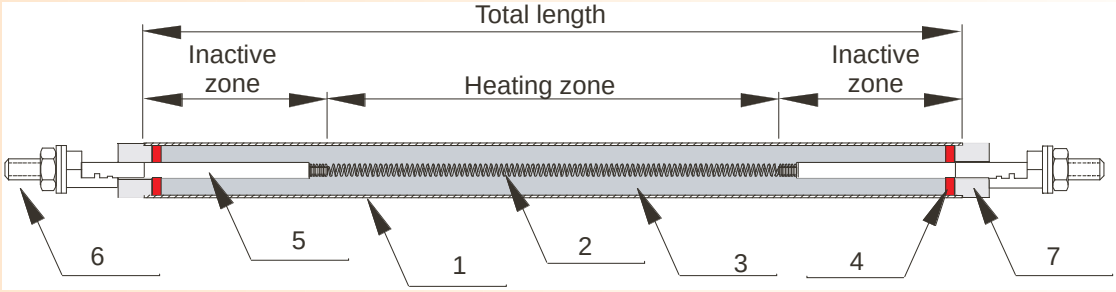
GROUP 0 - Introduction

0.1 - Construction: tubular heating element parts



1.- Tubular sheath

It changes based on the material to heat and the working temperature. See attached table with some of the most standard materials sheaths, also with the different diameter options and tube lengths

2.- Resistive coil

Resistive wire of Nickel Chrome alloy or other metals. The alloy changes according to the type of application of the heating element. The resistive coil can be made with one, two or three wires.

This element is the heat source.

3.- Granular insulating

Magnesium oxide electrofused with the adequate characteristics to Electricfor's constructive thermic class. When the magnesium oxide is compacted by lamination or compression it acquires a good thermal conductivity as well as ensuring correct dielectric strength.

4.- Seal

It protects against humidity penetrating the heating element. Five types of seal according to Electricfor's constructive thermic class:

- Airtight seal.
- Extra airtight seal.
- Extra airtight high temperature seal.
- Porous seal.
- Porous high temperature seal

5.- Terminal

In prenickeled steel, stainless steel AISI 303 or steel.

The length of internal terminal determines the cold zone of the heating element.

6.- Connection terminal

Different types of terminal to connect to electricity supply.

7.- Insulation terminal

Ceramic or thermoplastic wallhole to ensure the dielectric strength between tubular sheath and terminal.

GROUP 0 - Introduction

0.2 - EC Conformity statement

CE CONFORMITY STATEMENT

Electricfor, S.A. declares that all the products described in this catalogue fulfil the requirements of the Community's Directive on Low Voltage **73/23 EEC** and the Directive on Electromagnetic Accountability 89/336 EEC. For this reason, the accepted EC standards are applied in the design and manufacture of our products, with emphasis on:

- **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.
- **UNE-EN 60.519** Safety in electrothermal installations
- **EN 60.529** Degrees of protection provided by enclosures (IP Code)

For its products destined to form part of an end appliance, Electricfor ensures the points of the standards applicable. It is the responsability of the appliance constructor to adopt the necessary measures to fulfil the standards in force.

(1) Referring mainly to tolerances in power and intensity, leakage currents, dielectric strength, screws and connections, escape lines, distances in the air and distances through the insulation.

The heating elements bearing the attached symbol are considered components of a final appliance which cannot in themselves guarantee protection against electric shock in accessible metallic parts. It is responsability of the constructor of the end appliance to adopt the protection measures and/or earthing devices according to standards in force.

GROUP 0 - Introduction

0.3 - Quality assurance

Electricfor assures in its heating elements manufacturing process the maintenance of the standards of design applied. For our standardised products, the following **systematic** controls are carried out among others

Class I elements

- **Power:** +5% -10%
- **Dielectric strength:** 1250 V - 1 min.
- **Leakage current:** 0,75 mA / kW (max. 5 mA)
- **Dimensions:** General according IT15

Class II elements ⧈

- **Power:** +5% -10%
- **Dielectric strength:** 500 V - 1 min In event of a **basic insulation** in normal use with a **safety extra low voltage**
  1000 V - 1 min for any **basic insulation**
  2750 V - 1 min for a **supplementary insulation**
  3750 V - 1 min for a **reinforced insulation**
- **Leakage current:** 0,25 mA
- **Dimensions:** General according IT15

In products of special manufacture, the control parameters are personalised from the design according to the needs of each case

In compliance with these chapters, the measures required by the norm are carried out under normal functioning temperature. Electricfor carries out measures at the highest temperature admitted by each product. One needs to take into consideration that if a sufficient extraction of heat of the resistance isn't guaranteed, it can exceed the maximum temperature and melt or deteriorate. To make sure that the element, once installed on the final heater, keeps on fulfilling the EC norm you will only need to measure the temperatures of the seal and sheath in all the situations likely to occur, whether during normal use, abnormal functioning or during overheating, and check that it remains within the limits of utilisation of the product detailed below. It is specially advised to study the functioning without a product to heat, for example without ventilation or without being immersed in water, depending on the products. It necessary take the adequate measures in order to avoid the resistance functioning in such conditions and inform the user of the precautions to take.

The object of the **Electricfor constructive thermic classes** is to define a standard construction of heating elements depending on the sheath material, its maximum permissible temperature and the type of seal. These three characteristics, and above all the sheath material, should always be chosen bearing in mind the medium in which the element is to work.

SHEATH MATERIALS

- **AISI 304L**: Austenitic stainless steel. It presents optimum ability for soldering and good resistance to corrosion at room temperature. If it is kept for some time within the critical temperature interval of 450 to 850º, an inter-crystalline precipitation of chrome carbide may occur with the consequential inter-granular corrosion.
- **AISI 321**: A specific amount of titanium is added to the components of the AISI304 with the effect of preventing formation of chrome carbide and, thus, preventing the phenomenon of inter-granular corrosion, making this material particularly suitable for use over prolonged periods of time at critical temperature interval. It has good resistance to formation of cinders up to 800ºC
- **AISI 316L**: It contains an addition of 2÷3% molybden that gives it greater resistance to corrosion by pitting and better performance that the previous steels as far as low tension corrosion is concerned. Carbon content lower than 0.03% that makes it difficult for chrome carbide to form, thus increasing its resistance to inter-granular corrosion.
- **INCOLOY® 800**: Refractory stainless steel with high nickel and chrome content. Good resistance to formation of cinders up to 1,100ºC. It presents high resistance to tension and good resistance to corrosion at high temperatures.
- **INCOLOY® 825**: This is a nickel-iron-chrome alloy with additions of molybden and copper. It offers good resistance to both reducing and rusting acids, to corrosion due to tension, to pitting and to interstitial corrosion.

  ® Brand-name registered by "The International Nickel Co."
- **COPPER (SF-Cu DIN 1787)**: Semi-noble metal and by nature highly resistant to corrosion by water.
- **TITANIUM**: Titanium is a metallic element that presents a compact hexagonal structure, it is hard, refractory and a good conductor of electricity and heat. It presents high resistance to corrosion. Resistance to corrosion that it presents is owing to the phenomenon of passivation that it undergoes (an oxide that coats it if formed)

TYPES OF SEAL

- **Airtight seal**: this seal does not allow moisture to enter the element, maintaining insulation values for more than five years. Sheath and seal temperature should not exceed 300ºC and 150ºC respectively. If the sheath temperature exceeds 300ºC or the seal temperature exceeds 150ºC, insulation values decrease rapidly and leaks appear within a short time.
- **Extra airtight** seal: this seal does not allow the entry of moisture into the element either, maintaining the insulation values for more than ten years. In this case, temperature of the sheath can reach up to 600ºC. If the sheath temperature exceeds 600ºC or the seal temperature exceeds 150ºC/250ºC (according to thermic class), insulation values decrease rapidly and leaks appear within a short time.
- **Transpirable seal**: When an element works at over 600ºC, it consumes oxygen. If the seal does not permit entry of such, the life of the element is reduced by about 100 hours. Thus, a seal has been designed to allow air to enter in sufficient quantities so as to permit correct respiration of the element. However, for proper respiration to occur, you should check that the element is halted for intervals of over 5 minutes, at least 15% of the time, and that it does not work without stopping for over 8 consecutive hours. Stoppages can easily be those originated by mediums of control, such as thermostats, etc. in the usual way in the majority of applications.

  Due to the special conditions of this seal, on allowing the entry of air, it also allows moisture to enter, thus insulation can decrease to values of about 1 MΩ and, at the time of connecting, after a prolonged halt, transitory leaks of current may occur. These leaks may reach up to 5 mA per kilowatt during this period, then drop to values of 0.2 mA per kilowatt until the temperature is established. In order to ensure that the leaks disappear before temperature stabilisation is reached, and thus comply with UNE-EN-60335 standards, it must be ensured that the seal temperature is at least 110ºC.

LIMITS OF USE OF THE HEATING ELEMENTS

Electricfor's constructive thermic class	Tube's protection		Seal		Seal temperature (base)			
					Minimum temperature		Maximum temperature	
	Maximum temperature	Tube material	Type	Designation	Off	On	Under regular use	Under peak
T-175-E	175 °C	Cobre	E	AIRTIGHT	-40 °C	--	150 °C	170 °C
T-270-E	270 °C	AISI 304L or 321 covered by a tube of Teflón®	E	AIRTIGHT	-40 °C	--	150 °C	170 °C
T-300-E	300 °C	AISI 304L or 321	E	AIRTIGHT	-40 °C	--	150 °C	170 °C
T-301-E	300 °C	AISI 316L	E	AIRTIGHT	-40 °C		150 °C	170 °C
T-440-E	440 °C	Titanium	E	AIRTIGHT	-40 °C	--	150 °C	170 °C
T-450-E	500 °C	Steel	E	AIRTIGHT	-40 °C	--	150 °C	170 °C
T-600-S	600 °C	AISI 304L or 321	S	EXTRA AIRTIGHT	-40 °C	--	150 °C	170 °C
T-601-S	600 °C	AISI 316L	S	EXTRA AIRTIGHT	-40 °C	--	150 °C	170 °C
T-602-S	600 °C	Incoloy® 800 or 825	S	EXTRA AIRTIGHT	-40 °C	--	150 °C	170 °C
T-600-H	600 °C	AISI 304L or 321	H	EXTRA AIRTIGHT	-40 °C	--	250 °C	280 °C
T-601-H	600 °C	AISI 316L	H	EXTRA AIRTIGHT	-40 °C	--	250 °C	280 °C
T-602-H	600 °C	Incoloy® 800 or 825	H	EXTRA AIRTIGHT	-40 °C	--	250 °C	280 °C
T-700-T	700 °C	AISI 304L or 321	T	POROUS	-40 °C	(*) 110 °C	200 °C	250 °C
T-750-T	750 °C	AISI 304L or 321	T	POROUS	-40 °C	(*) 110 °C	200 °C	250 °C
T-850-T	850 °C	Incoloy® 800	T	POROUS	-40 °C	(*) 110 °C	200 °C	250 °C
T-750-C	750 °C	AISI 304L or 321	C	POROUS	-40 °C	(*) 110 °C	(**) 750 °C	(**) 750 °C
T-850-C	850 °C	Incoloy® 800	C	POROUS	-40 °C	(*) 110 °C	(**) 850 °C	(**) 850 ° C

The temperature of the tube protection is measured by a thermopar of thin wire fin and little weight sealed to the heating zone of the resistance.

(*) In porous seals, leaks may reach 5 mA per kilowatt during heating, however they remain within the limits of the values imposed by the norm when the regular working temperature is reached and as long as the temperature of the seal reaches a minimum of 110 ºC. For this reason we recommend that you do not opt for such a seal unless absolutely necessary due to the temperature that the seal or the tube will have to reach.

(**) The maximum temperature of the sealing coincides with the maximum temperature permitted in the tube sheath. Whatever, when installing, other temperature limitations should be kept in mind, such as the maximum temperature in the supply conductors, terminal pins, flanges, etc.

While designing the heater in which the resistors will be included, it has to be taken into account that the temperature reached by the resistors should not dangerously affect the other parts of the heater.

In order to ensure a reasonable life expectancy, you should check the capacity of the protecting material in resisting corrosion in the real conditions created by the machine in operation. We remind you that even stainless steel in drinking water may show signs of corrosion. For more information, see our technical sheet NTT-4101, or contact our Technical-Commercial department.

Your design team partner

The experience of 75 years of manufacturing heating elements has taught us that some systems don't work because the elements don't contribute enough heat, there is bad regulation or none at all, the materials used aren't the most appropriate ones, with the consequent risk of defects in the elements, etc. On the other hand, we find systems that are overly large and the consequences of such: more energy consumption than required, systems that are too inertial, etc. All of these factors lead to increased costs in your production system and even to halts in manufacturing.

At Electricfor S.A., we know that communication between customer and manufacturer is fundamental for satisfying needs as far as functioning, quality and price are concerned. Therefore, our team of Sales Technicians, together with the client, takes stock of the situation and decides how to approach it and solve the "problem". At the same time, the sales technicians work side by side with the Technical Office and the R+D department, improving the final product to the maximum.

We know that the Universal Solution doesn't always exist, but for Electricfor, customer service is first, that's why our Technical Office has great flexibility with the mass produced products, and if we cannot adapt ourselves to what has been requested, our R+D department will create and design the product that best meets your requirements.

Continuous market research and development of new products and processes (know-how) ensures that our team will always be up-to-date in new technologies in order to be able to transmit them and incorporate them into the products we offer you.

PRODUCTION SCHEDULE FOR SHIELDED TUBULAR ELEMENTS

	Tube material	Standardised options of tube diameter. Round or square tube												
		Ø6,4	Ø8	Ø8,5	Ø9,60 (*)	Ø10 (*)	Ø10,92	Ø12	Ø12,5	Ø16	Class II Ø16	⧄6,1	⧄7,6	⧄ 9,65
Maximum tube length in mm	AISI 321	3800	6800	6800	6900	6900	6600	---	6900	6200	1450	3600	6100	3600
	AISI 304L													
	AISI 304	3800	6800	---	---	6900	---	---	---	6200	---	---	---	---
	AISI 316L	3800	6800	6800	6900	6900	---	---	6900	6200	1450	3600	6000	---
	Incoloy® 800	3800	7000		6900	6900	6600	---	6900	---	---	3600	6000	---
	Incoloy® 825	---	6800	---	6900	6900	---	---	---	---	---	---	---	---
	AISI 309S	3500	6800	---	6900	6900	---	---	---	6200	---	3600	---	---
	Steel	3500	7000	---	7100	7100	---	---	---	6400	---	3700	---	---
	Copper	3900	7100	7100	5900	5900	---	---	---	6400	---	3600	6000	---
	Titanium	---	6900	---	---	6850	---	---	6900	6900	---	---	---	---
	Aluminium	---	500	---	---	500	---	---	---	---	---	---	---	--
	Teflon®	---	---	---	---	---	---	6900	---	---	---	---	---	---

(*) Also in monotube up to max. length 1300 mm. See more information on page n[er] 109

Heating elements UL Listed for U.S. and Canada

Electricfor can supply heating elements on demand with UL certification (Underwriters Laboratories) for U.S. and Canada and delivered with trademark c UL us

The heating elements in this catalog incorporates the symbol c UL us can be manufactured with UL certification, file E336613. Please consult us to discuss your needs within the scope of our certification in heating elements.

Class II monotube heating elements. General technical characteristics

Los elementos calefactores monotubo de Clase II están destinados principalmente para uso en aparatos domésticos que requieren de una protección contra los choques eléctricos superior a los aparatos de uso industrial.

- Tube diameter: Ø16 mm
- Tube material: AISI 304 - AISI 321 - AISI 316L - Iy-800 - Iy-825
- Until max. length 1590 mm.
- Optionally, TIG welded connector of 1/2" - 1" - 1"1/4 in stainless steel or nickeled steel.
- Optionally with thermal fuse

STANDARDISED PRODUCTS

Electricfor is aware of market demands. In our constant search for total customer satisfaction, is very important to minimize the delivery time of our products. That's why we have decided to daily expand our range of articles, standardise them and stock them, so that in a high percentage of cases we can offer immediate and real solutions from our commercial engineering department.

SPECIAL MANUFACTURES

One of our specialities is to manufacture any kind of heating elements. We can do it from a plan or a sample, or also design a new one answering concrete needs. In these cases our delivery dates are:

(Optional)

Usual applications

- Steam boilers
- Water baths
- Warming of diesel fuel
- Water heaters
- Oil chambers
- Distillation
- Cleaning
- Dyeing
- Liquid convection heating radiators
- Towel dryers
- Degreasing
- Endothermal or exothermal reactions requiring it
- Heating by circulation of liquids
- Fish farms
- Boiling vats
- Cooking vats
- Chemical industries
- Electromedicine...

General characteristics

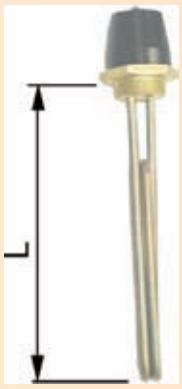
- Tubular element of nickel-plated copper or stainless steel AISI 321 of Ø8 mm
- BSP threaded plug of stamped brass
- Polyester with fiber glass or bichromed zinc-plated steel protection hood, with degree protection against moisture IP-40.
- Optionally, all the models with BSP thread of 1 1/2", 2" and 2 1/2" can be supplied with aluminum connection box IP-66.
- Welded with silver alloy for stainless steel tube and with copper alloy for copper tube.
- Standard voltage ~230 V
- By request, special heating elements can be made according to your specifications:
  - Material tube: AISI 316L, Incoloy®-800, Incoloy®-825 and Titanium
  - Stainless steel or titanium BSP threaded plugs.

U-SHAPED HEATING ELEMENT WITH BRASS COUPLING PLUG

Code	L in mm	BSP Threaded plug	Watts	W/cm²	Tube material	Peso en Kg	Electricfor's construct. thermic class	Box connection range	
								IP-40 (1)	IP-66 (2)
NA001	170	3/4"	500	8,3	SS	0,21	T-300-E	C-FE-3/4"	---
NA001C	170	3/4"	500	8,3	Cu	0,21	T-175-E	C-FE-3/4"	---
NA002	180	1 1/4"	500	8,3	SS	0,28	T-300-E	C-MENZ	Range P3
NA002C	180	1 1/4"	500	8,3	Cu	0,28	T-175-E	C-MENZ	Range P3
NA101	180	1"	500	8,3	SS	0,21	T-300-E	C-MENZ	---
NA101C	180	1"	500	8,3	Cu	0,21	T-175-E	C-MENZ	---
NA003	250	3/4"	750	7,5	SS	0,24	T-300-E	C-FE-3/4"	---
NA003C	250	3/4"	750	7,5	Cu	0,24	T-175-E	C-FE-3/4"	---
NA004	260	1 1/4"	750	7,5	SS	0,32	T-300-E	C-MENZ	Range P3
NA004C	260	1 1/4"	750	7,5	Cu	0,32	T-175-E	C-MENZ	Range P3
NA103	260	1"	750	7,5	SS	0,25	T-300-E	C-MENZ	---
NA103C	260	1"	750	7,5	Cu	0,25	T-175-E	C-MENZ	---
NA104C	260	1 1/2"	750	7,5	Cu	0,30	T-175-E	C-MENZ	
NA005	340	3/4"	1000	7	SS	0,28	T-300-E	C-FE-3/4"	---
NA005C	340	3/4"	1000	7	Cu	0,28	T-175-E	C-FE-3/4"	---
NA006	350	1 1/4"	1000	7	SS	0,35	T-300-E	C-MENZ	Range P3
NA006C	350	1 1/4"	1000	7	Cu	0,35	T-175-E	C-MENZ	Range P3
NA105	350	1"	1000	7	SS	0,29	T-300-E	C-MENZ	---
NA105C	350	1"	1000	7	Cu	0,29	T-175-E	C-MENZ	---
NA008	520	1 1/4"	1500	6,6	SS	0,44	T-300-E	C-MENZ	Range P3
NA008C	520	1 1/4"	1500	6,6	Cu	0,44	T-175-E	C-MENZ	Range P3
NA108	520	1"	1500	6,6	SS	0,36	T-300-E	C-MENZ	---
NA108C	520	1"	1500	6,6	Cu	0,36	T-175-E	C-MENZ	---
NA010	680	1 1/4"	2000	6,5	SS	0,50	T-300-E	C-MENZ	Range P3
NA010C	680	1 1/4"	2000	6,5	Cu	0,50	T-175-E	C-MENZ	Range P3

DOUBLE LOOP U-SHAPED HEATING ELEMENT WITH BRASS COUPLING PLUG

Code	L in mm	BSP Threaded plug	Watts	W/cm²	Tube material	Weight in Kg	Electricfor's construct. thermic class	Box connection range	
								IP-40 (1)	IP-66 (2)
OV001	140	1 1/4"	600	7,1	SS	0,29	T-300-E	C-MENZ	Range P3
OV003	170	1 1/4"	800	7	SS	0,33	T-300-E	C-MENZ	Range P3
OV003C	170	1 1/4"	800	7	Cu	0,33	T-175-E	C-MENZ	Range P3
OV105	235	1 1/4"	400	2,2	SS	0,37	T-300-E	C-MENZ	Range P3
OV005	235	1 1/4"	1200	6,7	SS	0,42	T-300-E	C-MENZ	Range P3
OV005C	235	1 1/4"	1200	6,7	Cu	0,42	T-175-E	C-MENZ	Range P3
OV107	345	1 1/4"	900	3,1	SS	0,51	T-300-E	C-MENZ	Range P3
OV007	345	1 1/4"	1800	6,3	SS	0,51	T-300-E	C-MENZ	Range P3
OV007C	345	1 1/4"	1800	6,3	Cu	0,51	T-175-E	C-MENZ	Range P3
OV009	445	1 1/4"	2400	6,2	SS	0,56	T-300-E	C-MENZ	Range P3
OV009C	445	1 1/4"	2400	6,2	Cu	0,56	T-175-E	C-MENZ	Range P3
OV111	505	1 1/4"	1000	2,2	SS	0,61	T-300-E	C-MENZ	Range P3
OV211	505	1 1/4"	1500	3,4	SS	0,61	T-300-E	C-MENZ	Range P3
OV011	505	1 1/4"	3000	6,7	SS	0,61	T-300-E	C-MENZ	Range P3
OV011C	505	1 1/4"	3000	6,7	Cu	0,61	T-175-E	C-MENZ	Range P3



TRIPLE LOOP U-SHAPED HEATING ELEMENT WITH BRASS COUPLING PLUG

Code	L in mm	BSP Threaded plug	Watts	W/cm²	Tube material	Weight in Kg	Electricfor's constructive thermic class	Box connection range	
								IP-40 (1)	IP-66 (2)
T001	150	1 1/4"	750	5	Inox	0,36	T-300-E	C-MENZ	Range P3
T003	200	1 1/4"	1000	4,4	Inox	0,24	T-300-E	C-MENZ	Range P3
T005	250	1 1/4"	1500	5,7	Inox	0,49	T-300-E	C-MENZ	Range P3
T007	350	1 1/4"	2000	4,5	Inox	0,62	T-300-E	C-MENZ	Range P3
T108	250	2"	2000	4,9	Inox	0,86	T-300-E	C-FE-2"	---
T009	450	1 1/4"	2500	4,2	Inox	0,74	T-300-E	C-MENZ	Range P3
T011	550	1 1/4"	3000	4	Inox	0,88	T-300-E	C-MENZ	Range P3

Note 1: Standard junction box. It is always given with the heater.
Note 2: Aluminum junction box. Optional. Delivered on request (see page # 5)
Note 3: In the elements with 3/4" BSP coupling plug, the protection hood is optional and is not included in price. **Code** 108006001
Note 4: If you require weldable flanges, nuts and threaded adapters for all these elements, see page #' 6

GROUP 1 - Immersion heaters, drum heaters and accessories

1.1 - With coupling plug

General characteristics

- Tubular element of nickel-plated copper or stainless steel AISI 321 of Ø8 mm
- BSP threaded plug of stamped brass
- Polyester with fiber glass or bichromed zinc-plated steel protection hood, with degree protection against moisture IP-40.
- Optionally, all the models with BSP thread of 1 1/2", 2" and 2 1/2" can be supplied with aluminum connection box IP-66.
- Welded with silver alloy for stainless steel tube and with copper alloy for copper tube.
- Standard voltage 3~230 V Δ, 3~400 V Y
- By request, special heating elements can be made according to your specifications:
  - Material tube: AISI 316L, Incoloy®-800, Incoloy®-825 and Titanium
  - Stainless steel or titanium BSP threaded plugs.

C US (Optional)

TRIPLE U-SHAPED HEATING ELEMENT WITH BRASS COUPLING PLUG

Code	L in mm	BSP Threaded plug	Watts	W/cm²	Tube material	Weight in Kg	Electricfor's construct. thermic class	Connection box range	
								IP40 (1)	IP66 (2)
DP001	180	2"	1500	8,3	Inox	0,76	T-300-E	C-FE-2"	Range M1
DP001C	180	2"	1500	8,3	Cu	0,76	T-175-E	C-FE-2"	Range M1
DP003	260	2"	2250	7,5	Inox	0,87	T-300-E	C-FE-2"	Range M1
DP003C	260	2"	2250	7,5	Cu	0,87	T-175-E	C-FE-2"	Range M1
DP005	350	2"	3000	7	Inox	1,0	T-300-E	C-FE-2"	Range M1
DP005C	350	2"	3000	7	Cu	1,0	T-175-E	C-FE-2"	Range M1
DP007	520	2"	4500	6,6	Inox	1,2	T-300-E	C-FE-2"	Range M1
DP007C	520	2"	4500	6,6	Cu	1,2	T-175-E	C-FE-2"	Range M1
DP009	680	2"	6000	6,4	Inox	1,4	T-300-E	C-FE-2"	Range M1
DP009C	680	2"	6000	6,4	Cu	1,4	T-175-E	C-FE-2"	Range M1
DP010	680	2 1/2"	6000	6,4	Inox	1,6	T-300-E	C-FE-2"1/2	Range G1
DP025	180	1 1/2"	1500	8,3	Inox	0,53	T-300-E	C-MENZ	Range P1
DP025C	180	1 1/2"	1500	8,3	Cu	0,53	T-175-E	C-MENZ	Range P1
DP030C	180	1 1/2"	2000	9,5	Cu	0,53	T-175-E	C-MENZ	Range P1
DP026C	260	1 1/2"	2250	7,5	Cu	0,63	T-175-E	C-MENZ	Range P1
DP027C	350	1 1/2"	3000	7	Cu	0,79	T-175-E	C-MENZ	Range P1
DP031C	290	1 1/2"	3000	8,4	Cu	0,71	T-175-E	C-MENZ	Range P1
DP028C	520	1 1/2"	4500	6,6	Cu	1,0	T-175-E	C-MENZ	Range P1
DP029C	680	1 1/2"	6000	6,4	Cu	1,2	T-175-E	C-MENZ	Range P1
DP032C	315	1 1/2"	6000	14,5	Cu	0,74	T-175-E	C-MENZ	Range P1
DP021	415	1 1/2"	1200	2,2	Inox	0,84	T-300-E	C-MENZ	Range P1
DP022	635	1 1/2"	2700	3,1	Inox	1,1	T-300-E	C-MENZ	Range P1
DP023	956	1 1/2"	3000	2,2	Inox	1,5	T-300-E	C-MENZ	Range P1
DP024	956	1 1/2"	4500	3,4	Inox	1,5	T-300-E	C-MENZ	Range P1

DOUBLE LOOP TRIPLE U-SHAPED HEATING ELEMENT WITH BRASS COUPLING PLUG

Code	L in mm	BSP Threaded plug	Watts	W/cm²	Tube material	Weight in Kg	Electricfor's construct. thermic class	Connection box range	
								IP40 (1)	IP66 (2)
ED001	140	2"	1800	7,1	SS	0,84	T-300-E	C-FE-2"	Range M1
ED002C	140	2 1/2"	1800	7,1	Cu	1,2	T-175-E	C-FE-2"1/2	Range G1
ED003	170	2"	2400	7	SS	0,92	T-300-E	C-FE-2"	Range M1
ED003C	170	2"	2400	7	Cu	0,92	T-175-E	C-FE-2"	Range M1
ED105	235	2"	1200	2,2	SS	1,1	T-300-E	C-FE-2"	Range M1
ED005	235	2"	3600	6,7	SS	1,1	T-300-E	C-FE-2"	Range M1
ED005C	235	2"	3600	6,7	Cu	1,1	T-175-E	C-FE-2"	Range M1
ED107	345	2"	2700	3,1	SS	1,4	T-300-E	C-FE-2"	Range M1
ED007	345	2"	5400	6,3	SS	1,4	T-300-E	C-FE-2"	Range M1
ED007C	345	2"	5400	6,3	Cu	1,4	T-175-E	C-FE-2"	Range M1
ED008	345	2 1/2"	5400	6,3	SS	1,6	T-300-E	C-FE-2"1/2	Range G1
ED008C	345	2 1/2"	5400	6,3	Cu	1,6	T-175-E	C-FE-2"1/2	Range G1
ED009	445	2"	7200	6,2	SS	1,6	T-300-E	C-FE-2"	Range M1
ED009C	445	2"	7200	6,2	Cu	1,6	T-175-E	C-FE-2"	Range M1
ED109	445	2 1/2"	7200	6,2	SS	1,8	T-300-E	C-FE-2"1/2	Range G1
ED110	505	2"	3000	2,2	SS	1,8	T-300-E	C-FE-2"	Range M1
ED111	505	2 1/2"	3000	2,2	SS	1,9	T-300-E	C-FE-2"1/2	Range G1
ED210	505	2"	4500	3,4	SS	1,8	T-300-E	C-FE-2"	Range M1
ED211	505	2 1/2"	4500	3,4	SS	1,9	T-300-E	C-FE-2"1/2	Range G1
ED010	505	2"	9000	6,7	SS	1,8	T-300-E	C-FE-2"	Range M1
ED010C	505	2"	9000	6,7	Cu	1,8	T-175-E	C-FE-2"	Range M1
ED011	505	2 1/2"	9000	6,7	SS	1,9	T-300-E	C-FE-2"1/2	Range G1
ED011C	505	2 1/2"	9000	6,7	Cu	1,9	T-175-E	C-FE-2"1/2	Range G1
ED012C	680	2"	12000	6,6	Cu	2,3	T-175-E	C-FE-2"	Range M2
ED013C	680	2 1/2"	12000	6,6	Cu	2,5	T-175-E	C-FE-2"1/2	Range G1
ED014C	835	2"	15000	6,6	Cu	2,9	T-175-E	C-FE-2"	Range M2

Note 1: Standard connection box. It is always given with the element.
Note 2: Aluminum connection box. Optional. Delivered on request (see page # 5)

Note: If you require weldable flanges, nuts and threaded adapters for all these elements, see the catalogue page # 6

GROUP 1 - Immersion heaters, drums heaters and accessories

1.1 - With coupling plug

ET

Models as per catalogue: 733

General characteristics

- Tubular element of nickel-plated copper of Ø8 mm
- BSP threaded plug of stamped brass
- Polyester with fiber glass or bichromed zinc-plated steel protection hood, with degree protection against moisture IP-40.
- Optionally, all the models with BSP thread of 1 1/2", 2" and 2 1/2" can be supplied with aluminum connection box IP-66.
- Welded with silver alloy for stainless steel tube and with copper alloy for copper tube.
- Standard voltage 3~230 V Δ, 3~400 V ⅄
- By request, special heating elements can be made according to your specifications:
  - Material tube: AISI 316L, Incoloy®-800, Incoloy®-825 and Titanium
  - Stainless steel or titanium BSP threaded plugs.

TRIPLE LOOP TRIPLE U-SHAPED HEATING ELEMENT WITH BRASS COUPLING PLUG

Code	L in mm	BSP Threaded plug	Watts	W/cm²	Tube material	Weight in Kg	Electricfor's construct. thermic class	Connection box range	
								IP40 (1)	IP66 (2)
ET401C	355	2 1/2"	9000	6,7	Cu	2,1	T-175-E	C-FE-2"1/2	Range G1
ET402C	465	2 1/2"	12000	6,6	Cu	2,6	T-175-E	C-FE-2"1/2	Range G1
ET403C	570	2 1/2"	15000	6,6	Cu	3,0	T-175-E	C-FE-2"1/2	Range G2
ET404C	680	2 1/2"	18000	6,5	Cu	3,6	T-175-E	C-FE-2"1/2	Range G2

Note 1: Standard connection box. It is always given with the element.
Note 2: Aluminum connection box. Optional. Delivered on request (see page # 5)

Note: If you require weldable flanges, nuts and threaded adapters for all these elements, see the catalogue page nᵉʳ 6

GROUP 1 - Immersion heaters, drums heaters and accessories

1.2 - Titanium heaters with coupling plug

TIM

TITANIUM HEATERS WITH COUPLING PLUG, TIM RANGE

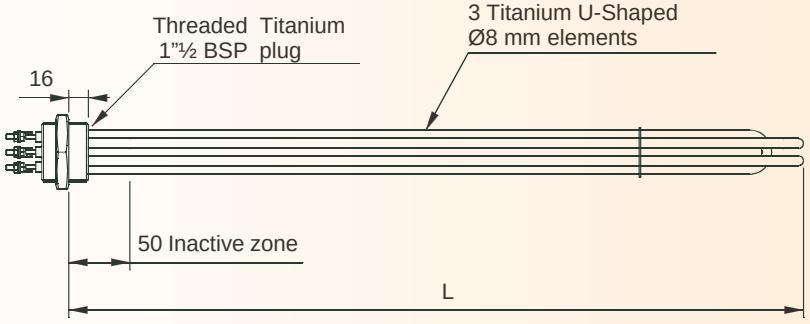
The titanium tube and screw-cap TIM electrical resistors range is used to heat all kinds of water, of whatever source and treatment (e.g. seawater, chlorine treatment, bromine, ozone, electrophysical, electrochemical, and chlorine-free products).

General Characteristics

- Ø8 mm tubular elements in titanium
- Electrocasted and roll-compressed magnesium-oxide insulated resistor.
- 1" 1/2-thread Gas titanium screw heads
- Aluminium terminal box with damp protection grade IP-66
- With titanium casing of Ø9.5 x 0.5 mm for temperature sensors.
- Welds with titanium filler metal
- Standard voltage 3~230 V Δ, 3~400 V
- On request, resistors can be fabricated to order according to your specifications:

Standardised models

Code	L in mm	BSP Threaded plug	Watts	W/cm²	Tube material	Weight in Kg	Electricfor's constructive thermic class	Connection box range		Thermostat range
								WITHOUT thermostat	WITH thermostat	
TIM005	255	1" 1/2	3000	9,7	Titanium Ø8	0,6	T-440-E	Range D	Range P2	EG
TIM010	255	1" 1/2	4500	14,5	Titanium Ø8	0,6	T-440-E	Range D	Range P2	EG
TIM015	255	1" 1/2	6000	19,4	Titanium Ø8	0,6	T-440-E	Range D	Range P2	EG



GROUP 1 - Immersion heaters, drum heaters and accessories

1.3 - With coupling plug. Europa range

General characteristics

- Tubular element of nickel-plated copper, stainless steel AISI 321, stainless steel AISI 316l or steel
- Threaded plug of stamped brass or stainless steel AISI 304
- All the models are provided with sheath for thermostat of the same material as the tube, with the exception of models CR77CIA.
- Adjustable aluminium connection box, with degree protection against moisture IP-66 according to IEC-60529. Supplied with plastic pouch containing all connection, interlock and sealing accessories

(*) Note: If you require heating elements with threaded Gas plug, change the corresponding code
45 for **112**
77 for **212**

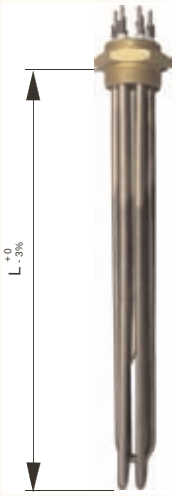
Example: Threaded brass 1" 1/2 Gas plug with 3 nickeled copper U-Shaped elements of Ø 8 mm, 2000 W
Code: CR112CN0020

Attention: aluminium connection box and thermostat of bulb not included in price. See page # 5

Note: If you require weldable flanges, nuts and threaded adapters for all these elements, see page # 7

THREADED BRASS M45x2 or 1''1/2 BSP PLUG
WITH 1 or 3 U-SHAPED Ø8 ELEMENTS, WITH SHEATH FOR THERMOSTAT

Code (*)			L in mm	Nº elements	Watts	W/cm²	Weight in Kg	Electricfor's constructive thermic class	Connection box range	
									WITHOUT thermostat	WITH thermostat
Tube material	Nickeled copper	CR112CN0020	205	3	2000	10,3	0,60	T-175-E	Range D	Range P2
		CR112CN0030	285	3	3000	9,6	0,68	T-175-E	Range D	Range P2
		CR112CN0040	360	3	4000	9,5	0,80	T-175-E	Range D	Range P2
		CR112CN0060	520	3	6000	9,1	1,0	T-175-E	Range D	Range P2
	Stainless steel 316-L	CR112CI0010	160	3	1000	8,3	0,24	T-301-E	Range D	Range P2
		CR112CI0020	270	3	2000	7	0,48	T-301-E	Range D	Range P2
		CR112CI0030	380	3	3000	6,7	0,60	T-301-E	Range D	Range P2
		CR112CI0050	600	3	5000	6,5	0,89	T-301-E	Range D	Range P2
		CR112CI0065	770	3	6500	6,4	1,1	T-301-E	Range D	Range P2

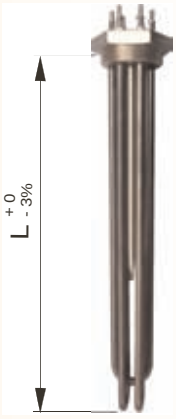


THREADED BRASS M77x2 or 2''1/2 BSP PLUG
WITH 3 NICKELED COPPER U-SHAPED Ø16 ELEMENTS, WITH SHEATH FOR THERMOSTAT

Code (*)	L in mm	Watts	W/cm²	Weight in Kg	Electricfor's constructive thermic class	Connection box range		The r
						WITHOUT thermostat	WITH thermostat	
CR212CN0040	230	4000	8,7	1,8	T-175-E	Range G1	Range G1	
CR212CN0060	310	6000	8,6	2,1	T-175-E	Range G1	Range G1	
CR212CN0080	390	8000	8,6	2,6	T-175-E	Range G1	Range G1	
CR212CN0100	470	10000	8,7	3,0	T-175-E	Range G1	Range G1	
CR212CN0150	700	15000	8,1	4,2	T-175-E	Range G1	Range G3	CA
CR212CN0200	900	20000	8,2	5,2	T-175-E	Range G2	Range G3	CA
CR212CN0240	1070	24000	8,1	6,0	T-175-E	Range G2	Range G3	CA
CR212CN0350	1500	35000	8,5	8,7	T-175-E	Range G2	Range G3	CA

THREADED STAINLESS STEEL 304 M77x2 or 2''1/2 BSP PLUG
WITH 3 STAINLESS STEEL 316L U-SHAPED Ø10 ELEMENTS, WITH SHEATH FOR THERMOSTAT

Code (*)	L in mm	Watts	W/cm²	Weight in Kg	Electricfor's constructive thermic class	Connection box range		The r
						WITHOUT thermostat	WITH thermostat	
CR212II0030	315	3000	6,6	1,1	T-301-E	Range G1	Range G1	
CR212II0045	445	4500	6,5	1,3	T-301-E	Range G1	Range G1	
CR212II0060	589	6000	6,2	1,5	T-301-E	Range G1	Range G1	
CR212II0090	845	9000	6,3	2,1	T-301-E	Range G1	Range G1	
CR212II0120	1110	12000	6,4	2,9	T-301-E	Range G1	Range G3	CA



THREADED BRASS M77x2 or 2''1/2 BSP PLUG
WITH 3 STEEL U-SHAPED Ø16 ELEMENTS, WITH SHEATH FOR THERMOSTAT

Code (*)	L in mm	Watts	W/cm²	Weight in Kg	Electricfor's constructive thermic class	Connection box range	Thermostat range
CR77CHA0060	980	6000	2,2	2,7	T-450-E	Range G1	EG

Standard voltage:
1 Resistor: ~230 V
3 Resistors: 3~230 V Δ 3~400 V ⅄

GROUP 1 - Heating elements for immersion, accessories and tank heaters

1.3 - With Europa Range connection plug

EUROPA RANGE

Models according to catalogue: 733

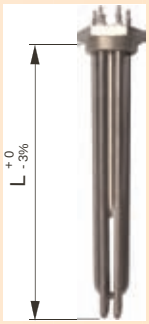
General characteristics

- AISI 321 stainless steel tubular elements
- Stamped brass threaded heads
- Aluminium, adjustable-angle, connection box with IP-66 protection according to standard EN-60529. Supplied with all connection accessories, screws and thermostat connection.

Attention: Aluminium connection box and bulb thermostat are ordered separately. See page nº. 5

Note: If you need them we have solderable flanges, nuts and adaptors for these heating elements on page nº. 7 of the catalogue.

(Optional)



Code	L in mm	Watts	W/cm²	Weight in Kg	Electricfor's constructive thermic class	Connection box range		Thermostat range
						WITHOUT thermostat	WITH thermostat	
CR212AC0010	290	1250	2,5	1,1	T-300-E	G1 Range	G1 Range	EG
CR212AC0022	450	2250	2,5	1,5	T-300-E	G1 Range	G1 Range	EG
CR212AC0030	565	3000	2,6	1,7	T-300-E	G1 Range	G1 Range	EG
CR212AC0045	840	4500	2,5	2,3	T-300-E	G1 Range	G1 Range	EG
CR212AC0060	1100	6000	2,5	3,2	T-300-E	G1 Range	G1 Range	EG
CR212AC0090	1500	9000	2,7	4,7	T-300-E	G1 Range	G1 Range	EG

BRASS PLUG M77X2 THREAD OR 2"1/2 GAS THREAD
WITH 3 "DL-HAIRPIN" Ø8 mm AISI321 HEATING ELEMENTS (WITHOUT THERMOSTAT SHEATH)

Code (*)	L in mm	Watts	W/cm²	Weight in kg	Electricfor's constructive thermic class	Connection box range
CR212CIA2012	235	1200	2,2	0,75	T-300-E	G1 Range
CR77CIA2030	505	3000	2,2	1,90	T-300-E	G1 Range

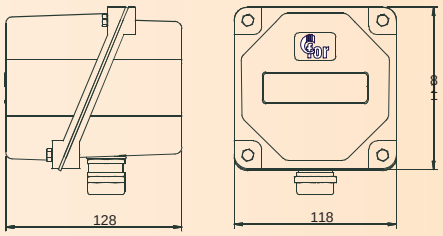
GROUP 1 - Heating elements for immersion, accessories and tank heaters

1.4 - Accessories: Connection box

ALUMINIUM CONNECTION BOXES

P-M-G- RANGES
VALID FOR ALL DP – ED - ET - TIM and EUROPA HEATING ELEMENT RANGES.

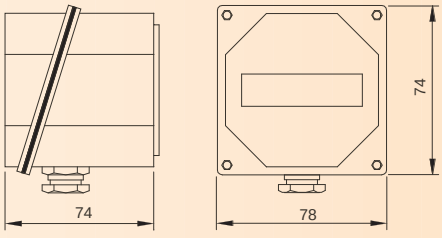
- Aluminium, adjustable-angle, connection box with IP-66 protection according to standard EN-60529.
- Supplied with all connection accessories, screws and thermostat connection.
- Black oven-painted finish resistant to temperatures up to 220ºC.
- The entire kit includes joints, screws, nuts, metal M25 or M32 stuffing box for power entry, metal M12 stuffing box for single-phase thermostat supply; and tightening discs needed for ensuring IP-66 level of protection against damp.



Connection box range	Code	Characteristics	Ready for:			Weight in Kg
			WITHOUT thermostat	Monophase thermostat	Triphase thermostat	
P1 Range	128088005	• For M45 and 1"1/2 • Maximum power: 10 KW • M25 Packing gland	X	---	---	0,95
P2 Range	128088006	• For M45 and 1"1/2 • Maximum power: 10 KW • M25 Packing gland	---	X (Ranges CA / CT) Only until 3,6 KW	X (Range EG)	0,95
M1 Range	128088007	• For 2" • Maximum power: 10 KW • M25 Packing gland	---	---	X (Range EG)	0,95
M2 Range	128088008	• For 2" • Power: 15 KW a 35 KW • M32 Packing gland	X	---	---	0,95
M3 Range	128088009	• For 2" • Power: 10 KW a 35 KW • M32 + M12 Packing gland	---	X (Ranges CA / CT)	---	1,0
G1 Range	128088010	• For M77 and 2"1/2 • Potencia máxima: 10 KW • M25 Packing gland	X	---	X (Range EG)	0,95
G2 Range	128088011	• For M77 and 2"1/2 • Potencia: 15 KW a 35 KW • M32 Packing gland	X	---	---	1,0

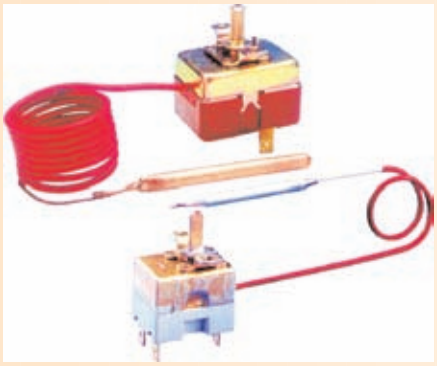
P, D RANGE and
VALID FOR NA – OV - T – TIM AND CR45 EUROPA MODELS.
NOT SUITABLE FOR INCORPORATING BULB THERMOSTAT

- Aluminium, adjustable-angle, connection box with IP-66 protection according to standard EN-60529.
- Supplied with all connection accessories and screws
- The entire kit includes joints, screws, nuts, metal M20 stuffing box for power entry, and tightening discs needed for ensuring IP-66 level of protection against damp.



Connection box range	Code	Characteristics	Weight in Kg
Gama P	108050999	• For M45 and 1"1/2 • M20 Packing gland	0,35
Gama D	108050997	• For M45 and 1"1/2 • M20 Packing gland	0,35
Gama P3	128088013	• For 1"1/4 • M20 Packing gland	0,35

Single-pole bulb and capillary thermostats



Bulb and capillary thermostats to include in the Europa Range

Single-pole snap action thermostats. 3 to 5 ºC differential depending on temperate scales. Bulb and capillaries in copper up to 160ºC, and in stainless steel for over 160ºC. Connection to 6.3 mm fastons.

The thermostat units for each of the temperatures comprise the standard thermostat with its respective buttons, cover and connection screws.

Code	Thermostat range	Range	Characteristics	Max current (~240 V)	Weight in Kg
3509310324	CA	0 / 40 °C	Bulb in copper Ø6,5x142 mm Capillary 1m. 3 Faston	16 A	0,11
3509310320	CA	0 / 90 °C	Bulb in copper Ø6,5x66 mm Capillary 1m. 3 Faston	16 A	0,11
3509310321	CA	0 / 120 °C	Bulb in copper Ø6,5x66 mm Capillary 1m. 3 Faston	16 A	0,11
3509310322	CA	0 / 200 °C	Bulb in S. Steel Ø5x98 mm Capillary 1m. 3 Faston	16 A	0,11
3509310323	CA	0 / 320 °C	Bulb in S. Steel Ø3x195 mm Capillary 1m. 3 Faston	16 A	0,11
517350000	CT1	0 / 90 °C	Bulb in copper Ø6x99 mm Capillary 1m. 2 Faston	20 A	0,06
517355000	Button + Face plate 0 / 90 °C				0,01
517352000	CT2	30 / 160 °C	Bulb in copper Ø6x88 mm Capillary 1m. 2 Faston	20 A	0,06
517357000	Button + Face plate 30 / 160 °C				0,01
517377000	TE	120 °C	Manual reset thermostat. Capillary 1m. Bulb in S.Steel Ø6x72 With M9x1 gland	16 A	0,12

NON-pluggable cane thermostats

Bulb and capillary thermostats to include in the Europa Range

Three-pole snap action thermostats. 2 to 13ºC differential depending on temperate scales. Bulb and capillaries in stainless steel. Connection to 6.3mm fastons.

Code	Thermostat range	Range	Characteristics	MAximum intensity (~240 V)	Weight in Kg
517370000	EG	1 / 40 °C	Bulb in copper Ø6x215 mm Capilary 880 mm	16 A	0,19
517370001	Botón escala 0 / 40 °C				0,02
517371000	EG	28 / 85 °C	Bulb in copper Ø6x129 mm Capilary 880 mm	16 A	0,19
517371001	Botón escala 30 / 85 °C				0,02
517372000	EG	36 / 125 °C	Bulb in copper Ø6x138 mm Capilary 880 mm	16 A	0,19
517372001	Botón escala 30 / 120 °C				0,02
517373000	EG	60 / 200 °C	Bulb in S. Steel Ø6x142 mm Capilary 880 mm	16 A	0,19
517373001	Button scale 60 / 200 °C				0,02
517374000	EG	50 / 300 °C	Bulb in S. Steel Ø6x77 mm Capilary 880 mm	16 A	0,19
517374001	Button scale 50 / 300 °C				0,02

Rod thermostats

Single-pole rod thermostats. 5 to 10ºC differential depending on temperature scales. Connection by leads through side inputs.

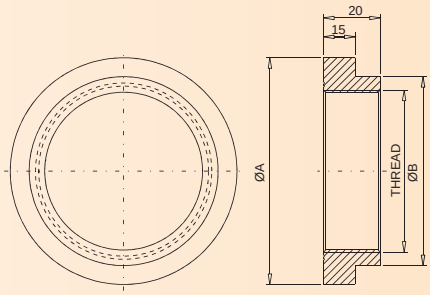
Code	Description	Thermostat range	Operation temperatures		Characteristics	Maximum current (~240 V)
			Control (Automatic reset)	Safety (Manual reset)		
517330000	TER-CO-165-0-80-NEF	NEF	0 / 80 °C	---	Sheath Ø7,5x165 mm	20 A
517335000	TER-CO-265-5-80-NEF	NEF	5 / 80 °C	---	Sheath Ø7,5x265 mm	20 A
517337000	TER-CO-265-45-120-NEF	NEF	45 / 120 °C	---	Sheath Ø7,5x265 mm	20 A
517358000	TER-CO-165-0-73-87-NEF	NEF	-10 / 73 °C	87 °C	Sheath Ø7,5x165 mm	20 A
517347000	TER-SV-280-45-95-NEF	NEF	---	45 / 95 °C	Sheath Ø7,5x280 mm	16 A

ACCESSORIES FOR THERMOSTATS

Code	Description
570004330	Mounting clip for bulb thermostat $Ø_{nominal}$ 7,5 mm to sheath Øint 3,5 to 8 mm
570004331	Mounting clip for bulb thermostat $Ø_{nominal}$ 6 mm to sheath Øint 3,5 to 7 mm
570004332	Mounting clip for bulb thermostat $Ø_{nominal}$ 8 mm to sheath Øint 3,5 to 12 mm

WELDABLE FLANGES

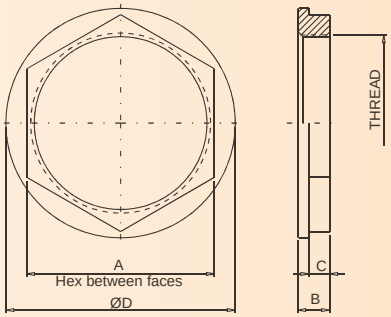
Code	Dimensions in mm		Thread	Material	Weight in Kg
	ØA	ØB			
106073000	70	60	M45	SS. 304	0,35
106071000	108	90	M77	SS. 304	0,60
106077000	65	54	1 1/4"	SS. 304	0,27
106075000	70	60	1 1/2"	SS. 304	0,28
106081000	93	75	2"	SS. 304	0,54
106079000	108	90	2 1/2"	SS. 304	,064
106072002	70	60	M45	Steel	0,31
106070002	108	90	M77	Steel	0,57
106076002	65	54	1 1/4"	Steel	0,26
106074002	70	60	1 1/2"	Steel	0,27
106080002	93	75	2"	Steel	0,53
106078002	108	90	2 1/2"	Steel	0,60



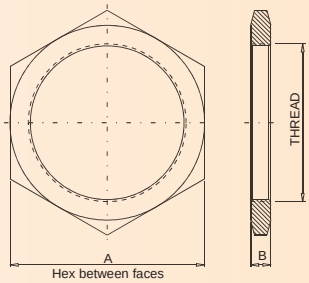
NUTS

Code	Dimensions in mm				Thread	Material	Weight in Kg
	A	B	C	Ø D			
106065000	60	7,5	-	-	M45	SS. 304	0,15
106083000	95	10	-	-	M77	SS. 304	0,27
106096000	55	7,5	-	-	1 1/4"	SS. 304	0,11
106068000	60	7,5	-	-	1 1/2"	SS. 304	0,13
106102000	85	10	-	-	2"	SS. 304	0,20
106099000	95	10	-	-	2 1/2"	SS. 304	0,28
106066002	60	7,5	-	-	M45	Steel	0,12
106084002	95	10	-	-	M77	Steel	0,24
106097000	55	7,5	-	-	1 1/4"	Steel	0,08
106069002	60	7,5	-	-	1 1/2"	Steel	0,12
106103000	85	10	-	-	2"	Steel	0,26
106100002	95	10	-	-	2 1/2"	Steel	0,24
106005000	28,7	7,3	5	35,4	3/4"	Brass	0,02
106007000	35,8	7,8	5	45,1	1"	Brass	0,02
106008000	44,8	8,2	5	55,9	1 1/4"	Brass	0,03
106064000	60	7,5	-	-	M45	Brass	0,08
106009000	60	7,5	-	-	1 1/2"	Brass	0,05
106010000	65	9	6	86,6	2"	Brass	0,12
106011000	90,8	11,5	9	112,2	2 1/2"	Brass	0,25

BRASS

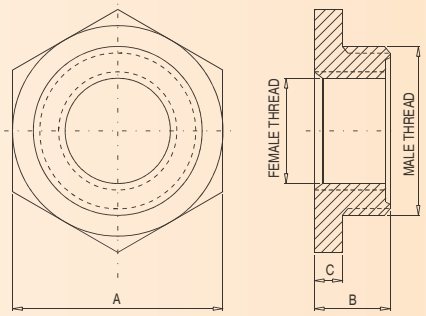


SS AISI 304 / STEEL



THREADED BRASS ADAPTERS

Code	Dimensions in mm			BSP Thread		Weight in Kg
	A	B	C	Male	Female	
106090000	57	25	10	R 1 1/2"	R 1 1/4"	0,12
106091000	75	27	10	R 2"	R 1 1/4"	0,43
106093000	88	28	10	R 2 1/2"	R 2"	0,51



GASKETS

Code	Thread for	Material
107058000	ACL-CAL (Electric boiler flange P-EB-110)	Basic
107097000	¾"	Basic
107095000	1"	Basic
107031000	1 1/4"	Rubber
107042000		Basic
107072000	1 1/2"	Basic
107032000	2"	Rubber
107050000		Basic
107075000	2 1/2" and M77x2	Rubber
107076000		Basic
107069000	M45x2	Rubber
107070000		Basic

BASIC: basic composition rubber NBR + Fibers of aramide (asbestos free)

ECU

Models as per catalogue: NTC-9604

GROUP 11 - Immersion heaters, drums, heaters and accesories

1.9 - Heaters for knife sterilizers

THERMOSTATIC HEATER ASSEMBLY FOR KNIFE STERILIZERS OR OTHER INSTRUMENTS

General characteristics

- Tubular element of stainless steel AISI 316L of Ø8 mm
- BSP threaded plug of stamped brass
- Steel painted connection box with degree protection against moisture IP-66.
- Stuffing box
- Watertightness gasket
- Welded with silver alloy for stainless steel tube
- Standard voltage ~230 V
- Sheath with manual reset safety thermostat of 105 ± 4 ºC. Differential 20 ± 10 ºC.
- Sheath with automatic reset control thermostat of 93 ± 3 ºC. Differential 6 ± 2 ºC.
- On demand, special heating elements can be made according to your specifications:
  - Material tube: AISI 316L, Incoloy®-800, Incoloy®-825 and Titanium
  - Stainless steel or titanium BSP threaded plugs.

Code	L (LIR) in mm	Thread	Watts	W/cm²	Tube material	Electricfor's construct. thermic class	Weight in Kg
ECU1	190	M45	1000	6,9	Ø 8 AISI 316L	T-301-E	1,1
ECU2	190	1 1/4"	1000	6,9	Ø 8 AISI 316L	T-301-E	1,1

Note: The complete set of heating element, connection box, thermostats, lock nut and klingerit joint is included in the price.

Usual applications: Especially appropiate for knife sterilizers in refrigerated slaughterhouses.

It may also be used for other applications such as heating slightly salted waters, or with low chlorine content, neutral or marginally basic pH, high oxygen content, etc., for which the most suitable sheath material for the element is 316L stainless steel, or when air-tightness is required in the connection box, or double safety in the temperature control. In case of doubt, please consult NTT nº4101 or else our Technical Department.

SPARE THERMOSTATS FOR THERMOSTATIC HEATER ASSEMBLY ECU

Description	Code	Thermostat range	Range	Reset	Max. current	Capillary length	Bulb		Weight in Kg
							Material	Dimensions	
TER-BU-90-AUT-ECU	517105000	ECU	93 °C	Automatic	10 A (~250 V)	180	Copper	Ø6 x 102 mm	0,75
TER-BU-105-MAN-ECU	517106000	ECU	104 °	Manual	10 A (~250 V)	180	Copper	Ø6 x 102 mm	0,75

NOB

Models as per catalogue: 733 / NTC-8750

GROUP 11 - Immersion heaters, drums, heaters and accesories

1.10 - With coupling plug and sheath for thermostat

MONOBLOCK GROUP OF HEATING ELEMENT WITH SHEATH FOR THERMOSTAT WITH BRASS 1"1/4 BSP COUPLING PLUG

General characteristics

- Tubular element of stainless steel AISI 321, AISI 316L or nickel-plate copper of Ø8 mm, according models.
- BSP threaded plug of stamped brass
- Protection hood IP-40
- Welded with silver alloy for stainless steel tube.
- Sheath for rod thermostat connectable to heating element.
- Standard voltage ~230 V

RANGE FOR WATER OR HIGH QUALITY THERMAL OIL

Code	L (LIR) in mm	Watts	W/cm²	Thermostat range according to appli.		Shape	Tube material	Electricfor's constructive thermic class	Weight in Kg
				Water	Oil				
NOB11	135	500	5,3	A1	A2	VD	AISI 321 or 304L	T-300-E	0,23
NOB12	150	750	7,7	A1	A2	VD	AISI 321 or 304L	T-300-E	0,24
NOB13	315	1000	7,9	B1	B2	U	AISI 321 or 304L	T-300-E	0,27
NOB14	315	1500	7,5	B1	B2	1/2 VD	AISI 321 or 304L	T-300-E	0,34
NOB15	315	2000	7,8	B1	B2	VD	AISI 321 or 304L	T-300-E	0,38
NOB16	285	2500	7,6	B1	B2	TVC	AISI. 316L	T-301-E	0,45
NOB17	325	3000	7,8	B1	B2	TVC	AISI. 316L	T-301-E	0,50
NOB18	375	3500	7,7	B1	B2	TVC	AISI. 316L	T-301-E	0,58
NOB21	300	1000	8,3	B1	-	U	Nickeled copper	T-175-E	0,28
NOB23	290	1500	7,7	B1	-	1/2 VD	Nickeled copper	T-175-E	0,35
NOB24	330	2000	9,3	B1	-	1/2 VD	Nickeled copper	T-175-E	0,38

RANGE FOR OIL

Code	L (LIR) in mm	Watts	W/cm²	Thermostat range	Shape	Tube material	Electricfor's constructive thermic class	Weight in Kg
NOB3	315	1000	4	B1 - B2	VD	AISI 321 or 304L	T-300-E	0,39
NOB5	450	1500	3,9	B1 - B2	VD	AISI 321 or 304L	T-300-E	0,50
NOB7	420	2000	3,9	B1 - B2	TVC	AISI 321 or 304L	T-300-E	0,63
NOB30	450	2500	3,3	B1 - B2	CVC	AISI 321 or 304L	T-300-E	0,80
NOB32	530	3000	3,3	B1 - B2	CVC	AISI 321 or 304L	T-300-E	0,95

RECOMMENDATIONS

- To heat water **don't** use the A2 and B2 thermostat range. (Scale 30-150 °C).
- To heat thermal oil of high quality or high velocity of movement **don't** use heating elements in copper or nickeled copper tube.
  The corrosive effect of the oil over the copper may seriously damage the life of the heating element.

L = Maximum length (sheath or resistor) including thread.

Dimensional tolerances for element shape:

"U" = $^{+0}_{-3\%}$

"1/2 VD" - "VD" - "TVC" - "CVC" = IT15

Code: CNOB

PROTECTION ACCESSORIES AND PROTECTION HOOD

Degree protection against moisture IP40

GROUP 1 - Immersion heaters, drum heaters and accessories

1.11 - With round flange and sheath for thermostat

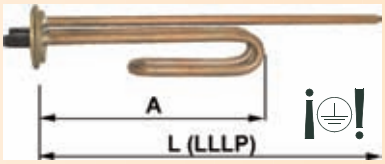
ECU

Models as per catalogue: NTC-9604

MONOBLOCK GROUP OF HEATING ELEMENT WITH Ø48 mm ROUND BRASS FLANGE AND SHEATH FOR THERMOSTAT

General characteristics

- Tubular element of copper of Ø8 mm
- Ø48 mm round stamped brass flange
- Sheath for rod thermostat connectable to heating element.
- Standard voltage ~230 V



L = Maximum length (sheath or resistor)

Dimensional tolerances for element shape: "1/2 VD" = ± 2 mm.

RANGE FOR WATER

Code	Dimensions in mm		Watts	W/cm²	Thermostat range	Shape	Tube material	Electricfor's constructive thermic class	Weight In Kg
	L (LLLP)	A							
PNOB12AR	280	200	1500	10,9	E1-E3	VD	Copper	T-175-E	0,21

GROUP 1 - Immersion heaters, drum heaters and accessories

1.12 - Steatite mounted heating elements

NOB

Models as per catalogue: 733, NTC-8750

MONOBLOCK GROUP OF HEATING ELEMENT WITH BRASS 1"1/4 BSP COUPLING PLUG AND SHEATH FOR THERMOSTAT.
SUITABLE FOR CONNECTING ADJUSTABLE ALUMINUM COUPLING BOX IP-66

General characteristics

- Tubular element of stainless steel AISI 321 or AISI 316L of Ø8 mm, according models
- BSP threaded plug of stamped brass
- Adjustable connection box with degree protection against moisture IP-66
- Welded with silver alloy for stainless steel tube.
- Sheath for rod thermostat connectable to heating element.
- Standard voltage ~230 V

RANGE FOR WATER OR HIGH QUALITY THERMAL OIL

Code	L (LIR) in mm	Watts	W/cm²	Thermostat range According to application		Shape	Tube material	Electricfor's constructive thermic class	Weight in Kg
				Water	Oil				
NOB19CH	425	4000	7,6	CT1	CT2	TVC	AISI 316L	T-301-E	0,80

RANGE FOR OIL

Code	L (LIR) en mm	Watts	W/cm²	Thermostat range	Shape	Tube material	Electricfor's constructive thermic class	Weight in Kg
NOB36CH	680	4000	3	CT2	CVC	AISI 321 or 304L	T-300-E	1,35

NOTE: The complete set is made up of element + adjustable aluminum coupling box + bulb thermostat range CT1 or CT2.
The aluminum coupling box, as well as the bulb thermostat are not included in the price

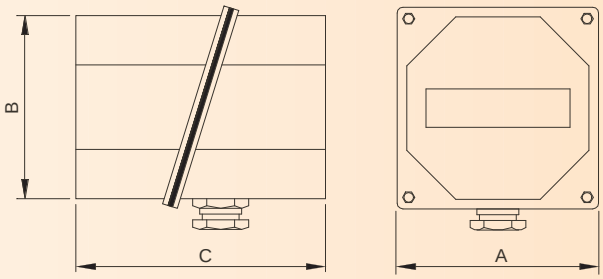
NOB

Models as per catalogue: 733, NTC-8750

C-HER-TER-MO RANGE
SUITABLE FOR THERMOSTAT BULB

Code	Dimensions in mm			Weight in Kg
	A	B	C	
108072000	78	74	98	0,41

The complete set includes the joints, screws, nuts, flange attachment to bulb thermostat, metallic packing glands M20 for voltage supply and tightening disc necessary to assure the degree protection against moisture IP-66



GROUP 11 - Control and regulation

11.3 - Thermostats for monoblock

Description	Code	Thermostat range	Range	Max. current	L2 mm	Connection to element	Mains connection	Weight in Kg
TER-CO-137-0-90-F	517321000	A1	0-90	16 A	137	Faston 6,3	Barrilete	0,06
TER-CO-137-40-150-F	517323000	A2	40-150	16 A	137	Faston 6,3	Barrilete	0,06
TER-CO-270-30-90-F	517320000	B1	30-90	16 A	270	Faston 6,3	Barrilete	0,08
TER-CO-270-90-150-F	517322000	B2	90-150	16 A	270	Faston 6,3	Barrilete	0,08
TER-CO-280-10-80	517277000	E1	10-80	16 A	270	Faston 6,3	Barrilete	0,05
TER-AR-280-20-80-F	517311000	E3	20-80	15 A	280	Faston 6,3	Barrilete	0,05

Note 1: The thermostats of the "A" range may replace those of the "B" range, but they have a higher differential and lower accuracy.

Note 2: For water it is recommendable to use the thermostat up to 90 °C to avoid risk of accidental boiling.

BULB THERMOSTATS FOR NOB19CH and NOB36CH MODELS

Description	Code	Thermostat range	Range	Max. current	Capillary length	Bulb		Weight in Kg
						Material	Dimensions	
TER-BU-CT-0-90	517350000	CT1	0-90	20 A	1000	Copper	Ø6x65 mm	0,06
Button 0/90 + Black face plate	517355000	CT1	0-90	-	-	-	-	0,01
TER-BU-CT-30-160	517352000	CT2	30-160	20 A	1000	Copper	Ø6x65 mm	0,06
Button 30/160 + Black face plate	517357000	CT2	30-160	-	-	-	-	0,01

ACCESSORIES FOR BULB THERMOSTAT

Code	Description
570004330	Mounting clip for bulb thermostat $Ø_{nominal}$ 7,5 mm to sheath Øint 3,5 to 8 mm
570004331	Mounting clip for bulb thermostat $Ø_{nominal}$ 6 mm to sheath Øint 3,5 to 7 mm
570004332	Mounting clip for bulb thermostat $Ø_{nominal}$ 8 mm to sheath Øint 3,5 to 12 mm

GROUP 1 - Immersion heaters, drums, heaters and accesories

1.13 - Steatite mounted heating elements

STEATITE-MOUNTED HEATING ELEMENTS

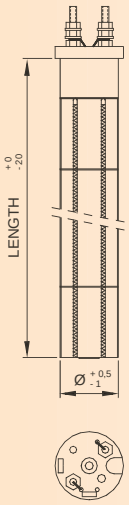
SINGLE VOLTAGE “CT” RANGE and DUAL VOLTAGE “BT” RANGE

Steatite-mounted elements work inserted inside a sheath that in turn is in contact with the liquid to be heated. They are made both for household as well as for industrial use

General characteristics

- Resistive wire of Nickel-Chrome alloy
- High-quality ceramic support
- Easy to replace spare parts
- On order, other diameters, lengths, power and voltages, both in mono-, two- and three-phase

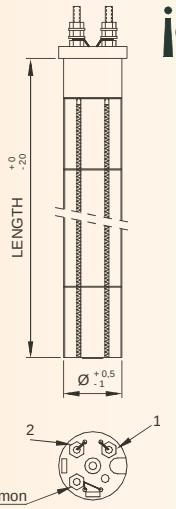
SINGLE VOLTAGE “CT” RANGE



Code	Watts	ØxLength in mm.	Weight in Kg
CT002	600	20 x 220	0,07
CT003	750	20 x 270	0,07
CT004	850	20 x 320	0,09
CT006	750	20 x 255	0,09
CT007	750	20 x 265	0,09
CT009	850	20 x 370	0,20
CT013	600	29 x 175	0,18
CT014	750	29 x 175	0,22
CT015	750	29 x 260	0,25
CT016	1000	29 x 260	0,25
CT017	1000	29 x 325	0,30
CT026	1500	29 x 325	0,30
CT018	1000	29 x 375	0,31
CT019	1500	29 X 525	0,45
CT020	2000	29 X 625	0,55
CT021	2000	29 x 725	0,65
CT022	800	38 x 225	0,42
CT023	1000	38 x 275	0,45
CT024	1000	38 X 325	0,50
CT025	1000	38 X 375	0,56

SINGLE VOLTAGE, 2 TERMINALS, Voltage~230V

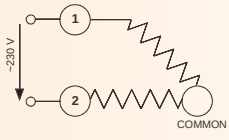
DUAL VOLTAGE “BT” RANGE



Code	Watts	ØxLength in mm.	Weight in Kg
BT008	800	29 x 175	0,15
BT009	900	29 x 225	0,20
BT001	1000	29 x 275	0,25
BT002	1000	29 x 325	0,30
BT003	1000	29 x 375	0,34
BT004	1500	29 x 375	0,34
BT005	1500	29 x 525	0,45
BT006	2000	29 x 625	0,50
BT010	1300	31 x 325	0,40
BT011	1500	31 x 325	0,40
BT007	1000	38 x 325	0,50
BT012	1000	48 x 275	0,68
BT013	1500	48 x 370	0,86

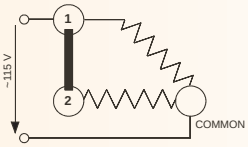
DUAL VOLTAGE, 3 TERMINALS, Voltage ~115/230 V

CONNECTION TO ~230 V



Connect to a ~230 V line through the terminal 1 and 2.

CONNECTION TO ~115 V



Join terminals 1 and 2, and connect to a ~115 V line through the common terminal and one of the other two joined terminals.

CALEB

Models as per catalogue: 836

HEATING ELEMENTS FOR ELECTRIC BOILERS

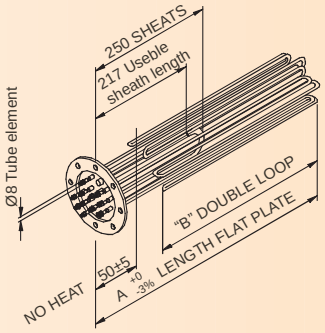
General characteristics

- Tubular elements of nickel-plate copper, insulated with electromelted and lamination-compressed magnesium oxide.
- Double-drawn plates of stainless steel plate or copper plated steel with coating of polyurethane acrylic resin primer. Also we can supply with brass or stainless steel threaded plugs or other type of plates in addition to those standardized by Electricfor.
- Silver alloy welds.
- M4 stainless terminals.
- All models with M5 terminal welded to plate for earth connection.
- Two sheaths of 217 mm usable length with Øint 8,5 mm for bulb thermostats or temperature sensors.
- The bunch of elements passes through Ø70 mm.
- The heating element is given a general finish of copper or nickel plating. The respective bridges, washers and nuts are supplied with each heating element.
- For specially hard water facilities, acid or alkaline they can to be made in stainless steel tube AISI 321, AISI 316L or Incoloy®-825.

Usual applications

- In all facilities in which water is heated in a closed circuit to a maximum of 90 °C with a built-in acceleration pump.
- Electric boilers, auxiliary circuits for tap water, auxiliary circuits for bathrooms, etc.

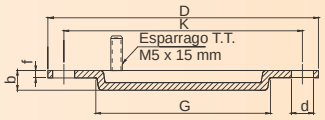
Code	Watts	W per element	W/cm²	Nº elements	Dimensions in mm		Shape	Electricfor's constructive thermic class	Weight in Kg
					A	B			
CALEB4,5	4500	750	11	6	200	-	U	T-175-E	0,89
CALEB6	6000	1000	11	6	250	-	U	T-175-E	1,0
CALEB7,5	7500	1250	10	6	305	-	U	T-175-E	1,1
CALEB9	9000	1500	10	6	360	-	U	T-175-E	1,3
CALEB10,5	10500	1750	9,5	6	320	115	VD	T-175-E	1,5
CALEB12	12000	2000	9,4	6	375	115	VD	T-175-E	1,7
CALEB13,5	13500	2250	9,4	6	375	170	VD	T-175-E	1,8
CALEB15	15000	2500	9,3	6	375	230	VD	T-175-E	1,9
CALEB18	18000	3000	9,4	6	375	335	VD	T-175-E	2,2
CALEB21	21000	2500	11	6	375	335	VD	T-175-E	2,2
CALEB24	24000	4000	12	6	375	335	VD	T-175-E	2,2



Standard Voltage 3~230 V Δ, 3~400 V

( ) Attention: DO NOT USE THESE MODELS UNLESS THERE IS A LARGE FLOW OF LIQUID. CONSULT OUR TECHNICAL-COMMERCIAL DEPARTMENT.

STANDARD PLATE FOR ELECTRIC BOILER HEATING ELEMENTS



Model	Code	Dimensions in mm.						Nº of boreholes coupling	Material
		D	K	G	d	b	f		
P-EB-110	111033230	110	97	71	9	7	2,5	8	Stainless Steel

GASKETS FOR ELECTRIC BOILER HEATING ELEMENTS

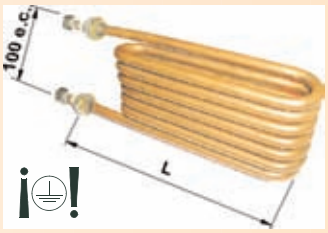
Code	Description	Material
107058000	ACL-CALD	BASIC (asbestos free)

7V / U

Models as per catalogue: 733

SEVEN LOOP U-SHAPED HEATING ELEMENT WITH COUPLING CONNECTORS

General characteristics



- Tubular elements of nickel-plate copper, insulated with electromelted and lamination-compressed magnesium oxide
- M12 brass connectors, welded to the tube with silver alloy.
- Standard Voltage ~230 V

Code	L In mm	Threas	Watts	W/cm²	Tube material	Electricfor's construct. thermic class	Weight in Kg
7V001C	170	M12	3.000	5,9	Cobre	T-175-E	0,50

U-SHAPED HEATING ELEMENTS WITH COUPLING CONNECTORS

General characteristics

- Tubular elements of nickel-plate copper or stainless steel AISI 304L or AISI 321 Ø8 mm, insulated with electromelted and lamination-compressed magnesium oxide
- M13 x 1'25 brass connectors, welded to the tube with silver alloy.
- Standard Voltage ~230 V

Code	L in mm	Thread	Watts	W/cm²	Tube material	Electricfor's construct. thermic class	Weight in Kg
U001	180	M13	500	8,3	Stainless Steel	T-600-E	0,14
U001C	180	M13	500	8,3	Nick. cooper.	T-175-E	0,14
U002	260	M13	750	7,5	Stainless Steel	T-600-E	0,17
U002C	260	M13	750	7,5	Nick. cooper.	1-175-E	0,17
U003	350	M13	1000	7	Stainless Steel	T-600-E	0,21
U003C	350	M13	1000	7	Nick. cooper.	T-175-E	0,21
U004	520	M13	1500	6,6	Stainless Steel	T-600-E	0,28
U004C	520	M13	1500	6,6	Nick. cooper.	T-175-E	0,28
U005	680	M13	2000	6,5	Stainless Steel	T-600-E	0,35
U005C	680	M13	2000	6,5	Nick. cooper.	T-175-E	0,35

GROUP 1 - Immersion heaters, drums, heaters and accesories

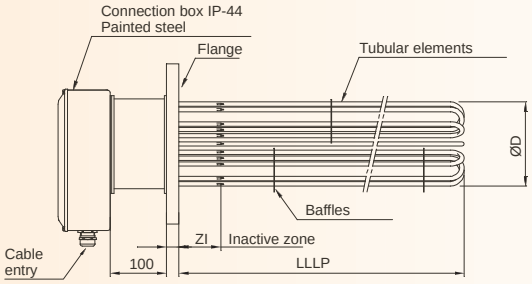
1.16 - Heating groups with flange

The GCB heating groups consist of a group of hairpin shaped elements soldered to standardised DIN2527 or ANSI flange of suitable diameter and nominal pressure, with its corresponding connection box.

The GCB heating groups are specifically adapted for heating and temperature maintenance of large volumes or for heating of fluids in circulation, such as water, heavy fuel-oil, thermal oils, air or gas.

Installation may be carried out indistinctly in vats or cisterns, in boilers or pass superheaters.

They represent an optimum electric heating system for such diverse industries as agroalimentary, chemical, textile, etc.



General characteristics

- Power according to your specifications
- Voltage supply 3~400 V ⅄
- Density load up to 16 W/cm². Recommended density load according to applications
  - 1 to 3 W/cm² → Air, ovens
  - 1,2 W/cm² → Heavy fuel-oil
  - 2 to 4 W/cm² → Thermic oil, light fuel-oil
  - 6 to 8 W/cm² → Water
- Shape “U” tubular elements
- Tube material in stainless steel AISI 321, AISI 316L or Incoloy®-825
- Standardized tube diameters: Ø10 mm
- Maximum length flat plate: Standardized models until 1750 mm, on demand until 3300 mm
- Inactive zone (ZI) standardized models: 100 mm
- Standard flanges: DIN 2527 in steel
- Connection box IP-44.
- 2 Sheats of Øint6,5 mm for thermostat, limitter, thermocouple or PT100 sensor.
- Optionally, temperature control with thermostat, limitter, thermocouple or PT100 sensor
- Optionally, we can supply the GCB group with the cabinet of electrical set-up with all the components and necessary protections for its connection: Controllers, switches, relays, circuit breakers, etc…

IMPORTANT: When the heating groups GCB settle in a container affected by the Pressure Equipment Directive PED 97/23/EC, they will only be able to be used in equipment with a maximum design pressure according to the following parameters (extracted from the standard EN 1092-1, Table G.2.1-3 - PN10)

Design temperature	Maximum design pressure
Up to 99 °C	10 bar
From 100 °C to 149 °C	9,2 bar
From 150 °C to 199 °C	8,8 bar
From 200°C to 249 °C	8,3 bar

STANDARDIZED MODELS GCB-V, RANGE FOR STEAM GENERATOR. MAXIMUM WORK TEMPERATURE: 150 °C

	ØD in mm	Nº elements. (Tube Iy-825® Ø10 mm)									Length flat plate (LLLP in mm)					
		6	9	12	15	18	21	24	27	30	600	800	1000	1250	1500	1750
DN Flange	100	X									6 kW	7,5 kW	9 kW	12 kW	15 kW	20 kW
	150		X								9 kW	11,25 kW	13,5 kW	18 kW	22,5 kW	30 kW
				X							12 kW	15 kW	18 kW	24 kW	30 kW	40 kW
	200				X						15 kW	18,75 kW	22,5 kW	30 kW	37,5 kW	50 kW
						X					18 kW	22,5 kW	27 kW	36 kW	45 kW	60 kW
							X				21 kW	26,25 kW	31,5 kW	42 kW	52,5 kW	70 kW
	250							X			24 kW	30 kW	36 kW	48 kW	60 kW	80 kW
									X		27 kW	33,75 kW	40,5 kW	54 kW	67,5 kW	90 kW
										X	30 kW	37,5 kW	45 kW	60 kW	75 kW	100 kW

STANDARDIZED MODELS GCB-AT, RANGE FOR THERMIC OIL. MAXIMUM WORK TEMPERATURE: 150 °C

	ØD in mm	Nº elements. (Tube AISI 321 Ø10 mm)									Length flat plate (LLLP in mm)					
		6	9	12	15	18	21	24	27	30	600	800	1000	1250	1500	1750
DN Flange	100	X									8 kW	10,5 kW	13,5 kW	18 kW	21 kW	25,5 kW
	150		X								12 kW	15,75 kW	20,25 kW	27 kW	31,5 kW	38,25 kW
				X							16 kW	21 kW	27 kW	36 kW	42 kW	51 kW
	200				X						20 kW	26,25 kW	33,75 kW	45 kW	52,5 kW	63,75 kW
						X					24 kW	31,5 kW	40,5 kW	54 kW	63 kW	76,5 kW
							X				28 kW	36,75 kW	47,25 kW	63 kW	73,5 kW	89,25 kW
	250							X			32 kW	42 kW	54 kW	72 kW	84 kW	102 kW
									X		36 kW	47,25 kW	60,75 kW	81 kW	94,5 kW	114,75 kW
										X	40 kW	52,5 kW	67,5 kW	90 kW	105 kW	127,5 kW

STANDARDIZED MODELS GCB-A, RANGE FOR WATER. MAXIMUM WORK TEMPERATURE: 150 °C

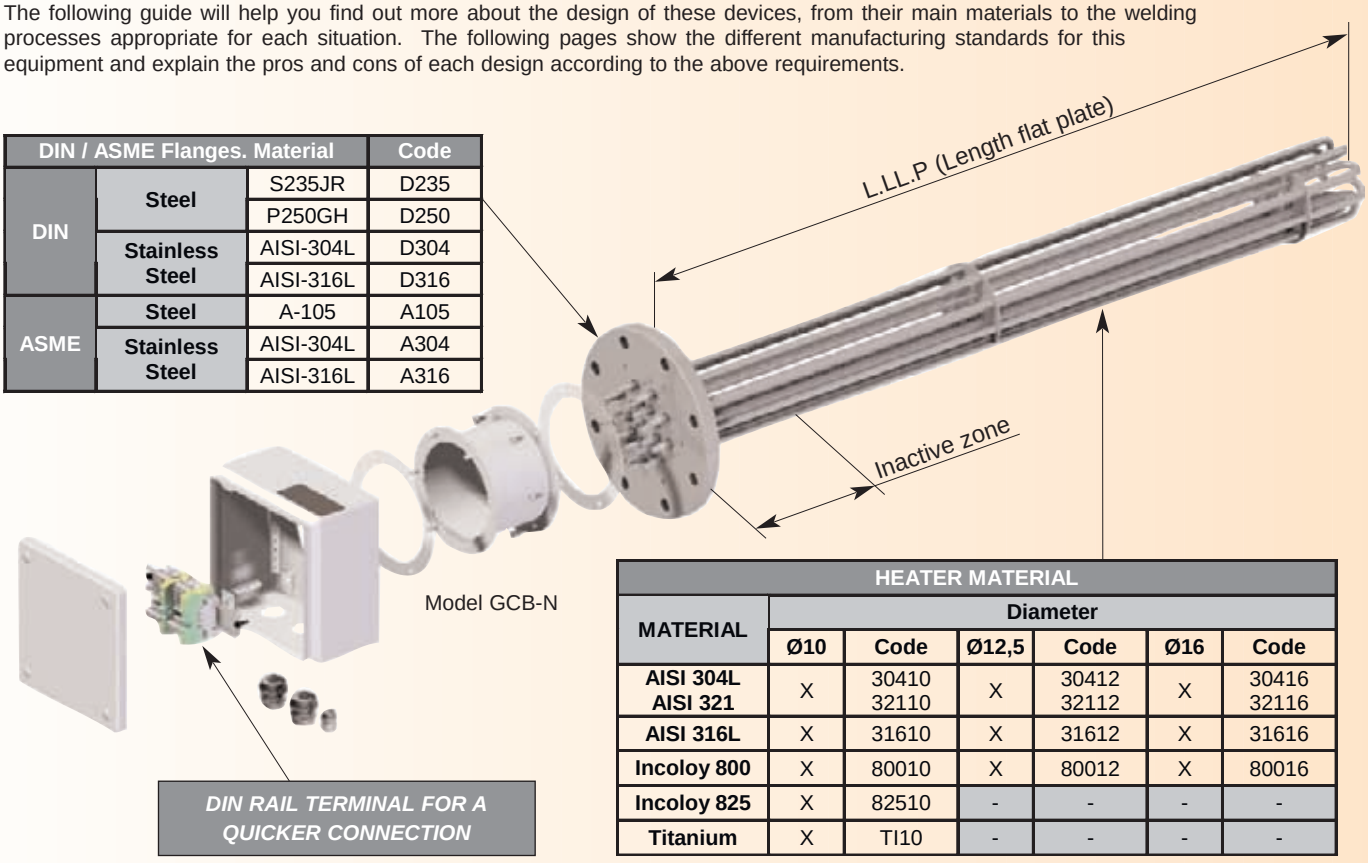
	ØD in mm	Nº elements. (Tube AISI 316L Ø10 mm)									Length flat plate (LLLP in mm)					
		6	9	12	15	18	21	24	27	30	600	800	1000	1250	1500	1750
DN Flange	100	X									15 kW	21 kW	27 kW	33,3 kW	42 kW	50 kW
	150		X								22,5 kW	31,5 kW	40,5 kW	50 kW	63 kW	75 kW
				X							30 kW	42 kW	54 kW	66,7 kW	84 kW	100 kW
	200				X						37,5 kW	52,5 kW	67,5 kW	83,3 kW	105 kW	125 kW
						X					45 kW	63 kW	81 kW	100 kW	126 kW	150 kW
							X				52,5 kW	73,5 kW	94,5 kW	116,7 kW	147 kW	175 kW
	250							X			60 kW	84 kW	108 kW	133,3 kW	168 kW	200 kW
									X		67,5 kW	94,5 kW	121,5 kW	150 kW	189 kW	225 kW
										X	75 kW	105 kW	135 kW	166,7 kW	210 kW	250 kW

The GCB heaters (flange heaters) are heating units designed to work under pressure. They are constructed through the welding of various reinforced heating elements to a standard blind flange.

The design of a GCB can vary significantly. Working pressure, the desired temperature or the fluid to be heated are just some of the factors that can affect which system to design. This is why each case is assessed by our technical department in order to provide a product that meets the specific requirements of each of our customers.

The following guide will help you find out more about the design of these devices, from their main materials to the welding processes appropriate for each situation. The following pages show the different manufacturing standards for this equipment and explain the pros and cons of each design according to the above requirements.

DIN / ASME Flanges. Material			Code
DIN	Steel	S235JR	D235
		P250GH	D250
	Stainless Steel	AISI-304L	D304
		AISI-316L	D316
ASME	Steel	A-105	A105
	Stainless Steel	AISI-304L	A304
		AISI-316L	A316



HEATER MATERIAL						
MATERIAL	Diameter					
	Ø10	Code	Ø12,5	Code	Ø16	Code
AISI 304L AISI 321	X	30410 32110	X	30412 32112	X	30416 32116
AISI 316L	X	31610	X	31612	X	31616
Incoloy 800	X	80010	X	80012	X	80016
Incoloy 825	X	82510	-	-	-	-
Titanium	X	TI10	-	-	-	-

Electrical protection against outdoor conditions is through junction boxes or small control panels that prevent external elements getting inside (dust, water, etc.). This protection is calculated according to each application's special requirements.

Separators / Deflectors

To prevent contact between the heating elements our units include separators (see figure 1). These consist of a sheet whose diameter is always less than the nominal diameter of the flanges and that stiffens the heating elements thus preventing buckling or contact with contaminants during the element's lifecycle.

When the equipment is for heating a fluid in constant circulation, in most cases the flow needs to be directed to aid contact with the heater. Deflectors are included in these units for this (see figure 2).

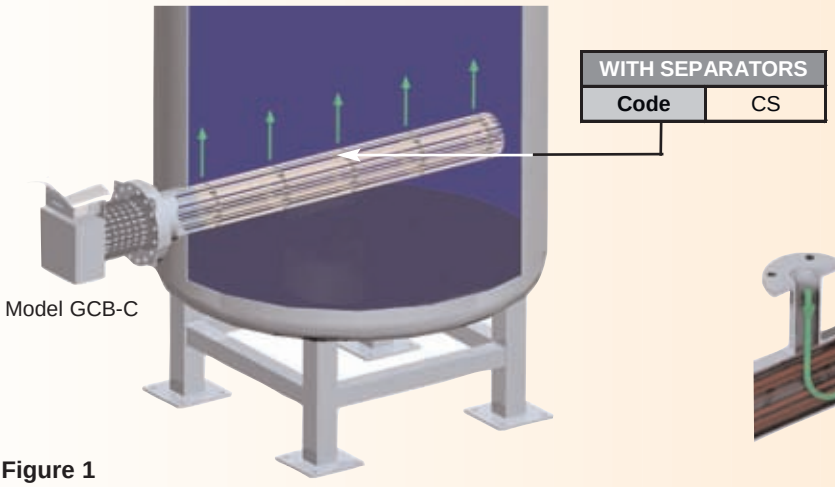


Figure 1

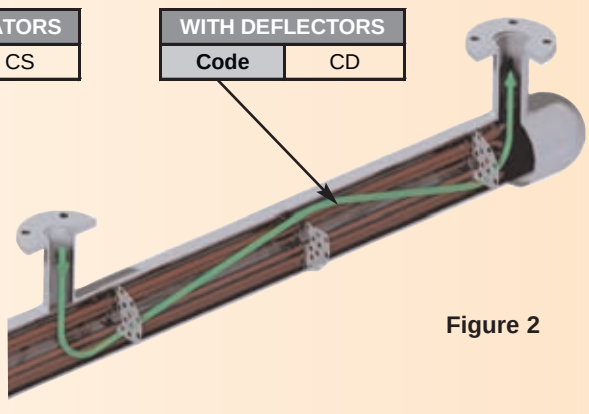


Figure 2

GROUP 1 - Immersion heaters, drums, heaters and accesories

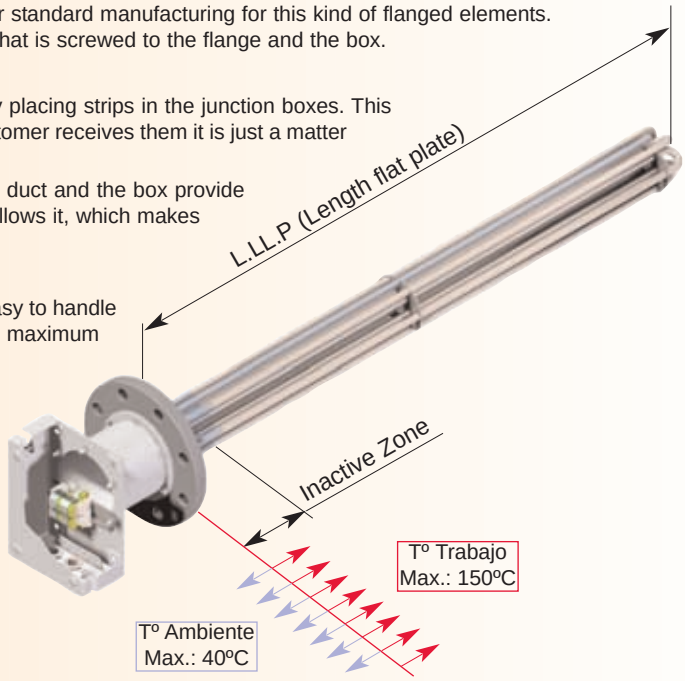
Manufacturing Systems: GCB-N Models

The GCB N heating units are the most frequently used and represent our standard manufacturing for this kind of flanged elements. They are constructed by coupling the junction box through a metal duct that is screwed to the flange and the box.

The heating elements remain near the flange and they are connected by placing strips in the junction boxes. This means the heating elements remain inter-connected so that once the customer receives them it is just a matter of the power reaching the strips.

Meanwhile, the seals between the flange and the duct, and between the duct and the box provide protection against dust and humidity of up to IP-66, as long as the box allows it, which makes them apt for working outdoors.

This kind of construction means the product is simple to assemble and easy to handle for practically anything. However, it is important to remember that the maximum heating temperature this composition permits is 150ºC.

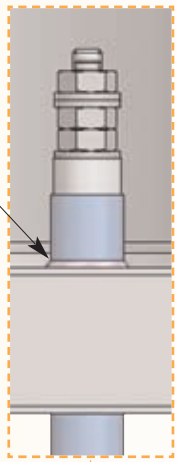


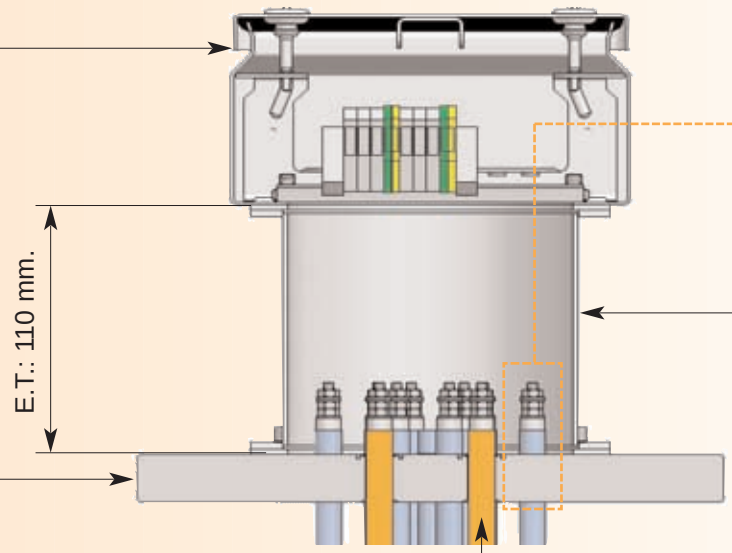
CONSTRUCTION OF FLANGES WITH DUCT

CONNECTION BOX		
IP	**Material**	**Code**
54	Painted steel	A54
54	S. Steel	I54
66	Painted steel	A66

(*) It is recommended that the exterior zone should always remain under a covered area. If this is not possible, the unit should be protected from direct water and wind, even if only with IP-66 protection.

FLANGE-HEATER WELDING	
Type	**Code**
Brazing silver alloy	P1
Welding TIG without contibution	T1

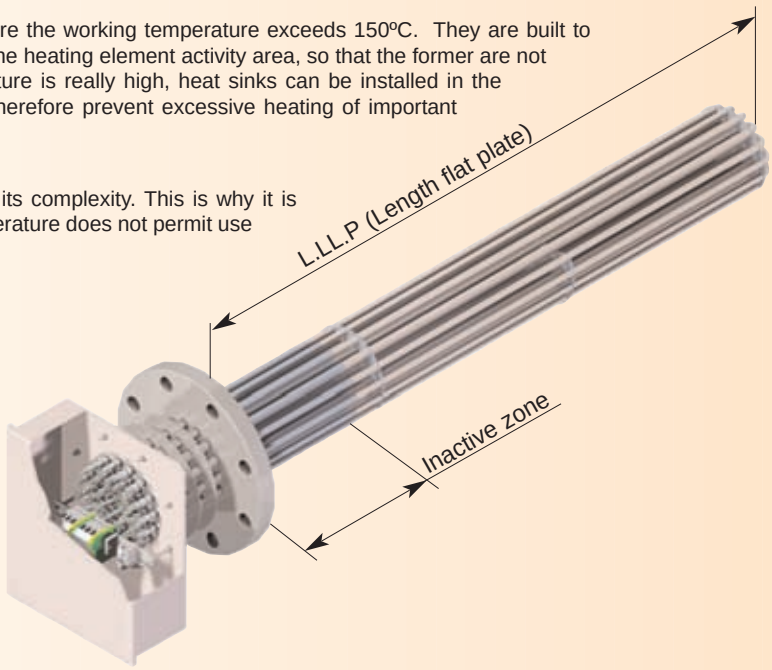




MAIN FLANGE	
Standards	**Code**
DIN	D
ASME	A

The GCB-C heating units are mostly used for facilities where the working temperature exceeds 150ºC. They are built to separate the terminals area and electrical connection from the heating element activity area, so that the former are not affected by the high temperature. Also, when the temperature is really high, heat sinks can be installed in the Thermal Zone to encourage temperature dissipation and therefore prevent excessive heating of important areas.

This kind of construction is always the most costly due to its complexity. This is why it is recommended for use only in cases when the working temperature does not permit use of a standard manufacturing model (GCB-N).



CONSTRUCTION OF FLANGES WITH THERMAL ZONE (TZ) AND BUSHING

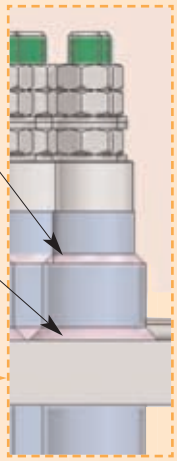
CONNECTION BOX		
IP	**Material**	**Code**
54	Painted steel	A54
54	S. Steel	I54
66	Painted steel	A66

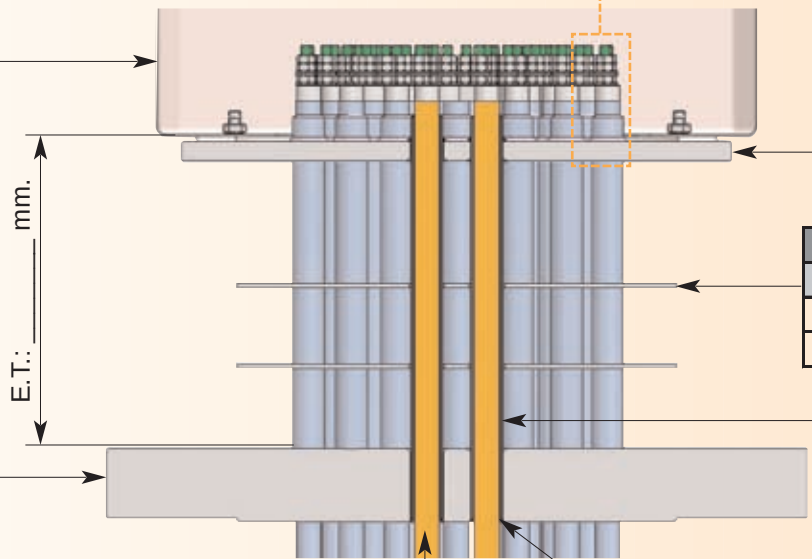
(*) It is recommended that the exterior zone should always remain under a covered area. If this is not possible, the unit should be protected from direct water and wind, even if only with IP-66 protection.

SHELL – HEATER WELDING	
Type	**Code**
Brazing silver alloy	P3
TIG welding without contribution	T3

SHELL – PLATEN WELDING	
Type	**Code**
Brazing silver alloy	P2
TIG welding without contribution	T2

Note: the combination of T3 and T2 is not recommended in the same element.





DISSIPATORS	
	Code
WITH	Nx
WITHOUT	N0

MAIN FLANGE	
Standards	**Code**
DIN	D
ASME	A

SHELL – FLANGE WELDING	
Type	**Code**
Brazing silver alloy	P1
TIG welding without contribution	T1

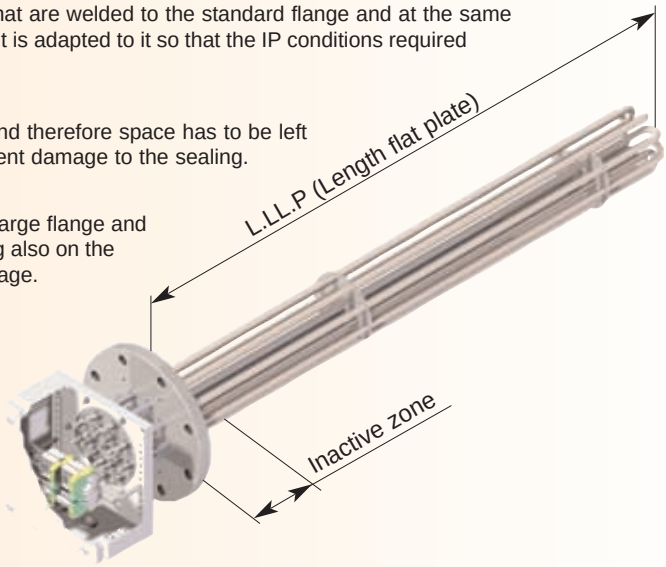
GROUP 1 - Immersion heaters, drums, heaters and accesories

Manufacturing Systems: GCB-ET Models

The heating units GCB-ET are made up of a group of heating elements that are welded to the standard flange and at the same time to a platen. This platen is what keeps the junction box fastened and it is adapted to it so that the IP conditions required in each case can be maintained.

This type of construction is used when the temperature exceeds 150ºC and therefore space has to be left between the connection flange and the heating element terminals to prevent damage to the sealing.

They are a good option for equipment that does not have an excessively large flange and the number of rods to be welded is not that high. In this case, or depending also on the application, the GCB-C can also be used, as explained on the following page.

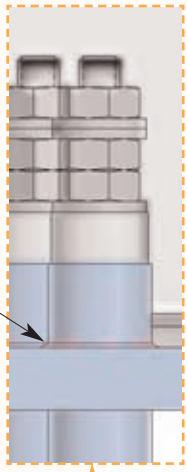


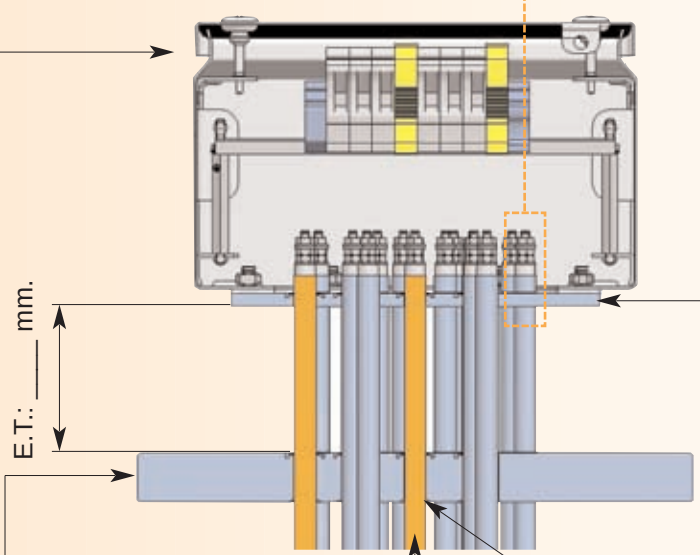
CONSTRUCTION OF FLANGES WITH THERMAL ZONE (ZT) WITHOUT BUSHING

CONNECTION BOX		
IP	**Material**	**Code**
54	Painted steel	A54
54	S. Steel	I54
66	Painted steel	A66

(*) It is recommended that the exterior zone should always remain under a covered area. If this is not possible, the unit should be protected from direct water and wind, even if only with IP-66 protection.

SHELL – PLATEN WELDING	
Type	**Code**
Brazing silver alloy	P2
TIG welding without contribution	T2





MAIN FLANGE	
Standards	**Code**
DIN	D
ASME	A

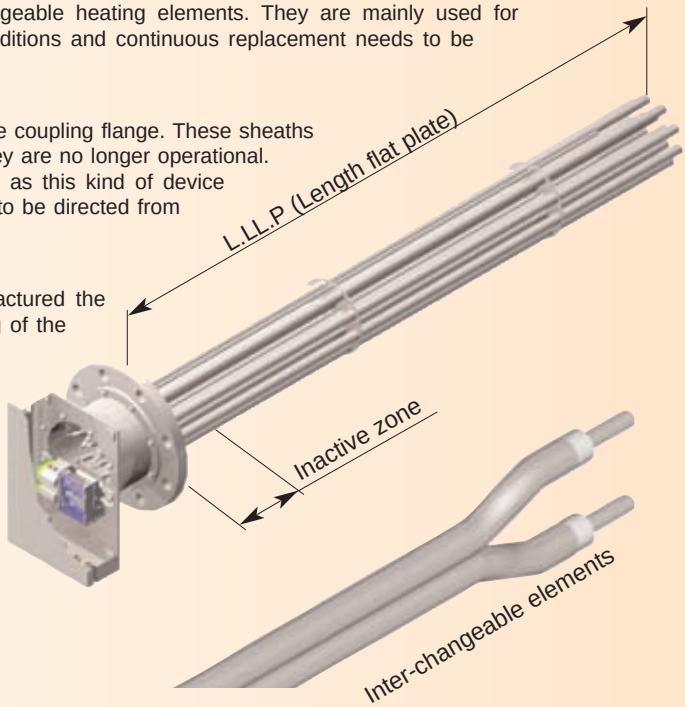
FLANGE – HEATER WELDING	
Type	**Code**
Brazing silver alloy	P1

The heating units GCB-R are reinforced elements with inter-changeable heating elements. They are mainly used for applications when the heating elements are exposed to strong conditions and continuous replacement needs to be anticipated.

Manufacturing this kind of element consists of welding sheaths to the coupling flange. These sheaths hold the heating elements and enable them to be replaced when they are no longer operational. Connecting and disconnecting the heating elements is very simple as this kind of device includes power distributors. These distributors enable the electricity to be directed from the customer's connection to all the heating elements.

This design with interchangeable heating elements can be manufactured the same as the GCB-C manufacturing process but without the welding of the heating element.

Optionally other kinds of interchangeable heating elements can be manufactured, (glow plugs, one-pipe, etc.)

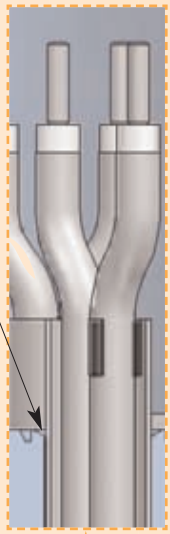


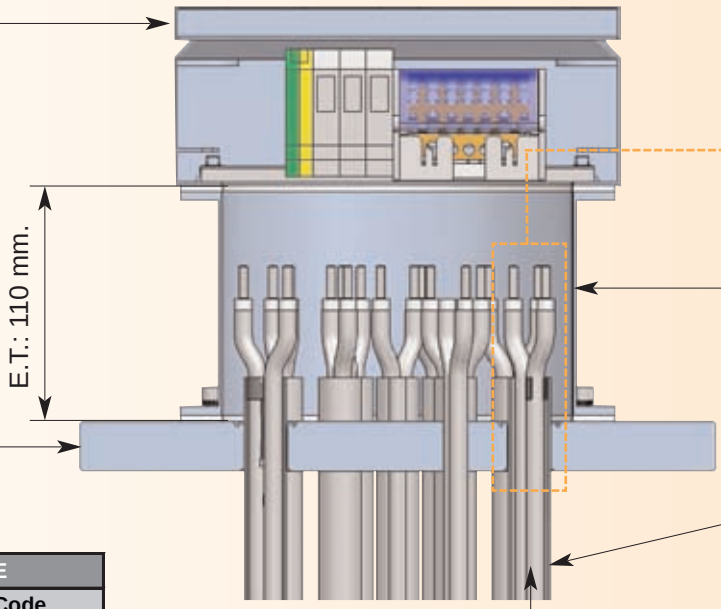
CONSTRUCTION OF FLANGES WITH INTERCHANGEABLE HEATING ELEMENTS

CONNECTION BOX		
IP	**Material**	**Code**
54	Painted steel	A54
54	S. Steel	I54
66	Painted steel	A66

(*) It is recommended that the exterior zone should always remain under a covered area. If this is not possible, the unit should be protected from direct water and wind, even if only with IP-66 protection.

FLANGE – SHEATH WELDING	
Type	**Code**
Brazing silver alloy	P1
TIG welding without contribution	T1





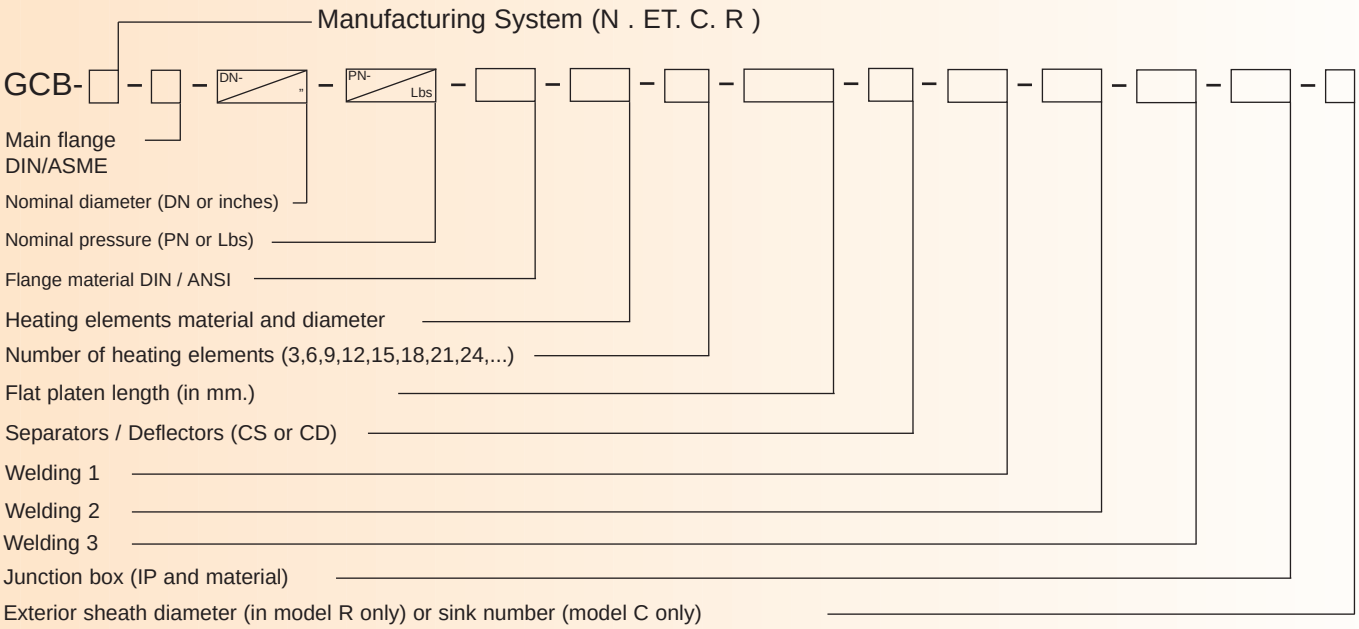
MAIN FLANGE	
Standards	**Code**
DIN	D
ASME	A

GROUP 1 - Heating elements for immersion, accessories and drum heaters

Flange Heating Unit - Codifying

The different codifying modes of the GCB are shown below. To fill in the fields you just have to choose the most appropriate manufacturing system for each case and fill in the gaps with the information shown.

When the code has been filled in, don't forget to fill in the equipment's working conditions and its electrical data as well as the control elements you wish to add.



WORK CONDITIONS	
Fluid	
Flow	m³/h
Volumen	m³
Inlet temperature	ºC
Outlet temperature	ºC
Work pressure	Bar
TS (Design temperature)	ºC
PS (Design pressure)	Barg
Test pressure	Barg

ELECTRICAL DATA	
Voltage	V
Watts	W
Nº Steps	
Max. load	W/cm²
Connection (star / delta)	

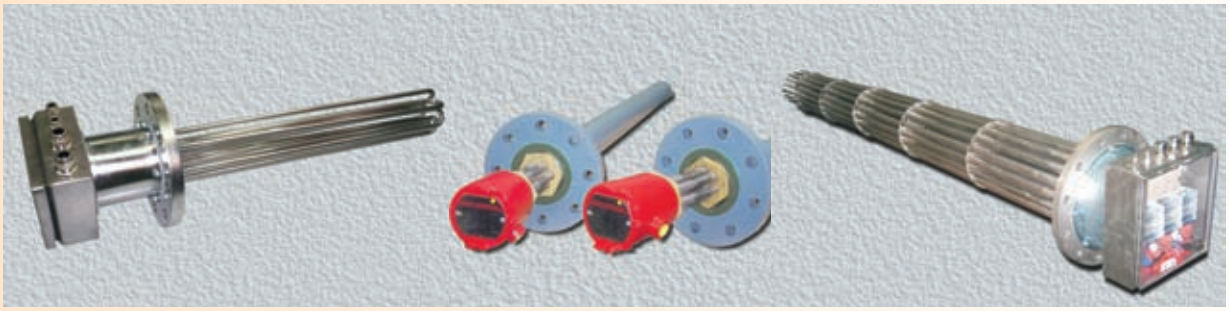
TEMPERATURE CONTROLS (OPTIONALS)		
Thermostat. Automatic reset	0-40ºC	
	0-90ºC	
	0-120ºC	
	0-200ºC	
	0-300ºC	
	30-160ºC	
Sensors	PT-100	
	Tipo "K"	
	Tipo "J"	
Limitter. Manual reset	55ºC	
	100ºC	
	230ºC	

Marcar con una cruz los elementos de control que se precisen.

Remarks:

Special manufacturing

If your requirements are not included in our standard manufacturing, please contact our technical department.



GCP pass superheaters consist of a GCB heating group assembled on a steel or stainless steel tubular body, of suitable flange, bed and entry, exit and purge tubulatures, threaded or flanged.

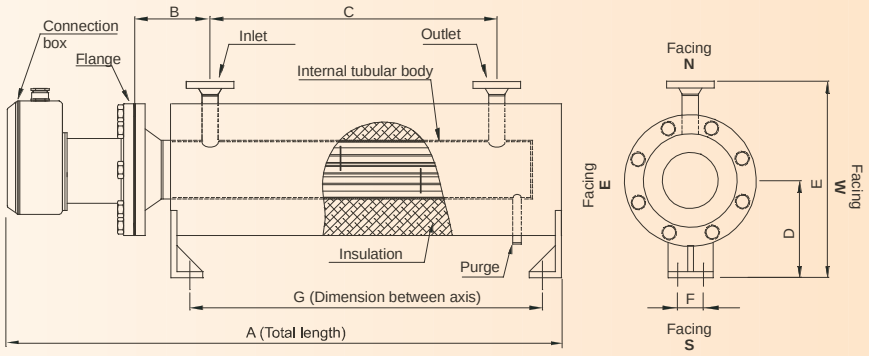
The fluid to be heater circulates inside the same, guided by the deflectors at intervals in the heating group.

The GCP pass superheaters are manufactured to measure, adapting the design for each specific case. They can be manufactured as heat-resistant or non-heat-resistant depending on the working temperature of the same, in horizontal or vertical position, etc.

General characteristics

- Shape “U” tubular elements
- Tube material in stainless steel AISI 321, AISI 316L, Incoloy®-800, Incoloy®-825 or nickeled copper
- Standardized tube diameters: Ø8, Ø10, 12’5, Ø16 mm
- Power according to your specifications
- Three-phase voltage up to 750 V
- Maximum length flat plate: 3300 mm
- Standard flanges: DIN - ANSI in stainless steel or steel
- Connection box IP-44. Tubular body in stainless steel or galvanized steel
- Optionally, tubular body with heat-resistant insulation
- Temperature control with thermostat, limitter, thermocouple or PT100 sensor
- Density load up to 16 W/cm². Recommended density load according to applications
  - 1 to 3 W/cm² → Air, ovens
  - 1,2 W/cm² → Heavy fuel-oil
  - 2 to 4 W/cm² → Thermic oil, ligth fuel-oil
  - 6 to 8 W/cm² → Water

If you wish to receive an offer for the GCP heating groups appropriate to your needs, please complete the attached tables indicating the data requested and send it by fax. You will receive a quote from us as soon as possible.



Process requirements		
Medium to heat: (Indicate material)	Liquid ❑	
	Gas ❑	
Static material	Q	dm³/h
In line material characteristics	Density	Kg/dm³
	Viscosity	cP
	Specific heat	KJ/kg.K
Work temperature		°C
Inlet temperature		°C
Outlet temperature		°C
Design pressure	P	kg/cm²

Tubular element characteristics				
Tube material	SS AISI 321 ❑		Incoloy®-825 ❑	
	SS AISI 316L ❑		Steel ❑	
	Incoloy®-800 ❑		Copper ❑	
Tube diameter	Ø8 mm ❑		Ø16 mm ❑	
	Ø10 mm ❑			

In line heater				
Material internal tubular body	Steel ❑		SS AISI 321 ❑	
			SS AISI 316 ❑	
Position	Horizontal ❑			
	Vertical ❑	Box position	Top ❑	
			Lower ❑	
Heat-resistant insulation	Yes ❑			
	No ❑			

Electrical characteristics		
Total Watts		kW
Power supply		V (Mono-phase)
		V (Three-phase)
Connection		Mono-phase
		Three-phase Δ
		Three-phase
N^{er} steps		⅄
Density load		W/cm²

Temperature control				
Safety	Fluid temperature			°C
	Tube temperature			°C
Control	Fluid temperature			°C
Type	Thermostat (ON/OFF) ❑	Range		°C
	Thermocouple sensor. Type:			
	J ❑		PT100 ❑	
	K ❑			
Position (Flat plate)				mm

Inlet / Outlet - Flanges

Flange	DIN		ANSI		Facing NSEW
	PN	DN	PN	DN	
Inlet					
Outlet					

Flange material	Steel ❑		SS AISI 321 ❑	
			SS AISI 316 ❑	
Purge	Yes ❑			
	No ❑			
Dimensions in mm	A		E	
	B		F	
	C		G	
	D			

GROUP 11 - Control and regulation

11.4 - Control and switch boards

A correct choice of setting and switch system material increases the results of the thermoelectrical elements and guarantees that the system works properly within the established working limits.

All Electricfor control and switch boards are designed to respond to European safety specifications.

Choice of whether the control board is a standard model or a made to measure model following specific specifications will depend largely on the following criteria:

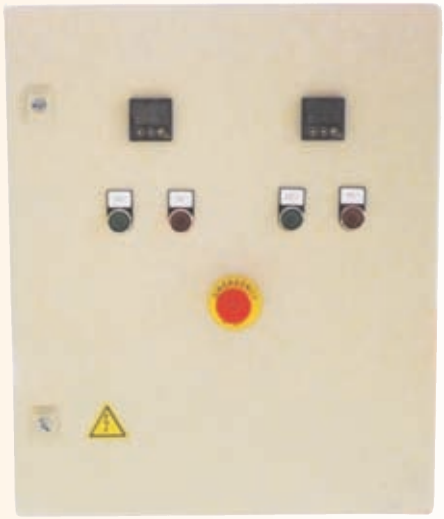
- Type of control method
- Required setting accuracy

If its application refers to a high thermal inertia process (for example, heating of large water or oil tanks), an ACO- type control board with ALL/NOTHING settings by contactors may be the best solution.

If on the other hand your process consists in instantaneous heating of circulating fluid (for example, tankless heaters) or you require rapid reactions in the setting system with great accuracy of temperature control, then the most suitable control board for you will be an ACT-type with a power setting by thyristors.

Contact our technical service for them to help you choose the most suitable equipment for each application.

Apart from setting and switch boards, you will also find a wide range of both mechanical and electronic action thermostats, of ALL/NOTHING, PD and PID type on pages 128 to 139 of this catalogue.



ACO model control and switch boards.
Power control by contactor (ALL-NOTHING)

- Board of an appropriate size for each range of power with IP-65 damp protection rating
- Control of one ALL/NOTHING power stage controlled by a remote thermostat
- Connection input for a safety thermostat
- Front running switch with door blocking and integrated fuses

Code	Voltage	Maximun nominal power, in KW	Dimensions in mm		
			High	Wide	Deph
ACO12	3N~400	12 kW	400	400	200
ACO27	3N~400	27 kW	400	400	200
ACO50	3N~400	50 kW	500	500	300
ACO61	3N~400	61 kW	500	500	300

ACT model control and switch boards
Power control by thyristor

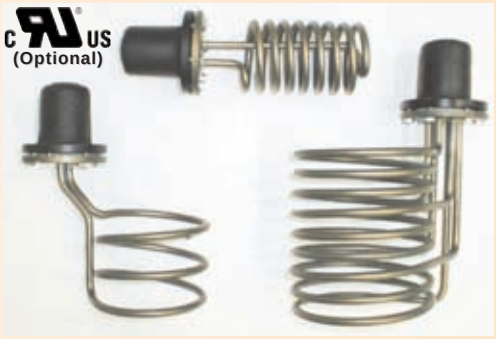
- Painted steel board of an appropriate size for each range of power with IP-41 damp protection rating.
- 1 sectioner door blocking + general protection.
- 1 safety contactor (overheating of the process/internal overheating/external contact).
- 1 break thyristor on 3 phases (in the 3N~400 V versions) with RC varistors and circuits.
- Feed and outlets on terminal block.
- 1 PID adjustable temperature controller.

Code	Voltage	Maximun nominal power, in KW	Dimensions in mm		
			High	Wide	Deph
ACT8	~230	8 kW	300	300	250
ACT12	3N~400	12 kW	300	300	250
ACT22	3N~400	22 kW	400	400	250
ACT27	3N~400	27 kW	600	500	311
ACT51	3N~400	51 kW	600	500	311
ACT60	3N~400	60 kW	600	500	311
ACT86	3N~400	86 kW	600	500	311

General characteristics

- Electric heating element Class I.
- Hermetic head (Degree protection against moisture IP67) in steel, except C405 model in stainless steel AISI 316.
- The upper part of the hermetic head incorporates a female 1/2" BSP thread to connect a tube.
- Heating element in stainless steel tube AISI 321, except for C405 models in AISI 316L
- Model C405 with two sheaths of Øint 8,5 mm for temperature sensors or bulb thermostats.
- Watertight gasket.
- For installations of acid/basic liquids or especially dense liquid, they can be manufactured in 316L stainless steel tube, Incoloy 800, Incoloy 825, and/or with lower charge densities.

(*) IP67 protection is ensured in the final installation with the appropriate nipples and joints on the ½" BSP female thread.



They allow, by means of a 1/2" BSP tube properly connected to the CUP heating element, conserving the degree protection against moisture, to prolong and to protect the connection cables, creating the cold zone and exit to the outside according to your necessities.

The C405 model is provided with two sheaths. The sheaths can be used for implementing control and safety elements, such as rod thermostats TER-xxxx-NEF (see pag 6 and 120) regulatable from 10 - 80 °C, or automatic or manual reset temperature limiters. Model C405 also allows safety elements within its two sheaths, such as fuses for external temperature, range of 15 A of 60 °C and 93 °C in temperature of non rearmable safety cut out and automatic reset thermostats models 9700 (13 A) 90 °C and 75 °C (see pag 118).

All the other models allow the placing of the previously mentioned security elements inside the CUP, with the exception of the rod thermostats

CENTERED 1/2" BSP CUP

Figure 1

OFFCENTRE 1/2" BSP CUP

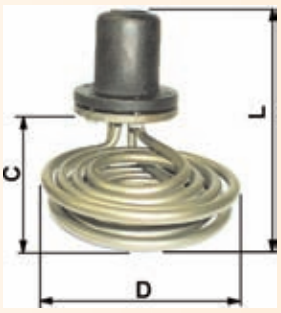
Figure 2

THREE-PHASE 1/2" BSP CUP

Figure 3

FLAT 1/2" BSP CUP

Figure 4



THREE-PHASE 1/2" BSP CUP

Figure 5

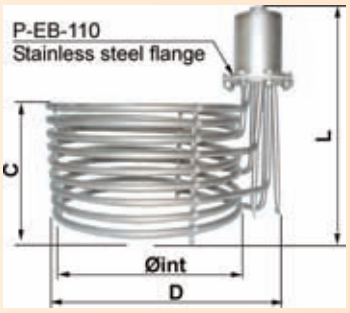


Figure	Code	Dimensions in mm				Volts	Watts	W/cm²	Tube material	Plate and connection box material	Electricfor's constructive thermic class	Weight in Kg
		C Heatig zone	D	ØInt	L							
1	C010	135	73	-	240	~230	1500	3,4	AISI 321 Ø8	Steel	T-300-E	1,4
	C011	165	73	-	270	~230	2000	4,0	AISI 321 Ø8	Steel	T-300-E	1,4
	C012	225	73	-	330	~230	3000	3,8	AISI 321 Ø8	Steel	T-300-E	1,7
2	C001	100	120	95	210	~230	1000	3,9	AISI 321 Ø8	Steel	T-300-E	1,2
	C002	100	160	130	210	~230	2000	3,6	AISI 321 Ø8	Steel	T-300-E	1,5
	C003	150	210	184	260	~230	3000	4,0	AISI 321 Ø8	Steel	T-300-E	1,6
	C004	150	210	180	260	~230	4500	3,4	AISI 321 Ø10	Steel	T-300-E	2,4
3	C302	170	170	118	270	3~230 Δ 3~400	3000	3,2	AISI 321 Ø8	Steel	T-300-E	1,8
	C303	230	170	118	330	3~230 Δ 3~400	4500	3,8	AISI 321 Ø8	Steel	T-300-E	2,2
	C304	160	245	190	260	3~230 Δ 3~400	6000	3,3	AISI 321 Ø8	Steel	T-300-E	2,6
4	C013	35	130	-	135	~230	1000	3,5	AISI 321 Ø8	Steel	T-300-E	1,2
	C014	50	130	-	135	~230	2 x 1000	3,6	AISI 321 Ø8	Steel	T-300-E	1,5
5	C405	173	343	280	344	3~230 Δ 3~400	9000	3,1	AISI 316L Ø10	Stainless Steel	T-301-E	4,1

SBR

Models as per catalogue: NTC-0118

GROUP 1 - Immersion heaters, drum heaters and accessories

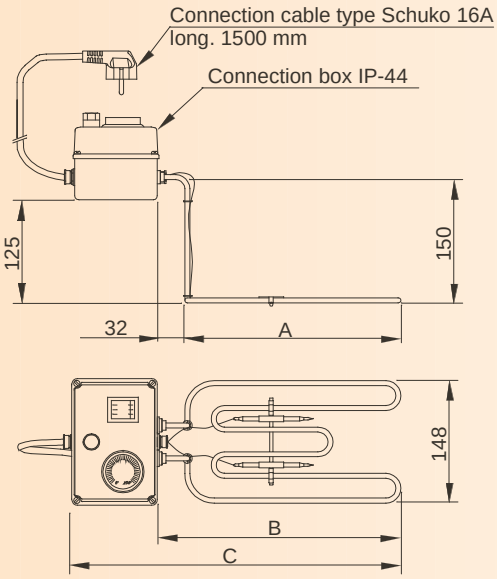
1.19 - Heating elements with IP44 connection box

FIXED IMMERSION HEATING ELEMENT WITH IP-44 CONNECTION BOX, CONTROL THERMOSTAT AND TEMPERATURE LIMITER

General characteristics

- Degree protection against moisture IP-44.
- Stainless steel AISI 321 or 304L tube.
- Connection box in painted steel.
- Zinc steel crimped connectors.
- Connection cable type Schuko 16 A.
- Control thermostat.
- Manual reset temperature limiter.
- Luminous On / Off switch
- Standard voltage ~230 V

NOTE: To ensure good system operation and prolonged life of heating elements we advise you to install protection elements such as fluid level controls (See pages 145, 146 and 147).



SBR RANGE TO HEAT WATER AND OTHERS APPLICATIONS OF MAXIMUM TEMPERATURE 90 °C.

Specific characteristics

- Bulb control thermostat. Scale 0 - 90 °C. Bulb and capillary in copper
- Manual reset safety limiter. Fixed at 100 °C. Bulb and capillary in copper

Code	Watts	W/cm²	Tube material	Dimensions in mm			Electricfor's constructive thermic class	Weight in Kg
				A	B	C		
SSBRH1,4	1400	4,7	AISI 321 ó 304L Ø8	196	228	328	T-600-S	1,3

SBR RANGE TO HEAT OIL AND OTHERS APPLICATIONS OF MAXIMUM TEMPERATURE 200 °C.

Specific characteristics

- Bulb control thermostat. Scale 0 - 200 °C. Bulb and capillary in stainless steel.
- Manual reset safety limiter. Fixed at 230 °C. Bulb and capillary in stainless steel.

Code	Watts	W/cm²	Tube material	Dimensions in mm			Electricfor's constructive thermic class	Weight in Kg
				A	B	C		
SSBRA1,4	1400	4,7	AISI 321 ó 304L Ø8	196	228	328	T-600-S	1,3

SPARE HEATING ELEMENTS FOR SBRH and SBRA RANGES

Code	Watts	W/cm²	Material tube	Electricfor's constructive thermic class	Weight in Kg
RESSBR1,4	1400	4,7	AISI 321 ó 304L Ø8	T-600-S	0,34

CCR

GROUP 1 - Immersion heaters, drum heaters and accessories

1.20 -Accessories: Connection box IP44 with thermostat and limiter

IP-44 CONNECTION BOX WITH CONTROL AND SAFETY THERMOSTAT AND ON / OFF LIGHTING SWITCH

General characteristics

Connection box for heating elements. All models including:

- Steel painted box. IP44.
- Control thermostat with automatic reset, chromed face plate and button.
- Manual reset temperature limiter.
- Luminous On / Off switch.
- Cable 3x1,5 mm² with Schuko 16 A plug type.
- PG11 for cable.
- PG9 for control thermostat and limiter bulbs.
- Gaskets for packing glands.
- It can accept other heating element types with connectors, always with maximum current 16A.
- External dimensions in mm: **155 mm wide x 105 mm deep x 88 mm high**

Code	Temperature ranges for control and safety elements		Weight in Kg
	Adjustable thermostat	Limiter	
CCR-40100	0 - 40 °C	100 °C	1,0
CCR-90100	0 - 90 °C	100 °C	1,0
CCR-200230	0 - 200 °C	230 °C	1,0

FIXED IMMERSION CIRCULAR BASE THREE-PHASIC HEATERS

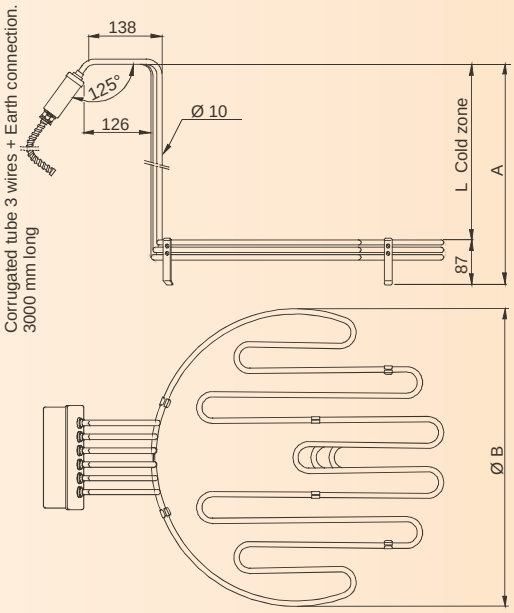
General characteristics

- IP-54 degree protection against moisture
- Incoloy-800 tube (Ø10 mm for the range SBM and Ø8 mm for the range SBC)
- Connection box AISI 430 and box cover AISI 304.
- Connectors AISI 303, crimped and re-sealed.
- Corrugated tube to protect the leads, 3000 mm long.
- Standard voltage 3~230 V Δ, 3~400 V ⅄

Applications

- Degreasing
- Chemical industries.
- Cleaning.
- Sea-food boilers
- Boilers
- Fish farms
- Saline solution heating

NOTE: To ensure a good system operation and prolonging heating element life we advise you to install protection elements such as fluid level controls (See pages 145, 146 and 147) and temperature controller (See our general Forcosa catalogue nº 927)



MODELS SBM.

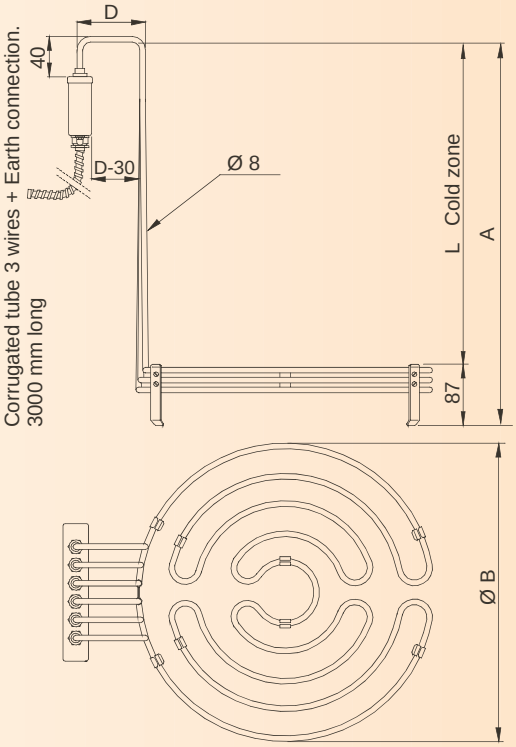
Code	Watts	W/cm²	Material tube	Dimensions in mm			Electricfor's constructive thermic class	Weight in Kg
				A	ØB	L		
SBM6	6000	3	Iy-800	529	370	442	T-602-S	5,4
SBM12	12000	2,9	Iy-800	414	560	327	T-602-S	7,4

Option

- Clamps to fix the heater to a double omega shaped tank. They will be supplied in bags of six units with six screws M4x25 Stainless Steel.
  Code: 128169000 **Reference:** MPA-BO-SBM
- Special order: Other dimensions, power and voltages.
  Manufacturing in titanium tube Ø10,92.mm
  Manufacturing in Teflon® tube Ø12 mm.

MODELS SBC.

Code	Watts	W/cm²	Tube material	Dimensions in mm					Electricfor' s constructive thermic class	Weight in Kg
				A	ØB	L	C	D		
SBC2,5	2500	1,7	Iy-800	438	235	351	40	70	T-602-S	3,2
SBC7,5	7500	2,4	Iy-800	690	425	612	57	97	T-602-S	5,1



Option

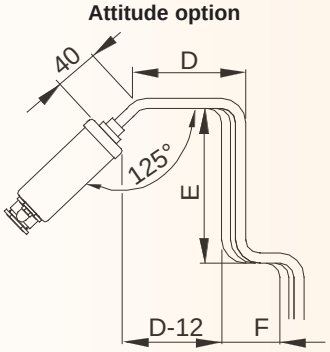
- Clamps to fix the heater to a double omega shaped tank. They will be supplied in bags of six units with six screws M4x25 Stainless Steel.
  Code: 128170000 **Reference:** MPA-BO-SBC
- Special order: Other dimensions, power and voltages.
  Manufacturing in titanium tube Ø10,92.mm
  Manufacturing in Teflon® tube Ø12 mm.

The SBM and SBC models are stocked in finished or semi-finished version is order to be adaptable to several differents uses.

If you require, we can also supply the SB type heaters varying side **A** height to make a special attitude, according to the diagrammes, to facilitate fixing the containing baskets in the heating barrels. Specify dimensions **A**, **C**, **D**, **E** and **F** in the order..

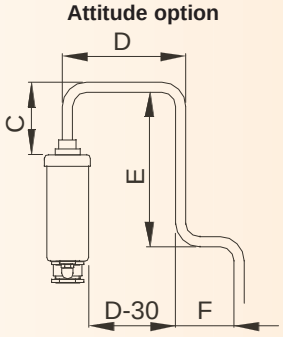
Models SBM.

Attitude option



Models SBC.

Attitude option



GROUP 1 - Immersion heaters, drum heaters and accessories

1.22 - Heating elements for no aggressice liquids

L-SHAPED FIXED HEATERS WITH HANDLE

General characteristics

- Degree protection against moisture IP-20.
- Stainless steel AISI 316L Ø10 mm tube.
- All models incorporate hose cable type H07RN-F with 3 wires of suitable section and length 1500 mm.
- Stocked in finished or semi-finished version in order to be adaptable to several differents uses.
- The standard version has the shape of an "S" with handle.
- Standard voltage ~230 V

Options

Shape: «V», «X», «Y».

Handles: Made in melted resin IP-67
Connection box with degree protection against moisture IP-66
Internal plug for 1, 3 or 6 elements.

Also available: Other dimensions, voltages and powers.
Titanium Ø10,92 mm tube

If you require to reduce the SN heater heights, indicate the dimension Ls, Lv, Ly, Lx on your order sheet

SN HEATERS. STANDARD MODELS

Code	Watts	W/cm²	Dimensions in mm						Electricfor's constructive thermic class	Weight in Kg
			Common		Shape S	Shape V	Shape Y	Shape X		
			C	A	Ls	Lv	Ly	Lx		
SN001	1500	3,3	320	70	450	587	600	931	T-301-E	1,0
SN002	3000	3,1	320	160	450	587	600	931	T-301-E	2,0
SN003	4500	2,9	320	250	450	587	600	931	T-301-E	2,6
SN004	2000	3,9	270	70	850	981	1000	1275	T-301-E	1,9
SN005	4000	3,9	270	160	850	981	1000	1275	T-301-E	2,3
SN006	5700	3,8	270	250	850	981	1000	1275	T-301-E	2,9

Fixation clamps for heaters SN, SL and SF

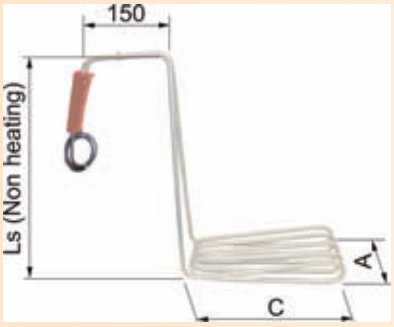
- Clamps to fix the heater SN to a double omega shaped tank. Material AISI 430. They will be supplied in bags of two units with two screws M4x25 Stainless Steel.

Code: 128171000

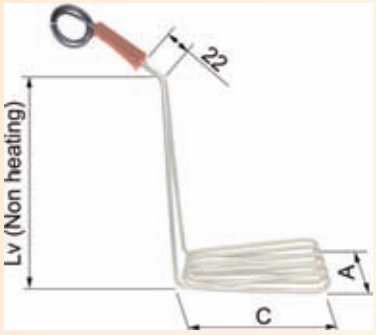
Reference: MPA-BO-SN

Other solutions with standard SN elements

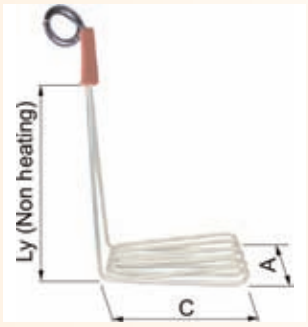
SHAPE "S"



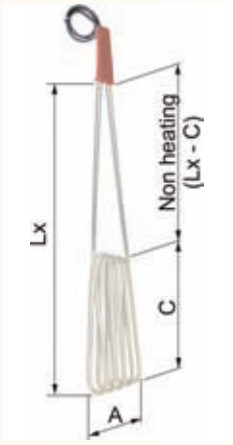
SHAPE "V"



SHAPE "Y"



SHAPE "X"



SL HEATERS. STANDARD MODELS

Code	Watts	W/cm²	Tube material	Dimensions in mm			Electricfor's constructive thermic class	Weight in Kg
				L	LC	Passes through Ø		
SL0,6	600	5,6	AISI 321	295	170	120	T-600-S	0,46
SL1	1000	5,9	AISI 316L	400	105	50	T-301-E	0,56
SL1,5	1500	6,6	AISI 316L	400	105	50	T-301-E	0,61

SL FIXED HEATERS
General characteristics

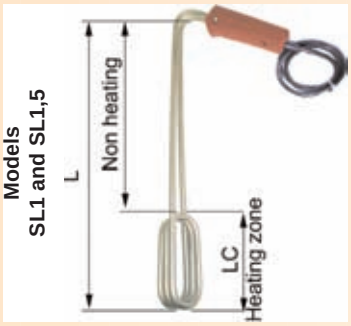
- Degree protection against moisture IP-20.
- Stainless steel AISI 321 Ø8 mm tube for the model SL0,6 and AISI 316L Ø8 mm tube for the models SL1 and SL1,5.
- All models incorporate hose cable type H07RN-F with 3 wires of suitable section and length 1500 mm.
- Standard voltage ~230 V

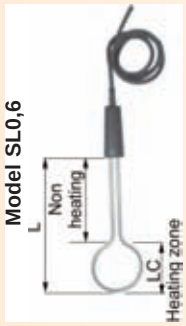
SF HEATERS. STANDARD MODELS

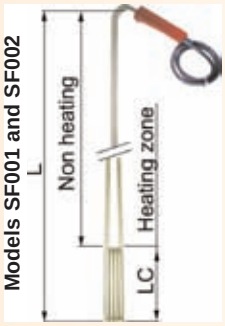
Code	Watts	W/cm²	Tube material	Dimensions in mm			Electricfor's constructive thermic class	Weight in Kg
				L	LC	Passes through Ø		
SF001	1000	5,3	AISI 321	1170	148	56,5	T-300-E	1,0
SF002	1500	5,6	AISI 321	1170	148	56,5	T-300-E	1,1
SF003	1200	2,9	AISI 321	840	447	24	T-300-E	1,1

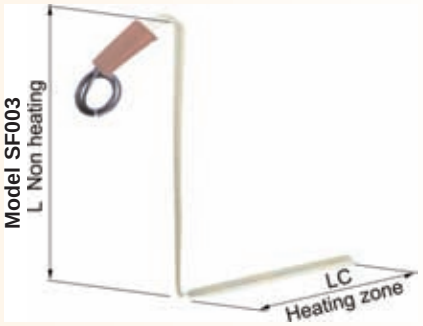
SF FIXED HEATERS FOR DRUMS
General characteristics

- Degree protection against moisture IP-20.
- Stainless steel AISI 321 Ø8 mm tube.
- All models incorporate hose cable type H07RN-F with 3 wires of suitable section and length 1500 mm.
- Standard voltage ~230 V









FIXED INSTALLATION HEATING ELEMENTS FOR AGGRESSIVE LIQUIDS.

General characteristics

- Smelted resin handles with degree protection against moisture IP-67.
- Silicone hose cable 2 wires + Earth cable 1500 mm long.
- Electrical Class I
- Standard voltage ~230 V
- Tube material:

Titanium Ø10 mm	→	Models STIU / STIM
AISI 316L Ø10 mm	→	Models SINU / SINM
Incoloy®-825 Ø10 mm	→	Models SIYU / SIYM / SIYMN

TITANIUM HEATERS. SHAPE “U”

Code	Watts	W/cm²	Dimensions in mm				Electricfor's constructive thermic class	Weight in Kg
			L	I	A	B		
STIU0,5	500	5,0	400	190	160	71	T-440-E	0,70
STIU1	1000	4,3	600	200	350	71	T-440-E	0,86
STIU2	2000	4,9	900	200	650	71	T-440-E	1,1
STIU3	3000	4,8	1250	200	1000	71	T-440-E	1,3
STIU4	4000	4,9	1550	200	1300	71	T-440-E	1,5

STAINLESS STEEL AISI 316L HEATERS. SHAPE “U”

Code	Watts	W/cm²	Dimensions in mm				Electricfor's constructive thermic class	Weight in Kg
			L	I	A	B		
SINU0,5	500	5,1	400	190	160	71	T-301-E	0,70
SINU1	1000	4,3	600	200	350	71	T-301-E	0,84
SINU2	2000	4,9	900	200	650	71	T-301-E	1,1
SINU3	3000	4,8	1250	200	1000	71	T-301-E	1,3
SINU4	4000	4,9	1550	200	1300	71	T-301-E	1,5

INCOLOY®-825 HEATERS. SHAPE “U”

Code	Watts	W/cm²	Dimensions in mm				Electricfor's constructive thermic class	Weight in Kg
			L	I	A	B		
SIYU1,5	1500	3,3	1000	250	700	60	T-602-E	1,1
SIYU2	2000	3,3	1300	300	950	60	T-602-E	1,4
SIYU3	3000	3,1	1900	330	1520	60	T-602-E	1,7
SIYU4	4000	3,3	2300	350	1900	60	T-602-E	2,1

TITANIUM HEATERS. SHAPE “M-4”

Code	Watts	W/cm²	Dimensions in mm				Electricfor's constructive thermic class	Weight in Kg
			L	I	A	B		
STIM2	2000	4,9	600	200	350	158	T-440-E	1,1
STIM2L	2000	4,9	700	200	450	158	T-440-E	1,1
STIM3	3000	4,8	800	200	550	158	T-440-E	1,3
STIM4	4000	4,9	900	200	650	158	T-440-E	1,5

STAINLESS STEEL AISI 316L HEATERS. SHAPE “M-4”

Code	Watts	W/cm²	Dimensions in mm				Electricfor's constructive thermic class	Weight in Kg
			L	I	A	B		
SINM2	2000	4,9	600	200	350	158	T-301-E	1,1
SINM2L	2000	4,9	700	200	450	158	T-301-E	1,1
SINM3	3000	4,8	800	200	550	158	T-301-E	1,3
SINM4	4000	4,9	900	200	650	158	T-301-E	1,5

INCOLOY®-825 HEATERS. SHAPE “M-4”

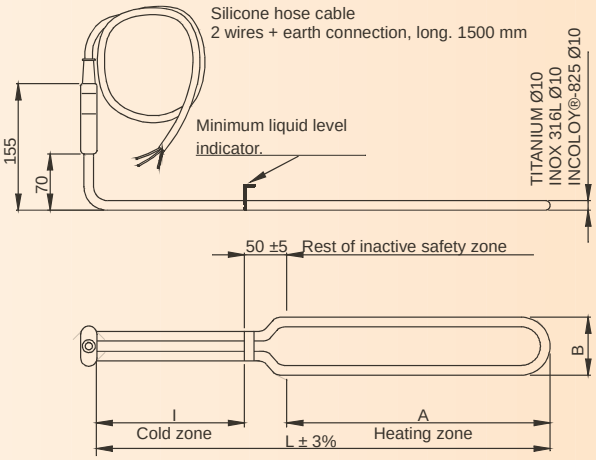
Code	Watts	W/cm²	Dimensions in mm				Electricfor's constructive thermic class	Weight in Kg
			L	I	A	B		
SIYM1,5A	1500	3,3	700	250	400	158	T-602-E	1,1
SIYM1,5B	1500	3,3	800	250	500	158	T-602-E	1,1
SIYM2A	2000	3,3	800	300	458	158	T-602-E	1,4
SIYM2B	2000	3,3	900	300	550	158	T-602-E	1,4
SIYM3	3000	3,1	1150	330	770	158	T-602-E	1,7
SIYM4	4000	3,3	1350	350	950	158	T-602-E	2,1

Applications

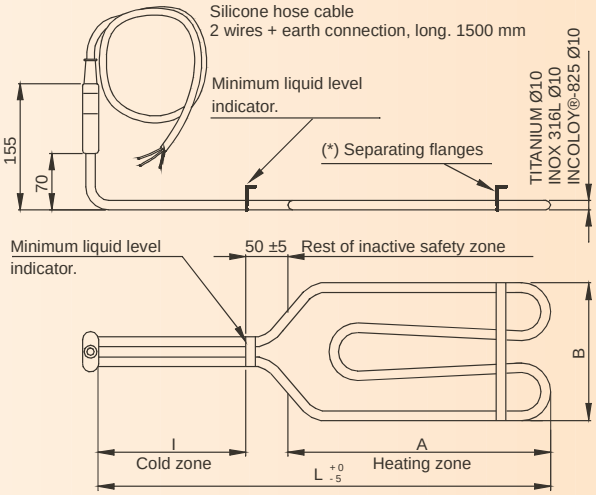
For chemical baths:

- Degreasing
- Pickling
- Shining
- Phosphatizing
- Electropolishing
- Zinc-plating
- Cadmium-plating
- Copper-plating
- Nickel-plating
- Chrome-plating
- Silver-plating
- Gold-plating
- Fixed
- Colored

COMMON DIMENSIONS. SHAPE “U” RANGE



COMMON DIMENSIONS. SHAPE “M-4” RANGE



(*) NOTE: The separating flange is only supplied with the models SIYU, SIYM and SIYMN

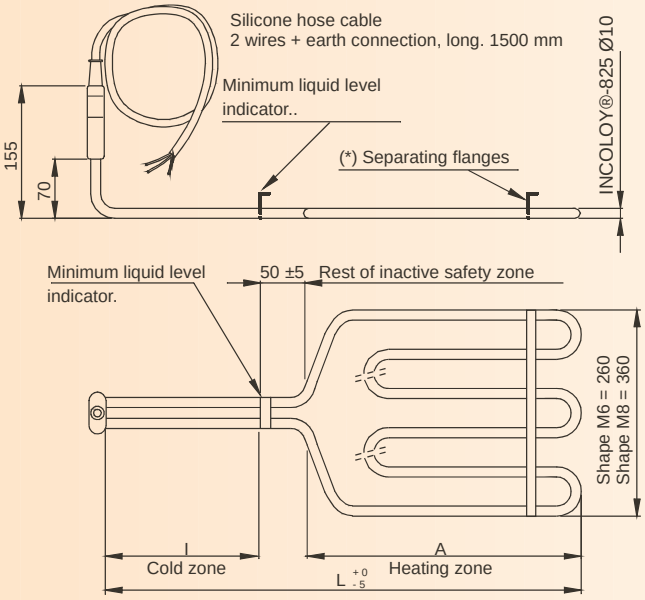
SIYMN / STEF

Models as per catalogue: NTC-0117

GROUP 1 - Immersion heaters, drum heaters and accessories

1.23 - Heating elements for aggressive liquids

COMMON DIMENSIONS. SHAPE “M-6” and “M-8”

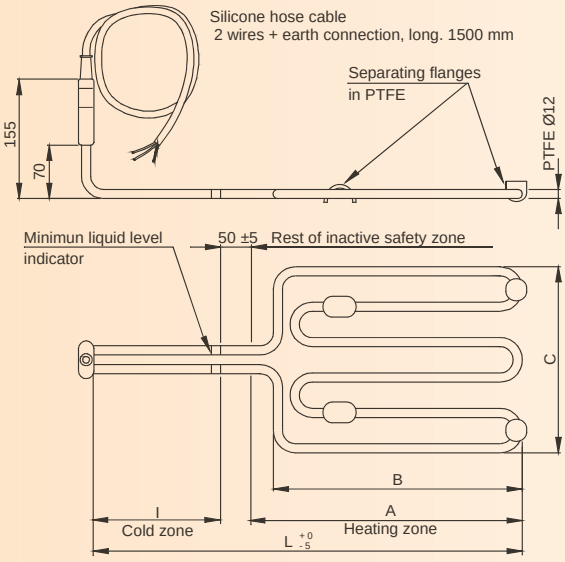


INCOLOY®-825 HEATERS.

SHAPE “M-6” / “M-8”

Code	Watts	W/cm²	Dimensions in mm			Shape	Electricfor's constructive thermic class	Weig in K
			L	I	A			
SIYMN1,5	1500	3,3	600	250	300	M6	T-602-E	1,1
SIYMN2	2000	3,3	700	300	350	M6	T-602-E	1,4
SIYMN3C	3000	3,1	800	330	420	M8	T-602-E	1,7
SIYMN3A	3000	3,1	900	330	520	M6	T-602-E	1,7
SIYMN3B	3000	3,1	1000	330	620	M6	T-602-E	1,7
SIYMN4C	4000	3,3	900	350	500	M8	T-602-E	2,1
SIYMN4D	4000	3,3	1000	350	600	M8	T-602-E	2,1
SIYMN4A	4000	3,3	1100	350	700	M6	T-602-E	2,1
SIYMN4B	4000	3,3	1200	350	800	M6	T-602-E	2,1

HEATERS COATED WITH PTFE



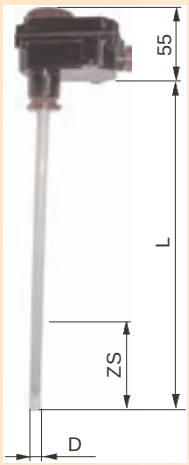
Exclusive for PTFE heaters.

These elements are especially designed to heat a wide variety of corrosive liquids with the exception of hydrofluoric acid. The final choice may be based on the working conditions, recommendations of the manufacturer of the corrosive material, or a preliminary test. ELECTRICFOR, S.A. declines responsibility for any possible problems owing to corrosion, since the different working conditions and factors, which are very often unknown, can affect the effectiveness of the sheath.

ATTENTION!: The maximum working temperature is 90 °C for liquids with boiling point below 110 °C, and 35 °C for liquids with boiling point over 110 °C. For more information ask for our NTC 9120.

Code	Watts	W/cm²	Dimensions in mm					Shape	Electricfor's constructive thermic class	Weigh in Kg
			I	A	B	C	L			
STEF1	1000	2,4	140	210	150	245	400	M6	T-270-E	1,1
STEF2	2000	2,5	180	370	330	245	600	M6	T-270-E	1,5
STEF3	3000	2,5	320	430	390	245	800	M6	T-270-E	2,1
STEF3A	3000	2,6	320	530	380	245	900	M8	T-270-E	2,1
STEF3B	3000	2,5	320	630	510	245	1000	M8	T-270-E	2,1

TERACTE / TERACTI / TERACTY



GROUP 11 - Control and regulation

11.5 - Thermostats for acids and aggressive liquids

Model	Sheath				Sheath replacement code	Thermostat			Weight in Kg
Assembly code	Material	Dimensions in mm				Assembly code	Material	Dimensions in mm	
		L	ZS Miniumn level Bulb zone	D					
TERACTE3090	PTFE	360	100	12	128046000	30_90	BULB	3501290201	0,34
TERACTI3090	TITANIUM	360	100	12,7	128045000	30_90	BULB	3501290201	0,34
TERACTIY3090	IY-825	360	100	12	128206000	30_90	BULB	3501290201	0,34

Replacements	
Code	Description
128046000	PTFE SHEATH
128045000	TITANIUM SHEATH
128206000	INCOLOY®-825 SHEATH
108046004	BAKELITE BOX WITH GASKETS
3503290201	THERMOSTAT WITHOUT BUTTON
517165000	BLACK BUTTON. TEMPERATURE RANGE 30 / 90 °C

IMMERSION HEATERS FOR AGGRESSIVE BATHS, RG RANGE.

Immersion heaters for aggressive baths in the RG range are used for heating the different types of substances and solutions of a chemical or electrolytic, surface-coating process

General characteristics

- Heating element manufactured with high-quality ceramic support and Ni-Cr alloy resistive wire
- Head in EPDM for all models with sheath Ø25, Ø30 and Ø33 mm and also for models with lead sheath in Ø52 mm.
- Bakelite head with IP65 protection degree for the porcelain models of Ø40 mm and all models with sheath Ø52 mm except for models with lead sheath.
- 2 or 3 wire silicone hose lead + Earth of 1500 mm long (for different lengths of lead, indicate on the order)
- Class I electric heater
- Standardised voltages: ~230 V; 2~400 V; 3~400 V
- Sheath material:

Titanium	→	Ø25 mm / Ø52 mm	**Pyrex**	→	Ø52 mm
Quartz	→	Ø25 mm / Ø30 mm	**PTFE**	→	Ø52 mm
AISI 316L	→	Ø33 mm / Ø52 mm	**Lead**	→	Ø52 mm
Porcelain	→	Ø40 mm			

Applications

Chemical baths for:

- Degreasing
- Bead-polishing
- Polishing
- Phosphate-plating
- Electro-polishing
- Zinc-plating
- Cadmium-plating
- Copper-plating
- Nickel-plating
- Chrome-plating
- Silver-plating
- Gold-plating
- Fixing
- Colouring

Method of use

- The immersion heater is supplied without any control elements, the user having to connect the different electrical circuits and drives to start the immersion heater running.
- Periodically check the air-tightness of the head to make sure there is no deterioration of the internal connections due to corrosive actions of vapours or liquids.
- The immersion heater has a mark which signals the heated zone. To ensure correct functioning, it is vital that this mark is always completely submerged
- For its electrical connection, it must be submerged in the bath.
- To remove it from the bath, it must be disconnected electrically and left for 15 minutes or until the heating element has cooled down.
- Before installing the immersion heater, check that the sheath material is suitable for the type of bath in which it is to be submerged. To do so, and only as a guideline, we show below a table with the recommended sheath materials per type of bath. The final choice may be based on working conditions, recommendations by the corrosive material manufacturer, or else, on a preliminary test. ELECTRIFOR S.A. cannot be held responsible for potential problems caused by corrosion, as different working conditions and other factors, often unknown, can modify the efficiency of the sheath.

	Titanium	Quartz	Stainless Steel AISI 316L	Porcelain	Pyrex	Lead
Electro-acid shining		X		X	X	X
Cadmium	X		X			
Alkaline copper	X		X			
Acid copper	X	X		X	X	X
Colouring			X			
Special chrome						X
Sulphuric chrome						X
Sulphurous chrome	X	X		X	X	
De-greasing	X		X			
Aggressive de-greasing		X		X	X	
Staining steel electro-polishing		X		X	X	
Aluminium electro-polishing		X		X	X	X
Fixing		X		X	X	X
Phosphate-plating	X		X			
Shiny nickel-plating			X			
Silver-plating	X	X		X	X	
Gold		X		X	X	
Alkaline zinc	X		X	X	X	
Salts for thermal treatments (nitrates – sodium nitrates)			X			

NOTE

The special characteristics of Teflon make it able to work in a wide range of corrosive liquids, and would therefore be suitable for any of the baths indicated in the table included.

The exception is to be found in baths with hydrofluoric acid or solutions with fluoride base. In these cases, Teflon is NOT appropriate

Standar models

Figure nº	Ø sheat	Sheat material	Long. A in mm							
			500	525	600	750	800	900	1000	1200
1	Ø25	TITANIUM	1000 W	--	--	--	2000 W	--	3000 W	--
1	Ø30	QUARTZ	1000 W	--	--	--	2000 W	--	3000 W	--
1	Ø33	AISI 316L	1000 W	--	--	--	2000 W	--	3000 W	--
2	Ø40	PORCELAIN	1000 W	--	--	--	2000 W	--	3000 W	--
2	Ø52	TITANIUM AISI 316L PYREX	--	1000 W	1000 W 1500 W 2000 W 2500 W 3000 W	2000 W	2000 W 2500 W 3000 W	3000 W	3000 W 3500 W	3000 W 3500 W
		PTFE	--	800 W	--	1600 W	--	2400W	--	--
1		LEAD	--	800 W	--	1600 W	--	2400W	--	--