

GROUP 1 - Immersion heaters, drums heaters and accessories

1.17 – In line heaters – GCP

GCP in line heaters 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 in line 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 nicked copper
- Standardized tube diameters: Ø8, Ø10, 12'5, Ø16 mm
- Power according to your specifications

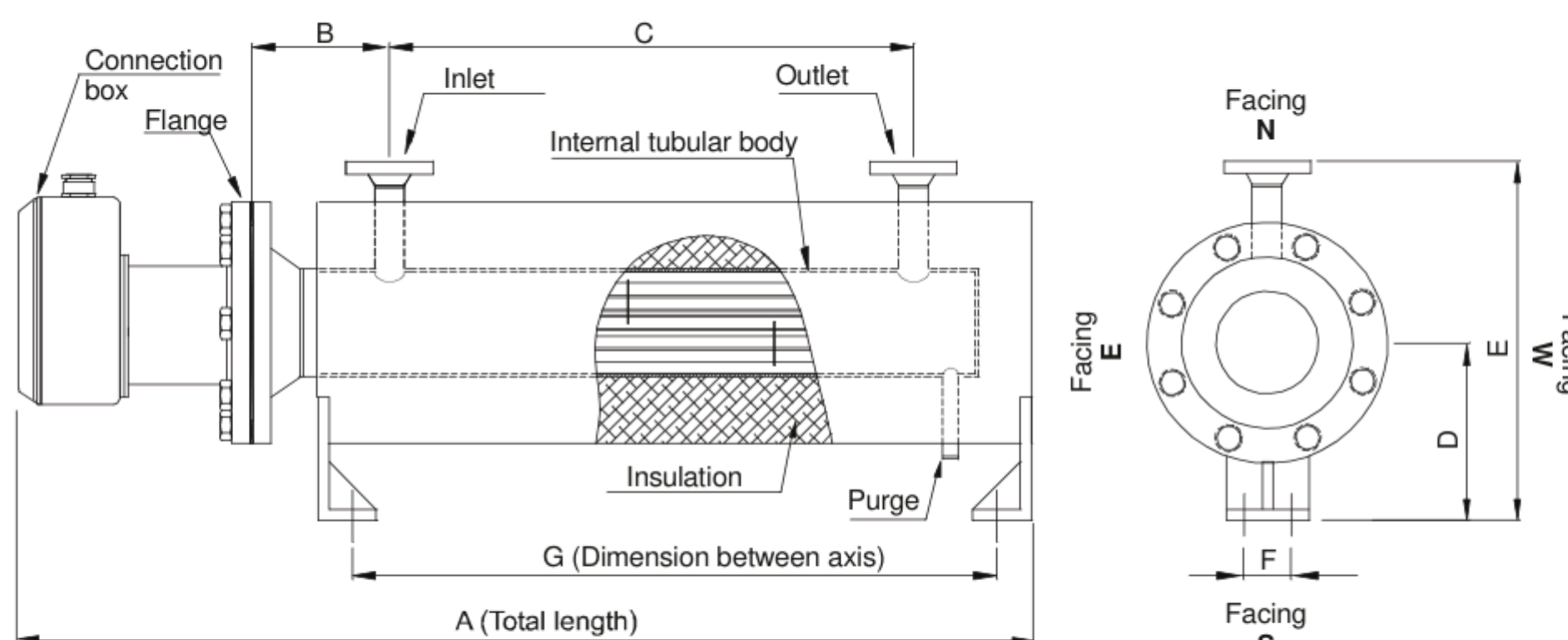
- Three-phase voltage up to 750 V
- Maximum length flat plate: 3300 mm
- Standard flanges: DIN - ANSI in stainless steel or steel
- Connection box IP-44. Tubular body in stainless steel or galvanized steel
- Optionally, tubular body with heat-resistant insulation
- Temperature control with thermostat, limiter, 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, lighth 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 <input type="radio"/> |
| | Gas <input type="radio"/> |
| Static material | Q dm ³ /h |
| In line material characteristics | Density Kg/dm ³ |
| | Viscosity cP |
| | Specific heat KJ/kg.K |
| Work temperature | °C |
| Inlet temperature | °C |
| Outlet temperature | °C |
| Design pressure | P kg/cm ² |
| Electrical characteristics | |
| Total Watts | kW |
| Power supply | V (Mono-phase) |
| | V (Three-phase) |
| Connection | Mono-phase |
| | Three-phase Δ |
| | Three-phase |
| N° steps | |
| Density load | W/cm ² |
| Temperature control | |
| Safety | Fluid temperature °C |
| | Tube temperature °C |
| Control | Fluid temperature °C |
| Type | Thermostat (ON/OFF) <input type="radio"/> Range °C |
| | Thermocouple sensor. Type: |
| | J <input type="radio"/> PT100 <input type="radio"/> |
| Position (Flat plate) | K <input type="radio"/> |
| | mm |

| Tubular element characteristics | | | |
|---------------------------------|------------------------------------|------------------------------------|--|
| Tube material | SS AISI 321 <input type="radio"/> | Incoloy®-825 <input type="radio"/> | |
| | SS AISI 316L <input type="radio"/> | Steel <input type="radio"/> | |
| | Incoloy®-800 <input type="radio"/> | Copper <input type="radio"/> | |
| Tube diameter | Ø8 mm <input type="radio"/> | Ø12.5 mm <input type="radio"/> | |
| | Ø10 mm <input type="radio"/> | Ø16 mm <input type="radio"/> | |
| In line heater | | | |
| Material internal tubular body | Steel <input type="radio"/> | SS AISI 321 <input type="radio"/> | |
| | | SS AISI 316 <input type="radio"/> | |
| Position | Horizontal <input type="radio"/> | | |
| | Vertical <input type="radio"/> | Box position | Top <input type="radio"/> Lower <input type="radio"/> |
| Heat-resistant insulation | Yes <input type="radio"/> | | |
| | No <input type="radio"/> | | |
| Inlet / Outlet - Flanges | | | |
| Flange | EN 1092 | | Facing NSEW |
| | PN | DN | |
| Inlet | | | |
| Outlet | | | |
| Flange material | Steel <input type="radio"/> | SS AISI 321 <input type="radio"/> | |
| | | SS AISI 316 <input type="radio"/> | |
| Purge | Yes <input type="radio"/> | | |
| | No <input type="radio"/> | | |
| Dimensions in mm | A | E | |
| | B | F | |
| | C | G | |
| | D | | |

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 136 to 143 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 | Supply | Maximum nominal power in KW | Dimensions en 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 | Supply | Maximum nominal power in KW | Dimensions en 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 |



The developed Cast-In Circulation Heater Technology offers a safe and precise integrated solution for your process heating requirements.

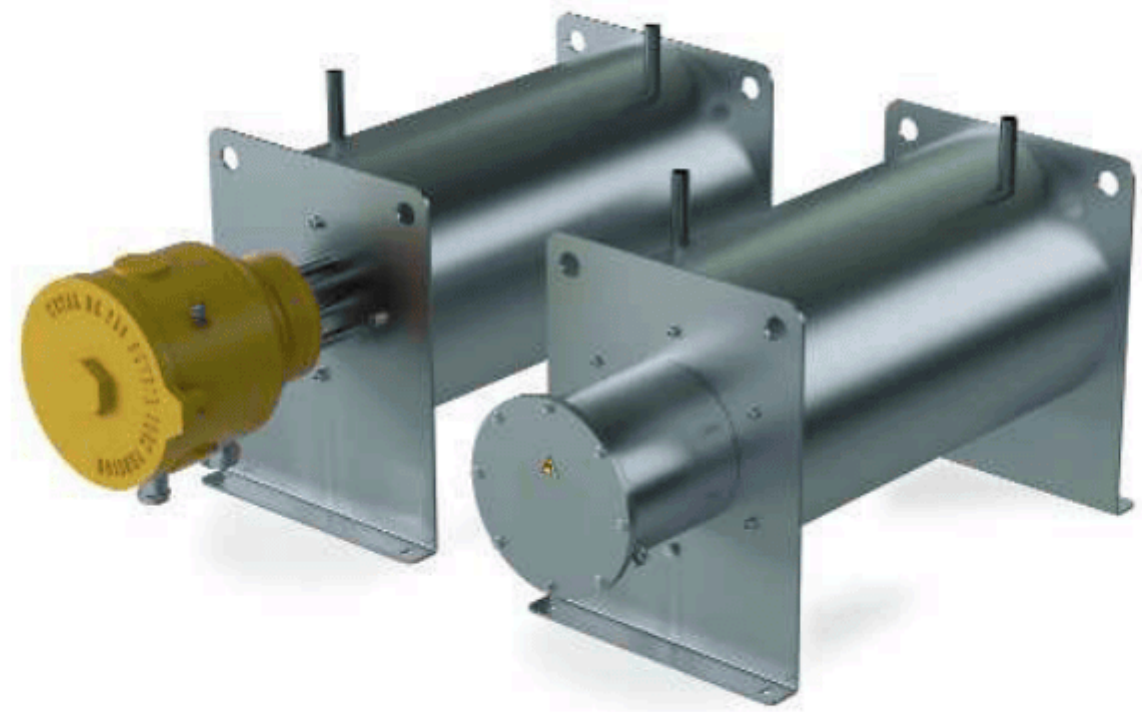
Operating principle

This system is the ideal solution for heating gaseous, liquid or two-phase fluid at a specific flow rate.

Cast-in heaters consists of a cylindrical cast aluminium block which is heated. The fluid to be heated circulates through an helical coil which is embedded in the cast aluminium block. The heat is precisely and efficiently transferred to the gas or liquid.

To minimise heat losses, the aluminium block is thermally insulated and protected by a casing.

As the system is highly flexible, the heater can be connected in series or in parallel, according to power requirements.

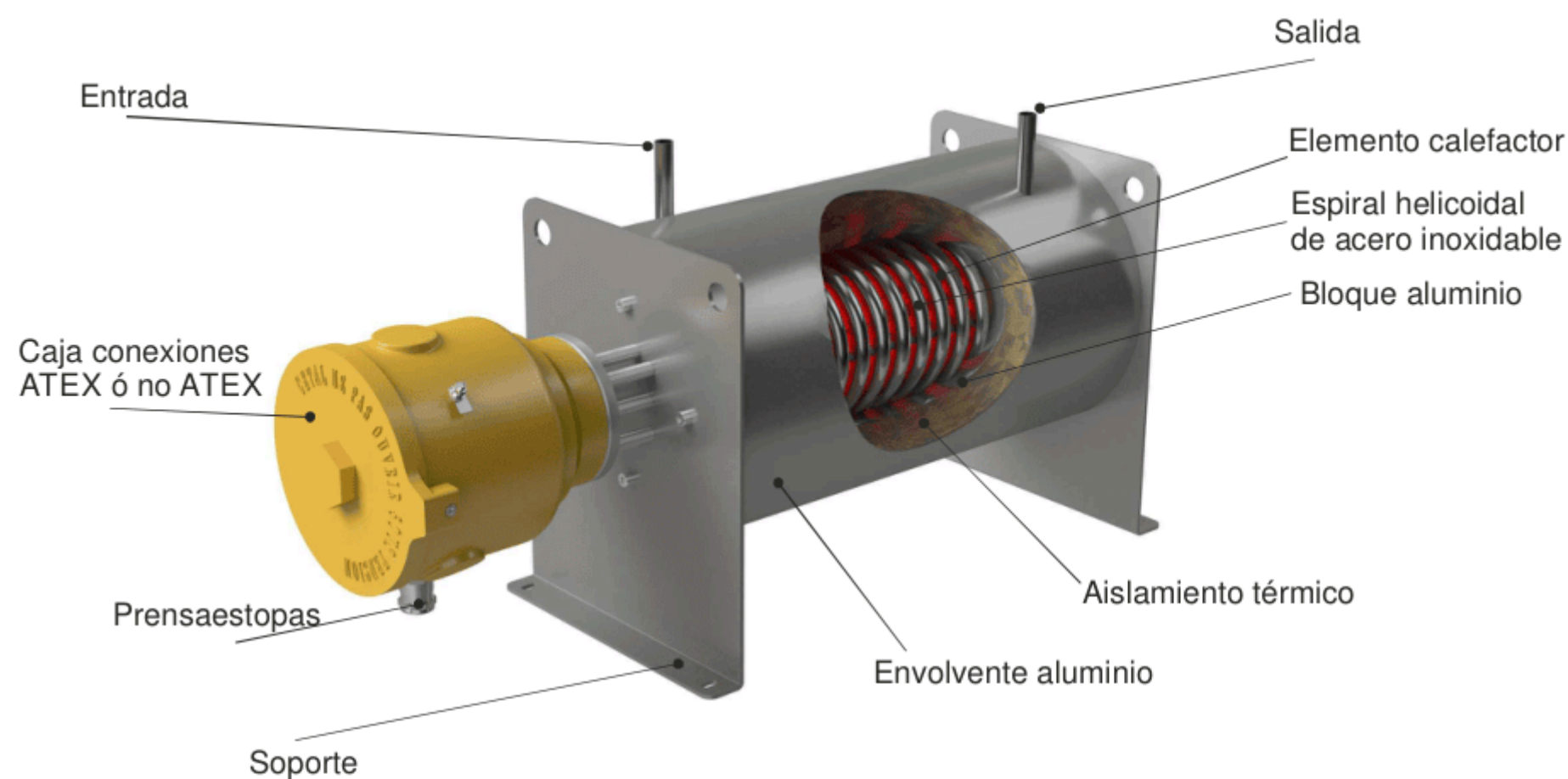


Applications

- Natural gas, butane, propane, N2, CO2, H2
- Oxygen: Special designs
- Hydrocarbons, solvents and paints
- Sensitive fluids and gas applications
- UHP applications
- Agri-food: pasteurisation / sterilisation

Advantages

- Indirect heating
- Less expensive than a conventional heater
- Compact design, smaller footprint
- Precise, even heating
- Easy cleaning
- Operates at very high pressure
- Standard wide range sized according to flow rate and power output



Technical advantages of indirect heating

- No direct contact between the fluid to be heated and the heating elements
- Optimized heat exchange
- Homogeneous heating, no hot spots during system start-up and temperature rise phase
- Easy cleaning

A compact alternative

Cast-in circulation heaters are excellent alternatives to conventional heaters consisting of an immersion heater mounted in a body.

They save space, have lower costs and are very competitive for high pressure applications.

System maintenance is also considerably reduced.

Regulation and control

A temperature probe is fitted as standard to monitor and control the skin temperature of the heating elements.

Other temperature probes are available as optional extras (for the aluminium block or at the heater inlet and outlet).

A control cabinet is used to control the heater.

ELECTRICFOR flexibility

Electricfor heaters are available for specific flow rates and process power requirements.

The range starts at 1.5 kW to 32 kW as standard and is available with either a 230 V single-phase, 400 V three-phase to 690 V three-phase power supply.

ATEX and non-ATEX versions available

The entire system is available in an explosion- proof version for the ATEX T1 (450°C) to T6 (85°C) environment or for other “safe” environment applications.

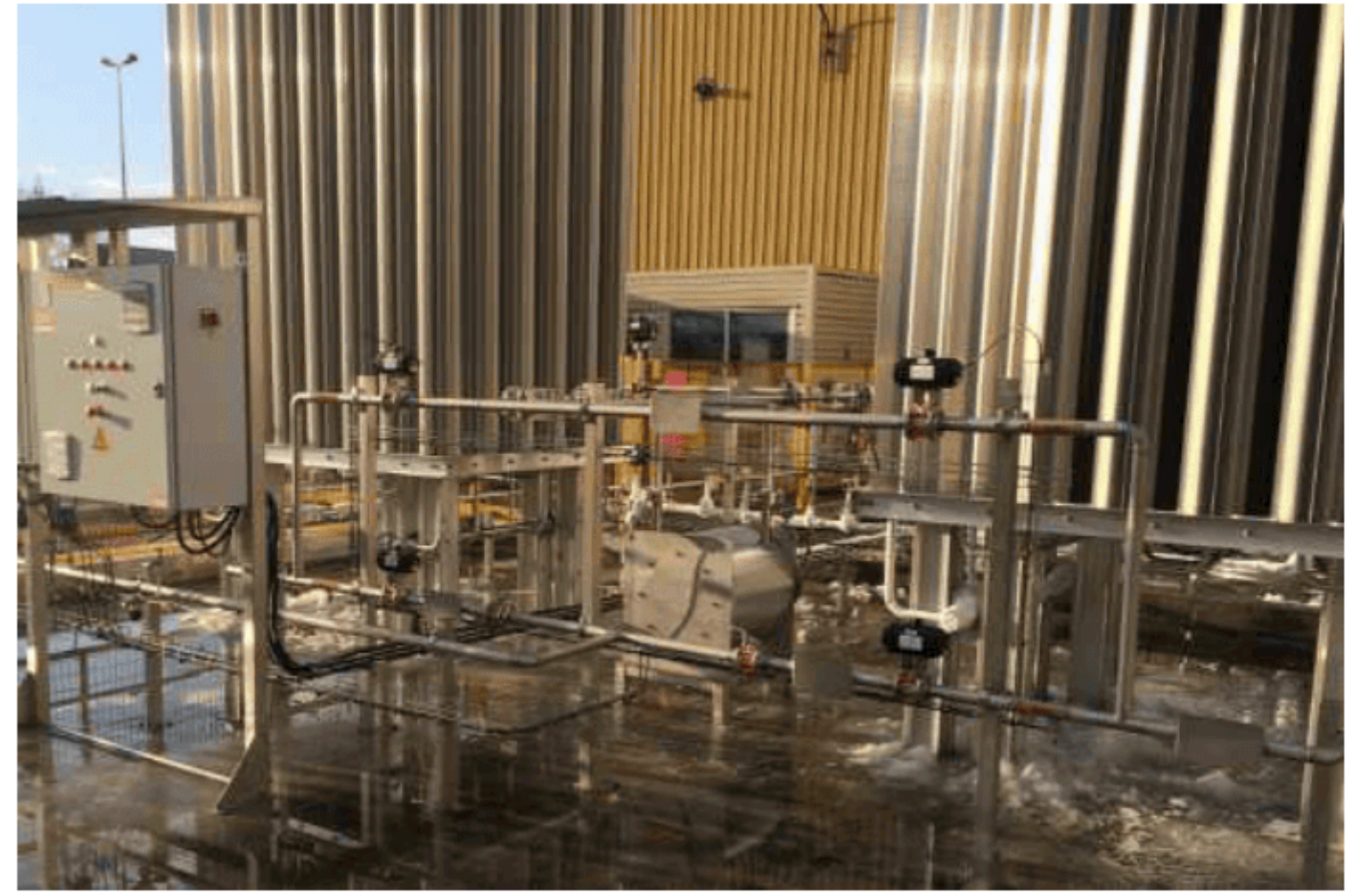
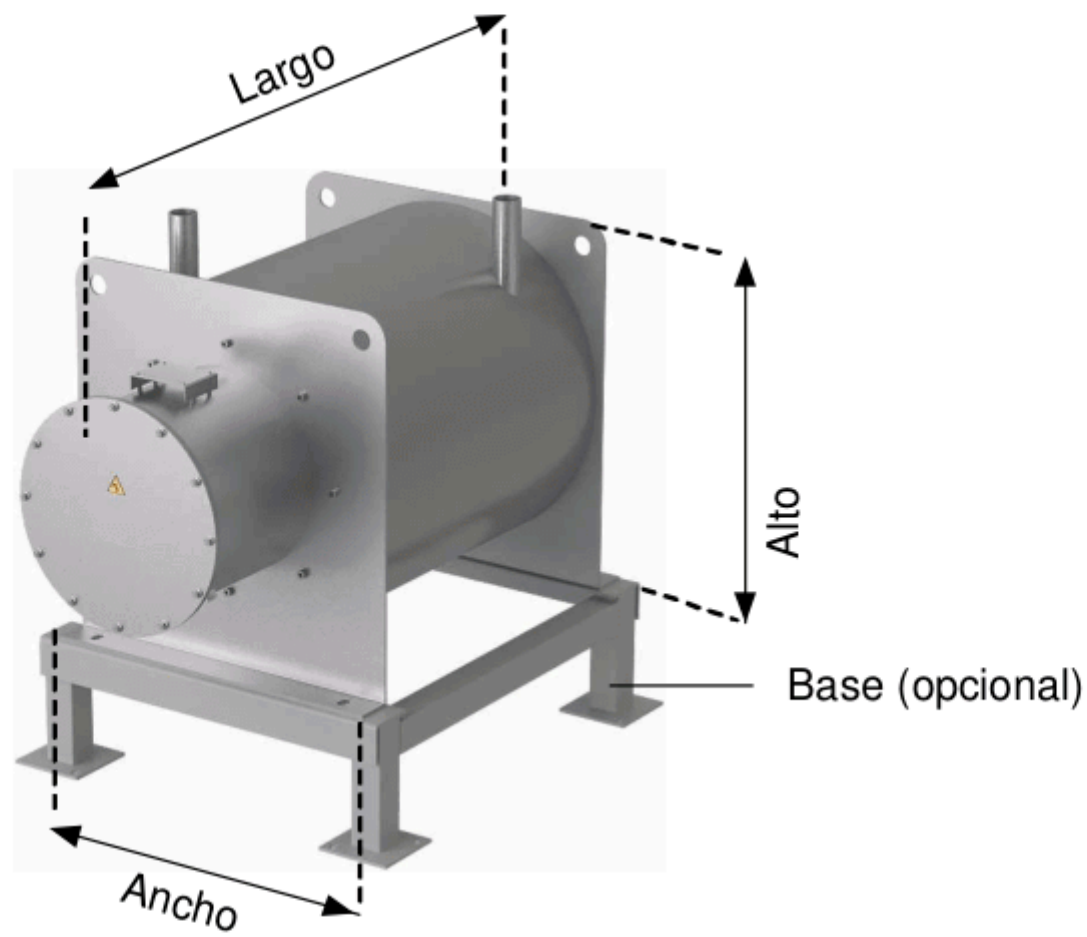
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1.18 – Cast-in line heaters

Standardized Models

Delivery time: 8 weeks to be counted from the approval of the technical documentation

Defining design based on the application



| Type | Power KW | Min flow-rate at 8 bar (Nm ³ /h) | Max flow-rate at 80 bar (Nm ³ /h) | Max liquid flow-rate m ³ /h | Distance between inlet/outlet | Ext.Ø of helical coil in mm | Tube thickness in mm | Dimensions in mm | | | Weight in Kg |
|------------------|----------------------|---|--|--|-------------------------------|-----------------------------|----------------------|------------------|--------|--------|--------------|
| | | | | | | | | Width | Length | Height | |
| Cast-in 01-xx KW | 1.5 / 3 | 10 | 100 | 0.2 | 90mm | 6.35 | 1.24 | 240 | 470 | 190 | 30 |
| Cast-in 02-xx KW | 1.5 / 3 | 25 | 250 | 0.5 | | 8 | 1 | | | | 30 |
| Cast-in 03-xx KW | 1.5 / 3 / 6 | 40 | 400 | 1 | | 10 | 1 | | | | 30 |
| Cast-in 04-xx KW | 1.5 / 3 / 6 | 55 | 560 | 1.5 | 140mm | 13.7 | 2.24 | 310 | 500 | 220 | 45 |
| Cast-in 05-xx KW | 3 / 6 / 9 / 12 | 120 | 1300 | 3 | | 17.2 | 1.6 | | | | 45 |
| Cast-in 06-xx KW | 3 / 6 / 9 / 12 / 24 | 180 | 1900 | 4 | 250mm | 21.3 | 2.11 | 430 | 520 | 275 | 90 |
| Cast-in 07-xx KW | 6 / 9 / 12 / 24 | 320 | 3300 | 7 | | 26.7 | 2.11 | | | | 95 |
| Cast-in 08-xx KW | 6 / 9 / 12 / 24 | 540 | 5500 | 11 | | 33.4 | 2.77 | | | | 110 |
| Cast-in 09-xx KW | 6 / 9 / 12 / 24 / 32 | 850 | 8600 | 19 | 340mm | 42.2 | 2.77 | 540 | 550 | 320 | 240 |
| Cast-in 10-xx KW | 9 / 12 / 24 / 32 | 1150 | 12000 | 26 | 390mm | 48.3 | 2.77 | 590 | 550 | 345 | 250 |

Technical data

Attachment and connection

- Standard smooth welding end

Options:

- 1/2" to 2" ASME/ANSI B16.5 stainless steel RF flange, 150 lbs to 600 lbs
- PN 40 or PN 100, DN15 to DN50, RF flange. Other seal bearing on request for ASME or DIN flange
- Stainless steel female 1/8" to 1 1/2" diameter standard NPT or gas or 3000lbs union fitting
- Back flange, nuts and bolts and PTFE or spiral wound graphite seal

Operating conditions

- Operating temperature: from -196 °C to +350 °C (-273 °C on request)
- Operating flow rate: from 10 Nm³/h to 12000 Nm³/h max. depending on operating pressure and gas
- Up to 100 bar operating pressure as standard
- Very high pressure up to 420 bar on request

Electrical

- Power: 1.5 kW to 32 kW per unit
- 230 V AC single-phase or three-phase
- 400 V AC three-phase and up to 690 V three-phase optional

Coil

- Fluid circulation and heating in a 316L stainless steel coil
- Pickled, passivated seamless tube for better mechanical strength
- 6.35 mm to 48.3 mm diameter

Options:

- Incoloy or inconel coil
- Coil electro polishing
- Oxygen degreasing

Temperature control

- Three-wire PT100 probe for monitoring the heating element temperature

Options:

- Safety thermocouple or safety limiter thermostat or thermal fuse

- Temperature regulation of the aluminium cast-in unit by PT100 probe, thermocouple or thermostat

- Process regulation with temperature monitoring by PT100 probe at the outlet or thermocouple (in a separate housing)

- Temperature measurement at the heater inlet by PT100 probe, thermocouple or thermostat (in a separate housing)

- 4-20 mA transmitter with or without HART protocol for PT100 probes or thermocouples (ATEX version if an Ex e housing is used)

Non-ATEX connection box

- Stainless steel IP66/67 connection box
- Two nickel-plated brass cable glands for power and control

ATEX connection box

- Aluminium explosion-proof box with protective paint, Ex d IIC or stainless steel Ex e II C increased safety box
- Two nickel-plated brass cable glands for power and control

Options:

- Anti-condensation heating tape
- Cable gland for additional temperature probe

Insulation and mounting

- Foamglas® / rock wool / ceramic insulation depending on operating temperatures and the fluid being heated

- Protective aluminium jacket
- Horizontal foot mounting

Self-draining

- Available option : Vertical mounting configuration
- Gas bleed and complete drain down

Certifications (if required)

- According to Pressure Equipment Directive 2014/68/EU

ATEX (option)

Exd IIC T1 to T6

Ex IIC 2GD Ex tD A21 IP67

- Ambient temperature: -50 °C ≤ Ta ≤ +60 °C

- According to CE LCIE 04 ATEX 6094X examination certification