

GROUP 1 - Immersion heaters, drums heaters and accessories

1.16 – Heating groups with flange — GCB

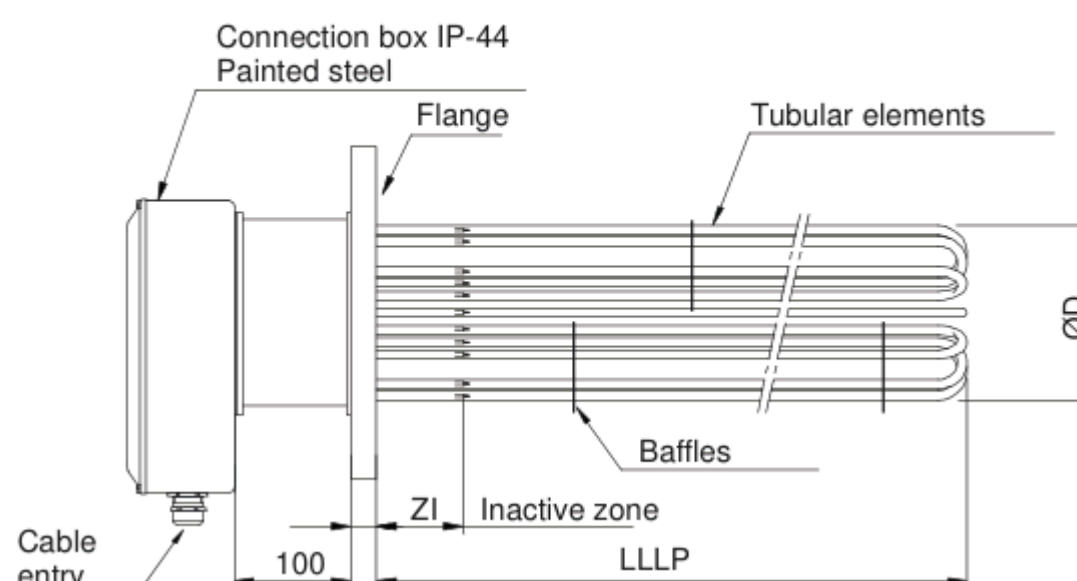


The GCB heating groups consist of a group of hairpin shaped elements soldered to standardised EN 1092 or ANSI flange of suitable diameter and nominal pressure, with its corresponding connection box.

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 Y
- 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: EN 1092 in steel
- Connection box IP-44.
- 2 Sheets of Øint6,5 mm for thermostat, limiter, thermocouple or PT100 sensor.
- Optionally, temperature control with thermostat, limiter, 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)

Temperature design	Maximi design temperature
Up to 99 °C	9,2 bar
From 100 °C to 149 °C	8,8 bar
From 150 °C to 199 °C	8,3 bar
From 200 °C to 249 °C	7,6 bar

STANDARDIZED MODELS GCB-V, RANGE FOR STEAM GENERATOR. MAXIMUM WORK TEMPERATURE: 120 °C

Flange DN	ØD in mm	N° elements. (Tube ly-825® Ø10 mm)								Length flat plate (LLLp in mm)						
		6	9	12	15	18	21	24	27	30	600	800	1000	1250	1500	1750
100	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	
	200			X						12 kW	15 kW	18 kW	24 kW	30 kW	40 kW	
	250				X					15 kW	18,75 kW	22,5 kW	30 kW	37,5 kW	50 kW	
	300					X				18 kW	22,5 kW	27 kW	36 kW	45 kW	60 kW	
150	150						X			21 kW	26,25 kW	31,5 kW	42 kW	52,5 kW	70 kW	
	200							X		24 kW	30 kW	36 kW	48 kW	60 kW	80 kW	
	250								X	27 kW	33,75 kW	40,5 kW	54 kW	67,5 kW	90 kW	
	300									30 kW	37,5 kW	45 kW	60 kW	75 kW	100 kW	
	350															

STANDARDIZED MODELS GCB-AT, RANGE FOR THERMIC OIL. MAXIMUM WORK TEMPERATURE: 120 °C

Flange DN	ØD in mm	N° 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
100	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	
	200			X						16 kW	21 kW	27 kW	36 kW	42 kW	51 kW	
	250				X					20 kW	26,25 kW	33,75 kW	45 kW	52,5 kW	63,75 kW	
	300					X				24 kW	31,5 kW	40,5 kW	54 kW	63 kW	76,5 kW	
150	150						X			28 kW	36,75 kW	47,25 kW	63 kW	73,5 kW	89,25 kW	
	200							X		32 kW	42 kW	54 kW	72 kW	84 kW	102 kW	
	250								X	36 kW	47,25 kW	60,75 kW	81 kW	94,5 kW	114,75 kW	
	300									40 kW	52,5 kW	67,5 kW	90 kW	105 kW	127,5 kW	
	350															

STANDARDIZED MODELS GCB-A, RANGE FOR WATER. MAXIMUM WORK TEMPERATURE: 120 °C

Flange DN	ØD in mm	N° 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
100	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	
	200			X						16 kW	21 kW	27 kW	36 kW	42 kW	51 kW	
	250				X					20 kW	26,25 kW	33,75 kW	45 kW	52,5 kW	63,75 kW	
	300					X				24 kW	31,5 kW	40,5 kW	54 kW	63 kW	76,5 kW	
150	150						X			28 kW	36,75 kW	47,25 kW	63 kW	73,5 kW	89,25 kW	
	200							X		32 kW	42 kW	54 kW	72 kW	84 kW	102 kW	
	250								X	36 kW	47,25 kW	60,75 kW	81 kW	94,5 kW	114,75 kW	
	300									40 kW	52,5 kW	67,5 kW	90 kW	105 kW	127,5 kW	
	350															

GROUP 1 - Immersion heaters, drums heaters and accessories

Flange heaters — GCB-N / GCB-C / GCB-ET / GCB-R

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.

EN 1092 / ASME Material flanges		
EN 1092	Steel	S235JR
		P250GH
	Stainless Steel	AISI-304L
		AISI-316L
ASME	Steel	A-105
	Stainless Steel	AISI-304L
		AISI-316L

L.L.P. (length flat plate)

Inactive zone

GCB-N Model

BORNES DIN RAIL TERMINAL FOR A QUICKER CONNECTION

MATERIAL HEATER			
MATERIAL	DIAMETER		
	Ø10	Ø12,5	Ø16
AISI 304L	X	X	X
AISI 321	X	X	X
AISI 316L	X	X	X
Alloy 800	X	X	X
Alloy 825	X	-	-
250 SMO	-	X	-
Titanium	X	-	-

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).

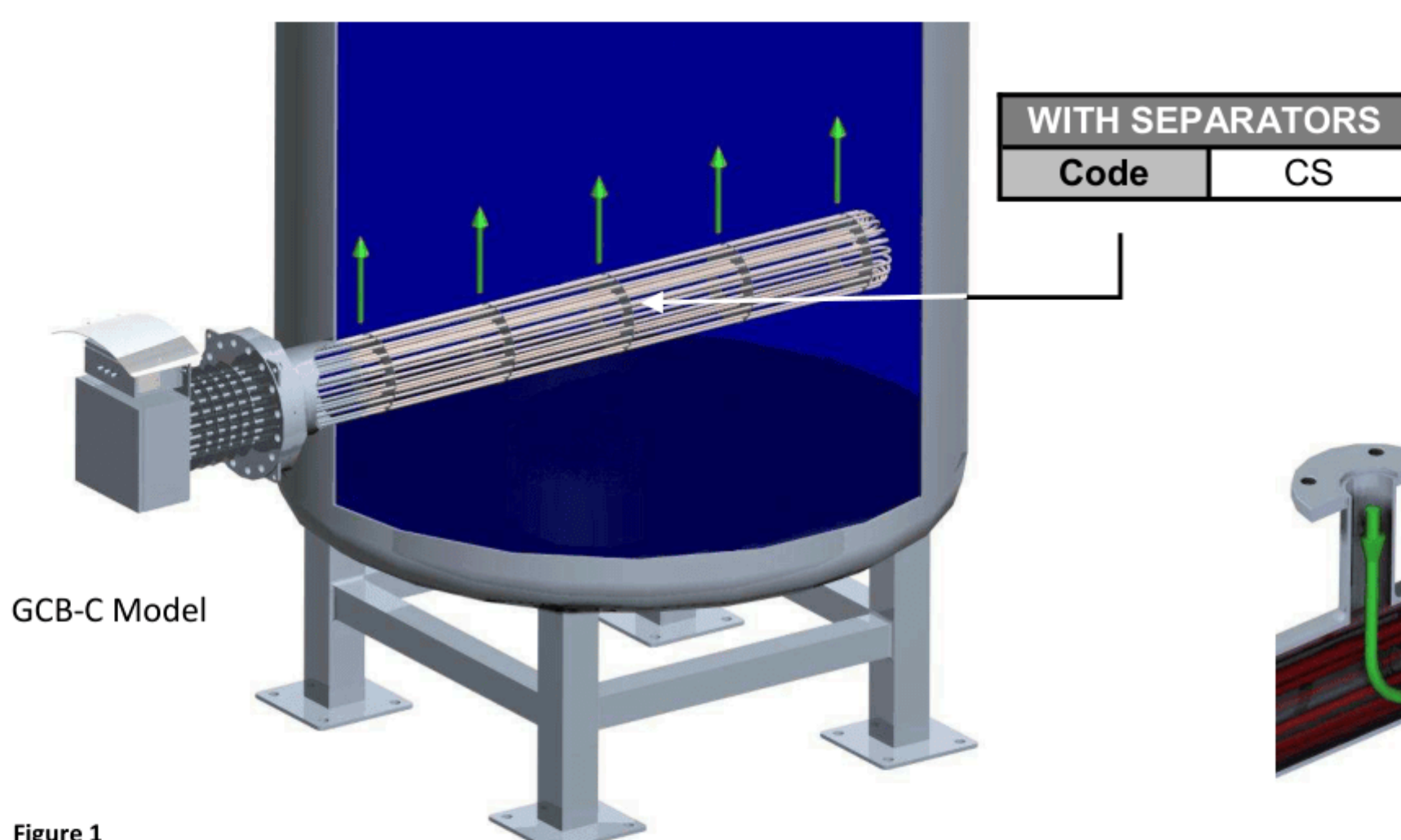


Figure 1

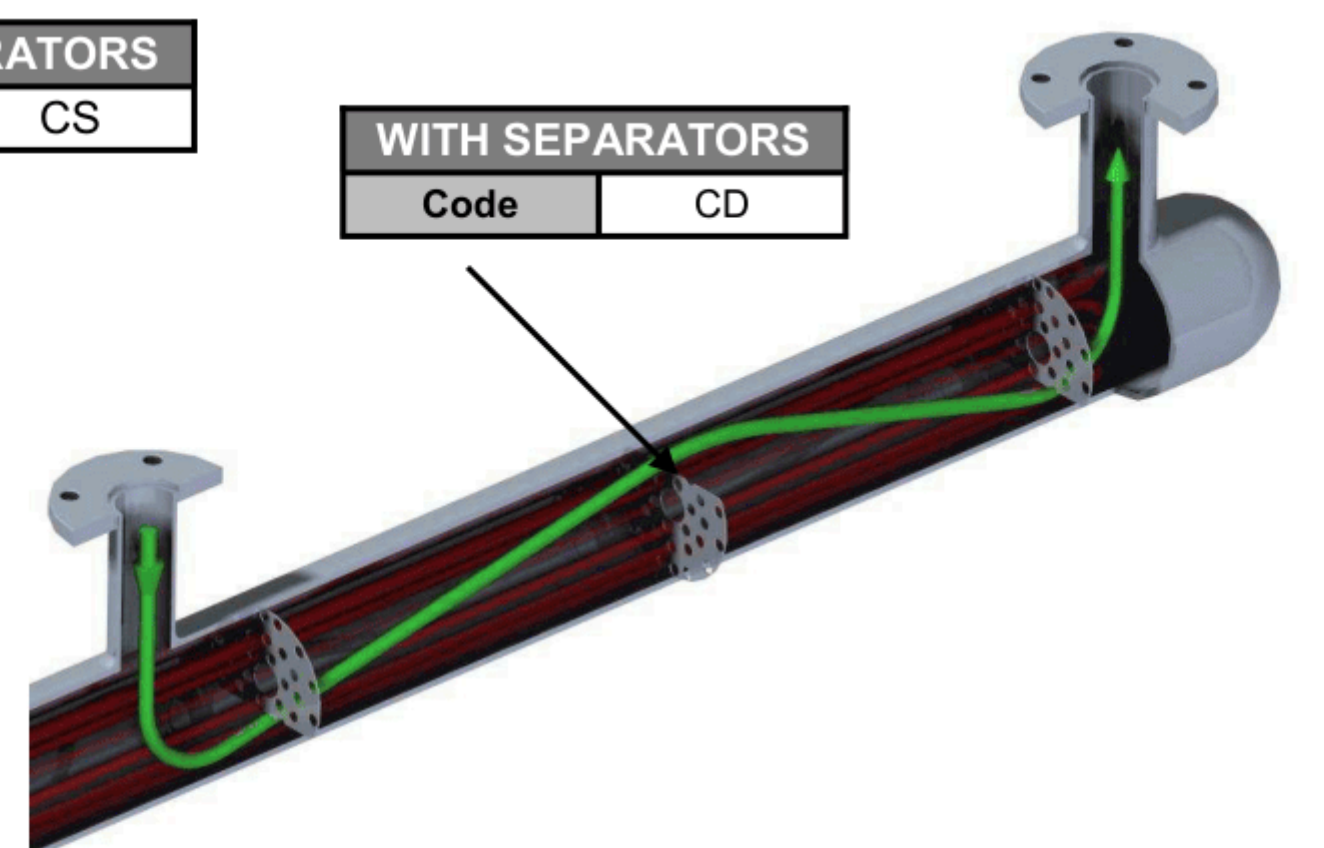


Figure 2

GROUP 1 - Immersion heaters, drums heaters and accessories

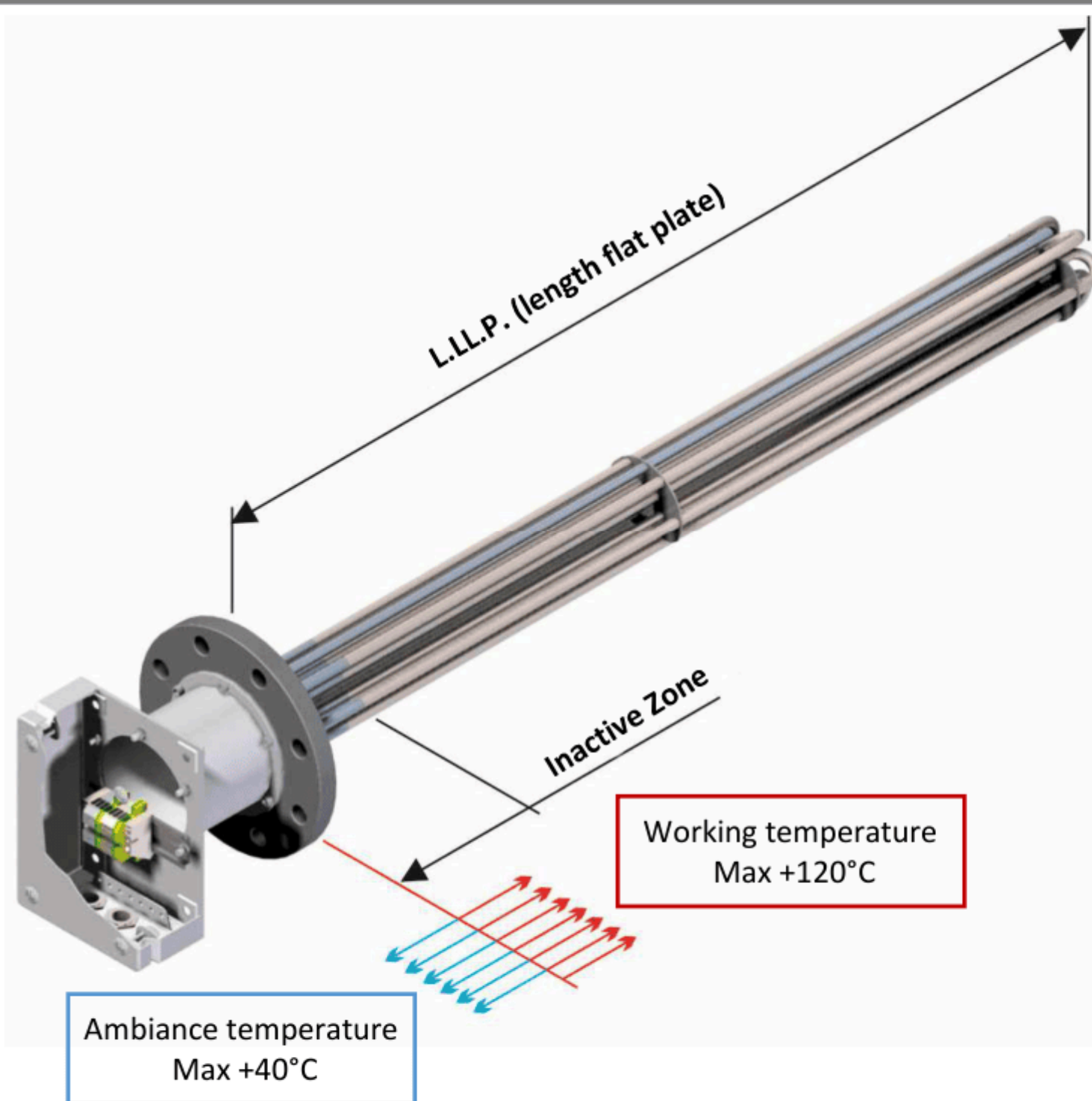
Flange heaters — GCB-N / GCB-C / GCB-ET / GCB-R

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 120 °C.

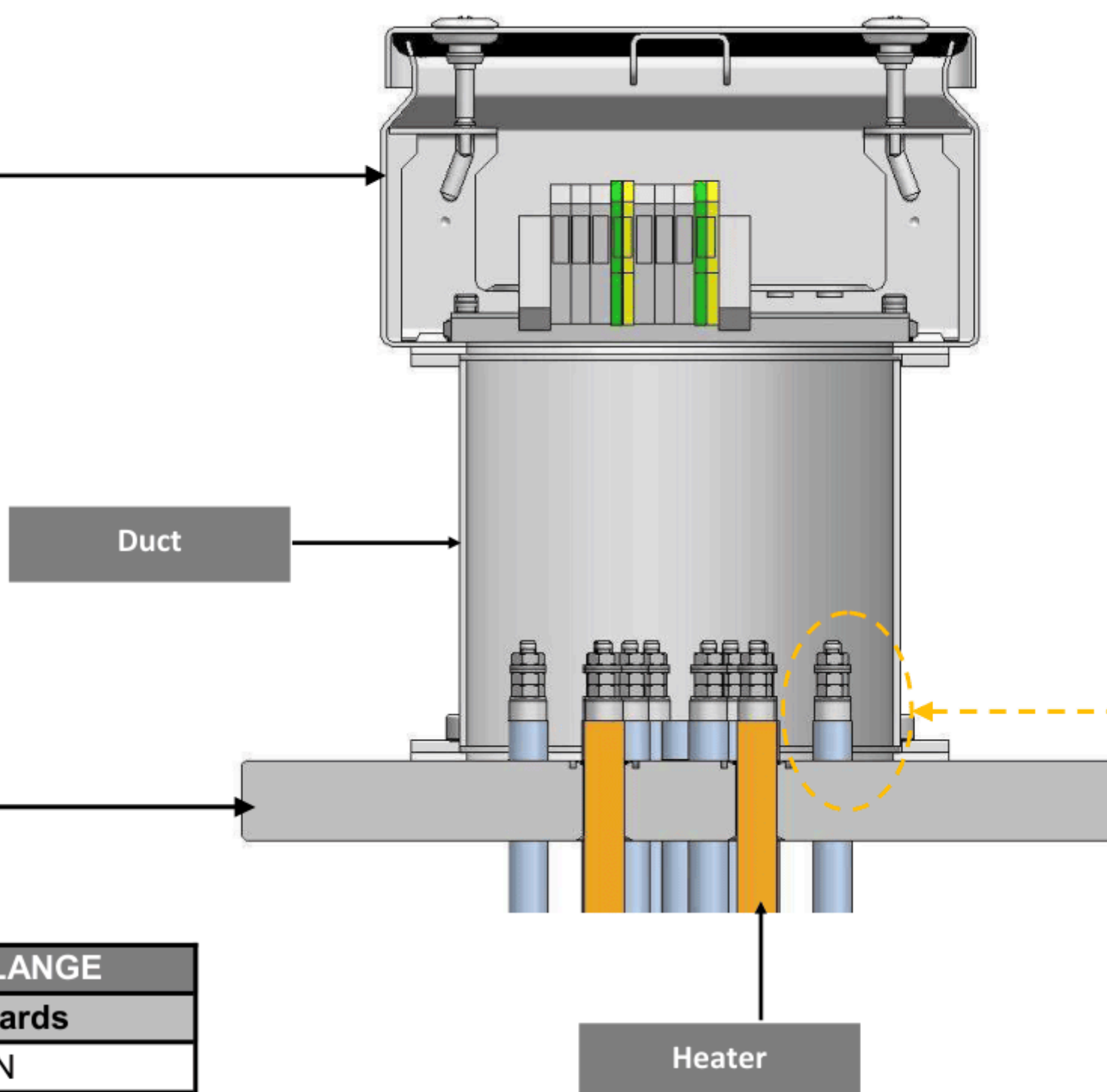
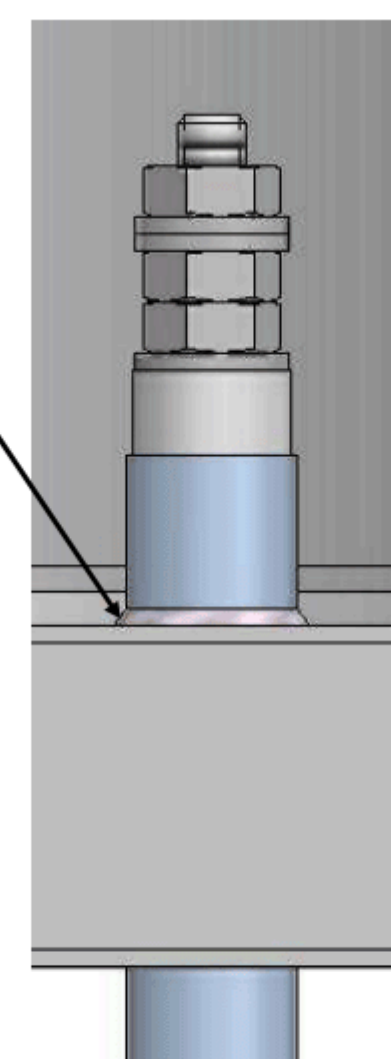


CONSTRUCTION OF FLANGES WITH DUCT

CONNECTION BOX	
IP	Material
54	Painted Steel
54	Stainless Steel
66	Painted Steel
66	Stainless Steel

(*) 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	
Brazing silver alloy	
Welding TIG without contribution	



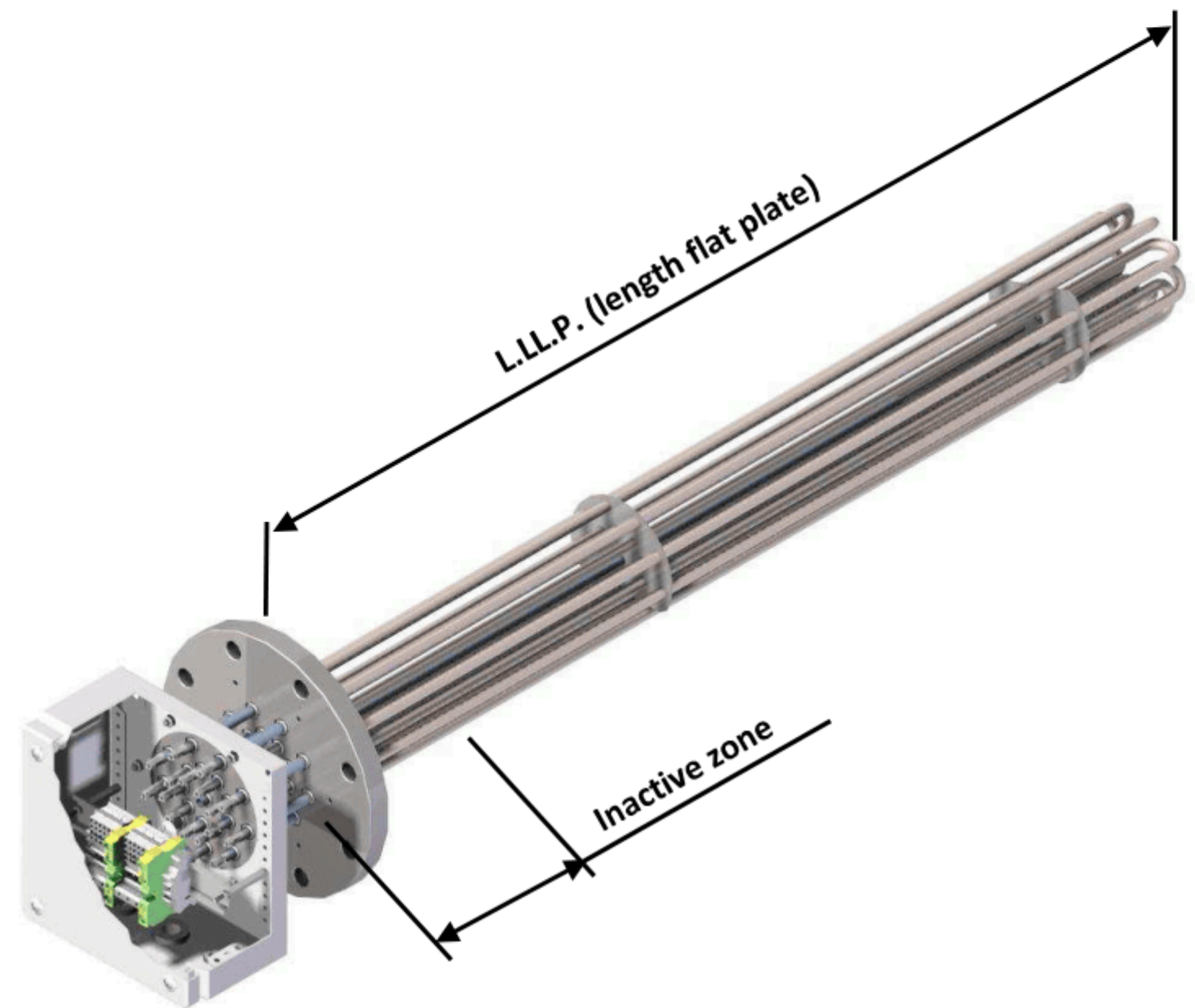
MAIN FLANGE	
Standards	
DIN	
EN 1092	
ASME	

GROUP 1 - Immersion heaters, drums heaters and accessories

Flange heaters — GCB-N / GCB-C / GCB-ET / GCB-R

The GCB-C heating units are mostly used for facilities where the working temperature exceeds 120 °C. 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 (ET) AND BUSHING

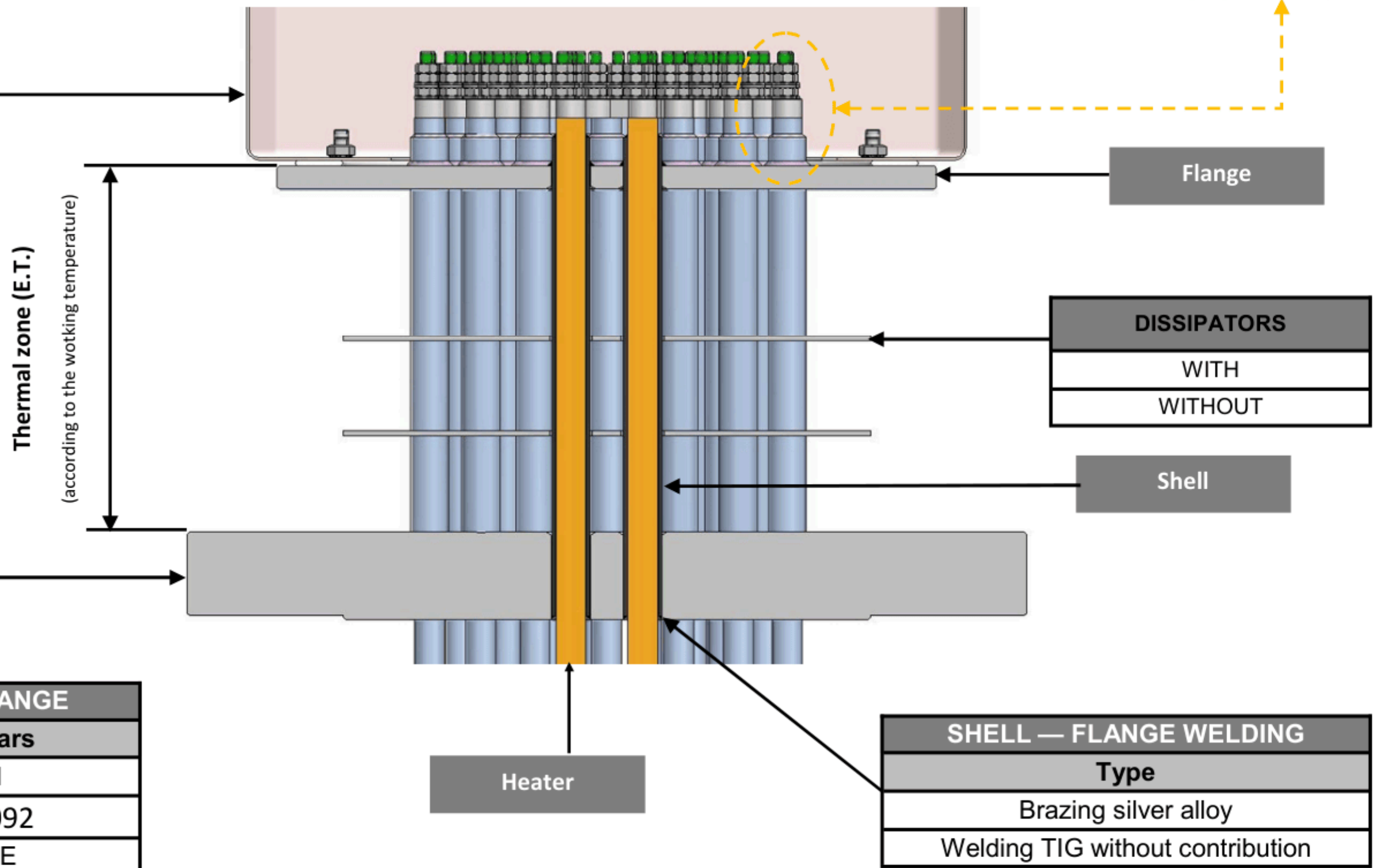
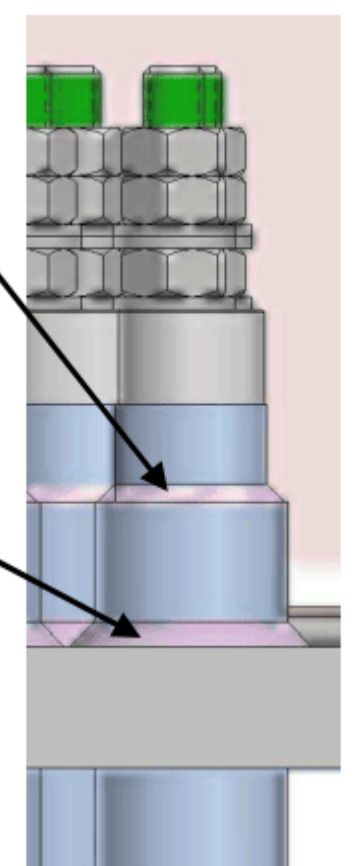
CONNECTION BOX	
IP	Material
54	Painted Steel
54	Stainless Steel
66	Painted Steel
66	Stainless Steel

(*) 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
Brazing silver alloy
Welding TIG without contribution

SHELL — FLANGE WELDING
Type
Brazing silver alloy
Welding TIG without contribution

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



MAIN FLANGE
Standars
DIN
EN 1092
ASME

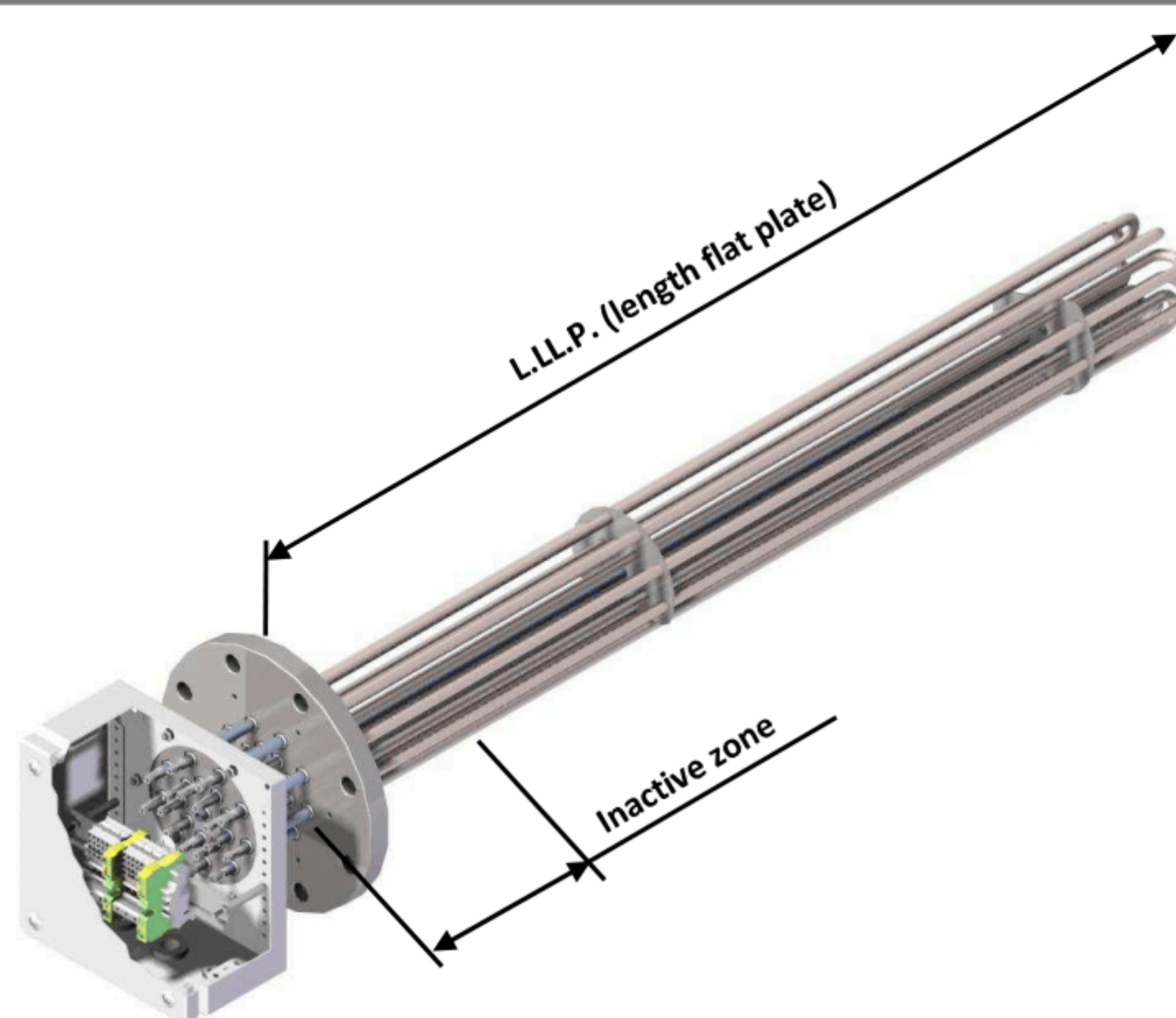
GROUP 1 - Immersion heaters, drums heaters and accessories

Flange heaters — GCB-N / GCB-C / GCB-ET / GCB-R

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 150°C 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.

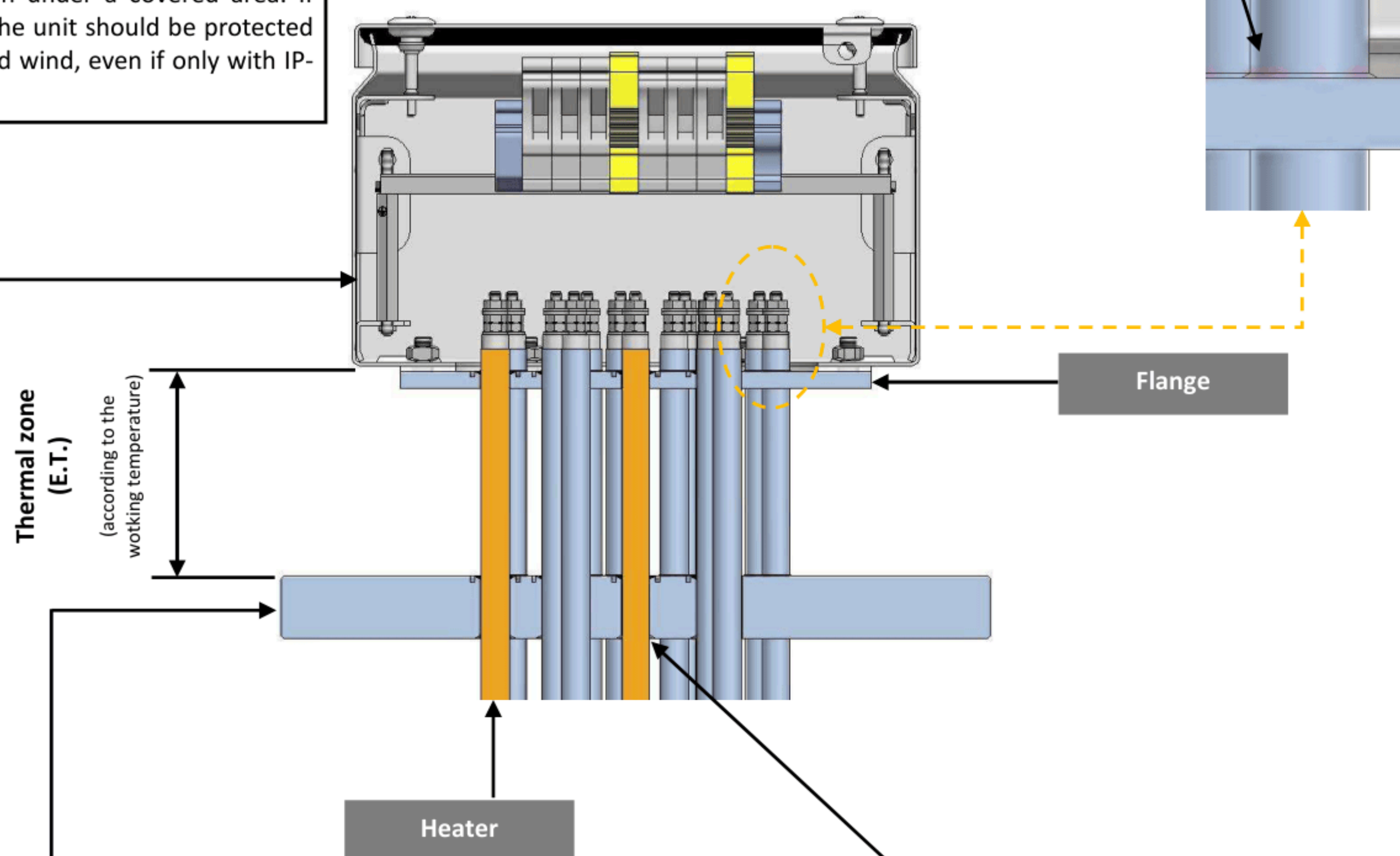
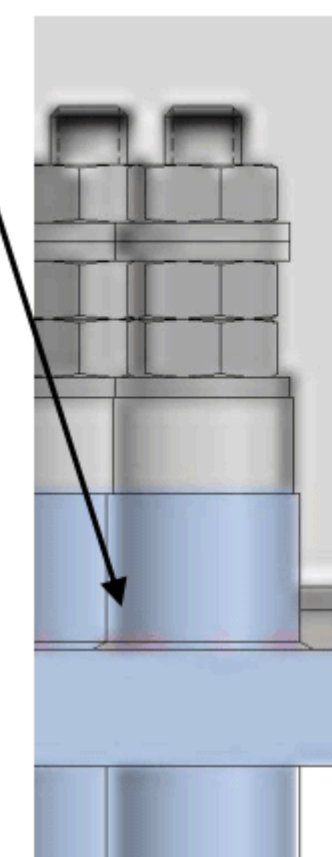


CONSTRUCTION OF FLANGES WITH THERMAL ZONE (ET) WITHOUT BUSHING

CONNECTION BOX	
IP	Material
54	Painted Steel
54	Stainless Steel
66	Painted Steel
66	Stainless Steel

(*) 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 — FLANGE WELDING	
Type	
Brazing silver alloy	
Welding TIG without contribution	



MAIN FLANGE	
Standards	
DIN	
EN 1092	
ASME	

SHELL — FLANGE WELDING	
Type	
Brazing silver alloy	

GROUP 1 - Immersion heaters, drums heaters and accessories

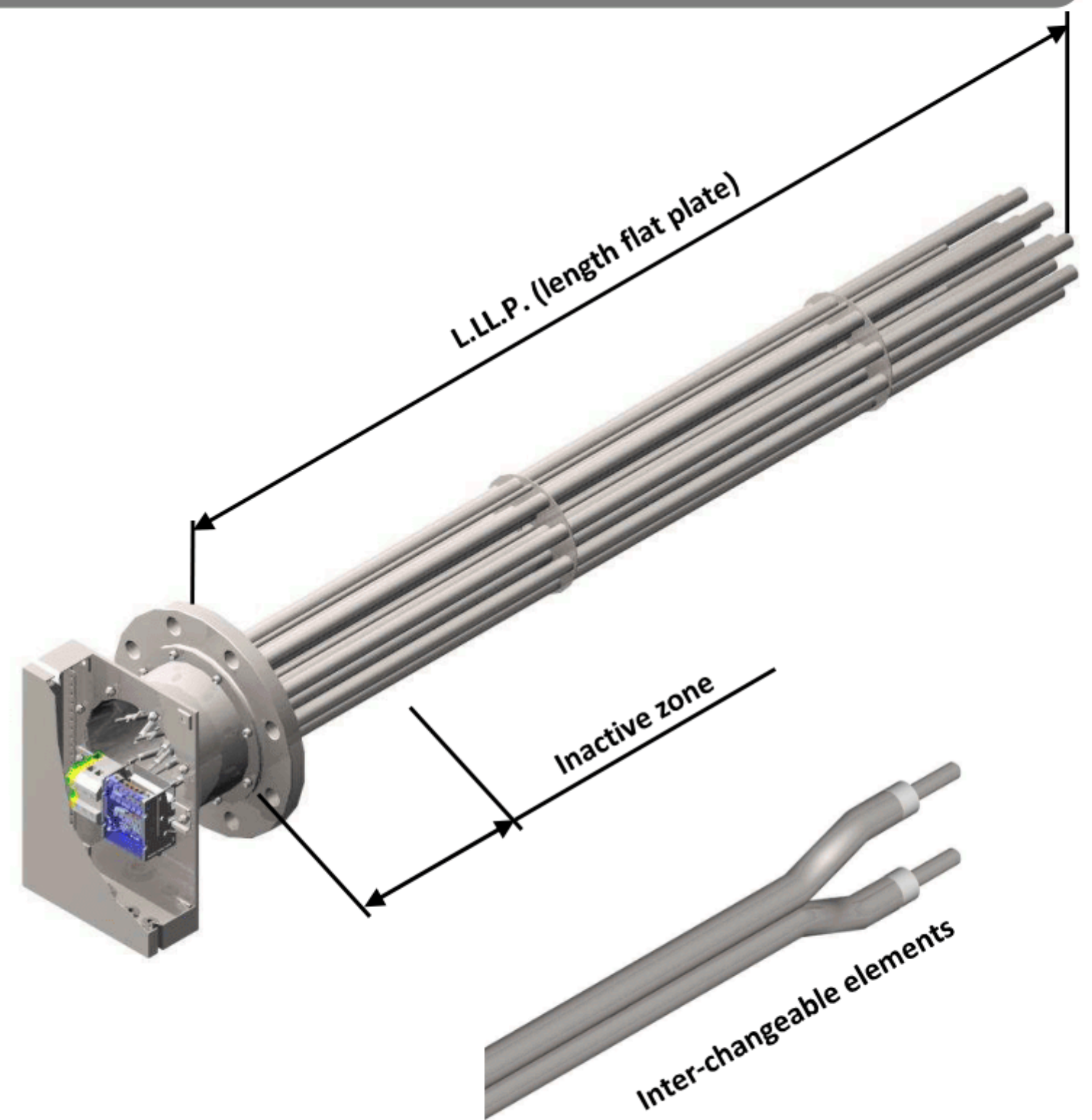
Flange heaters — GCB-N / GCB-C / GCB-ET / GCB-R

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.)

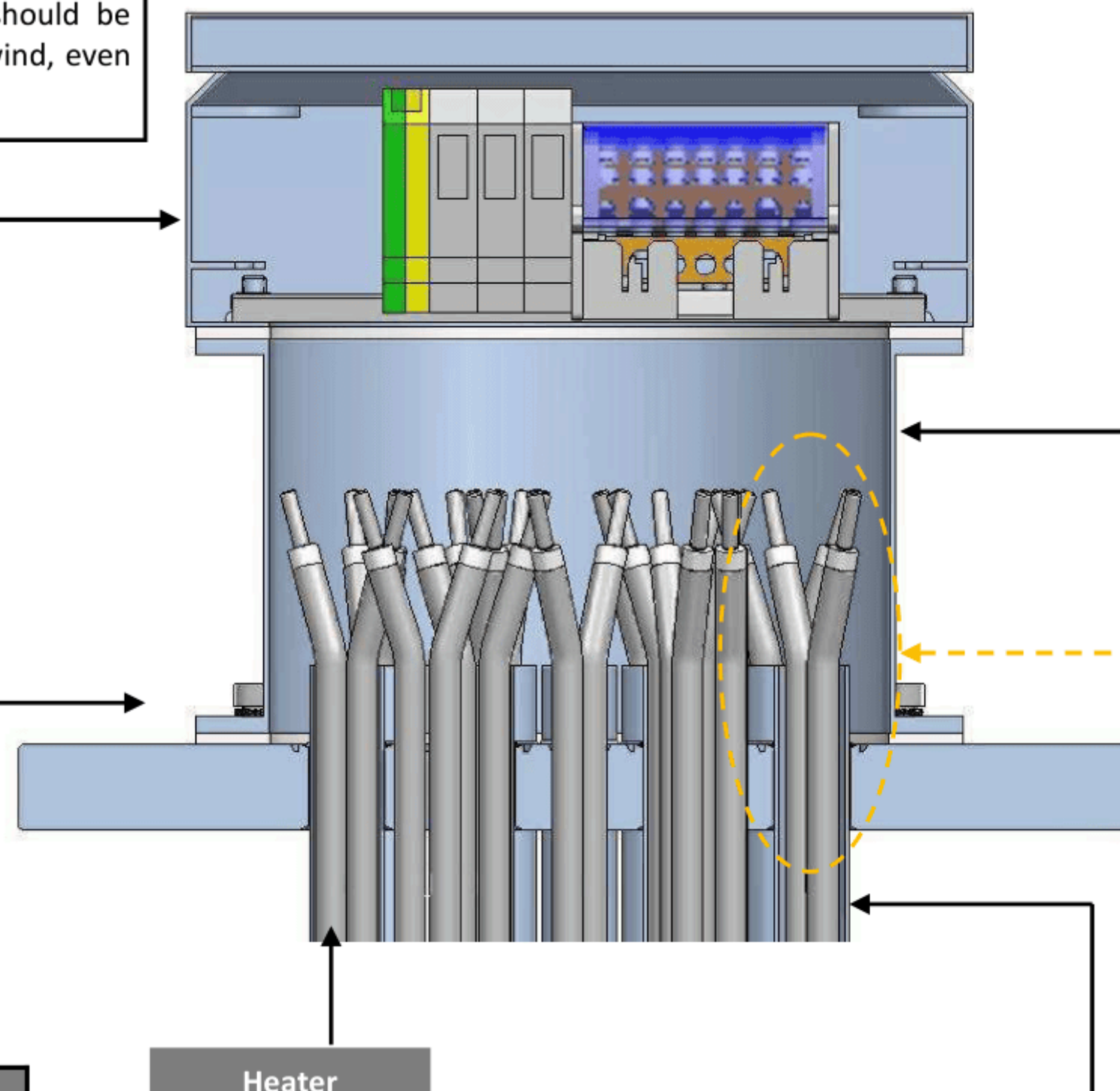
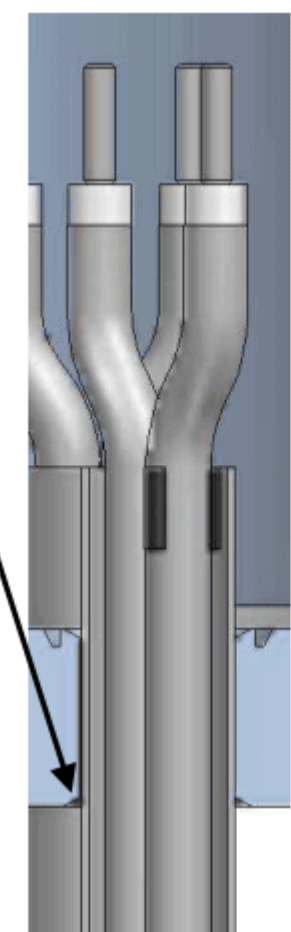


CONSTRUCTION OF FLANGES WITH INTERCHANGEABLE HEATING ELEMENTS

CONNECTION BOX	
IP	Material
54	Painted Steel
54	Stainless Steel
66	Painted Steel
66	Stainless Steel

(*) 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 — FLANGE WELDING	
Type	
Brazing silver alloy	
Welding TIG without contribution	



MAIN FLANGE	
Standards	
DIN	
EN 1092	
ASME	

SHEATS	
ØExt. sheath	
Ø19	
Ø25	