Thermon
South Africa (Pty) Ltd.

Immersion Heaters

for liquids and gases

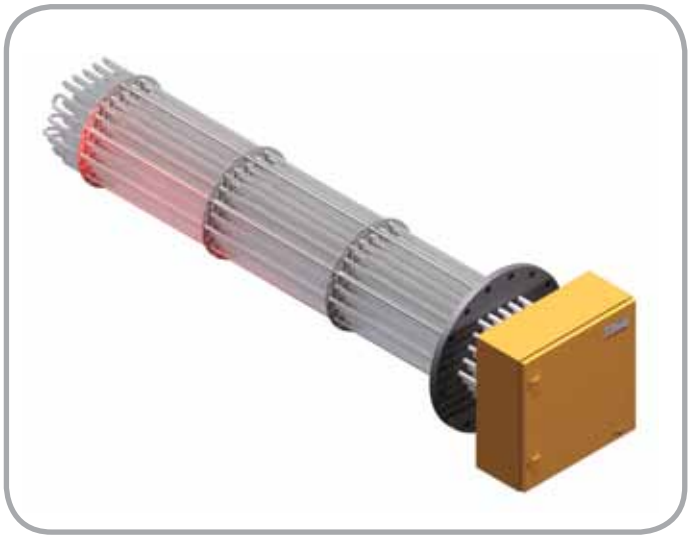
Immersion heaters are generally used when a direct heat transfer to a medium like water, chemicals or gases is required. Heat transfer is mainly through contact between the element and the medium. Depending on design the heat transfer can be enhanced by forcing the flow of the medium over the elements.

Immersion heaters are very versatile in their construction and design. Therefore their heating capacity can range from 1kW to a few MW.

Their range of applications is also quite varied.

Typical applications:

- Hot water tanks
- Electrically heated boilers (better control than with gas or coal burners)
- Control of bulk oil temperature in lube oil reservoirs (improves lubrication)
- For heavy weight oil (for better flow, easier pumping, increased combustion efficiency)
- Industrial water tanks, vessels and process piping
- Cleaning and rinsing tanks
- Heat transfer systems
- Circulation heating
- Steam superheating
- Heating of air or gas



Immersion heaters are normally mounted horizontally in the medium to be heated and preferably quite low in the medium.

They can be mounted vertically into the system with special design criteria.

Design criteria:

- Sheath material (element tube) as well as flange material must be matched to the medium to be heated. Issues with corrosion resistance, chemical stability, temperature stability, etc must be considered.
- The rate of heat transfer between element and the medium is important. If heat transfer is too high, the medium might degrade. Too low a heat transfer can result in a bulky construction.
- Degradation of the medium can quite often result in a precipitation of the degraded material onto the sheath. As this can reduce the rate of heat transfer, the element is put at risk of overheating.
- Flow rate of the medium over the elements helps to improve the heat transfer from the element into the medium. In such a case flow velocities and equalised flow patterns are of importance.
- Physical sizing of the element bundle in relation to the vessel it is mounted into, must be taken into consideration and balanced against all the other design criteria as mentioned above.
- Terminal design needs to consider current/ voltage rating as well as the type of electrical protection required. Typical consideration would be a dust proof or moisture proof terminal housing (IP rating).
- If the heater is used in a hazardous area, this will require substantial design considerations on the terminal layout and would require specialised certification (EX, ATEX) by third party authorities.
- Mounting methods of the immersion heaters are also quite varied. Depending on sizing, the most common methods are either via screw in flange or a bolt on flange. Care must be taken that a good seal is established at the given pressure rating.

The spec sheet will help the user to supply pertinent criteria for our design engineers.

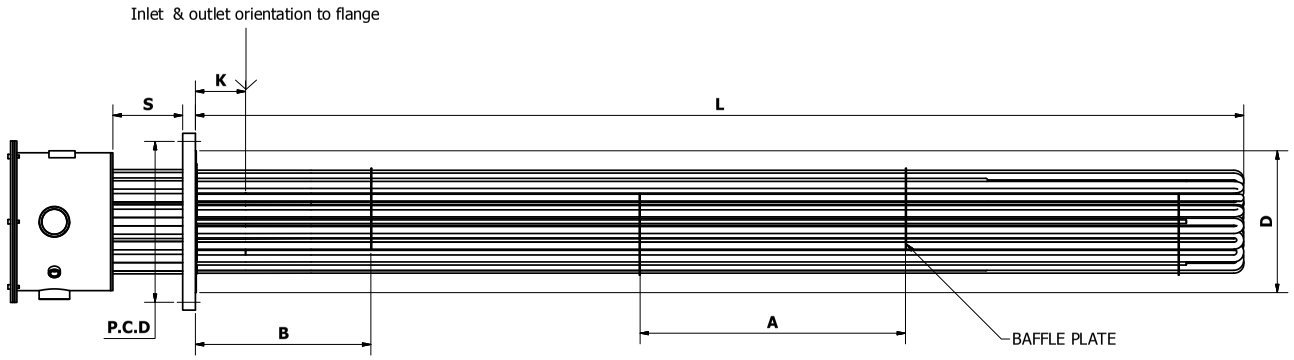
Typical immersion heaters with screw in flange are listed below:

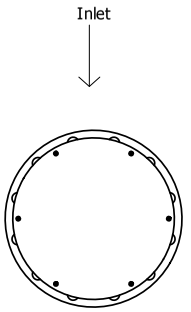
Standard stock items					
Stock code	Rating (Watts)	Power supply (Volt)	Immersion length (mm)	Fitting	Options
Elements for water (Incoloy-sheath, max 10 Watt/cm^2					
UHRBC11K00150N0	1000	230	150	2" Brass	terminals exposed
UHRBC11K00285N1	1000	230	285	2" Brass	terminals exposed, with pocket
UHRBC11K50185N0	1500	230	185	2" Brass	terminals exposed
UHRBC11K50270N1	1500	230	270	2" Brass	terminals exposed, with pocket
UHRBC12K00280N0	2000	230	280	2" Brass	terminals exposed
UHRBC12K00280N1	2000	230	280	2" Brass	terminals exposed, with pocket
UHRBC13K00350N0	3000	230	350	2" Brass	terminals exposed
UHRBC13K00350N1	3000	230	350	2" Brass	terminals exposed, with pocket
UHRBC14K00350N0	4000	230	350	2" Brass	terminals exposed
UHRBC14K00350N1	4000	230	350	2" Brass	terminals exposed, with pocket
UHRBC33K00275N0	3x1000	230 / 400 3ph	275	2" Brass	terminals exposed
UHRBC33K00275NA	3x1000	230 / 400 3ph	275	2" Brass	with terminal cover IP40
UHRBC33K00275NE	3x1000	230 / 400 3ph	275	2" Brass	with terminal cover IP65
UHRBC34K50330N0	3x1500	230 / 400 3ph	330	2" Brass	terminals exposed
UHRBC34K50330NA	3x1500	230 / 400 3ph	330	2" Brass	with terminal cover IP40
UHRBC34K50330NE	3x1500	230 / 400 3ph	330	2" Brass	with terminal cover IP65
UHRBC36K00400N0	3x2000	230 / 400 3ph	400	2" Brass	terminals exposed
UHRBC36K00400NA	3x2000	230 / 400 3ph	400	2" Brass	with terminal cover IP40
UHRBC36K00400NE	3x2000	230 / 400 3ph	400	2" Brass	with terminal cover IP65
UHRBC39K00620N0	3x3000	230 / 400 3ph	620	2" Brass	terminals exposed
UHRBC39K00620NA	3x3000	230 / 400 3ph	620	2" Brass	with terminal cover IP40
UHRBC39K00620NE	3x3000	230 / 400 3ph	620	2" Brass	with terminal cover IP65
UHRBC312K0620N0	3x4000	230 / 400 3ph	620	2" Brass	terminals exposed
UHRBC312K0620NA	3x4000	230 / 400 3ph	620	2" Brass	with terminal cover IP40
UHRBC312K0620NE	3x4000	230 / 400 3ph	620	2" Brass	with terminal cover IP65
Elements for light weight oil (Incoloy-sheath, 3.2 Watt/cm^2)					
UHRBC31K50340N0	3x500	230 / 400 3ph	340	2" Brass	terminals exposed
UHRBC31K50340NE	3x500	230 / 400 3ph	340	2" Brass	with terminal cover IP65
UHRBC33K00620N0	3x1000	230 / 400 3ph	620	2" Brass	terminals exposed
UHRBC33K00620NE	3x1000	230 / 400 3ph	620	2" Brass	with terminal cover IP65
UHRBC34K50980N0	3x1500	230 / 400 3ph	980	2" Brass	terminals exposed
UHRBC34K50980NE	3x1500	230 / 400 3ph	980	2" Brass	with terminal cover IP65
UHRBC36K01200N0	3x2000	230 / 400 3ph	1200	2" Brass	terminals exposed
UHRBC36K01200NE	3x2000	230 / 400 3ph	1200	2" Brass	with terminal cover IP65
Elements for heavy weight oils (Incoloy-sheath, 1.2 Watt/cm^2)					
UHRBC31K50810N0	3x500	230 / 400 3ph	810	2" Brass	terminals exposed
UHRBC31K50810NE	3x500	230 / 400 3ph	810	2" Brass	with terminal cover IP65
UHRBC32K21200N0	3x750	230 / 400 3ph	1200	2" Brass	terminals exposed
UHRBC32K21200NE	3x750	230 / 400 3ph	1200	2" Brass	with terminal cover IP65

Terminals exposed

IP40 cover

IP65 cover



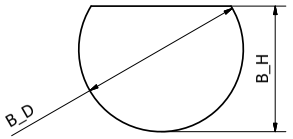


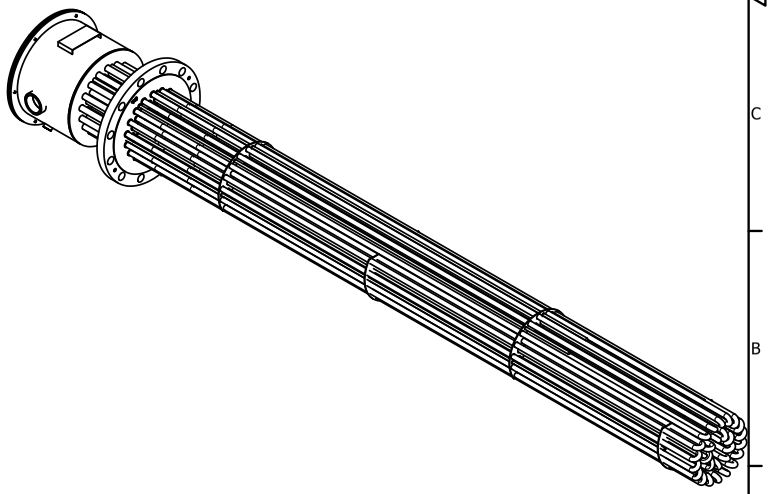
Terminal housing gland exits:
Please indicate gland size and orientation according to the inlet

Design Specifications

1) Element Specifications	
Immersion lenght "L"	mm
Quantity of elements	
Diameter of elements	mm
Minimum internal diameter of tube "D"	mm
Inlet distance from Flange face "K"	mm
Lenght between flange and terminal housing "S"	mm
2) Flange Specifications	
Flange Diameter	mm
Flange thickness	mm
Flange Material	
Number of bolt Holes	
Bolt hole diameter	mm
Bolt hole P.C.D	mm
3)Baffle plate	
QTY:	
Distance from flange to first baffle plate "B"	mm
Diameter of baffle plate "B_D"	mm
Height of baffle plate "B_H"	mm
Baffle plate spacing "A"	mm
4) Terminal housing	
Terminal housing Material:	
Terminal housing size:	
Width	mm
Height	mm
Depth	mm
EEX/ATEX certification required:	
Yes	
No	
EEX/ATEX rating specification: (if required)	
Number of cable glands	
"Please indicate gland orientation according to inlet"	

5) Electrical	
Supply Voltage	V
Type (Tick appropriate)	
Single Phase	
Three Phase Delta	
Three Phase Star	
Number of Zones	
Power rating per zone	
Number of temp probes	
Type of temp probes	
6) General	
Medium to be heated	
Maximum operating Temp	C
Maximum operating pressure	Bar
Flow rate of the medium	(m3/hr)
Density of Medium	(kg/m3)
Inlet Temperature	C
Outlet Temperature	C





Customer Details

CUSTOMER:	
CONTACT NAME:	
TEL:	
FAX:	
E-MAIL:	

FLANGE HEATER ENQUIRY SHEET

For larger bolt on flanged immersion heaters the following specifications/data sheet should be submitted: