

Duct heaters for air heating

for ATEX/IECEx hazardous areas
or in non-atex version

HEATING GASES

MAINTAINING A CONTINUOUS
TEMPERATURE

CETAL duct heaters are designed and manufactured according to customer specification.

Reliability and robustness are key drivers for our engineers.

Advantages

- Large range of materials and options according to customer process and conditions of use
- Benefit from CETAL's 50 years of experience as designer and manufacturer!
- 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



Duct heaters for rectangular or round ducts are made up of stainless steel heating elements or sometimes finned heating elements mounted on a galvanized or stainless steel plate. The electrical wiring is done in a protected steel or stainless steel connecting box.

Applications

These cost-effective and highly robust duct heaters are used in air conditioning systems for the heating of industrial premises. Recommended minimum air speed is 2m/s.

Industrial sectors

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

Duct heater design

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

Removable heating elements

The heating elements can be removed and replaced if required.

This enables you to optimize the lifetime of the duct heater and to save costs.

ATEX/IECEX

CETAL duct 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.

CETAL 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).

CETAL 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 **CETAL** 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 the 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...



Rectangular duct heaters

Electrical duct heaters with square or rectangular section are used in air ducts, in closed loop (recycled air) or open loop.

For temperatures above 110°C, the connection box is placed at a stand-off distance. The stand-off area can be insulated

- Tubular heating elements with or without fins, AISI 321 tube (stainless steel) or other material. The heating elements are equipped with steel or stainless steel connectors which are clamped or welded.
- The watt density (W/cm^2) is adapted according to the conditions of use (flowrate, temperature)..
- Safety and medium control thermostat.
- Steel or stainless steel frame.
- Stand-off connecting box for temperatures above 110°C.
- Voltage 230-400 V.
- Other voltage on request.
- **Standard range available: B range**

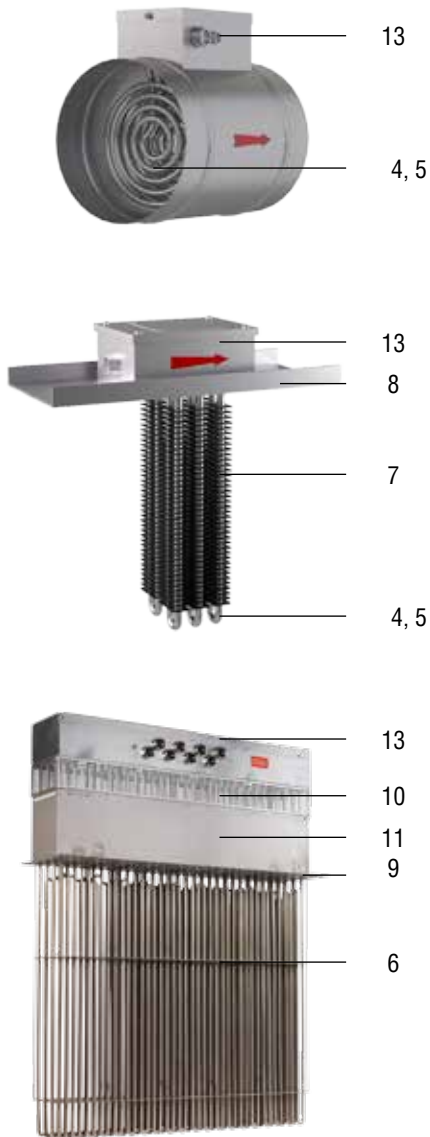
Duct heaters for rectangular ducts

- Heating elements with electro zinc coated or stainless steel fins mounted on galvanized steel or stainless steel plate for drawer mounting.
- Connecting box made of protected steel or stainless steel, IP55
- Safety and medium control thermostat.
- Voltage 230-400 V.
- Coupling MONO or TRI, cable gland.
- Other voltage on request.
- **Standard range available: BTR range**



Duct heaters for round ducts

- Duct Ø 125 to 630 mm in galvanized or stainless steel.
- Heating elements with stainless steel AISI 321 (1.4541) or others bended in spiral shape or multiple bended heating element mounted in row.
- Safety and medium control thermostat.
- Connecting part in protected steel or stainless steel.
- Voltage 230-400 V.
- Coupling MONO or TRI, cable gland.
- Other voltage on request.
- **Standard range available: BTO range**



Design of your duct heater

Input data

- A. Application
- B. Type of gas
- C. Pressure
- D. Inflow and outflow temperature
- E. Flow rate (mass or volume)
- F. Environment of use
- G. Voltage (V)
- H. ATEX/IECEX or not, temperature class
- I. Mounting in duct or on flange
- J. Dimensions of the duct
- K. Chassis
- L. Directives, standards, construction codes

CETAL 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
7. With or without fins for heat dissipation
8. Type of flange
9. Type of assembly (welding or brazing)
10. Stand-off length (SOL)
11. Thermal insulation
12. Temperature control and safety, type of sensor
13. Connecting box / Cable gland
14. Quotation: price and delivery time

Benefit from the CETAL advantages!



Design and manufacturing experts since 50 years!



Calculation and design tools specifically developed for industrial heating applications



End-to-end control of design and production chain for products which suit your process perfectly



Benefit from the CETAL know-how to optimize your process and reduce costs!

Technical Data

Available 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 / Steel plate

- Shape acc. to specifications
- Tube material choice according to applications and standards (steel, stainless steel or others)

Mounting

- Vertical or horizontal position

Electrical data

- Voltage : V_{AC} ou V_{CC}
- Cabling according to main voltage VAC/VCC 1PH + N or 3PH
- Power: from a few Watt to several Megawatts

Connecting box (non-ATEX)

- IP 54 / IP 66 / IP 67
- Material: painted steel, stainless steel, aluminum
- 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
- Material certificate 3.1 acc to NF EN 10204

Certifications (if requested)

- According to standards to comply with
- ATEX/IECEX certificate for component or system
- EAC CU TR, c CSA us



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



New!

Standard power control panels

CETAL offer a large range of cost-effective power control panels



Realisations



1



2



3

1. Duct heater 6 KW, IP67, for containers heating (working area) on oil & gas platform
2. Duct heater ATEX/IECEX Ex e for duct mounting
3. “Drawer” duct heater, 10 KW, ATEX/IECEX Ex d
4. Air heating 600 °C for mounting on oven with catalytic filter

4



ATEX/IECEx versions

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

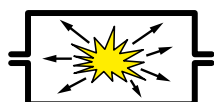
The increased safety protection mode "e" (EN 60079-7) or the explosion-proof protection mode "d" (EN 60079-1), together with temperature control acc. to EN 60079-0, make it possible to operate the equipments in hazardous area (zone 1 and zone 2) for gases of the A-B-C groups.



ATEX



ATEX housings, types of protection «d» and «e»



Type of protection "d" explosion-proof housing

- 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

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

