	2000





Product Code	Flange	Tube Diameter	Tube Material	Length B	Volt	Watt
92712	1.1/2	8,5	Cr-Ni	950	230	6000





Product Code	Flange	Tube Diameter	Tube Material	Length	Volt	Watt
91031	1.1/2	8,5	Cr-Ni	260	220	2000



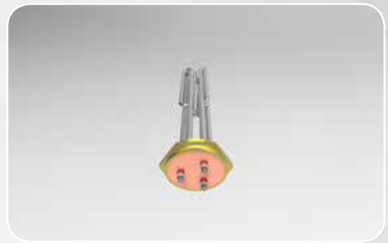


Product Code	Flange	Tube Diameter	Tube Material	Length	Volt	Watt
1086K	2	8,5	Cr-Ni/Cu	350	220/380	3000
1087K	2	8,5	Cr-Ni/Cu	295	220/380	4500
1088K	2	8,5	Cr-Ni/Cu	350	220/380	6000
1089K	2	8,5	Cr-Ni/Cu	350	220/380	7500
1090K	2	8,5	Cr-Ni/Cu	400	220/380	10000
92625	2	8,5	Cr-Ni/Cu	450	220/380	12000
92587	2	8,5	Cr-Ni/Cu	500	220/380	15000
1086B	2	8,5	BAKIR	290	220/380	3000
1087B	2	8,5	BAKIR	290	220/380	4500
1088B	2	8,5	BAKIR	290	220/380	6000
1089B	2	8,5	BAKIR	350	220/380	7500
1090B	2	8,5	BAKIR	400	220/380	10000
92625B	2	8,5	BAKIR	450	220/380	12000
92587B	2	8,5	BAKIR	500	220/380	15000

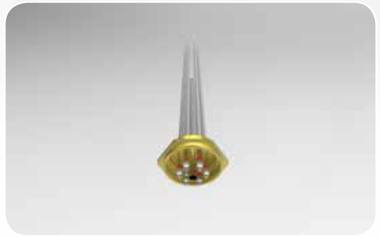
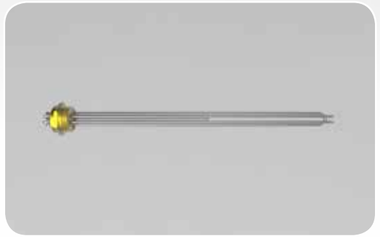




Product Code	Flange	Tube Diameter	Tube Material	Length	Volt	Watt
91906	2	8,5	Cr-Ni	220	220/380	10000
91907	2	8,5	Cr-Ni	220	220/380	7500
91908	2	8,5	Cr-Ni	220	220/380	6000
91909	2	8,5	Cr-Ni	270	220/380	10000
91910	2	8,5	Cr-Ni	270	220/380	7500
91911	2	8,5	Cr-Ni	270	220/380	6000
91910-1	2	8,5	Cr-Ni	330	220/380	7500
91909-1	2	8,5	Cr-Ni	330	220/380	10000


Product Code	Flange	Tube Diameter	Tube Material	Length	Volt	Watt
92690	2	8,5	Cr-Ni	330	220/380	7500
92691	2	8,5	Cr-Ni	340	220/380	10000

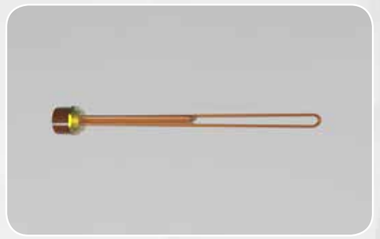
Product Code	Flange	Tube Diameter	Tube Material	Length	Volt	Watt
1095K	2.1/2	8,5	Cr-Ni	450	220/380	10000



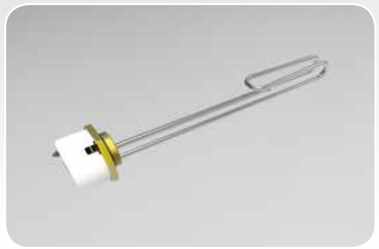
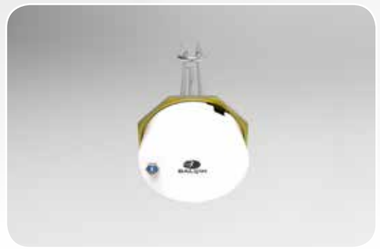


Product Code	Flange	Tube Diameter	Tube Material	Length B	Volt	Watt
92932	2.1/4	8,5	Cu			

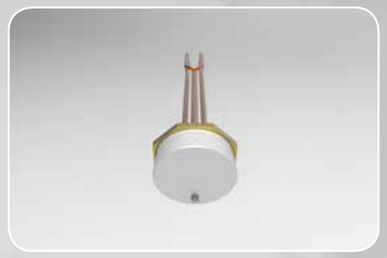




Product Code	Flange	Tube Diameter	Tube Material	Length	Volt	Watt
92933	2.1/4	8,5	Cu			


Product Code	Flange	Tube Diameter	Tube Material	Length	Volt	Watt
93115	2.1/2	8,5	Cr-Ni			


Product Code	Flange	Tube Diameter	Tube Material	Length	Volt	Watt
92295-1	2.1/4	8,5	Cu	330	240	3000
92295	2.1/4	8,5	Cu	597	240	3000





Product Code	Flange	Tube Diameter	Tube Material	Length	Volt	Watt
92998		8,5	Cr-Ni	342	230	2500





HEATING ELEMENTS FOR

INDUSTRIAL DISHWASHERS

TEA, COFFEE, HOT WATER VENDING APPLIANCES

INDUSTRIAL FRYERS

INDUSTRIAL DISTRIBUTION APPLIANCES

FOOD SERVICE EQUIPMENT
Commercial applications and business development department works on design, manufacture and functions of the heating elements for food sector. General areas of application may be listed as follows for the manufacturers preferring BALÇIK Heating Elements, who are the leaders of their respective sector:

- food preparation and conservation systems: refrigerated display cases, blast chillers and freezers;
- Cooking equipment: ovens, frying pans, grills, baking sheet for burgers, industrial bratt pans, cake pans, steam jacketed kettle for pasta;
- Food service equipments: steam heaters, self – service equipments;
- Industrial type dishwashers for the food sector (fur uses in restaurants, school canteens, hotels and hospitals): dishwashers and dishwashers for frying pan;
- Semi-industrial dishwashers (for uses in bars and cafes): dishwashers for mugs and glasses.

COLD STORAGE
The cold storage sector generally uses the following equipment:

- Steam containers: tubular heating elements with waterproof connection;
- Steam table pans: tubular elements

COOKING
Many cooking methods in use today are available through the systems, in which heating elements are assembled (steam jacketed kettle for pasta, ovens, frying pans, baking sheet for burgers, industrial bratt pans, cooker grills) .

SERVICE EQUIPMENT
In the food sector, the food cooked is offered to the customers on self-service trolleys or self-service platforms as warm or cold after cooking. In order for the food to remain warm when serving to the customer, tubular heating elements either heat directly on the surface or ensure heating using bain-marie method.

WASHING AND DRYING
The two most important assembly types for tubular heating elements in housing are assemblies into a steam jacketed kettle and a tank. In former practices, the heating element was normally assembled into the tank with the help of a three-phase steel flange; in current practices, the single-phase heating element is placed in parallel to the tank floor and is fixed using flanges or other types of connection tubes.
The heating element for the kettle can also be delivered with integrated safety device (thermal fuse).
Tubular heating elements in housing can also be assembled into the drying tunnels, and they can have circular or rectangular ends or smooth surfaces.

APPLICATIONS FOR BAKERIES AND PASTRY SHOPS
BALÇIK pays attention especially to the bakeries, pastry shops and pizza making sector in order to be able to offer the highest possible quality products and services to the customers. The heating elements in these sectors are generally:

- baking chambers and cooking chambers
- ovens for bakeries and pastry shops
- pizza ovens

COOKING CHAMBERS
In this type of cooking chamber, the economic lives of the heating elements are affected by the humid environment inside the chambers. There are many ways to be protected from this effect; the best among them is airtight connection gaskets. Both ends of the heating element are protected by heat-resistant rubber connections.

BAKERY OVENS
The heating tubes in these ovens is designed with low surface load (W / cm 2), so that the bread can bake without getting burned. These heating elements also undergo a special thermal process named "black tempering" in order to ensure surface emission and high performance.

PIZZA OVENS
Design and manufacture systems explained for bakery ovens also apply for pizza ovens. Only, measurements of the baking chamber and the power needed for baking change (pizza oven has a smaller baking chamber and less power is needed for the process); thus, housing for the cooking element has smaller diameters.
Flatteners used while making pizza also need a source of heat; and only then the wet dough squeezed between two metal surfaces can become flat and round without getting sticky.
Tubular heating elements can be used for such applications. Thus, a regular and smooth source of heat that is easy to assembly is offered.

COFFEE AND SANDWICH SHOPS, VENDING MACHINES
BALÇIK is also an international manufacturer in the fast food sector and shows that it has a say in its own field for the applications in question with its wide range of products:

- coffee shops: coffee machines;
- dishwashing: washing glasses, washing mugs
- Sandwich shops: small frying pans (deep fryers), toasters;
- vending machines: machines offering hot and cold drinks with a vending machine
- application for automatic ice cream production

ESPRESSO COFFEE MACHINES
Depending on the type of material, from which the boiler is manufactured, most heaters used in such machines are manufactured with brass connection flange and have brass housing. The brass plate can easily be shaped as desired and offers a good heat transfer coefficient. Other types can also be offered alternatively, and housing made from special "incoloy" alloy, which is very highly resistant to heat, and stainless steel flanges are also available.
Coffee mug heaters also use the heat-resistant connection gaskets.

TOASTERS
These applications are generally used in the sandwich sector, and consist of tubular elements or cast iron sheets below or above the grill.

SMALL FRYING PANS (DEEP FRYERS)
The difference between the heating elements in housing used at coffee shops/sandwich shops and the food sector is just a difference in size in general. Also, these pans are generally manufactured with a single phase.
Small frying pans should have proper surface loads (W / cm 2) so that the oil used does not undergo deterioration.
If you would like to examine the types of heating elements that are most frequently used in small frying pans, please refer to "frying pans" under the "food service equipment" section.

MUG WASHERS – GLASS WASHERS
As is the case with all heavy duty washers, the system consists of combination of steam boiler and tank in these washers, too. Old type elements consist of single or three-phase elements fixed with stainless steel flanges. Tank element is usually single-phase and is connected by welding.

VENDING MACHINES
Tubular heating elements are designed complete with supportive tools used for fixing (with nipples and flanges) in order to produce hot water for the boiler that performs the distribution. The heaters are placed in stainless steel housing. In such types of applications, self-integrated thermal fuses are popular especially in rubber boilers.

LAUNDERING, FLOOR CLEANING
High quality and technical performance of BALÇIK products make them preferable for very special applications and conditions, too:

- heavy duty type laundering applications
- dry cleaning devices
- industrial pressing and ironing machines
- domestic irons
- floor cleaning machines

HEAVY DUTY WASHING MACHINES
Heating elements are generally tubular with oval flanges. Heating element with integrated thermal fuse is used inside the steam boiler and washing tube.
At the drying stage, circular or rectangular coolers are used in order to allow a better heat transfer between the air and the element.

DRY CLEANING MACHINES
Tubular heater in the housing operates in variable modes depending on the solvent use in this application. The solvents are used for the purpose of "chemical wash" and they may corrode and damage within a very short time. Thus, for efficiency, it is necessary to pick the right technical characteristics (power and surface load) and the best heater material to be used inside the tube very carefully. Special attention must be paid so that the material does not get weakened and corroded as a result of the chemical effect during different operational stages of work.

PROFESSIONAL IRONS AND IRONERS
For these applications, production normally takes place by placing a tubular heating element inside the surface to perform ironing. In order for the heating element to transfer heat smoothly and homogenously to the surface to perform ironing, form and angle of placement of the element should be paid special attention. In cases, where the specific power needed is low, it is possible to act more flexibly in picking the heater element.
Flat tubular heating elements are mostly fixed on the drying and ironing cylindrical surface on ironers. It is necessary to make sure that these elements offer the right distribution of heat on the cylindrical surface.

FLOOR WASHING MACHINES
The heating elements are designed according to high levels of specific power for this application. Such high power levels are fit for operational environments with high pressure and low volume.
BALÇIK is able to design and offer a complete water boiling system as desired according to the power level, machine size and similar design criteria. provided by the customers.

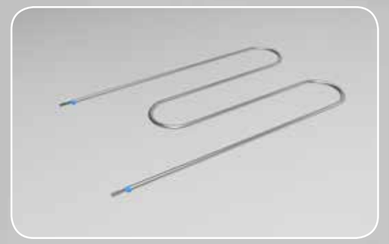
AESTHETIC AND HEALTH PRODUCTS
BALÇIK product types are normally used for beauty and skin care products. Water jet systems with Jacuzzi, domestic systems, professional saunas and electrical devices used for facial and body care (hair dryers, facial care and scent devices) use tubular heaters.

FACIAL AND BODY CARE
Heating elements assembled inside the housing are in metal or rubber vessels to produce vapor. For sound use of the solutions to be heated, the vessel shapes and materials must be picked very carefully. For example, solutions mixed with water (combination of water and perfume) increase the risk of corrosion.
For scents, submersed heaters are used to vaporize the scented liquid.
Hair dryers, on the other hand, consist of heating elements of low power heating the airflow direction. Air is heated during operation, allowing the hair to be dried.

SAUNAS
For Finnish type saunas, heating elements resistant to thermal shocks designed for diverse operational conditions are available. BALÇIK recommends tubular heating elements for infrared saunas.

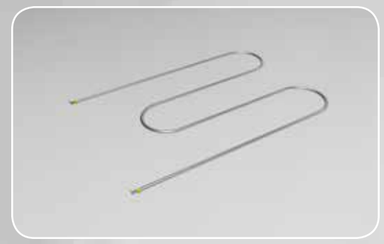
JACUZZI WATER JET BATHTUBS AND SPA BATHTUBS
BALÇIK can to offer tubular heaters to keep water temperature fixed in Jacuzzi bathtubs.

SHOWER CABINS
Normally, electrical heaters are used to get steam inside the cabin. BALÇIK can offer enclosed or controlled steam generators through the use of tubular elements





Code	Diameter	Volt	Watt
1050	8,5	220	1000



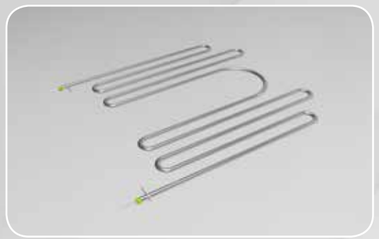


Code	Diameter	Volt	Watt
92642	8,5	230	900



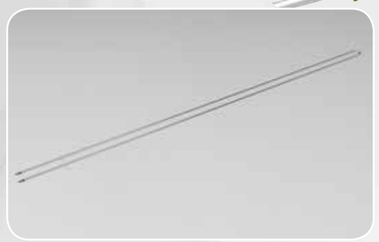


Code	Diameter	Volt	Watt
1164	6.5-8.5	220	1000



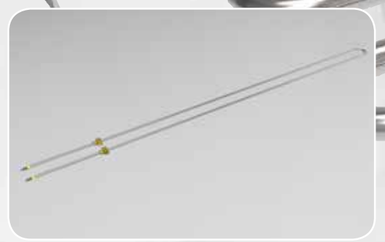


Code	Diameter	Volt	Watt
92416	8,5	230	2500



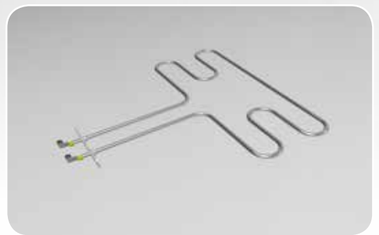


Code	Diameter	Volt	Watt
93008	8,5	230	650



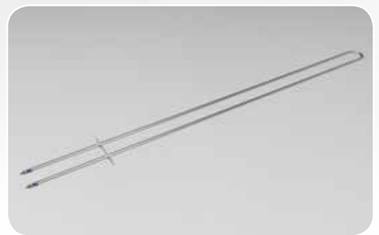


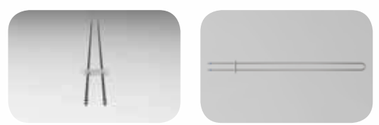
Code	Diameter	Volt	Watt
92996	8,5	230	1600





Code	Diameter	Volt	Watt
20744	8,5	230	1200





Code	Diameter	Volt	Watt
93087	8,5		





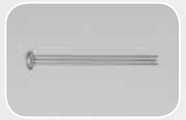




Code	Diameter	Volt	Watt
20334	8,5	220	4.500
20334-1	8,5	220	6.000
20334-2	8,5	220	7.500
20334-3	8,5	220	9.000
20334-4	8,5	220	10.000





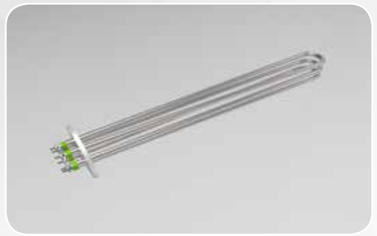


Code	Diameter	Volt	Watt
20333	8,5	220	4.500
20333-1	8,5	220	6.000
20333-2	8,5	220	7.500
20333-3	8,5	220	9.000
20333-4	8,5	220	10.000





Code	Diameter	Volt	Watt
20359	8,5	220	9000







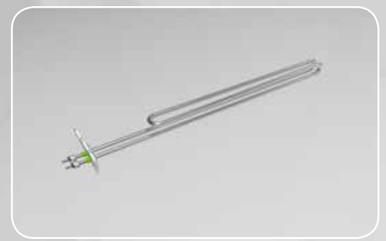
Code	Diameter	Volt	Watt
20338	8,5	220	6000
91208-2	8,5	230/380	10000







Code	Diameter	Volt	Watt
92652	8,5	220/380	6000
92652-1	8,5	220/380	9000
92652-2	8,5	220/380	12000







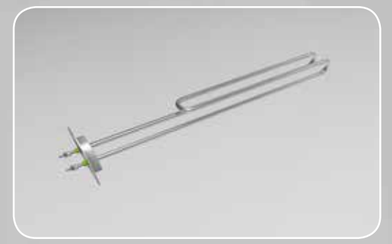
Code	Diameter	Volt	Watt
23672	6,5	230	3000







Code	Diameter	Volt	Watt
23733	6,5	230	3000







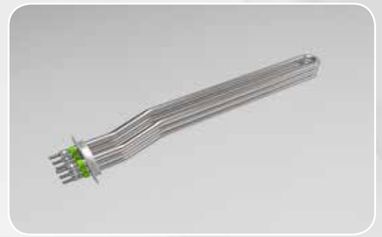
Code	Diameter	Volt	Watt
92422	8,5	230	2800







Code	Diameter	Volt	Watt
92686	8,5	230	6000







Code	Diameter	Volt	Watt
92429	8,5	220	6000







Code	Diameter	Volt	Watt
20298	8,5	220	6000







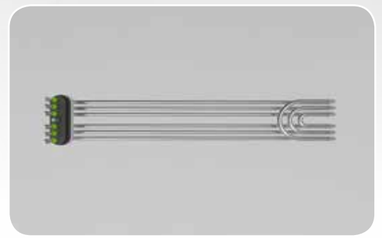
Code	Diameter	Volt	Watt
92673	8,5	230	2000



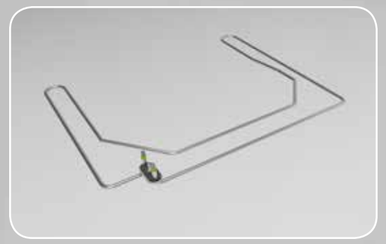


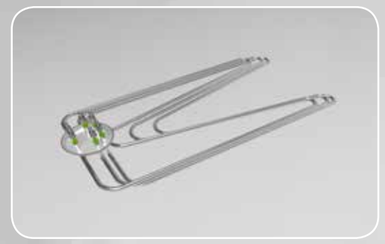


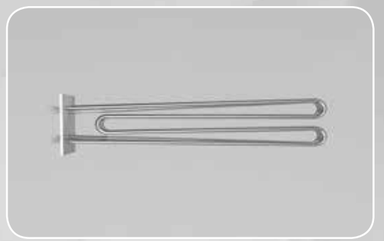
Code	Diameter	Volt	Watt
92650	8,5	230	2800

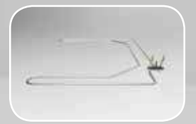


Code	Diameter	Volt	Watt
23691	8,5	230	4500



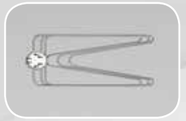












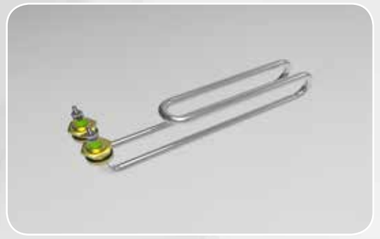


Code	Diameter	Volt	Watt
92649	8,5	220	2000

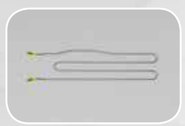
Code	Diameter	Volt	Watt
23673	8,5	220	6000

Code	Diameter	Volt	Watt
92674	8,5	230	9000









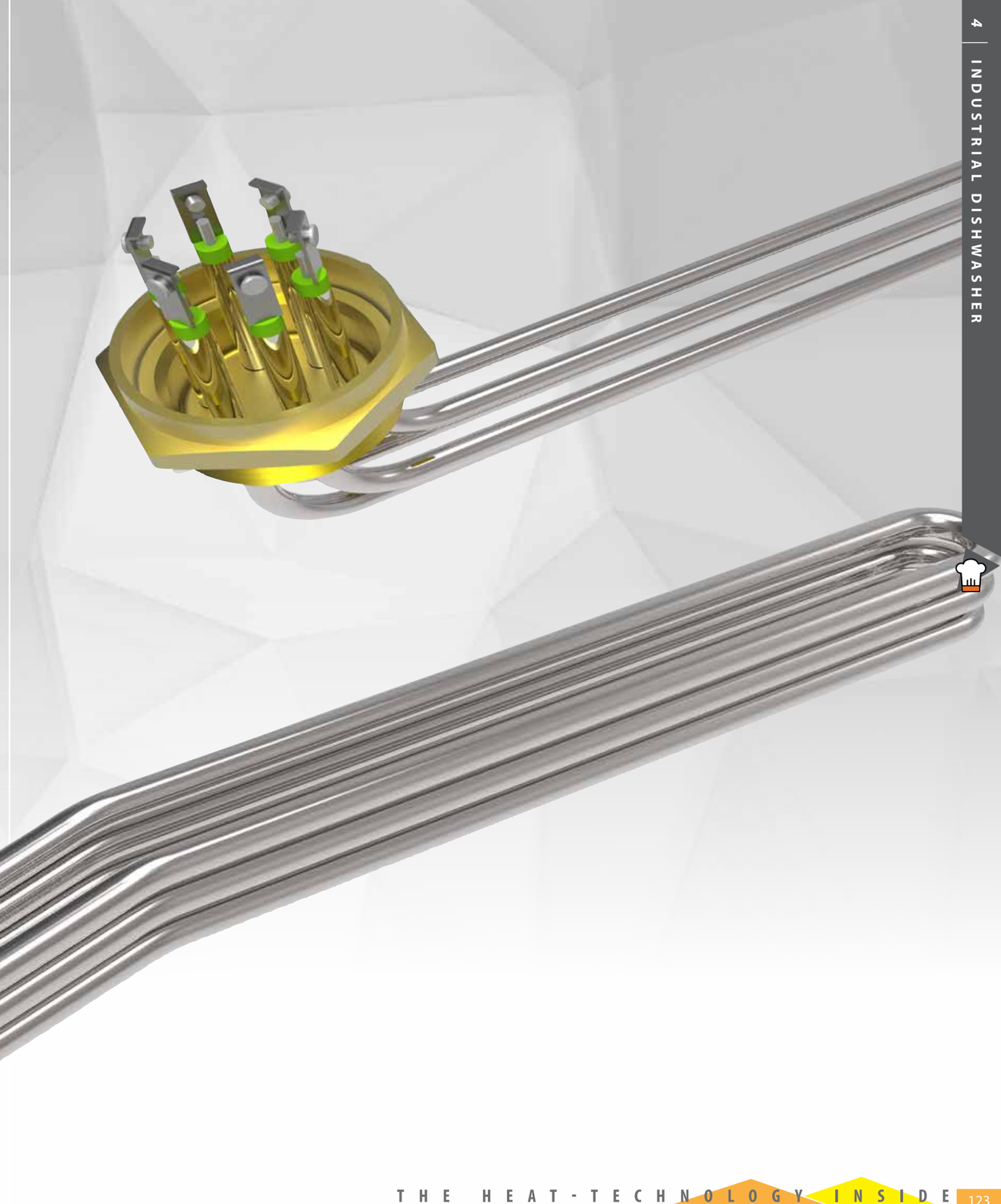




Code	Diameter	Volt	Watt
23692	8,5	220	2500

Code	Diameter	Volt	Watt
92657	8,5	230	2500

Code	Diameter	Volt	Watt
20353	8,5	230	1800







Code	Diameter	Volt	Watt
92272	8,5	230	2700

Code	Diameter	Volt	Watt
92273	8,5	230	3500
92273-1	8,5	230	4500

Code	Diameter	Volt	Watt
91684	8,5	220	1000



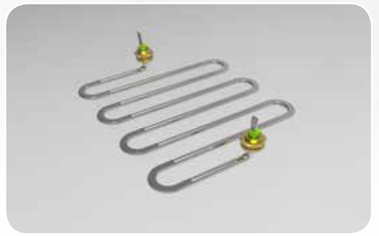


Code	Diameter	Volt	Watt
91681	8,5	220	1500

Code	Diameter	Volt	Watt
91682	8,5	220	2000

Code	Diameter	Volt	Watt
20644	6,5	220	1500

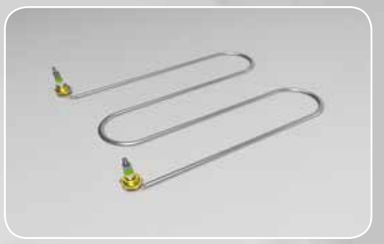
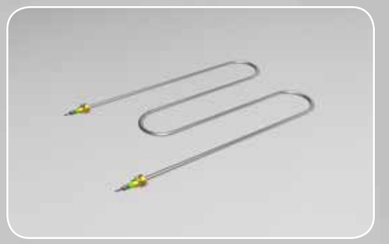




Code	Diameter	Volt	Watt
22762	6,5	220	2000

Code	Diameter	Volt	Watt
20146	8,5	220	2000

Code	Diameter	Volt	Watt
91683	8,5	220	2500

Code	Diameter	Volt	Watt
20469	6,5	220	2500

Code	Diameter	Volt	Watt
1134-1	8,5	220	2000

Code	Diameter	Volt	Watt
1134	8,5	220	2000



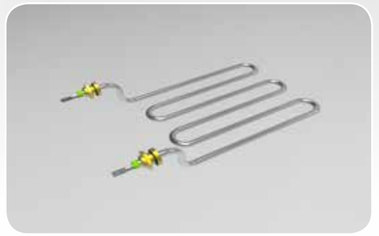


Code	Diameter	Volt	Watt
1057	8,5	220	2000

Code	Diameter	Volt	Watt
92571	8,5	220	1900

Code	Diameter	Volt	Watt
21342-1	8,5	220	2000

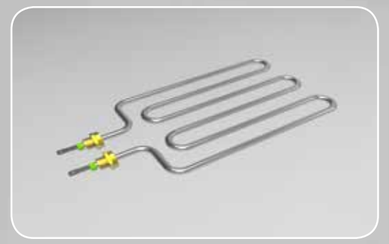




Code	Diameter	Volt	Watt
21342	8,5	220	2000
23415	8,5	220	1000

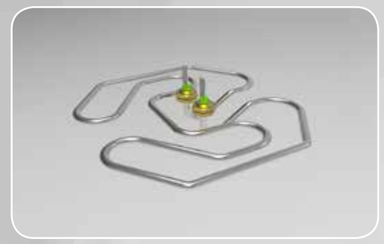
Code	Diameter	Volt	Watt
91677	8,5	230	2000

Code	Diameter	Volt	Watt
92424	8,5	220	2000





Code	Diameter	Volt	Watt
92342		220	2000





Code	Diameter	Volt	Watt
23676	8,5	230	2800





Code	Diameter	Volt	Watt
23671	6,5	230	2500



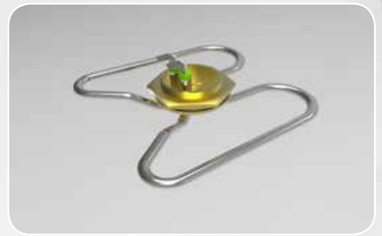


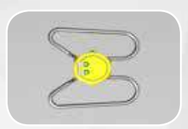
Code	Diameter	Volt	Watt
23189-1		230	2200





Code	Diameter	Volt	Watt
92537	8,5	230	1500
92538	8,5	230	1000
92359	8,5	230	2000





Code	Diameter	Volt	Watt
92481-1	8,5	230	1400
92482-1	8,5	230	1700
92483-1	8,5	230	2200





Code	Diameter	Volt	Watt
92654	8,5	220	2350





Code	Diameter	Volt	Watt
20161	6,5	220	1100





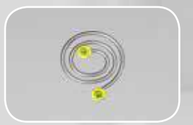
Code	Diameter	Volt	Watt
20161-1	6,5	220	2000





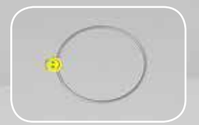
Code	Diameter	Volt	Watt
1132-B	6,5	220	550



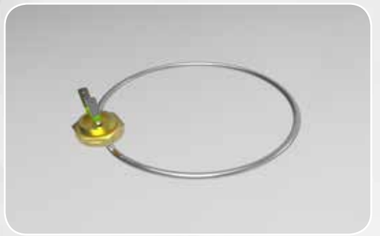


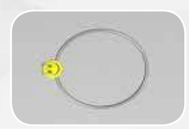
Code	Diameter	Volt	Watt
21346		220	2000





Code	Diameter	Volt	Watt
1056-B	6,5	220	1500





Code	Diameter	Volt	Watt
1056-C	8,5	220	500



Code	Diameter	Volt	Watt
1055	8,5	220	2000

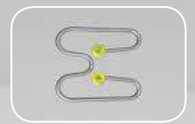
Code	Diameter	Volt	Watt
1056-A	8,5	220	2000

Code	Diameter	Volt	Watt
20143	8,5	220	1500

Code	Diameter	Volt	Watt
1142-B	6.5-8.5	220	800
1142-K	6.5-8.5	220	800

Code	Diameter	Volt	Watt
1133-K	8,5	220	800
1133-B	8,5	220	800





Code	Diameter	Volt	Watt
21341	8,5	220	2000



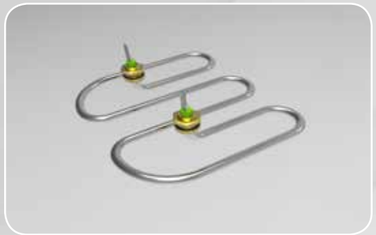


Code	Diameter	Volt	Watt
1056-D	8,5	220	1650





Code	Diameter	Volt	Watt
1137	6,5	220	800





Code	Diameter	Volt	Watt
1140	8,5	220	1200



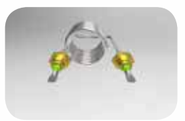


Code	Diameter	Volt	Watt
1060	6,5	220	2000





Code	Diameter	Volt	Watt
1061	8,5	220	2000


Code	Diameter	Volt	Watt
20383	6,5	230	2000





Code	Diameter	Volt	Watt
92403	8,5	230	1200



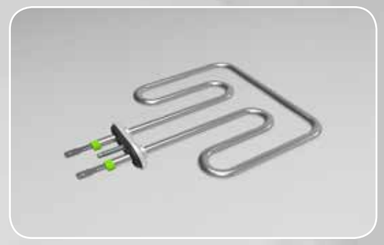


Code	Diameter	Volt	Watt
23450	6,5	220	900



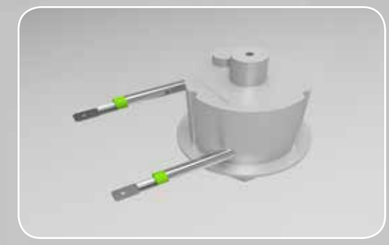


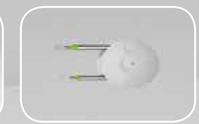
Code	Diameter	Volt	Watt
23451	6,5	225	1000



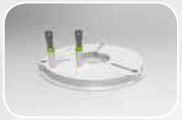


Code	Diameter	Volt	Watt
20352	8,5	220	1200





Code	Diameter	Volt	Watt
23677	6,5	230	2500


Code	Diameter	Volt	Watt
23681B	6,5	220	1000



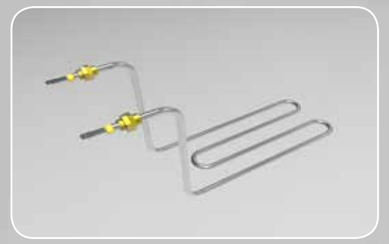
Code	Diameter	Volt	Watt
23681K	6,5	220	1000

Code	Diameter	Volt	Watt
92568	8,5	220	2000

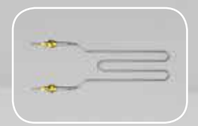
Code	Diameter	Volt	Watt
1060-1	6,5	220	2000

Code	Diameter	Volt	Watt
1053	8,5	220	650

Code	Diameter	Volt	Watt
20393	8,5	220	1200







Code	Diameter	Volt	Watt
20186	8,5	220	2700







Code	Diameter	Volt	Watt
91588	8,5	220	2500

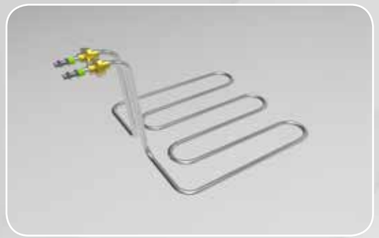
Code	Diameter	Volt	Watt
92136	8,5	220	3000







Code	Diameter	Volt	Watt
20357	6,5	220	1800





Code	Diameter	Volt	Watt
91949	8,5	220	3200

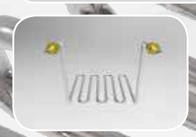






Code	Diameter	Volt	Watt
92764	8,5	230	2000







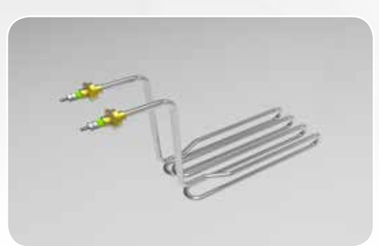
Code	Diameter	Volt	Watt
90963	8,5	220	4000



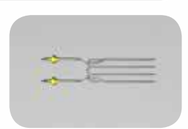




Code	Diameter	Volt	Watt
1059	8,5	220	2000







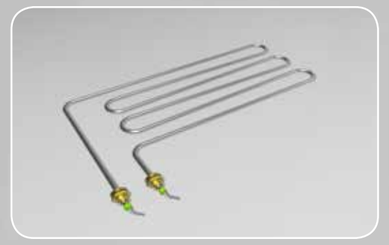
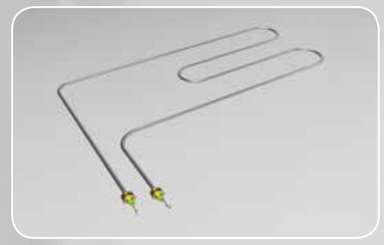
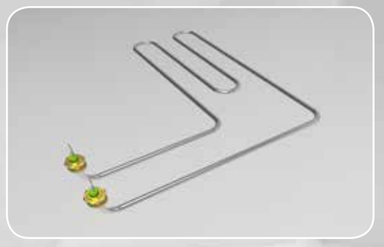
Code	Diameter	Volt	Watt
92711	8,5	230	3000





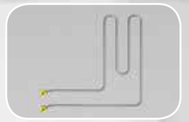


Code	Diameter	Volt	Watt
92352	8,5	230	1750



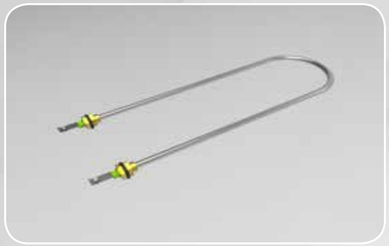


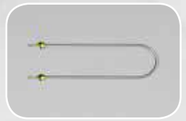
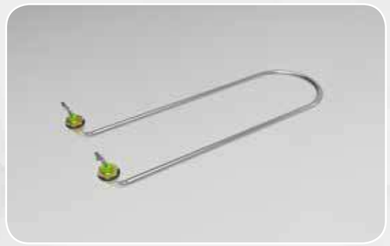


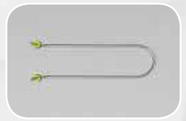
Code	Diameter	Volt	Watt
20250	6,5	220	1500
20250-1	8,5	220	2000
20250-2	8,5	220	2500

Code	Diameter	Volt	Watt
92653	8,5	220	2500

Code	Diameter	Volt	Watt
20198	8,5	220	2500

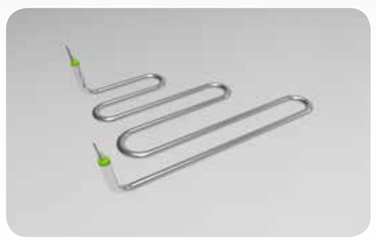


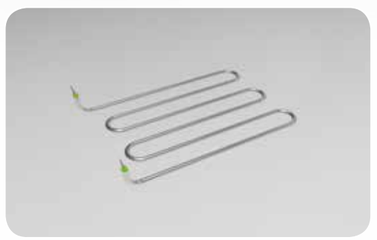





Code	Diameter	Volt	Watt
20251-3D	8,5	220	1000
20251-4D	8,5	220	1000
20251-5D	8,5	220	1500
20251-6D	8,5	220	2000
20251-7D	8,5	220	2000
20251-8D	8,5	220	2250
20251-9D	8,5	220	2500
20251-10D	8,5	220	2500
20251-11D	8,5	220	2500
20251-12D	8,5	220	2500

Code	Diameter	Volt	Watt
20251-3E	8,5	220	1000
20251-4E	8,5	220	1000
20251-5E	8,5	220	1500
20251-6E	8,5	220	2000
20251-7E	8,5	220	2000
20251-8E	8,5	220	2250
20251-9E	8,5	220	2500
20251-10E	8,5	220	2500
20251-11E	8,5	220	2500
20251-12E	8,5	220	2500





Code	Diameter	Volt	Watt
91008	8,5	220	1000

Code	Diameter	Volt	Watt
91281	8,5	220	1900

Code	Diameter	Volt	Watt
92658	8,5	220/380	10.500

Code	Diameter	Volt	Watt
92428	8,5	220	6000

Code	Diameter	Volt	Watt
20353	8,5	220	2000

Code	Diameter	Volt	Watt
91293	8,5	380	1500
92666	8,5	220	1500



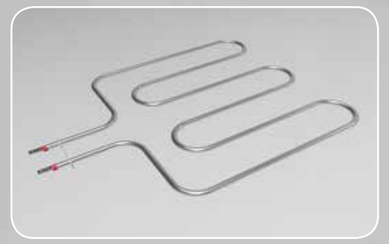
HEATING ELEMENTS FOR

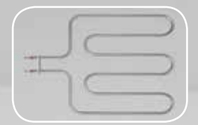
SAUNAS

VENTILATION SYSTEMS

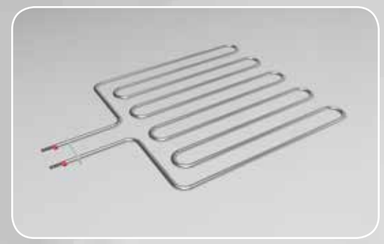


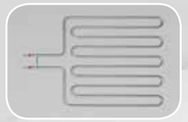




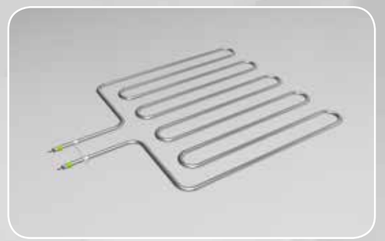


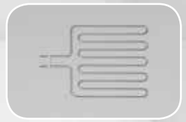
Code	Diameter	Volt	Watt
92706	8,5	230	1500



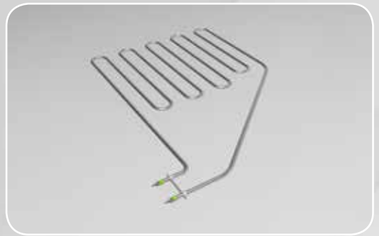


Code	Diameter	Volt	Watt
92705	8,5	230	2670





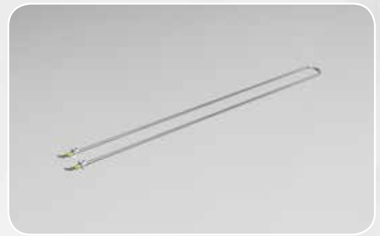
Code	Diameter	Volt	Watt
91974	8,5	220	2650

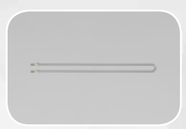




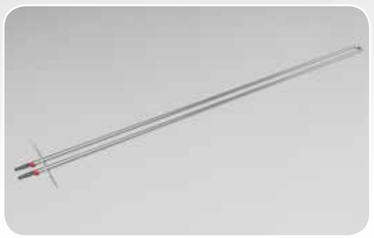
Code	Diameter	Volt	Watt
91976	8,5	220	2650

Code	Diameter	Volt	Watt
91648	8,5	220	1100



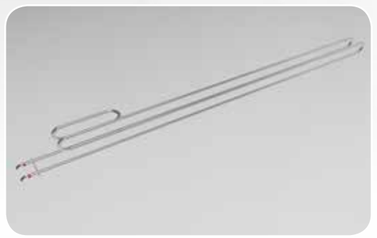
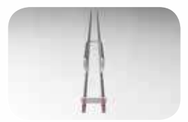


Code	Diameter	Volt	Watt
92831	8,5	220	3000

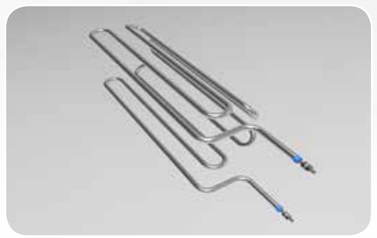
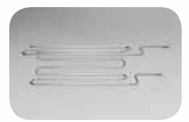




Code	Diameter	Volt	Watt
92707	8,5	230	340


Code	Diameter	Volt	Watt
92708	8,5	230	3500


Code	Diameter	Volt	Watt
93025	8,5	230	3000





Code	Diameter	Volt	Watt
91965	8,5	220	500



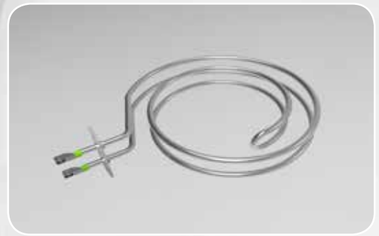


Code	Diameter	Volt	Watt
91967	8,5	220	1500



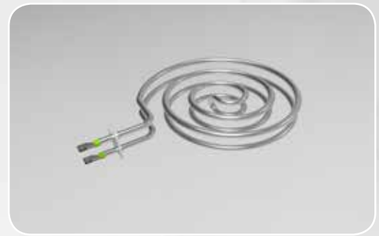


Code	Diameter	Volt	Watt
91968	8,5	220	2000





Code	Diameter	Volt	Watt
91969	8,5	220	3000



Code	Diameter	Volt	Watt
91970	8,5	220	2000

Code	Diameter	Volt	Watt
91281	8,5	220	1900

HEATING ELEMENTS FOR

FINNED TYPE HEATING ELEMENTS

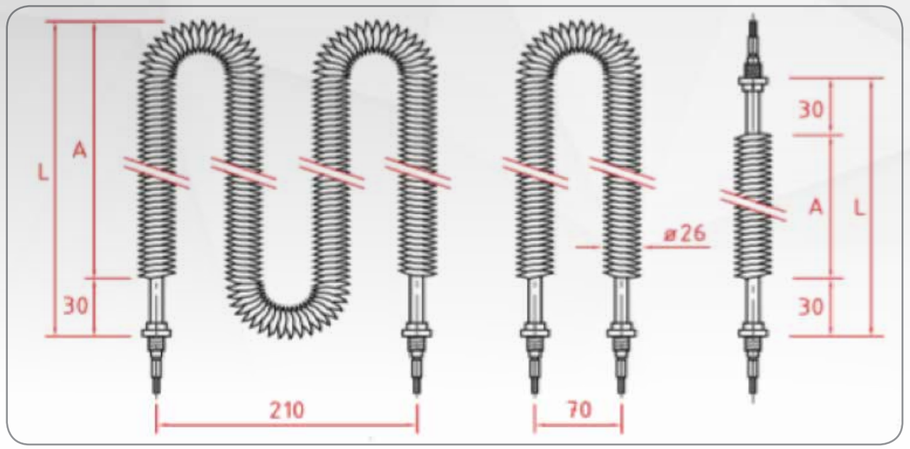
DEFROST TYPE HEATING ELEMENTS

STRAIGHT ROD TYPE HEATING ELEMENTS



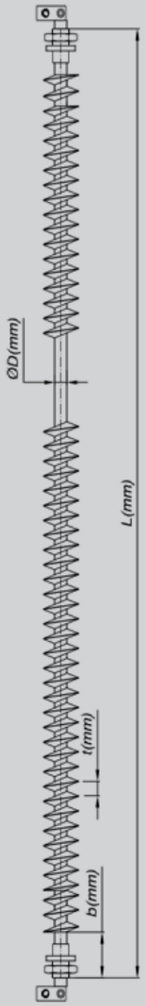
FINNED TYPE HEATING ELEMENTS

We are manufacturing safe, efficient finned heating elements in stainless or carbon steel that heat air silently, effectively and economically.
For the same sheath diameter the surface is greater than that of standard tubular versions. In this way heat exchange is maximized and 85% of convection heat is transmitted rapidly and evenly, moving a large volume of low temperature air.
Different shapes are available to meet customers' needs: flat, linear, M shaped, U shaped, etc. and the fins can be circular or rectangular.
When properly fitted the heater is completely safe and reliable and provides around 1% linear expansion and a maximum sheath temperature of 350°C.
Finned heating elements are often used for air conditioning, domestic heating and on industrial machinery and processes. They are also employed on specialist equipment, such as baking and professional drying.





FCI85SS-LENGTH-WATT

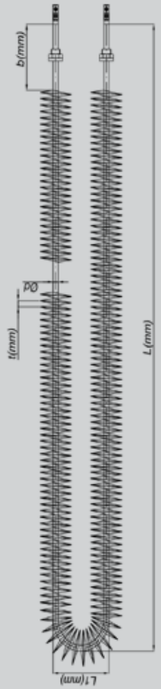


FCI115I-LENGTH-WATT

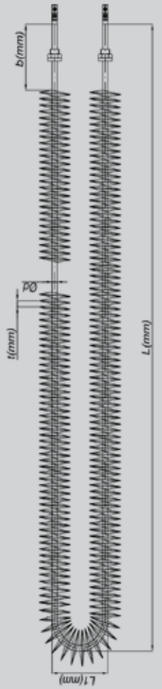
Product Code	Tube Diameter	Fin Diameter	Material of Tube and Fin	Length (mm)	Watt (W)	Volt (V)	Terminal Connection
	8,5mm	28mm	Stainless Steel 304	300	300	230	M12 B
	8,5mm	28mm	Stainless Steel 304	350	350	230	M12 B
	8,5mm	28mm	Stainless Steel 304	400	400	230	M12 B
	8,5mm	28mm	Stainless Steel 304	450	450	230	M12 B
	8,5mm	28mm	Stainless Steel 304	500	500	230	M12 B
	8,5mm	28mm	Stainless Steel 304	550	550	230	M12 B
	8,5mm	28mm	Stainless Steel 304	600	500	230	M12 B
	8,5mm	28mm	Stainless Steel 304	600	750	230	M12 B
	8,5mm	28mm	Stainless Steel 304	600	1000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	650	650	230	M12 B
	8,5mm	28mm	Stainless Steel 304	700	700	230	M12 B
	8,5mm	28mm	Stainless Steel 304	700	500	230	M12 B
	8,5mm	28mm	Stainless Steel 304	700	750	230	M12 B
	8,5mm	28mm	Stainless Steel 304	700	1000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	750	750	230	M12 B
	8,5mm	28mm	Stainless Steel 304	800	800	230	M12 B
	8,5mm	28mm	Stainless Steel 304	800	500	230	M12 B
	8,5mm	28mm	Stainless Steel 304	800	750	230	M12 B
	8,5mm	28mm	Stainless Steel 304	800	1000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	850	850	230	M12 B
	8,5mm	28mm	Stainless Steel 304	900	900	230	M12 B
	8,5mm	28mm	Stainless Steel 304	900	750	230	M12 B
	8,5mm	28mm	Stainless Steel 304	900	1000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	900	1250	230	M12 B
	8,5mm	28mm	Stainless Steel 304	950	950	230	M12 B
	8,5mm	28mm	Stainless Steel 304	1000	750	230	M12 B
	8,5mm	28mm	Stainless Steel 304	1000	1000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	1000	1250	230	M12 B
	8,5mm	28mm	Stainless Steel 304	1000	1500	230	M12 B
	11,50mm	31,50mm	Steel	300	300	230	M18 B
	11,50mm	31,50mm	Steel	350	350	230	M18 B
	11,50mm	31,50mm	Steel	400	400	230	M18 B
	11,50mm	31,50mm	Steel	450	450	230	M18 B
	11,50mm	31,50mm	Steel	500	500	230	M18 B
	11,50mm	31,50mm	Steel	550	550	230	M18 B
	11,50mm	31,50mm	Steel	600	500	230	M18 B
	11,50mm	31,50mm	Steel	600	750	230	M18 B
	11,50mm	31,50mm	Steel	600	1000	230	M18 B
	11,50mm	31,50mm	Steel	650	650	230	M18 B
	11,50mm	31,50mm	Steel	700	700	230	M18 B
	11,50mm	31,50mm	Steel	700	500	230	M18 B
	11,50mm	31,50mm	Steel	700	750	230	M18 B
	11,50mm	31,50mm	Steel	700	1000	230	M18 B
	11,50mm	31,50mm	Steel	750	750	230	M18 B
	11,50mm	31,50mm	Steel	800	800	230	M18 B
	11,50mm	31,50mm	Steel	800	500	230	M18 B
	11,50mm	31,50mm	Steel	800	750	230	M18 B
	11,50mm	31,50mm	Steel	800	1000	230	M18 B
	11,50mm	31,50mm	Steel	850	850	230	M18 B
	11,50mm	31,50mm	Steel	900	900	230	M18 B
	11,50mm	31,50mm	Steel	900	750	230	M18 B
	11,50mm	31,50mm	Steel	900	1000	230	M18 B
	11,50mm	31,50mm	Steel	900	1250	230	M18 B
	11,50mm	31,50mm	Steel	950	950	230	M18 B
	11,50mm	31,50mm	Steel	1000	1000	230	M18 B
	11,50mm	31,50mm	Steel	1000	750	230	M18 B
	11,50mm	31,50mm	Steel	1000	1000	230	M18 B
	11,50mm	31,50mm	Steel	1000	1250	230	M18 B
	11,50mm	31,50mm	Steel	1000	1500	230	M18 B

Product Code	Tube Diameter	Fin Diameter	Material of Tube and Fin	Length (mm)	Watt (W)	Volt (V)	Terminal Connection
FCM85SS-LENGTH- WATT	8,5mm	28mm	Stainless Steel 304	300	300	230	M12 B
	8,5mm	28mm	Stainless Steel 304	350	350	230	M12 B
	8,5mm	28mm	Stainless Steel 304	400	400	230	M12 B
	8,5mm	28mm	Stainless Steel 304	450	450	230	M12 B
	8,5mm	28mm	Stainless Steel 304	500	500	230	M12 B
FCM115I-LENGTH-WATT	11,50mm	31,50mm	Steel	300	300	230	M18 B
	11,50mm	31,50mm	Steel	350	350	230	M18 B
	11,50mm	31,50mm	Steel	400	400	230	M18 B
	11,50mm	31,50mm	Steel	450	450	230	M18 B
	11,50mm	31,50mm	Steel	500	500	230	M18 B

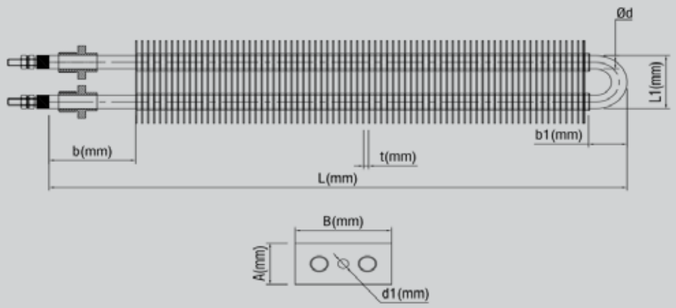
Product Code	Tube Diameter	Fin Diameter	Material of Tube and Fin	Length (mm)	Watt (W)	Volt (V)	Terminal Connection
FCU85SS-LENGTH-WATT	8,5mm	28mm	Stainless Steel 304	200	500	230	M12 B
	8,5mm	28mm	Stainless Steel 304	750	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	230	1000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	2000	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	250	1000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	300	500	230	M12 B
	8,5mm	28mm	Stainless Steel 304	800	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	1000	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	1250	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	1500	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	350	500	230	M12 B
	8,5mm	28mm	Stainless Steel 304	800	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	1000	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	1250	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	1500	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	400	1000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	1250	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	400	1500	230	M12 B
	8,5mm	28mm	Stainless Steel 304	1750	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	450	2000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	500	1000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	1250	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	1500	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	1750	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	2000	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	2250	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	550	550	230	M12 B
	8,5mm	28mm	Stainless Steel 304	2500	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	600	600	230	M12 B
	8,5mm	28mm	Stainless Steel 304	650	650	230	M12 B
	8,5mm	28mm	Stainless Steel 304	3000	230	M12 B	M12 B
	8,5mm	28mm	Stainless Steel 304	700	700	230	M12 B
	8,5mm	28mm	Stainless Steel 304	750	750	230	M12 B
	8,5mm	28mm	Stainless Steel 304	825	4000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	870	4000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	1015	5000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	1085	5000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	1200	5000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	1295	6000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	1200	5000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	1600	6000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	1645	7000	230	M12 B
	8,5mm	28mm	Stainless Steel 304	2245	7000	230	M12 B

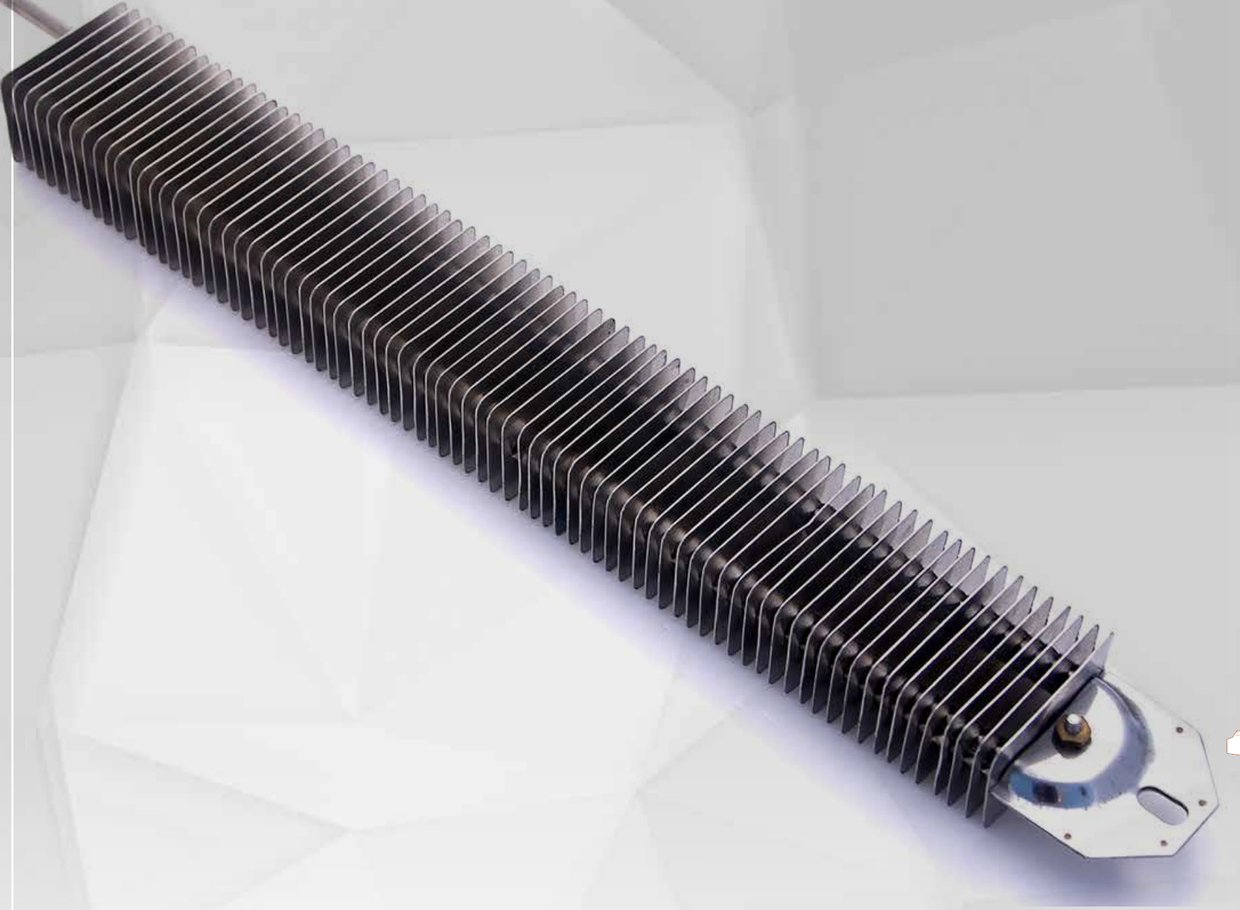


Product Code	Tube Diameter	Fin Diameter	Material of Tube and Fin	Length (mm)	Watt (W)	Volt (V)	Terminal Connection
FCU115I-LENGTH-WATT	11,50mm	31,50mm	Steel	200	500	230	M18 B
	11,50mm	31,50mm	Steel	750	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	230	1000	230	M18 B
	11,50mm	31,50mm	Steel	2000	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	250	1000	230	M18 B
	11,50mm	31,50mm	Steel	300	500	230	M18 B
	11,50mm	31,50mm	Steel	800	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	1000	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	1250	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	1500	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	350	500	230	M18 B
	11,50mm	31,50mm	Steel	800	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	1000	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	1250	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	1500	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	400	1000	230	M18 B
	11,50mm	31,50mm	Steel	1250	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	400	1500	230	M18 B
	11,50mm	31,50mm	Steel	1750	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	450	2000	230	M18 B
	11,50mm	31,50mm	Steel	500	1000	230	M18 B
	11,50mm	31,50mm	Steel	1250	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	1500	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	1750	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	2000	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	2250	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	550	550	230	M18 B
	11,50mm	31,50mm	Steel	2500	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	600	600	230	M18 B
	11,50mm	31,50mm	Steel	650	650	230	M18 B
	11,50mm	31,50mm	Steel	3000	230	M18 B	M12 B
	11,50mm	31,50mm	Steel	700	700	230	M18 B
	11,50mm	31,50mm	Steel	750	750	230	M18 B
	11,50mm	31,50mm	Steel	825	4000	230	M18 B
	11,50mm	31,50mm	Steel	870	4000	230	M18 B
	11,50mm	31,50mm	Steel	1015	5000	230	M18 B
	11,50mm	31,50mm	Steel	1085	5000	230	M18 B
	11,50mm	31,50mm	Steel	1200	5000	230	M18 B
	11,50mm	31,50mm	Steel	1295	6000	230	M18 B
	11,50mm	31,50mm	Steel	1200	5000	230	M18 B
	11,50mm	31,50mm	Steel	1600	6000	230	M18 B
	11,50mm	31,50mm	Steel	1645	7000	230	M18 B
	8,5mm	28mm	Stainless Steel 304	2245	7000	230	M12 B



Product Code	Tube Diameter	Fin Diameter	Material of Tube and Fin	Length (mm)	Watt (W)	Volt (V)	Terminal Connection
FRU85-LENGTH-WATT	8,5mm	50mm x 25mm	Stainless Steel 304	170	250	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	200	100	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	200	150	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	200	200	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	230	500	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	260	500	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	360	500	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	300	600	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	320	500	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	330	750	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	370	750	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	510	750	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	420	750	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	430	850	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	430	1000	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	500	1000	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	520	1000	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	645	1250	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	660	1000	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	530	1250	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	620	1250	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	810	1250	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	875	1750	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	630	1500	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	740	1500	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	770	1500	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	960	1500	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	830	2000	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	970	2000	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	1020	2000	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	1260	2000	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	1030	2500	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	1180	2500	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	1230	3000	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	1250	2500	230	M12 B
	8,5mm	50mm x 25mm	Stainless Steel 304	1520	3000	230	M12 B







Product Code	Volt (V)	Watt (W)	B (mm)	R Ø (mm)	Rb (mm)	D (mm)
102559-375663	230	400	460	Ø8,5	45	8,5



Product Code	Volt (V)	Watt (W)	B (mm)	R Ø (mm)	Rb (mm)	D (mm)
102560-375701	110	650	1360x2	Ø8,5	45	8,5



Product Code	Volt (V)	Watt (W)	A (mm)	B (mm)	R Ø (mm)	Rb (mm)
102621-391000	220	350	105	365	Ø11,5	45
102621-391001	220	650	113	660	Ø11,6	45



Product Code	Volt (V)	Watt (W)	B (mm)	R Ø (mm)	Rb (mm)	D (mm)
102595-377203	220	750	1710	Ø11,5	45	8,5



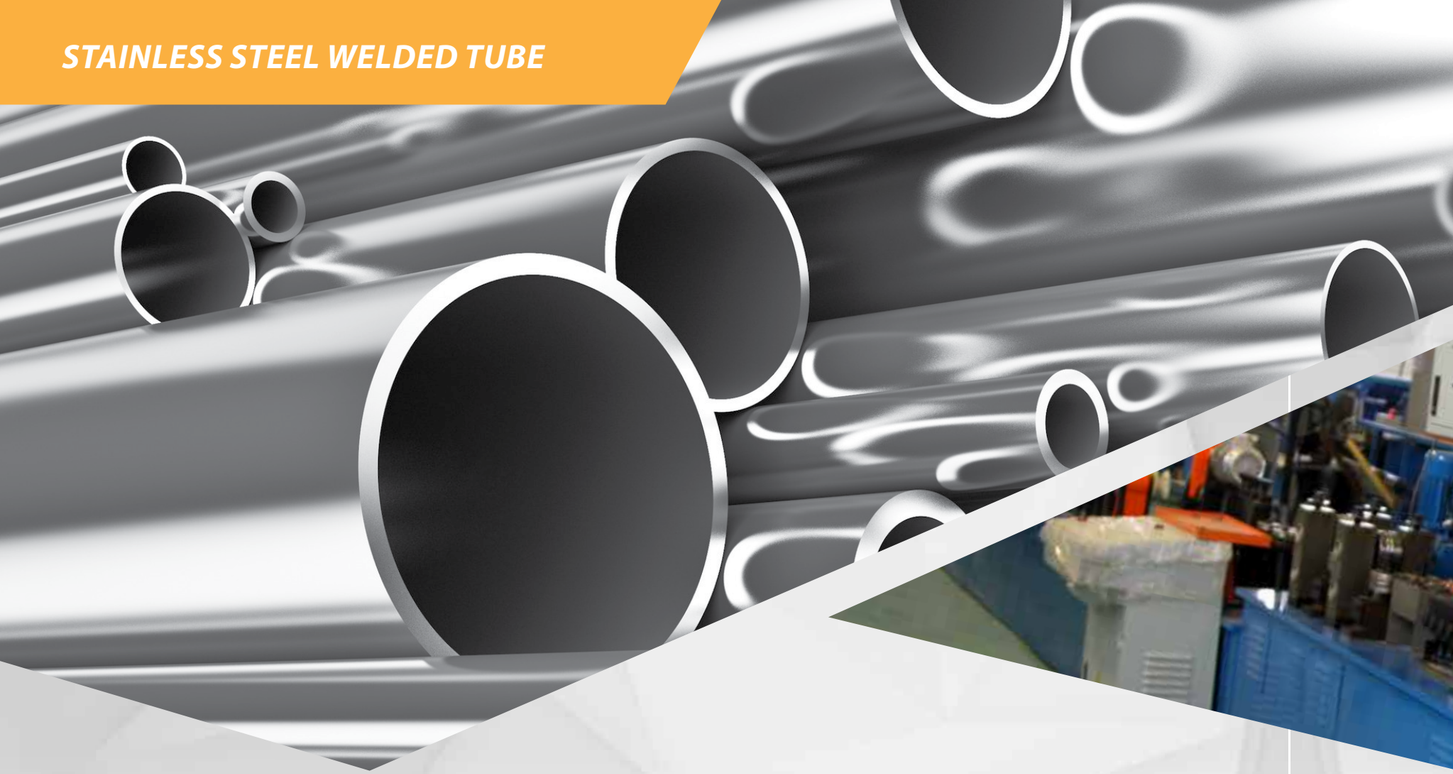


Product Code	Diameter	Tube Material	Element Length (mm)	Power (W)	Volt (V)	Cold Length (mm)
6530300	6,5mm	Stainless Steel 304	30	300	240	50
6535350	6,5mm	Stainless Steel 304	35	350	240	50
6540400	6,5mm	Stainless Steel 304	40	400	240	50
6545450	6,5mm	Stainless Steel 304	45	450	240	50
6550500	6,5mm	Stainless Steel 304	50	500	240	50
6555550	6,5mm	Stainless Steel 304	55	550	240	50
6560600	6,5mm	Stainless Steel 304	60	600	240	50
6565650	6,5mm	Stainless Steel 304	65	650	240	50
6570700	6,5mm	Stainless Steel 304	70	700	240	50
6575750	6,5mm	Stainless Steel 304	75	750	240	50
6580800	6,5mm	Stainless Steel 304	80	800	240	50
6585850	6,5mm	Stainless Steel 304	85	850	240	50
6590900	6,5mm	Stainless Steel 304	90	900	240	50
6595950	6,5mm	Stainless Steel 304	95	950	240	50
651001000	6,5mm	Stainless Steel 304	100	1000	240	50
651051050	6,5mm	Stainless Steel 304	105	1050	240	50
651101100	6,5mm	Stainless Steel 304	110	1100	240	50
651151150	6,5mm	Stainless Steel 304	115	1150	240	50
651201200	6,5mm	Stainless Steel 304	120	1200	240	50
651251250	6,5mm	Stainless Steel 304	125	1250	240	50
651301300	6,5mm	Stainless Steel 304	130	1300	240	50
651351350	6,5mm	Stainless Steel 304	135	1350	240	50
651401400	6,5mm	Stainless Steel 304	140	1400	240	50
651451450	6,5mm	Stainless Steel 304	145	1450	240	50
651501500	6,5mm	Stainless Steel 304	150	1500	240	50
651551550	6,5mm	Stainless Steel 304	155	1550	240	50
651601600	6,5mm	Stainless Steel 304	160	1600	240	50
651651650	6,5mm	Stainless Steel 304	165	1650	240	50
651701700	6,5mm	Stainless Steel 304	170	1700	240	50
651751750	6,5mm	Stainless Steel 304	175	1750	240	50

Product Code	Diameter	Tube Material	Element Length (mm)	Power (W)	Volt (V)	Cold Length (mm)
651801800	6,5mm	Stainless Steel 304	180	1800	240	50
651851850	6,5mm	Stainless Steel 304	185	1850	240	50
651901900	6,5mm	Stainless Steel 304	190	1900	240	50
651951950	6,5mm	Stainless Steel 304	195	1950	240	50
652002000	6,5mm	Stainless Steel 304	200	2000	240	50
652052050	6,5mm	Stainless Steel 304	205	2050	240	50
652102100	6,5mm	Stainless Steel 304	210	2100	240	50
652152150	6,5mm	Stainless Steel 304	215	2150	240	50
652202200	6,5mm	Stainless Steel 304	220	2200	240	50
652252250	6,5mm	Stainless Steel 304	225	2250	240	50
652302300	6,5mm	Stainless Steel 304	230	2300	240	50
652352350	6,5mm	Stainless Steel 304	235	2350	240	50
652402400	6,5mm	Stainless Steel 304	240	2400	240	50
652452450	6,5mm	Stainless Steel 304	245	2450	240	50
652502500	6,5mm	Stainless Steel 304	250	2500	240	50
652552550	6,5mm	Stainless Steel 304	255	2550	240	50
652602600	6,5mm	Stainless Steel 304	260	2600	240	50
652652650	6,5mm	Stainless Steel 304	265	2650	240	50
652702700	6,5mm	Stainless Steel 304	270	2700	240	50
652752750	6,5mm	Stainless Steel 304	275	2750	240	50
652802800	6,5mm	Stainless Steel 304	280	2800	240	50
652852850	6,5mm	Stainless Steel 304	285	2850	240	50
652902900	6,5mm	Stainless Steel 304	290	2900	240	50
652952950	6,5mm	Stainless Steel 304	295	2950	240	50
653003000	6,5mm	Stainless Steel 304	300	3000	240	50
653053050	6,5mm	Stainless Steel 304	305	3050	240	50
653103100	6,5mm	Stainless Steel 304	310	3100	240	50
653153150	6,5mm	Stainless Steel 304	315	3150	240	50
653203200	6,5mm	Stainless Steel 304	320	3200	240	50
653253250	6,5mm	Stainless Steel 304	325	3250	240	50
653303300	6,5mm	Stainless Steel 304	330	3300	240	50
653353350	6,5mm	Stainless Steel 304	335	3350	240	50
653403400	6,5mm	Stainless Steel 304	340	3400	240	50
653453450	6,5mm	Stainless Steel 304	345	3450	240	50
653503500	6,5mm	Stainless Steel 304	350	3500	240	50
653553550	6,5mm	Stainless Steel 304	355	3550	240	50
653603600	6,5mm	Stainless Steel 304	360	3600	240	50
653653650	6,5mm	Stainless Steel 304	365	3650	240	50
653703700	6,5mm	Stainless Steel 304	370	3700	240	50
653753750	6,5mm	Stainless Steel 304	375	3750	240	50
653803800	6,5mm	Stainless Steel 304	380	3800	240	50
653853850	6,5mm	Stainless Steel 304	385	3850	240	50
653903900	6,5mm	Stainless Steel 304	390	3900	240	50
653953950	6,5mm	Stainless Steel 304	395	3950	240	50
654004000	6,5mm	Stainless Steel 304	400	4000	240	50
654054050	6,5mm	Stainless Steel 304	405	4050	240	50
654104100	6,5mm	Stainless Steel 304	410	4100	240	50
654154150	6,5mm	Stainless Steel 304	415	4150	240	50
654204200	6,5mm	Stainless Steel 304	420	4200	240	50
654254250	6,5mm	Stainless Steel 304	425	4250	240	50
654304300	6,5mm	Stainless Steel 304	430	4300	240	50
654354350	6,5mm	Stainless Steel 304	435	4350	240	50
654404400	6,5mm	Stainless Steel 304	440	4400	240	50
654454450	6,5mm	Stainless Steel 304	445	4450	240	50
654504500	6,5mm	Stainless Steel 304	450	4500	240	50



Product Code	Diameter	Tube Material	Element Length (mm)	Power (W)	Volt (V)	Cold Length (mm)
8530300	8,5mm	Stainless Steel 304	30	300	240	50
8535350	8,5mm	Stainless Steel 304	35	350	240	50
8540400	8,5mm	Stainless Steel 304	40	400	240	50
8545450	8,5mm	Stainless Steel 304	45	450	240	50
8550500	8,5mm	Stainless Steel 304	50	500	240	50
8555550	8,5mm	Stainless Steel 304	55	550	240	50
8560600	8,5mm	Stainless Steel 304	60	600	240	50
8565650	8,5mm	Stainless Steel 304	65	650	240	50
8570700	8,5mm	Stainless Steel 304	70	700	240	50
8575750	8,5mm	Stainless Steel 304	75	750	240	50
8580800	8,5mm	Stainless Steel 304	80	800	240	50
8585850	8,5mm	Stainless Steel 304	85	850	240	50
8590900	8,5mm	Stainless Steel 304	90	900	240	50
8595950	8,5mm	Stainless Steel 304	95	950	240	50
851001000	8,5mm	Stainless Steel 304	100	1000	240	50
851051050	8,5mm	Stainless Steel 304	105	1050	240	50
851101100	8,5mm	Stainless Steel 304	110	1100	240	50
851151150	8,5mm	Stainless Steel 304	115	1150	240	50
851201200	8,5mm	Stainless Steel 304	120	1200	240	50
851251250	8,5mm	Stainless Steel 304	125	1250	240	50
851301300	8,5mm	Stainless Steel 304	130	1300	240	50
851351350	8,5mm	Stainless Steel 304	135	1350	240	50
851401400	8,5mm	Stainless Steel 304	140	1400	240	50
851451450	8,5mm	Stainless Steel 304	145	1450	240	50
851501500	8,5mm	Stainless Steel 304	150	1500	240	50
851551550	8,5mm	Stainless Steel 304	155	1550	240	50
851601600	8,5mm	Stainless Steel 304	160	1600	240	50
851651650	8,5mm	Stainless Steel 304	165	1650	240	50
851701700	8,5mm	Stainless Steel 304	170	1700	240	50
851751750	8,5mm	Stainless Steel 304	175	1750	240	50
851801800	8,5mm	Stainless Steel 304	180	1800	240	50
851851850	8,5mm	Stainless Steel 304	185	1850	240	50
851901900	8,5mm	Stainless Steel 304	190	1900	240	50
851951950	8,5mm	Stainless Steel 304	195	1950	240	50
852002000	8,5mm	Stainless Steel 304	200	2000	240	50
852052050	8,5mm	Stainless Steel 304	205	2050	240	50
852102100	8,5mm	Stainless Steel 304	210	2100	240	50
852152150	8,5mm	Stainless Steel 304	215	2150	240	50
852202200	8,5mm	Stainless Steel 304	220	2200	240	50
852252250	8,5mm	Stainless Steel 304	225	2250	240	50
852302300	8,5mm	Stainless Steel 304	230	2300	240	50
852352350	8,5mm	Stainless Steel 304	235	2350	240	50
852402400	8,5mm	Stainless Steel 304	240	2400	240	50
852452450	8,5mm	Stainless Steel 304	245	2450	240	50
852502500	8,5mm	Stainless Steel 304	250	2500	240	50
852552550	8,5mm	Stainless Steel 304	255	2550	240	50
852602600	8,5mm	Stainless Steel 304	260	2600	240	50
852652650	8,5mm	Stainless Steel 304	265	2650	240	50
852702700	8,5mm	Stainless Steel 304	270	2700	240	50
852752750	8,5mm	Stainless Steel 304	275	2750	240	50
852802800	8,5mm	Stainless Steel 304	280	2800	240	50
852852850	8,5mm	Stainless Steel 304	285	2850	240	50
852902900	8,5mm	Stainless Steel 304	290	2900	240	50
852952950	8,5mm	Stainless Steel 304	295	2950	240	50
853003000	8,5mm	Stainless Steel 304	300	3000	240	50
853053050	8,5mm	Stainless Steel 304	305	3050	240	50
853103100	8,5mm	Stainless Steel 304	310	3100	240	50
853153150	8,5mm	Stainless Steel 304	315	3150	240	50
853203200	8,5mm	Stainless Steel 304	320	3200	240	50
853253250	8,5mm	Stainless Steel 304	325	3250	240	50
853303300	8,5mm	Stainless Steel 304	330	3300	240	50
853353350	8,5mm	Stainless Steel 304	335	3350	240	50
853403400	8,5mm	Stainless Steel 304	340	3400	240	50
853453450	8,5mm	Stainless Steel 304	345	3450	240	50
853503500	8,5mm	Stainless Steel 304	350	3500	240	50
853553550	8,5mm	Stainless Steel 304	355	3550	240	50
853603600	8,5mm	Stainless Steel 304	360	3600	240	50
853653650	8,5mm	Stainless Steel 304	365	3650	240	50
853703700	8,5mm	Stainless Steel 304	370	3700	240	50
853753750	8,5mm	Stainless Steel 304	375	3750	240	50
853803800	8,5mm	Stainless Steel 304	380	3800	240	50
853853850	8,5mm	Stainless Steel 304	385	3850	240	50
853903900	8,5mm	Stainless Steel 304	390	3900	240	50
853953950	8,5mm	Stainless Steel 304	395	3950	240	50
854004000	8,5mm	Stainless Steel 304	400	4000	240	50
854054050	8,5mm	Stainless Steel 304	405	4050	240	50
854104100	8,5mm	Stainless Steel 304	410	4100	240	50
854154150	8,5mm	Stainless Steel 304	415	4150	240	50
854204200	8,5mm	Stainless Steel 304	420	4200	240	50
854254250	8,5mm	Stainless Steel 304	425	4250	240	50
854304300	8,5mm	Stainless Steel 304	430	4300	240	50
854354350	8,5mm	Stainless Steel 304	435	4350	240	50
854404400	8,5mm	Stainless Steel 304	440	4400	240	50
854454450	8,5mm	Stainless Steel 304	445	4450	240	50
854504500	8,5mm	Stainless Steel 304	450	4500	240	50







Thanks to the consumption and requirement of our Heating Element division for the Welded Stainless Steel Tubes, we have founded the BALÇIK Tube division and offering high-quality Stainless Steel Tubes and Tube products, which find use in a wide range of applications.

Based on large know-how and experience in tube manufacturing for more than 15 years, in our production site, high-quality BALÇIK Stainless Steel Tubes with diameters from 6,0 mm to 13,0 mm are TIG welded.

Stainless Steel Welded Tubes can be ordered in various dimensions:
Outside diameter: 6,0 - 13,0 mm
Wall thickness: 0,25 - 1,0 mm
Length: 20 - 8.000 mm

We have significant stock of tubes and raw material and can quickly satisfy customer's requests with timely supplies even for small quantities.

Technological Process
Roll-forming of cold-rolled strips of stainless steel or alloys with high content of nickel to the required diameter, TIG welding in inert atmosphere, sizing of outside diameter, heat treatment at 1040-1100°C.

Extremely precise production techniques guarantee the high performance of BALÇIK Stainless Steel Tubes:

- TIG welding with welding factor V = 1,0
- Annealing within inert gas atmosphere
- Leakage test
- Various tube end treatments for example

– Burr-free cutting,
– Inside and/or outside countersink deburring
– Low burr sawing
– Brush deburring

Vibratory grinding

- Defined roughness of welding seam
- Defined increase of inner welding seam

We optimize the complete production process in-house in order to achieve best final tube products starting from the selection of high-quality strip material to the adjustment of all production steps.

Our own laboratory analyzes and approves tubes or materials for our customers with up-to-date and high-equipped test devices.

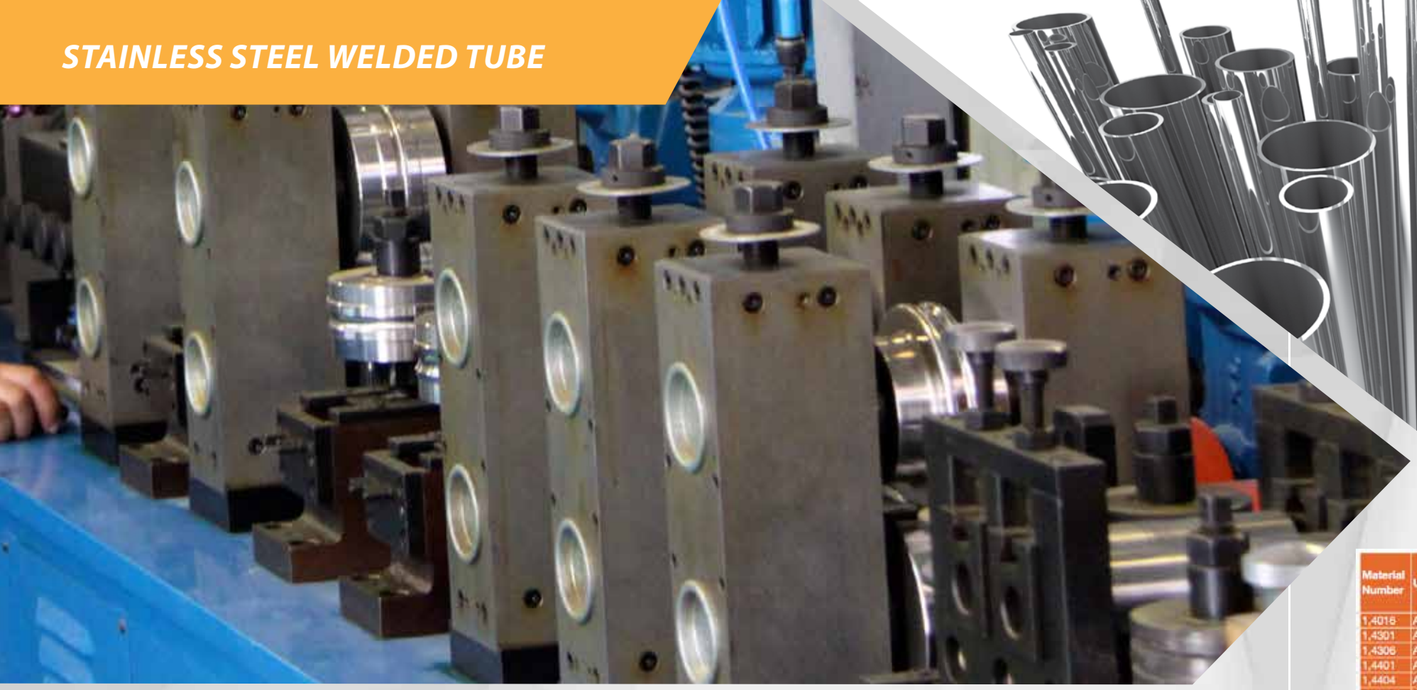
We ensure high quality due to strict controls which accompany every phase of the production process. We rely on a modern and well-equipped laboratory to monitor the quality. Diverse methods for analyzing the physical, metallographic and chemical properties of materials are available.

These methods especially include:
Tensile tests: yield point, tensile strength, elongation
Chemical analyses with a stationary metal analyzer and ICP-OES
Hardness tests
Measurements of roughness
Material tests with digital processing of images; by means of a scanning electron microscope
X-ray tests
Extensive investigations into corrosion resistance

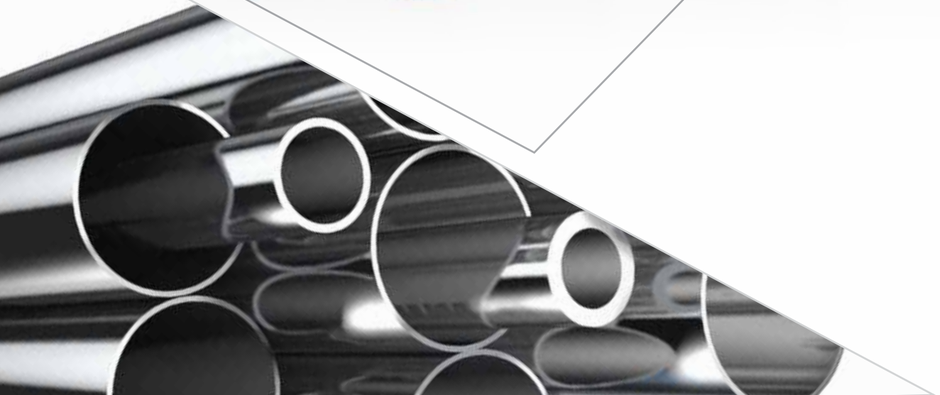
BALÇIK Stainless Steel Tubes and Tube products comply with the following standards;

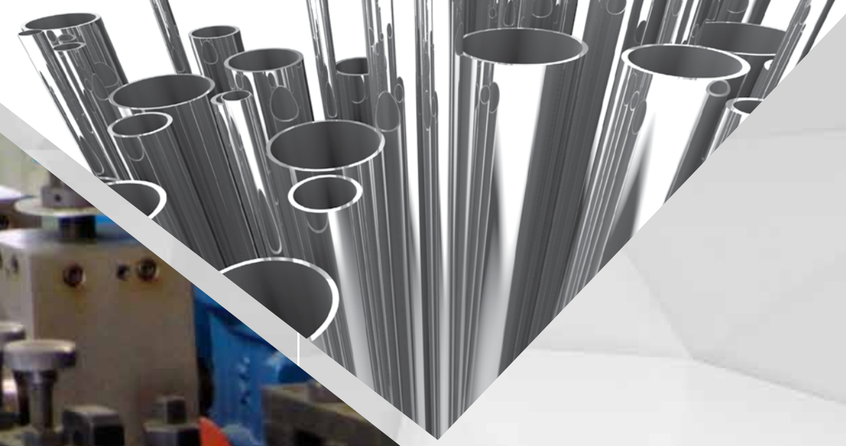
EN10088-2 Raw material technical specifications (strip)
EN10217-7 General reference standard for welded stainless steel circular tubes for pressure equipment
DIN 54141 Process control (Eddy current or Foucault current test) with cutting and automatic selection of tube with possibile surface variations.
Non destructive test, carried out on the production line
EN ISO 8493 Diameter expansion test, 30% minimun, without detecting cracks
Destructive test, carried out on samples out of the production line
EN ISO 8492 Back bending test of the welding area
Destructive test, carried out on samples out of the production line
EN 10204 Metallic materials: types of inspection documents
ASTM A 249/A Technical reference norm for heat-treated tubes to be used for heat exchangers and boilers
ASME
SA-312/SA312-M Specification for seamless and welded austenitic stainless steel pipes

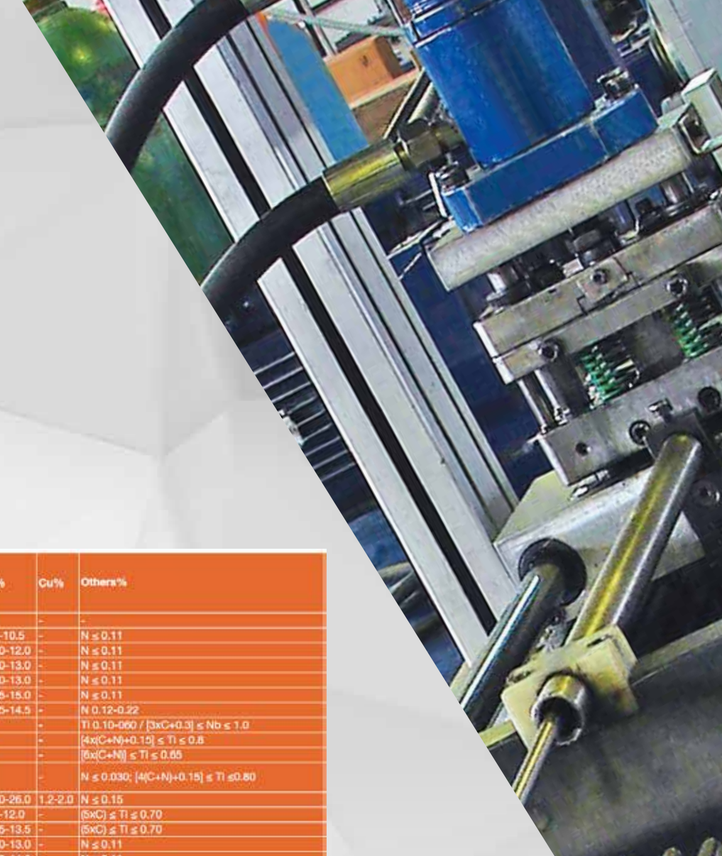
STAINLESS STEEL WELDED TUBE











Material Number	US code	Density g/cm³	C%	Si%	Mn%	P%	S%	Cr%	Mo%	Ni%	Cu%	Others%
1,4016	AISI 430	7.70	0.08	1.00	1.0	0.04	0.015	16,0 - 18,0	-	-	-	-
1,4301	AISI 304	7.90	0.07	1.00	2.0	0.045	0.015	17,5 - 19,5	-	8.0-10.5	-	N ≤ 0.11
1,4306	AISI 304L	7.90	0.03	1.00	2.0	0.045	0.015	18,0 - 20,0	-	10.0-12.0	-	N ≤ 0.11
1,4401	AISI 316	7.95	0.07	1.00	2.0	0.045	0.015	16,5 - 18,5	2,0-2,5	10.0-13.0	-	N ≤ 0.11
1,4404	AISI 316L	7.95	0.03	1.00	2.0	0.045	0.015	16,5 - 18,5	2,0-2,5	10.0-13.0	-	N ≤ 0.11
1,4435	AISI 316L	7.95	0.03	1.00	2.0	0.045	0.015	17,0 - 19,0	2,5-3,0	12.5-15.0	-	N ≤ 0.11
1,4439	AISI 317	8.00	0.03	1.00	2.0	0.045	0.015	16,5 - 18,5	4,0-5,0	12.5-14.5	-	N 0.12-0.22
1,4509	-	7.70	0.03	1.00	1.0	0.04	0.015	17,5 - 18,5	1,20-2,0	-	-	Ti 0.10-060 / [3x(C+0.3)] ≤ Nb ≤ 1.0
1,4510	AISI 439	7.70	0.05	1.00	1.0	0.04	0.015	16,0 - 18,0	-	-	-	[4x(C+N)+0.15] ≤ Ti ≤ 0.8
1,4512	AISI 409	7.70	0.03	1.00	1.0	0.04	0.015	10,5 - 12,5	-	-	-	[6x(C+N)] ≤ Ti ≤ 0.65
1,4521	AISI 403/444	7.70	0.025	1.00	1.0	0.04	0.015	17,0 - 20,0	1,8-2,5	-	-	N ≤ 0.030; [4(C+N)+0.15] ≤ Ti ≤0.80
1,4539	AISI 904L	8.00	0.02	0.70	2.0	0.03	0.010	19,0-21,0	4,0-5,0	24.0-26.0	1.2-2.0	N ≤ 0.15
1,4541	AISI 321	7.90	0.08	1.00	2.0	0.045	0.015	17,0-19,0	-	9.0-12.0	-	(5xC) ≤ Ti ≤ 0.70
1,4571	AISI 316Ti	7.95	0.08	1.00	2.0	0.045	0.015	16,5-18,5	2,0-2,5	10.5-13.5	-	(5xC) ≤ Ti ≤ 0.70
1,4828	AISI 309	7.90	0.20	1.5-2.5	2.0	0.045	0.015	19,0-21,0	-	11.0-13.0	-	N ≤ 0.11
1,4833	AISI 309S	7.90	0.15	1.00	2.0	0.045	0.015	22,0-24,0	-	12.0-14.0	-	N ≤ 0.11
1,4841	AISI 314	7.90	0.20	1.5-2.5	2.0	0.045	0.015	24,0-26,0	-	19.0-22.0	-	N ≤ 0.11
1,4845	AISI 310S	7.90	0.12	1.50	2.0	0.045	0.015	24,0-26,0	-	19.0-22.0	-	N ≤ 0.11
1,4876	INCOLOY 800	8.00	0.12	1.00	2.0	0.03	0.015	19,0-23,0	-	30.0-34.0	-	0.15≤ Al≤ 0.60, 0.15 ≤ Ti ≤ 0.60
2,4816	INCONEL 600	8.50	0.05-0.1	0.50	1.0	0.02	0.015	14,0-17,0	-	≥72.0	≤0.50	Al ≤ 0.30: Ti ≤ 0.30: Fe 6.0-10.0
2,4856	INCONEL 625	8.40	0.03-0.1	0.50	0.5	0.02	0.015	20,0-23,0	8,0-10,0	Rest	≤0.50	3.15 ≤ (Nb+Ta) ≤ 4.15: Co ≤ 1.0: Al≤0.40: Ti≤
2,4858	INCOLY 825	8.10	0.025	0.50	1.0	0.02	0.015	19,5-23,5	2,5-3,5	38,0-46,0	1.5-3.0	0.60 ≤ Ti 1.20: Co≤ 1.0: Al ≤ 0.20: Fe Rest

Pressure test in air at 10 Bar for 10 min. or, in conformity with EN 10217-7 norm, in water at 70 Bar or up to 300 Bar on request.

All tubes are marked with identification code of producer, in addition to diameter, thickness, alloy and specific production information to guarantee that all data about them are traceable.

Tube in bars is packed in:
stackable wooden boxes, fixed with straps
stackable wooden boxes, fixed with straps and cover
appropriate wooden crates for tubes cut to length
bundles, fixed on wooden boards with straps
made-to-measure wooden packages, fixed with straps for tubes up to 20 m long.

All types of packing guarantee the preservation of all the dimensional and sanitary characteristic of the product.

Heat Treatment for Tubes - Online Bright Annealing Technology
A heat treat process performed online thru our tube mills by a carefully controlled furnace atmosphere resulting in a clean, smooth, scale free metal surface. During typical open annealing, the heated steel combines with oxygen in the air to form an oxide layer on the steels surface. In bright annealing, the steel is heated in a furnace filled with gases, such as hydrogen or nitrogen, to prevent oxide scale formation. The material comes out of the bright anneal furnace with the same surface as it had when it went into the furnace.

Bright annealing is carried out in a furnace full of Hydrogen (H2) at temperatures ranging between 1040 ° C and 1100° C and is followed by a rapid cooling. The Hydrogen is NOT an oxidising agent and therefore no surface oxidation is created and pickling is no longer required after the bright annealing.

The main advantage of this system, besides a bright and even surface that eases further processing of the tubes, is the improved corrosion resistance of the material. Such treatment, carried out at the final stage of the production process, ensures the complete solution of the possible carbides precipitated at the grain border, thus obtaining an austenitic matrix free of defects. This makes it possible to avoid the dangerous phenomena of intergranular corrosion.
The austenitic structure obtained through on-line bright annealing, is homogeneous with regular grain size; the consequence is an improvement of stainless steel tensile properties, in particular traction and elongation, with an increase of plasticity and a decrease of residual stress. This is a a material characteristic very well appreciated by all end users who are making further manipulations on tubes such as bending and forming.



Thanks to the expertise of our customer-orientated project management and our highly qualified technical engineering we are in a position to supply Tubes as processed – shaped - welded tubes according to the requirements and demands of our customers.

Range of Possible Tube Processing;

Deformed tubes;
1) Bending techniques (Full Automatic CNC & Semi Automatic)
Possibilities of deformation with full-automatic CNC machine
We can bend a further range of tube dimensions by semi-automatic bending
2) Compression of tube ends
a) Upsetting
Possibilities of upsetting
Change of length, thickness and shape via compression forces Deformation grade of one process approximately 40 %
b) Rotary swaging
Possibilities of rotary swaging
Reduction of tube diameter: Two or more tool segments surround the tube cross section simultaneously in the radial direction and in rotation
Deformation grade of one process approximately 300 %

Tubes with brazed metal parts;
Brazing of various metal parts on our tubes for example
Flanges
Support bars
Brackets

We offer our customers to design their special product requirements by implementing new techniques such as;

- Perforation
- Stamping
- Punching
- Adding of screw connections

FURNACE BRAZING



Brazing has often been overlooked by designers, possibly due to a poor historical image. The modern brazing process and materials are a far cry from this perception however - it has become an exceptional joining process that makes possible engineering assemblies with joint strengths that cannot be achieved by any other means.

BALÇIK Metal Treatment division is the one of the well known furnace brazing specialist in Turkey for multi-jointed components in Stainless Steel.
The process and technology was developed primarily due to the requirement of the brazing of heating elements at first, but afterwards BALÇIK has founded this division to become a service center for brazing requirements of the market.

Furnace Brazing

Often referred to as Mesh Belt Brazing, Bright Brazing, Nickel Brazing, Copper Brazing, Continuous Brazing, Atmosphere Brazing.
An ideal process for very low to very high volume parts in steel or stainless steel. Carried out under a reducing furnace atmosphere resulting in a clean component & one requiring no post braze cleaning.

Brazed stainless steel parts must always be clean and bright, and have precise micro structure requirements for strength and corrosion resistance properties. Most of conventional and typical brazing or annealing processes cannot reliably meet these requirements. Our furnace brazing system will provide you with superior results at a fraction of the cost our old technology processes charge.

Our Parts are Always Bright and Always Right

Guaranteed Punctual Delivery
The furnace brazing process, along with our unique efficiency systems, guarantees you receive prompt deliveries. We serve customers throughout Turkey and Europe with precise deliveries and reduce the lead times for the brazing and heat treating process. Your parts do not spend time at our facility; they are delivered immediately and with the quality you expect.

Better Processes
Our use of pure atmospheres and continuous furnaces is unique. This combination produces the cleanest brightest parts with the strongest joints. These conditions are ideal for stainless steels. Your parts will meet the exacting standards of the design expected by your customer.

Best Service

We are open 24 hours per day, seven days per week. We run your parts when you need them and can work weekends to meet unexpected demands. We are on time. You are not surprised with expediting costs or entanglements.

Capabilities

- Base Metals
- Mild Steel
- 300 series Stainless Steels
- 400 series Stainless Steels
- Carbide
- Tungsten
- Copper

Braze Alloys
Copper
Nickel
Silver

What is Brazing

Brazing is a process in which two metals are joined together using a filler metal whose melting point is above 840° F but below the melting point of the base metals being joined. The filler metal is distributed between the closely fitted metal surfaces by capillary action.

Typical Applications
The list of potential applications is substantial, however, the most common categories are:

- Hydraulic Fittings
- Heat Exchangers
- Tube Manipulations
- Machined Assemblies
- Pressed Assemblies
- Fabrications

Wire Formed Assemblies

Joint Design

Brazing relies on capillary attraction. Therefore, the joint design is crucial in the success of the brazing. An unbroken capillary path with gaps not exceeding 0.1mm are required for most applications.
Whenever possible, joints should be self-supporting or self-jigging as furnace jigs can be expensive, they may move in the heat during the process and they occupy furnace space adding to the unit costs.

Joint Strength

A correctly designed and brazed joint should produce a strength of joint that is in excess of the parent metal.

Advantages & Disadvantages

Furnace Brazing is still one of the least appreciated manufacturing techniques with many engineers being unaware of its existence or its advantages as a method of joining two or more parts together.

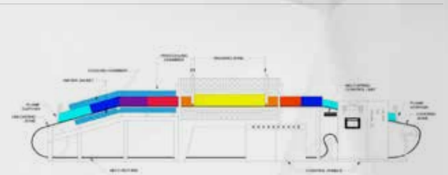
FURNACE BRAZING















Main Advantages of Furnace Brazing:

- Stronger assemblies. Joint strengths greater than the parent metal are possible. Parent metals are not fused or damaged. Permanent joints.
- Produce extremely clean brazed parts with superior, flux-free braze joints of high integrity and strength.
- Complex assemblies from common parts. Furnace brazing facilitates the manufacture of complex & delicate assemblie which might be impossible to achieve by any other method.
- Multi-joint processing in a single pass. Multiple joints can be brazed at once.
- The process is a semi-automatic process used due to its adaptability to mass production. Main advantage is the ease with which it can produce large numbers of parts per hour.
- Efficient designs (e.g. stainless and mild steel combinations). Dissimilar metals can be brazed together.
- Long and inaccessible joints can be filled successfully.
- Different metal thickness are permissible in brazed joints.
- Leak-tight and attachment properties.
- Lighter weight components.
- Elimination of special tooling or fixtures. Components to be brazed can be designed for self alignment without the need for fixturing.
- Elimination of other processes like machining, staking or threading.
- No need for post braze cleaning operations.
- Uniform stress relief throughout. Stresses are relieved during brazing. Residual stresses are reduced due to slow heating and cooling cycles. This, in turn, can significantly improve the thermal and mechanical properties of the material, thus providing unique heat treatment capabilities.
- The parts are uniformly heated under tight process control. A uniformed heating & cooling rate can reduce the potential for distortion. A controlled heat cycle minimizes or eliminates distortion.
- No surface deterioration takes place during the process.
- Rapid reproducible results are obtainable.

Disadvantages of Furnace Brazing:

- Close fits are necessary to facilitate the capillary action.
- Component parts will be annealed during the process.
- Provision for location of the brazing material has to be allowed for in the design.

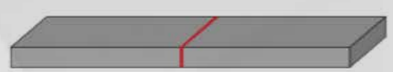
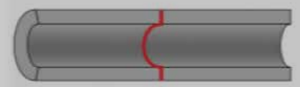
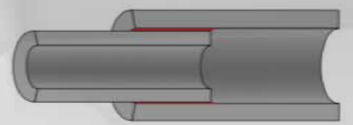
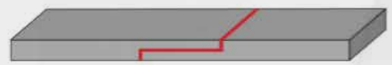
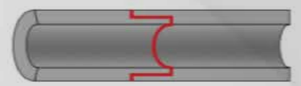
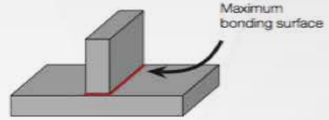
Braze filler metal base material

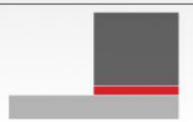
Base material	Nickel (Ni)	Silver (Ag)	Copper (Cu)
Braze range	927 - 1205 °C 1700 - 02200°F	620 - 980°C 1150 - 1800 °F	705 - 1150°C 1300 - 2100°F
Maximum useful service temperatrue	980°C 1800°F	370°C 700°F	370°C 700°F
Applications	Alloy steels Carbon steels Copper alloys Stainless steels Nickel/cobalt alloys	Alloy steels Carbon steels Cast iron Copper alloys Nickel alloys Stainless steels Tool steels	Alloy steels Carbon steels Cast iron Copper alloys Stainless steels Tool steels
Brazing methods/ atmospheres	Dissociated ammonia	Dissociated ammonia	Dissociated ammonia

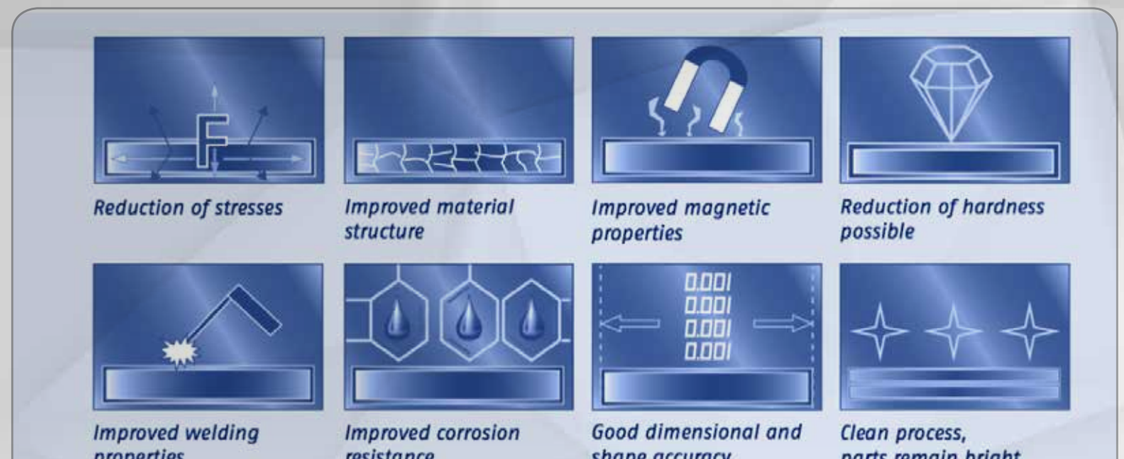
Braze filler metal application by base material

Brazing filler metal	Aluminum and aluminum alloys	Carbon steel and low alloy seetls	Cast iron	Ceramics	Cobalt and cobalt alloys	Copper and copper alloys	Magnesium and magnesium alloys	Nickel and neckel alloys	Stainless steell	Titanium and titanium alloys	Tool steels
	Base material of component										
Nickel based [BNi]		●	●		●	●			●		●
Copper (pure) [Bcu]		●	●			●		●	●		●
Copper phosphorus [BcuP]						●					
Copper-zinc [BCuZn]		●	●			●		●			●
Silver based [Bag]		●	●	●		●		●	●	●	●

Joint configuration

Joint type	Flat parts	Tubular parts (cutaway)
Butt joint		
Lap joint		
Butt-lapp joint		
Scarf joint		
Tee joint		

	Capillary force enhanced brazing	Filler material in place
Before brazing		
During brazing		
After brazing		



BALÇIK Metal Treatment division uniquely placed in having continuous furnaces for bright annealing in Turkey. This is giving us capability of bright annealing service for larger lower volume parts & smaller very high volume parts.

A highly technological heat treat process performed to the parts by a carefully controlled furnace atmosphere resulting to a clean, smooth, scale free metal surface.

Bright annealing is carried out in a furnace full of Hydrogen (H2) at temperatures ranging between 1040 ° C and 1100° C and is followed by a rapid cooling. The Hydrogen is NOT an oxidising agent and therefore no surface oxidation is created and pickling is no longer required after the bright annealing.

The main advantage of this technology, besides a bright and even surface that eases further processing of the tubes, is the improved corrosion resistanc. Such treatment, carried out at the production process, ensures the complete solution of the possible carbides precipitated at the grain border, thus obtaining an austenitic matrix free of defects. This makes it possible to avoid the dangerous phenomena of intergranular corrosion.

WHICH PART WOULD YOU PREFER ?



THEIRS OURS



OURS THEIRS

The austenitic structure obtained through bright annealing, is homogeneous with regular grain size; the consequence is an improvement of stainless steel tensile properties, in particular traction and elongation, with an increase of plasticity and a decrease of residual stress.

Reducing the hardness and minimizing residual stresses prepare metals and alloys for further processing or for the intended service conditions. Materials facilitating the progress of subsequent manufacturing operations, by improved machinability with ease and increased ductility.

Our continuous furnaces provide outstanding heating and cooling cycle performance. Quality is evident in our signature surface finish. There is never any haze, scale or heavy oxidation. Quick turnaround times are not a problem.
Stainless steels are ideally suited to our system. Special fixtures are not required. We achieve superior results versus vacuum processes at a fraction of the cost.

Services

- Bright Anneal
- Stress Relief
- Normalizing
- Tempering

Base Metals

300 series Stainless Steels
400 series Stainless Steels
Mild Steels
Other Ferrous alloys
Nickel alloys

Processes

High efficiency continuous furnaces
Pure hydrogen atmospheres
Pure nitrogen atmospheres
Heat lot tracking

NICKEL DIFFUSION COATING



Diffused nickel plating is the most effective nickel coating to ensure the highest levels of corrosion resistance via the total encapsulation method of plating. The process is done at elevated temperatures in a controlled chamber. As a result, the base metal develops extreme resistance to corrosion, oxidation and erosion in its severe working conditions.

Diffused nickel plating is proven to be more corrosion resistant than even the highest grade stainless steel. It is so resistant to corrosion, even in marine subsea environments increasing the longevity of components, and by this way that our customers give mild steel plated in this way 30 year sub-sea guarantees.

When independent salt spray testing was carried out on diffused nickel plated components, the experiment was abandoned after 2000 hours because no corrosion could be detected.

Benefits;
Extends the life of materials, such as mild steel
Highly cost-effective
Downtime as a result of corroded parts is severely reduced or avoided altogether
The costs of repairing, replacing or maintaining parts can be dramatically reduced or avoided altogether

Provides;
Exactly same coating thichness on all the surface of tube
High corrosion resistance
High resistance against chemicals
High resistance to degradation
Hard to stick surface
Slickness on the surface
Hardness
Ductility
Solderability

Diffused Nickel Plating difference in comparison to Electroless Nickel Plating
What is different between the two methods of Nickel Plating, is the way in which the processes are undertaken. It has already been deciphered that Diffused Nickel Plating occurs via a total encapsulation plating method but this is not the same for Electroless Nickel Plating. This occurs when a layer of metal is deposited of even thickness all over the surface of a component, despite the shape of it. This uniform coating is perfect for components which are used in industries, such as, Healthcare, Defence, Automotive and Aerospace, where the components are often not standard and need to be hygienic.

BALÇIK Metal Treatment division's diffused nickel plating process is the highest standard for corrosion resistance via the plating process.

DEGRADATION OF NICKEL DIFFUSION COATING IN DIFFERENT ENVIROMENTS		
Enviroment	Temprature (°C)	Degradation Ratio (Micron/Year)
SEA SALT WATER %3,5	95	NONE
ACETIC ASID	20	0.8
AMMONIUM SULFATE	20	5
ASCETONE	20	0.8
AMMONIA %25	20	16
AMMONIUM NITRATE %20	20	15
AMMONIUM SULFATE DILUTED	20	3
BENZENE	20	NONE
CALCIUM CHLORIDE %42	20	0.2
CARBON TETRA CHLORIDE	20	NONE
CITRIC ACID DILUTED	20	200
IRON CHLORIDE %1	20	200
FORMIC ACID %88	20	13
HYDROCHLORIC ACID %5	20	24
LACTIC ACID %85	20	1
LEAD ACETATE %36	20	0.2
NITRIC ACID %0,1	20	25
OXALIC ACID %10	20	3
PHENOL %90	20	0.2
PHOSPORIC ACID %85	20	3
POTASSIUM HYDROXIDE %50	20	NONE
SODIUM CARBONATE DILUTED	20	1
SODIUM HYDROXIDE %45	20	NONE
SODIUM HYDROXIDE %50	95	0.2
SODIUM SULFATE %10	20	0.8
SULFURIC ACID %65	20	9
ACIDIC WATER (Ph3.3)	20	7
DISTILLED WATER	100	NONE

Coating Properities	Electrolytic	Diffused Nickel
Composition	%99+Nickel	Average %2-15P and %98-85 Ni
Appearance	Dull to Bright	Half Bright
Structure	Crystal	Amorphous
Density	8.9GR/CM^3	Average 7.9 GR/CM^3
Thickness Distribution	Variable	%10
Melting Point	1455°C	890°C (Average)
Hardness	40-150 VSD	500-600 VSD
Hardness after Heat Treatment	Ineffective	1000 VSD
Degration Resistance	Moderate	Very Good
Corrosion Resistance	Good (Poriferous)	Very Good
Magnetic Susceptibility	%36	%4
Electrical Resistance	7 MİKROOHM/CM	60-100 MİKROOHM/CM
Thermal Conductivity	0.16 CAL/CM.S.°C	0.10-0.02
Elongation %	6 - 30	2

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55 years

THE HEAT-TECHNOLOGY INSIDE

BALÇIK ISI ELEMANLARI
SANAYİ TİCARET ANONİM ŞİRKETİ

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