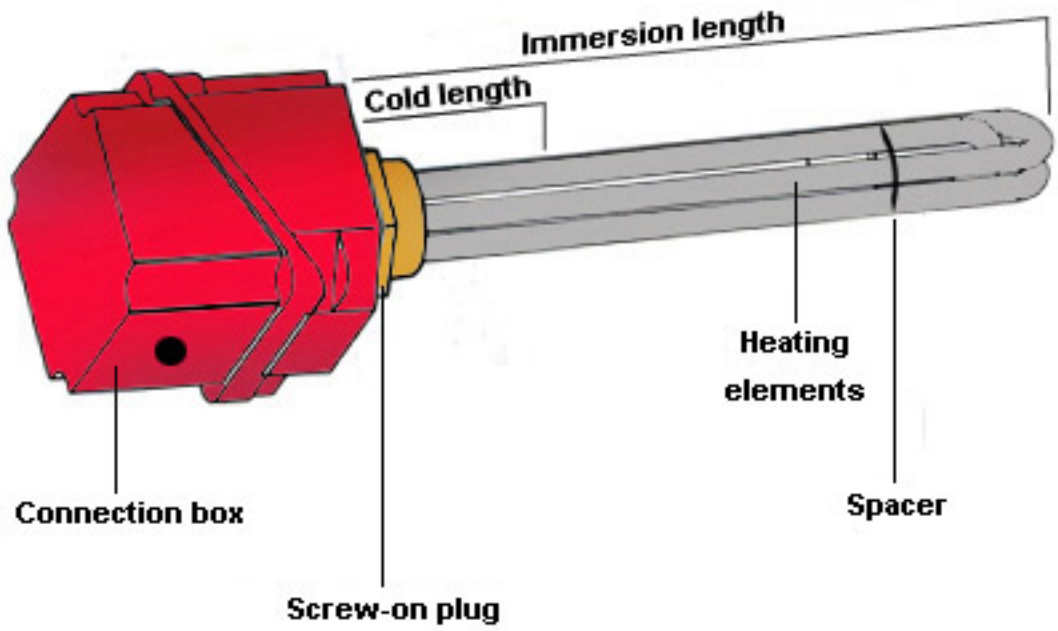
GENERAL INFORMATION

CETAL

• CONSTITUTION



• NON HEATING LENGTH

All the elements are made up of a heating part and two non heating parts at either end.
The table opposite shows the length of the steel or stainless steel output rods which form the non heating part.

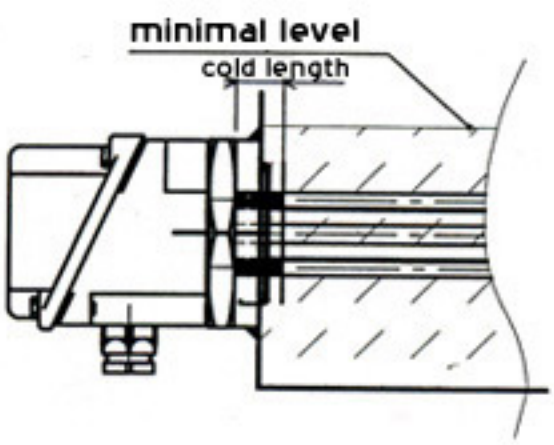
Sheath Ø		6.5	8.5 et 10			13,5	16		
Outlet Ø in mm		2	3.5	M4x0.7		M5x0.8	M6x1		M8x1.25
Material		Steel	Steel	Steel	S.Steel	Steel	Steel	S.Steel	Steel
Length in mm	35	•							
	45		•	•					
	55	•	•	•	•				
	75	•	•	•	•				
	80					•	•	•	•
	95	•	•	•	•				
	122	•	•		•	•	•	•	
	150	•	•	•	•	•	•	•	•
	180				•				
	205				•				
	225	•		•	•	•	•	•	•
	235		•						
	260				•				
	330	•		•	•	•	•	•	•
	365	•	•						•
	445			•			•	•	•
	530			•		•	•	•	•
	640						•		•
	800			•			•		•
	1000						•		
	1350						•		

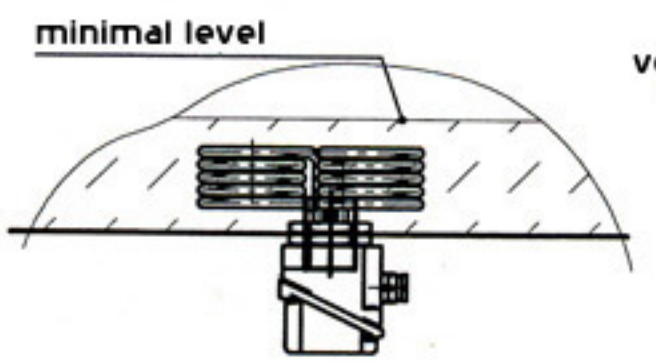
S.Steel : Stainless steel

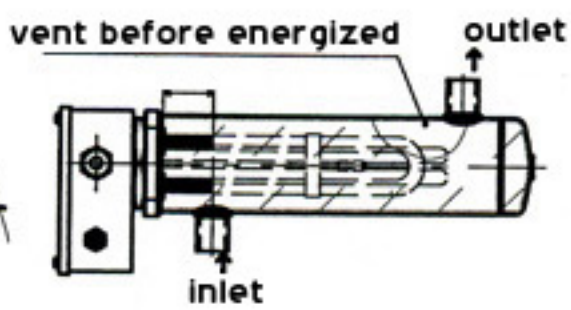
• SURFACE TREATMENT

Appropriate surface treatment is applied to adapt the heating elements to almost all requirements :
- *Mechanical treatment : sand blasting, aluminium or zinc plating, lead or Halar coating*
- *Chemical treatment : pickling, copper and stainless steel passivating*
- *Galvanic treatment : tin or nickel plating, electrolytic polishing.*

• NON HEATING LENGTH SELECTION/MOUTING RECOMMANDATION







TECHNICAL INFORMATION

CETAL

• ELECTRICAL CHARACTERISTICS

Usual diameters	6.5	8.5	10	13.5	16
Maximum utilisation voltage	415 V	415 V	500 V	750 V	750 V
Max. current intensity per resistor	10 A	14 A	14 A	20 A	60 A
Power tolerance > 100W	+5 - 10 %	+5 - 10 %	+5 - 10 %	+5 -10 %	+5 - 10 %
Power tolerance < 100 W	±10 %	±10 %	±10 %	±10 %	±10 %

• DIMENSIONAL CHARACTERISTICS

The heating length of an element is determined to ensure even distribution of heat in the heated medium.

It is calculated to the HL formula in cm $= \frac{P}{p.s}$

P = nominal power of heating element
p = specific load in W/cm²
s = circumference of armouring sheath in cm

• MECHANICAL CHARACTERISTICS

Sheaths *Very high quality rolled, welded or seamless sheaths manufactured and inspected to standards ASTM-DIN or NFA 49-147*

Forming *The heating elements are available in a variety of shapes adapted to the utilisation circumstances defined in the specifications or by the customer*

Tolerances

- *diameter : 6.5 ± 0.1 mm 13.5 ± 0.1 mm*
  8.5 ± 0.1 mm 16 ± 0.1 mm
  10 ± 0.1 mm
- *length: ±1% with + 5 mm minimum*
- *standard material : the dimensions in the tables are maximal dimensions intended to prevent assembly problems.*

• METALLURGICAL CHARACTERISTICS

Materials	Copper	Austenitic steel			Nickel alloy		
Cetal code	K	V	C	N	Z	A	I
AFNOR Code	COPPER	Z 6 CNT 18-10	Z 6 CNDT 17-12	Z 15 CN 24-13	Z 8 NC 32-20	Z 3 NC DU 42-22	Z 8 NC 75-15
AISI code		321	316 L/Ti	309	INCOLOY 800	INCOLOY 825	INCONEL 600
DIN code		1.4541	1.4571	1.4828	1.4876	2.4858	2.4816
Usual diameters 6.5	•	•		•	•		
8.5	•	•	•	•	•		•
10	•	•	•	•	•		
13.5		•(1)				•	
16	•	•(1)	•	•	•	•	•
Limit temp. of use	250°C in the air	750°C	750°C	1000°C	950°C	950°C	950°C

(1) seamless tube on stock

GRADE SELECTION

The most important criteria are the utilisation temperature, the nature of the medium and the surface flux.

AISI 321 — *Variety of AISI 304 stabilised with titanium to stop the formation of chromium carbide. It is specially recommended for prolonged use in the critical temperature range.*

AISI 316 L - 316 TI — *The addition of molybdenum (2 - 3%) makes it particularly resistant to chemical agents with a reducing effect. The low carbon content (or addition of titanium) gives it high resistance to intercrystalline corrosion.*

AISI 309 — *Austenitic steel with a high chromium and nickel content which makes it refractory. High resistance to oxidation.*

INCOLOY 800 — *Based on the ternary nickel/iron/chromium system and characterised by high resistance to corrosion in aqueous surroundings. Its high nickel content gives it effective resistance to crevice corrosion under stress due to chlorine ions. Its high chromium content makes it resistant to oxidation and carburation at high temperatures.*

INCOLOY 825 — *The addition of molybdenum and copper make it highly resistance to reducing and oxidising acids, crevice corrosion under stress and pitting corrosion. It is particularly resistant to sulphuric and phosphoric acid.*

INCONEL 600 — *Nickel chromium alloy offering high resistance to oxidation at high temperatures and resistance to crevice corrosion under stress due to chlorine ions, corrosion by very pure water and caustic corrosion.*

As deposit attacks, corrosion under stress and chemical corrosion (pitting) depend upon the conditions of utilisation, Cetal shall not be held responsible for failures and defects due to corrosion. We encourage you to check if the offered material is suitable for your application.

• CODE NUMBERS

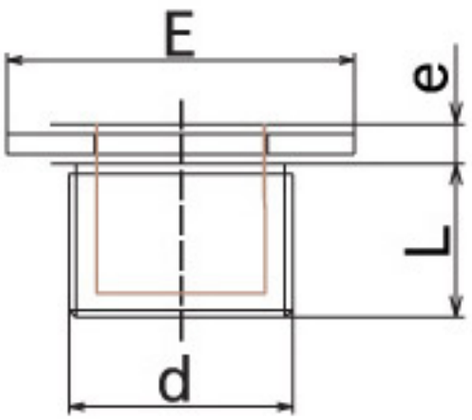
Non standard products code numbers :

e.g. R 16 V 1500/0150 (.....)

R = Heating resistor
16 = diameter of the element in mm
V = sheath grade (AISI 321)
1500 = total length of the heating element in mm
0150 = non heating length in mm on either side of the heating part.
(.....) = replying reference

ASSEMBLY PARTS

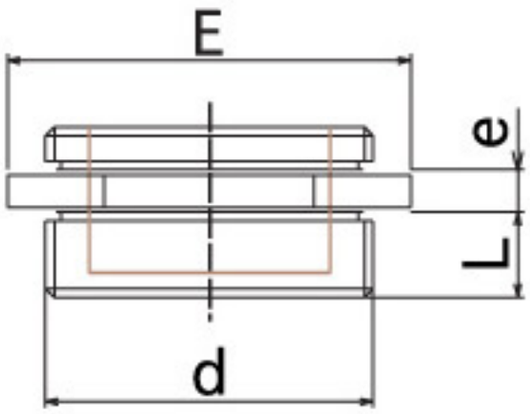
CETAL



SERIES 500 HEX PLUG

Use : bottom immersion heaters with OR series covers

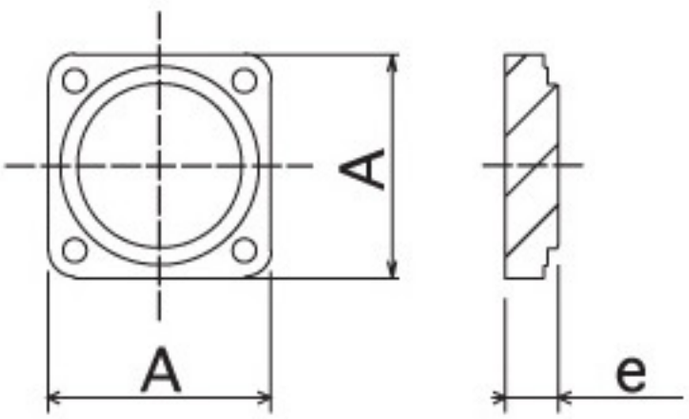
Code no	Material	Dimensions d	E	e	L
545 FC	Brass	M 45 x 2	H 60	8	31
577 FC	Brass	M 77 x 2	H 90	10	31
577 FC CN	S.steel	M 77 x 2	H 90	10	31
545	Brass	M 42 x 2	H 60	10	15
527	Brass	G 3/4 "	H 32	8	15
534	Brass	G 1"	H 42	8	15
577	Brass	M 77 x 2	H 95	10	20
577 CN	S.steel	M 77 x 2	H 95	10	20



SERIES 600 HEX PLUG

Use : immersion heaters with pivoting protective cover and :
- *either an end gland*
- *or a side gland.*

Code no	Material	Dimensions d	E	e	L
621	Brass	G1/2"	H 30	6	15
627	Brass	G3/4"	H 45	8	15
634	Brass	G1"	H 45	8	15
642	Brass	G1 1/4"	H 60	8	15
649	Brass	G1 1/2"	H 60	10	15
649 CN	S.steel	G1 1/2"	H 60	8	15
659	Brass	G 2"	H 70	8	15
676	Brass	G2 1/2"	H 95	10	20
676 CN	S.steel	G2 1/2"	H 95	10	20
645 Fe	Steel	M 45 x 2	H 60	8	15
645 CN	S.steel	M 45 x 2	H 60	8	15
645	Brass	M 45 x 2	H 60	10	15
677 Fe	Steel	M 77 x 2	H 95	10	20
677 Cn	S.steel	M 77 x 2	H 95	10	20
677	Brass	M 77 x 2	H 95	10	20



SQUARE FLANGE

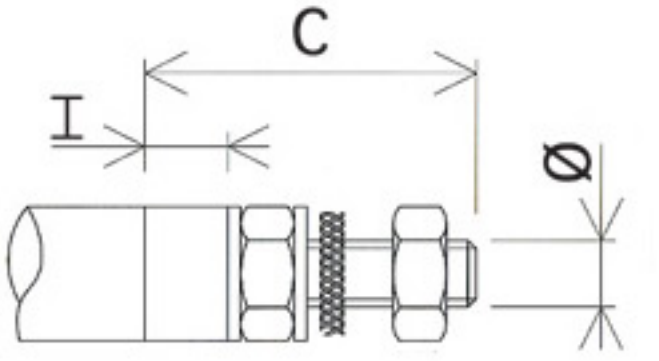
Code no.	Material	Dimensions in mm
	Brass	110 x 110 x 15
	Steel	105 x 105 x 25
	Stainless Steel	105 x 105 x 25

FLANGE TO SPECIFICATIONS

Steel or stainless steel, cut or deep-drawn
1 - 5 mm thick.

CONNECTING TERMINALS

CETAL



SERIE B 100 *Threaded steel or stainless steel rod*

Code no.	Dimensions Ø in mm	~C	~I	sheath Ø 6.5	8.5	10	13.5	16
B104	M 4 x 0.7	20	5	•				
B114	M 4 x 0.7	20	5		•	•		
B114 CN	M 4 x 0.7	20	5		•	•		
B 115	M 5 x 0.8	30	10				•	
B 115 CN	M 5 x 0.8	30	10				•	
B116	M 6 x 1	35	10					•
B116 CN	M 6 x 1	35	10					•
B118	M 8 x 1.25	35	10					•
B118 CN	M 8 x 1.25	35	10					•

Nota : more connections on request

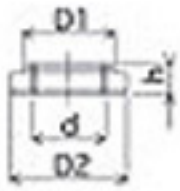
(see § Connecting terminals - Heating elements according to specifications)

ACCESSORIES

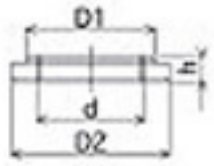
CETAL

• MOUNTING ACCESORIES

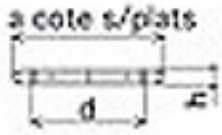
WELDING RING



Thread	Dimensions D1	D2	h	Steel	S.steel
M 45 x 2	55	70	18	•	•
M 77 x 2	90	110	18	•	•
G 1"	40	45	12	•	



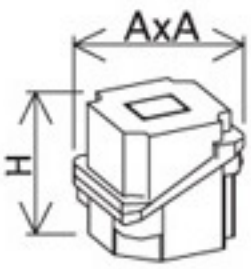
G 1" 1/4	55	60	12	•	
G 1" 1/2	60	70	18	•	
G 2"	68	75	18	•	
G 2" 1/2	90	110	18	•	



NUT / SEAL

Thread	h	a	Nut Steel	Nut S.steel	Nut Brass	Seal Low	Seal S.steel
M 37 x 1.5	6	45			•	•	•
M 45 x 2	8	60		•	•	•	•
M 77 x 2	10	90	•	•	•	•	
G 1/4"	5	19				•	•
G 3/4"	6	32				•	•
G 1"	6	45			•	•	
G 1" 1/4	8	60			•	•	
G 1" 1/2	8	60			•	•	
G 2"	10	70			•	•	
G 2" 1/2	10	90			•	•	•

• STANDARD CASINGS

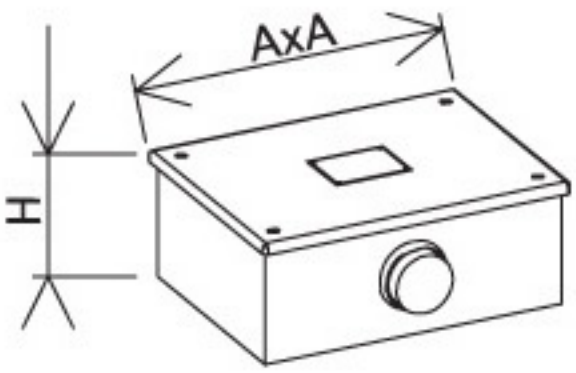


ORPM/ORGM

Pivoting aluminium casing with side gland for screw type or flanges immersion heaters.

Code no.	Material	Base Ø	A x A	H	Gland
ORPM	Aluminium	45-1"1/2-2"	85	80	13
ORGM	Aluminium	77-2"1/2	110	105	16

Sealed protective cover to standard EN 60-529
Standard version IP 46
Special version IP 66
Optional : gland on cover
externally or internally controlled thermostat.



ORS/ORT

Pivoting casing for screw type, removable or flanged immersion heater.

Code no.	Material	Base Ø	A x A	H	Gland
ORS 45	Protected metal	45-1"1/2-2"	165 x 120	65	13 ou 16
ORS 77	Protected metal	77-2"1/2	165 x 120	65	16 ou 21
ORT 45	ABS plastic	45-1"1/2-2"	180 x 106	90	13 ou 16
ORT 77	ABS plastic	77-2"1/2	180 x 106	90	16 ou 21

Optional : thermostat (16 A, 230/400 V)
limiter (10 A, 230/400 V), terminal plate, lamp, contactor.
** version inox*

• TEMPERATURE CONTROL

Regulating (thermostat) or safety (limiter) devices intended for use in the various connection casings (ORS, sealed and explosion-proof). They come in single and three-phase models with breaking power equal to 5 - 16 A.

For higher power ratings, a control contactor must be fitted in the electrical cabinet. Several vapour tension models are available to cover major industrial applications in normal and tropicalised versions.