



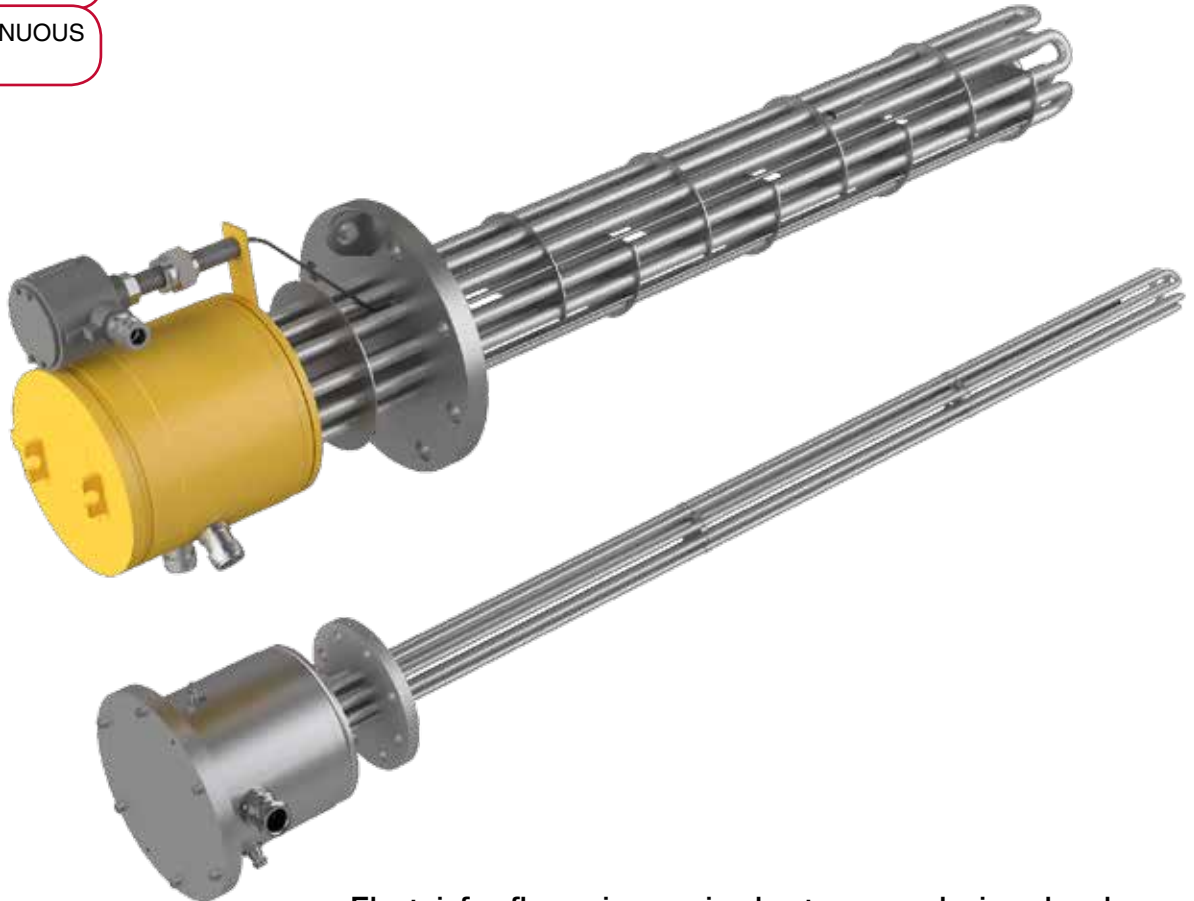
# Flange immersion heaters

for ATEX/IECEX hazardous areas  
or in non-ATEX version

HEATING GASES

HEATING LIQUIDS

MAINTAINING A CONTINUOUS  
TEMPERATURE



Electricfor flange immersion heaters are designed and manufactured according to customer specifications. Reliability and robustness are key drivers for our engineers.

## Advantages

- Large range of materials and options according to customer process and conditions of use
- Equipment available for use in hazardous areas or safe environment
- The end-to-end control of the design and production chain allows us to deliver a product which suits your process perfectly.



ATEX



The flange immersion heaters consist of tubular heating elements mounted on a flange. They are highly performant for heating or maintaining the temperature of gas or liquids.

### Applications

- Maintaining the temperature and heating of large volumes of liquids or gas
- Heating of circulating or static fluids
- Mounted in tanks, cisterns, boilers or circulation heaters, etc.
- Designed for pressure up to 300 bars
- Power up to 5 MW
- Process temperature up to +650 °C
- Tension max. 750 V

### Secteurs industriels

- Petrochemicals
- Chemical industry
- Food industry
- Plastics
- Aeronautics
- Etc.

### Immersion heater engineering

After customer specification analysis, our engineers will drive you to the best solution for your process.

### ATEX/IECEX

Electricfor flange immersions heaters are available in ATEX/IECEX version for class temperature T1 (450°C) to T6 (85°C).

### Temperature control

Temperature sensors (thermostat, limiter, thermocouple or PT100) in the medium (process control) or on the heating element (safety control), on the flange or in the connecting box.

## Electricfor heating elements



1. Connection terminals
2. Tube
3. Insulation : magnesia oxyde (Mg O), to secure optimized heat transfer and electrical insulation.
4. Resistance wire: Made of Nickel Chrome 80/20, it is the active part of the heating element (Joule effect)
5. Cold length
6. Sealing material: Keeps out external moisture. Different types (silicon, resins, cement) are used depending on the industrial application, the external medium and temperature.
7. Output insulation: Made of steatite ou corundum, it provides dielectric insulation (creepage distance, distance in the air).

**Electricfor** manufactures its own heating elements which are the key components (active parts) of all electric heating systems. The design is defined according to customer specifications. The watt density, tube diameter and the tube sheath are chosen to optimize the reliability and robustness (corrosion, temperature) of **Electricfor** equipments.

### Manufacturing

The electric heating resistance (sheathed heating resistance) consists of a Nickel Chrome 80/20 resistance wire placed in the middle of a protective tube (sheath). It is filled with high-quality magnesia oxyde enabling an optimized heat transfer and electrical insulation. Each side of the heating element has a cold length which is used for wiring; its length depends on the application..



## Design of your flange immersion heater

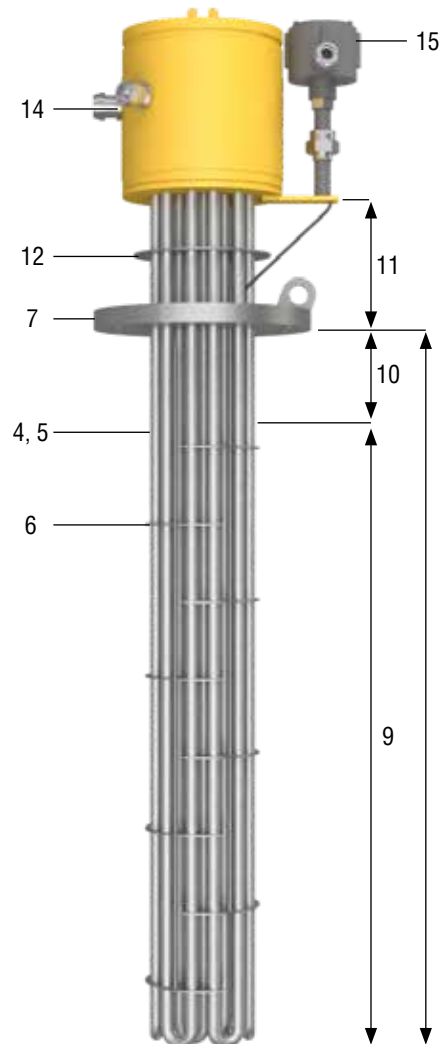
### Input data

- A. Application
- B. Type of fluid
- C. Pressure
- D. Inlet and outlet temperature
- E. Flow rate (mass or volume)
- F. Ambient area
- G. Voltage (V)
- H. ATEX/IECEX or not, temperature class
- I. Max. immersed length
- J. Directives, standards, construction codes
- K. Flow direction

### Electricfor thermal design and offer

Design procedure to optimize your product

1. Power
2. Choice of technology and product type
3. Watt density ( $W/cm^2$ )
4. Number of heating elements
5. Material / Tube diameter
6. Type and number of baffles / bundle spider
7. Type of flange
8. Type of assembly (welding or brazing)
9. Heating length (HL)
10. Cold length (CL)
11. Stand-off length (SOL)
12. Cooling discs and heat shields
13. Temperature control and safety, type of sensor
14. Connecting box / Cable gland
15. Other components
16. Quotation: price and delivery time



**Technical Data**



**Tube materials**

- Stainless steel
  - AISI 321 (1.4541)
  - AISI 316L (1.4404)
  - AISI 309 (1.4828)
- Others
  - Incoloy 800 (1.4876)
  - Incoloy 825 (2.4858)
  - Inconel 600 (2.4816)
  - Titanium
- Specific coating
  - Teflon™ (PTFE)
  - Halar

**Tube diameter**

- 6.5 / 8.5 / 10 / 13.5 / 16 mm

**Flange**

- All diameters (including very large sizes)
- NF EN 1092-1 (European standard, PN)
- NF EN 1759-1 (European standard, Class)
- ASME B16-5 (American standard)
- Others standards on request
- Material choice according to application and standards (carbon steel, stainless steel or others)

**Mounting**

- Vertical or horizontal position

**Electrical**

- Voltage: VAC or VCC
- Cabling according to main voltage VAC/VCC  
1PH + N or 3PH
- Power : a few Watt to several Megawatts

**Connecting box (non-ATEX)**

- IP 54 / IP 66 / IP 67
- Material: painted steel, stainless steel, aluminium
- Polyamide or nickel-plated brass cable gland

**ATEX/IECEx connecting box** 

- Explosion-proof connecting box, aluminium, stainless steel or painted steel, Ex d IIC
- Stainless steel increased security enclosure, Ex e IIC
- Nickel-plated brass cable gland (stainless steel as option)

**Standard documentation**

- Certificate of conformity to the order
- Heater wiring diagram
- Instruction manual

**On-request documentation**

- Supplied according to directives, standard and construction code
- Welder qualifications (QS)
- Welding qualifications (QMOS)
- DESP documentation
- Material certificate 3.1 acc. to NF EN 10204

**Certifications (if requested)**

- According to standard to comply with
- ATEX/IECEx certificate for component or system
- EAC CU TR, c CSA us (NEC500)



## Options



- **Temperature control**  
Temperature sensors (thermostat, limiter, thermocouple or PT100) in the medium (process control) or on the heating element (safety control), on the flange or in the connecting box.
- **Separate connecting box for temperature control**  
out of the power connecting box
- **Stainless steel material for ATEX/IECEx cable gland**
- **Space heaters against moisture**  
inside the connecting box
- **Coating** for the connecting box  
customized specifications and colors.
- **Tropicalization** : Adapted materials and components, heat-shrink insulated terminals, for extreme atmospheres (moisture, temperature).

## Complementary products and alternatives

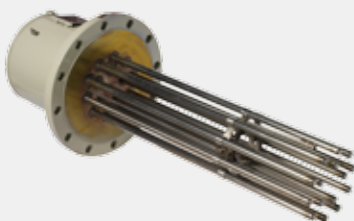


**Standard power control panels**  
Electricfor offers a large range of cost-effective power control panels.

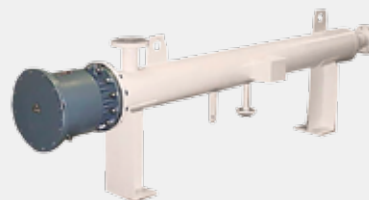


**VHP\* immersion heaters**  
Using Boron Nitrid as insulation (instead of magnesia) allows to build heaters with a watt density of 150 W/cm<sup>2</sup> and more. These smaller and lighter heaters provide a better temperature gradient and thus significant cost savings.

\*Very High Performance



**Immersion heaters with removable elements**  
Using removable heaters (cartridges in sleeves) instead of tubular heating elements has interesting advantages in some applications. For example, it avoids draining tanks in case of replacement.



**Vessels (for circulation heaters)**  
We provide complete circulation heaters (heater + vessel) on request.



## Realisations



1. Steam superheater, ATEX/IECEX, 174 kW
2. Gas heating, ATEX/IECEX, 35 kW
3. Oil heating, double box, with temperature control device, 3 kW
4. Gas regenerator, 2.5 MW
5. L-shaped immersion heater, 20 kW, for mounting from the top into a tank or cistern.





### ATEX/IECEx versions

In addition to heater design, the use of specifically developed connection boxes allows to install the products in hazardous areas.

The increased safety protection mode “e” (EN 60079-7) or the explosion-proof protection mode “d” (EN 60079-1), together with temperature control acc. to EN 60079-0, make it possible to operate the equipments in hazardous area (zone 1 and zone 2) for gases of the A-B-C groups.



### ATEX housings, types of protection “d” and “e”



#### Type of protection “d” explosion-proof housing

With this method, the housing (casing):

- Must contain the explosion within the enclosure
- Make sure that the ignition cannot reach the hazardous area
- Always keep an external temperature lower than the auto-ignition temperature of any surrounding

The following factors are selected depending on the internal free volume of the enclosure and the gas present in the area

- Type of seal (cylindrical, flat, threaded)
- Seal length
- Gap length

The power and temperature control circuits can be accommodated in separate housings.



#### Type of protection “e” increased safety

Method: To prevent the occurrence of any accidental ignition source (electric arcs, heating)..

This mode of protection is achieved by:

- Selecting high-quality insulating material
- Defining the right creepage distances
- Ensuring the quality of electrical connection
- For all classes of gases and vapours
- Suitable for connection housings

