

HEATING GASES

HEATING LIQUIDS

Industrial Cast-in Circulation Heaters

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

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

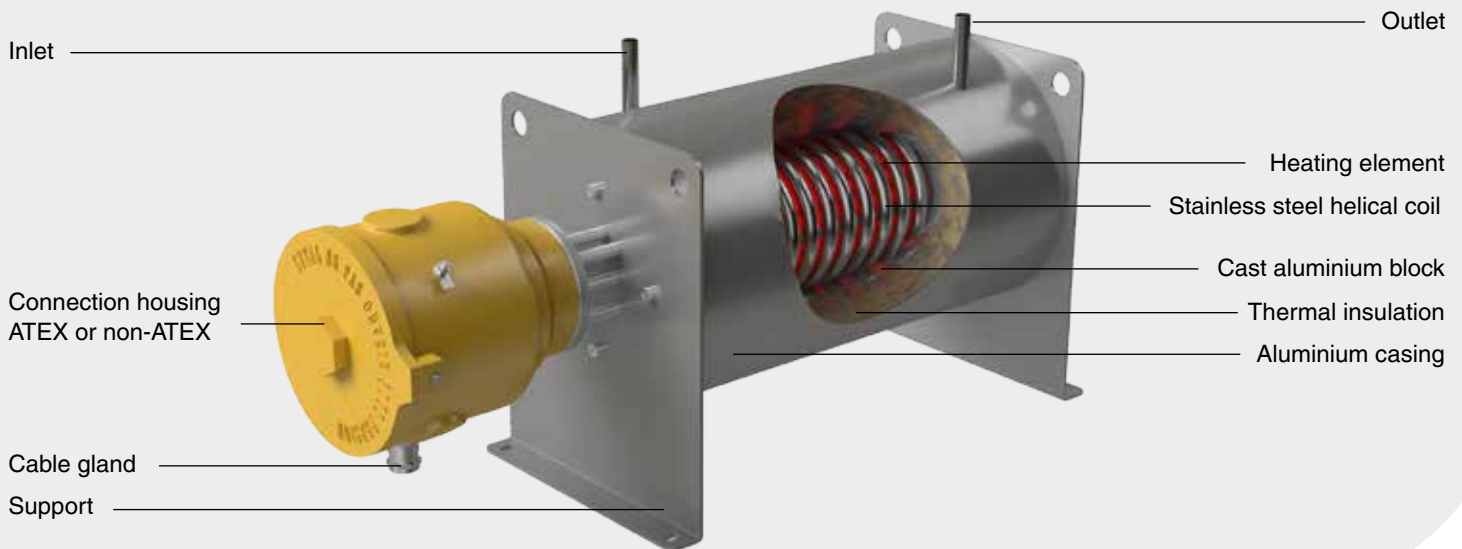


Applications

- Natural gas, butane, propane, N₂, Co₂, H₂
- Oxygen: Special designs
- Hydrocarbons, solvents and paints
- Sensitive fluids and gas applications
- UHP applications
 - Semi conductors applications on request
- 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



Maximum thermal exchange and precise heat control with increased safety

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.

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

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.

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.

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.

CETAL flexibility

CETAL 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.



Ready-to-use electrical control cabinets (option)

Electric heating controls for industrial processes must be designed for the characteristics of the fluid to be heated and also take into account the process specifications.

CETAL offers an economical range of power supply and control cabinets. They are specially designed to control cast-in circulation heaters.

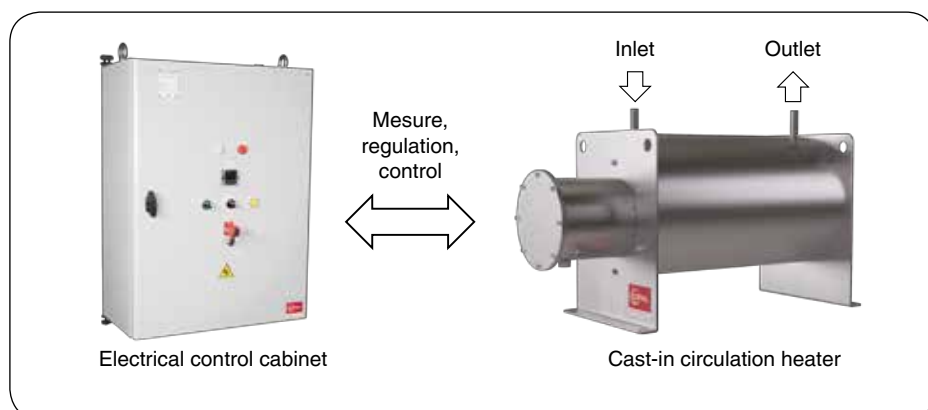
The design of the pre-configured cabinets allows for simplified quick installation and safe commissioning. They are supplied in the form of IP54 sealed metal boxes with a small, space-saving footprint.

Depending on the process, two methods of regulation are available: the standard version with a contactor controlled by a PID controller or, optionally, with a static contactor (thyristor). The front panel controls are easy to use:

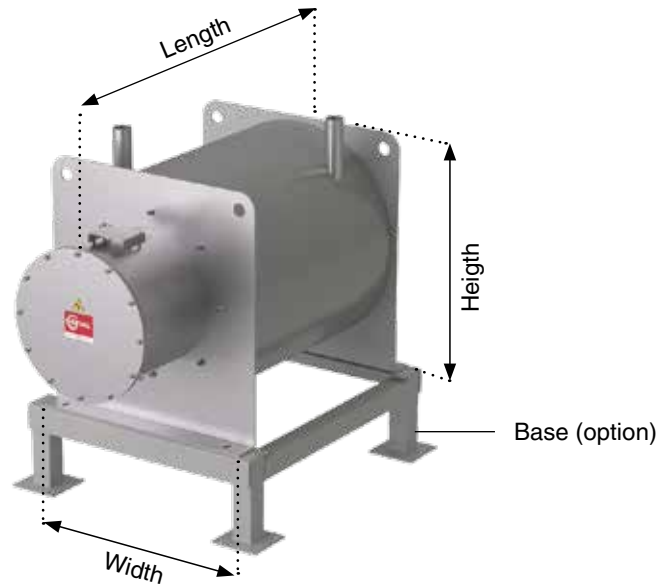
- General switch-disconnector at the top of the cabinet
- On / Off switch
- Fault acknowledgement button
- Emergency stop button

Technical data

- Dimensions according to the model: from 600 x 500 x 250 mm to 1200 x 100 x 300 mm
- Power: 3 kW to 150 kW, 400 V three-phase + earth
- Three-phase 12 A to 200 A disconnector
- Right side handle
- Safety fuse holders + fuses
- Transformer
- ON indicator, general fault indicator, illuminated green knob
- Safety line contactor
- PID controller
- SSR output + 1 high alarm
- Three outputs on potential-free contact
- Wall bracket
- **Options:**
 - Wave train control contactor
 - If required, 230 V fan with filter and thermostat
 - Floor mounting base
 - Top



Technical data



Type	Power (KW)	Max. flow rate Nm ³ /h at 8 bar	Max. flow rate Nm ³ /h at 80 bar	Max. liquid flow rate m ³ /h	Distance between inlet & outlet* (mm)	Ext. Ø of helical coil (mm)	Tube thickness (mm)	Width* (mm)	Length* (mm)	Height* (mm)	Weight (kg)
Cast-in circulation heater 01-xx kW	1.5/3	10	100	0.2	90	6.35	1.24	310	825	400	30
Cast-in circulation heater 02-xx kW	1.5/3	25	250	0.5		8	1				30
Cast-in circulation heater 03-xx kW	1.5/3/6	40	400	1		10	1				30
Cast-in circulation heater 04-xx kW	1.5/3/6	55	560	1.5	140	13.7	2.24	310	840	400	45
Cast-in circulation heater 05-xx kW	3/6/9/12	120	1300	3		17.2	1.6				45
Cast-in circulation heater 06-xx kW	3/6/9/12/24	180	1900	4	250	21.3	2.11	430	880	530	90
Cast-in circulation heater 07-xx kW	6/9/12/24	320	3300	7		26.7	2.11				95
Cast-in circulation heater 08-xx kW	6/9/12/24	540	5500	11		33.4	2.77				110
Cast-in circulation heater 09-xx kW	6/9/12/24/32	850	8600	19	340	42.2	2.77	540	910	670	240
Cast-in circulation heater 10-xx kW	9/12/24/32	1150	12000	26	390	48.3	2.77	590	910	670	250

* subject to change

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 3000 lbs 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
- **Other voltages available on request**

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
- **Options :** vertical foot mounting or wall bracket

Self-draining

- Available option : Vertical mounting configuration
- Gas bleed and complete drain down
- Documentation
- Supplied according to standards and codes

Certifications (if required)

- Conforms to Pressure Equipment Directive 2014/68/EU
- **ATEX (option)**
 - Ex d IIC T1 to T6
Ex IIC 2GD Ex tD A21 IP67
 - Ambient temperature: -50°C ≤ Ta ≤ +60°C
 - According to EC type LCIE 04 ATEX 6094X examination certification

All CETAL products can be adapted to your specifications.

Contact us!



Flange immersion heaters



Screw plug immersion heaters



Removable immersion heaters



Circulation heaters



Cast line heaters



Air duct heaters



Industrial convectors



Formed elements



Cast elements



Ribbed heaters



Anti-condensation heating elements



Bolt heaters



Power control panels – Standard range

