

Duct heaters for ATEX/IECEx hazardous areas or in non-ATEX version

Storage, installation and maintenance instructions



* Non contractual picture



Warning

It is imperative to read these instructions carefully before installing or maintaining the equipment.

General information

CETAL duct heaters are designed for various electric heating application of air or other gaseous fluids.

Technical characteristics :

The heating element are made of heating resistive wires made of nickel alloy 80/20 chromium centered in a stainless steel tube filled with an insulating material (magnesium oxide) ensuring heat transfer.

The watt density is adapted to the application.

The duct heater integrator is responsible for the installation. A control and safety equipment, suitable for the application, must protect the equipment against any risks of temperature and flow exceeding. Failure to do so may result in destruction of equipment or serious injury.

Flow conditions in a duct heater.

Basic rules :

- Provide a minimum distance $\approx 5 D$ between any obstacle (valve, flap or elbow) and the heating elements.
- The flow must be evenly distributed through the duct.

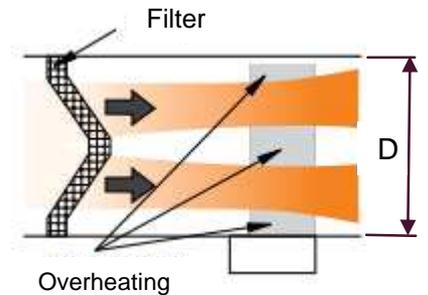
If these basic rules are not respected, overheating may occur.

D : diameter of the cross section

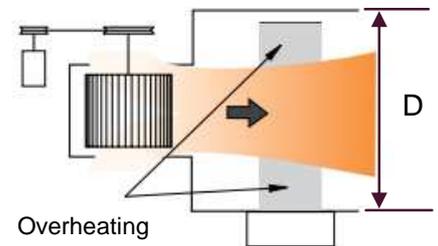
Pictures :



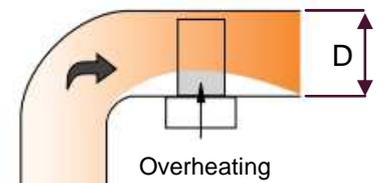
If the heating elements are located too close to a filter or diffuser, overheating zones may occur.



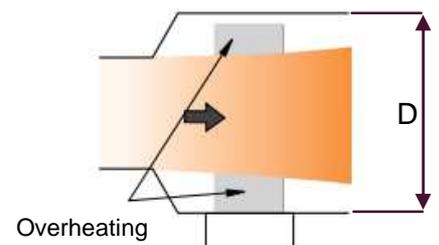
If the heating elements are located too close to a fan, overheating zones may occur.



If the heating elements are located near an elbow, overheating zones may occur.



If the heating elements are located too close to a transition, overheating zones at the edges of the heater may occur.



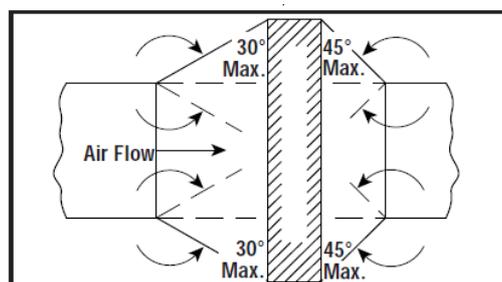
- If one of these overheating cases exists the life expectancy of the heating elements will be affected. We recommend that you follow the basic rules outlined above. If these conditions can not be avoided, it is advisable to provide non-heating lengths in the appropriate areas of the device.

Section change in a duct.

- In some air distribution systems, the dimensions of the duct may be considerably bigger or smaller than the associated ventilation duct.

The duct heater can be adapted to different sizes of duct network by installing a sheet metal adapter. The adapter shall be designed so that the slope of the upstream side of the equipment is less than 30°(see sketch below). On the downstream side, the slope must be less than 45 °.

Recommended dimensions for transitions on the duct.



Storage

- Store the heating equipment in its original packaging protected from rain, sun, shock and moisture.
- For long time storage over one month, periodically replace the dehumidifier bags set in the junction box (when applicable).
- The connection box must be properly closed and the cable entries must be properly sealed during the entire storage period.
- For equipment ordered with a specific vacuum packaging, no perforation in the packaging bag should be possible.
- Unpack the equipment only before installation and check its general condition.
- Any material, even without fret and packing, travels at the recipient's own risk. The recipient must make written reservations on the carrier's delivery note if he finds damage caused during transport (confirmation to the carrier according to local and national regulations).
- Inform CETAL for any warranty default (a defective product must not be put into service).

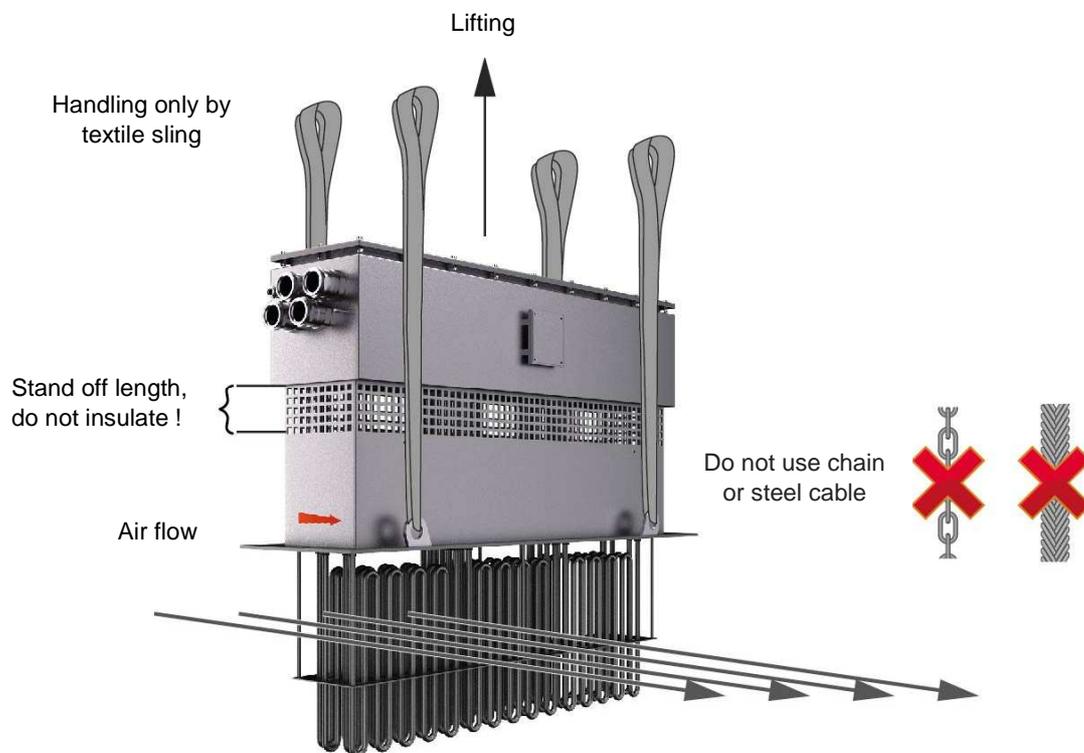
Installation



Warning

Any electrical or mechanical intervention on the duct heater must be carried out by qualified people for electrical operations in accordance with local and national regulations.

- Before working on the installation, make sure that it is switched off.
- Check that the characteristics of the duct heater match the requirements.
- The use of the duct heater to heat a medium for which it was not designed will result in the loss of warranty.
- The electrical installation to which the CETAL duct heater is connected must be sized for safe and full operation.
- Check the supply voltage. (See the informations on the duct heater).
- Electrical protective devices must be installed in accordance with the regulations in force and the rules of the art.
- Handling of the duct heaters must be carried out with care by the lifting rings (provided for this purpose) using lifting equipment adapted to the dimensions and the weight.
- Do not use the heating elements for handling, this may cause deformation.
- A sufficient length of clearance must be provided for the installation of the duct heater and possible dismantling.
- The duct heater must be mounted in accordance with the specifications (horizontal or vertical mounting). Do not insulate the remote part (if applicable) unless foreseen during design.
- No modification of the duct heater is authorized without the written consent of the company CETAL. Otherwise, CETAL would be exempt from all liability.
- The joint surface must be clean and in perfect condition when installing the duct heater. Use a gasket and bolting suitable for the operation conditions.



Important

Check the flow direction of the air / gas (inlet / outlet) indicated by the red arrow on the duct heater.

Before turning on the power

1. Make sure that the seal is correctly seated and that the duct heater is securely attached.
2. Ensure that all electrical connections are made according to the wiring diagram.
3. Ensure that the terminal box is closed with clamping device at the torque indicated in the table below (clamping screw, locking screw).

Wiring



Warning

Any electrical work on the duct heater must be carried out only when power is switched off and by qualified and authorized operators.



Important

In all cases, the installer must comply with the requirements of applicable standards, local and national regulations and CETAL recommendations. The duct heater must be grounded by the appropriate ground screws.

1. Make the electrical connections (tightening torque according to the table below) according to the wiring diagram and check the coupling of the heating elements. The connection of the power cable must be made with a cable suitable for the maximum amperage and for the environment.
2. The control thermostats and/or safety limiters may be wired in series on the power circuit only if their electrical capacities are sufficient.
Otherwise, the control and safety circuit must be separate and relayed to disconnect the power circuit.
3. Check that all electrical connections and cable entries are tight. Unsecured and loose terminals may cause the electrical terminal block to overheat, resulting in loss of warranty.
4. Do not support the weight of the connecting cables on the electrical connection box.

Ø	Tightening Torque [Nm] (±10%)
M4	2.0
M5	3.8
M6	6
M8	10

Condition of use



Important

The user shall check as often as necessary the conditions of use and the equipment itself to ensure that the essential safety requirements are not altered.

A flow measurement must be installed and cut the heating of the duct heater if the flow rate falls below the technical specifications defined for the duct heater.

1. The material is under the responsibility of the user.
2. Do not use the duct heater at a voltage higher than that indicated on the rating plate. Excessive voltage will shorten the life of the duct heater.
3. Make sure that manual reset of the limiter (if equipped) is switched on.
4. Set the control threshold of the thermostat (if equipped) or any other control unit provided.

Maintenance



Warning

Make sure that the duct heater is switched off for every maintenance operation.

All maintenance work should only be carried out by qualified operators. Only the user is responsible for the periodicity of the maintenance based on the experience, the heated medium, the operating conditions of the duct heater as well as the local standards and rules.

1. The duct heater is intended to be installed as it is. The manufacturer's liability in case of failure can not be incurred for any modification occurring after delivery. Repair or modification may only be carried out by the manufacturer.
2. Check the general condition of the duct heater and its tightening. No leakage should be present at the gasket.
3. Check the surface condition of the heating elements, which must be free of any deposits of scale or any other fouling which is a source of poor heat exchange and / or corrosion.
4. Check the tightness of all electrical connections (check the ohmic values between phases and carry out an insulation check between the phases and ground).
5. Check that no moisture is present inside the terminal box (change the seals if necessary).
6. Check the ground continuity of the immersion heater.
7. Check the operation of the safety device.

Special requirements for ATEX/IECEx duct heaters

Instructions should always be kept directly with the equipment.

Make sure that the group, zone, gas or dust group and temperature class of the equipment are suitable for the danger zone. This information must be transmitted and is the responsibility of the end user.

Maximum temperatures

The CETAL duct heaters are designed for safe operation without exceeding temperature on any external surface according to the temperature class transmitted by the customer.

Temperature Class	T6	T5	T4	T3	T2	T1
Maximum temperature	85°C	100°C	135°C	200°C	300°C	450°C

The temperature class is dependent on the flammable fluid in the environment of the duct heater installation.

Only the buyer and the end user are responsible for determining the temperature class of the duct heater. This information is to be transmitted to the company CETAL when ordering for a design of equipment appropriate to the hazardous area.

Marking

The following information appears on the tag plate (detailed in the UE declaration of conformity, delivered with the duct heater) :

CETAL

67501 HAGUENAU - FRANCE

Marking : **CE** 0081 (ATEX marking)

Type :

Month and year of manufacture : (MM-YY)

Specific ATEX marking : **Ex** II 2 G or **Ex** II 2 GD

Supplementary marking sample :

Ex d IIC T1 à T6 Gb

Ex tb IIIC Tx°C Db IP66/67

LCIE 01 ATEX 6045 X

IECEX LCI 11.0017 X

Ambiant temperature : $xx^{\circ}\text{C} < T_a < xx^{\circ}\text{C}$ if different to standard : $-20^{\circ}\text{C} < T_a < 40^{\circ}\text{C}$

Do not open under voltage.

Warning

- Never use the duct heater outside the limits stated on the tag plate fixed to the equipment.
- Adjustment of temperature limiters by thermostat was carried out during the manufacturing of the duct heater and sealed. It can not under any circumstances be modified by the user.
- In accordance with EN 50495 standard, all installed safety devices must operate independently of the measuring and control systems. The resetting of the safety devices must be possible only with the voluntary intervention of the user.

Installation

- Installation of the equipment is carried out by qualified operators who are familiar with the ATEX directive and / or the IECEX rules (if applicable) and the provisions it implies.
- It is managed by the operating staff of the industrial site.
- It is necessary to connect the duct heater to the ground using the devices provided and follow the wiring diagram delivered with the equipment.
- The duct heater is intended for installation as it is. The responsibility of the manufacturer in case of failure, can not be engaged for any modification occurring after delivery.
- Repair or modification may only be carried out by the manufacturer.

Instructions

The following instructions should be read in conjunction with :

- The equipment installation and maintenance instructions
- IEC/EN 60 079-14 Standard (Electrical installations in explosive gas atmospheres)
- IEC/EN 60 079-17 Standard (inspection and maintenance in hazardous locations)
- IEC/EN 60 079-11 & IEC/EN 60 079-14 Standard (when IS circuits are integrated in the equipment)
- Decrees, Orders, Laws, Directives, Application Circulars, Standards, Best Practices and any other document in force concerning the place of installation.

Failure to do so can not be the responsibility of CETAL.

Our equipment is CE marked according to UE Directive 2014/34 / UE (ATEX).

They are intended for use in potentially explosive atmospheres :

- Group IIA, IIB or IIC (according type)
- Category 2G or 2GD (according type) (ATEX)
- Zone 1 and 2 or 21 and 22 (according type)

Special conditions for safe use

- ATEX : refer to corresponding subsection of the delivered  type examination certificate.
- IECEX : refer to the paragraph « conditions of certification » of the attached certificate of conformity.

Commissioning

Commissioning is only permitted if the duct heater :

- is installed in the system and connected correctly,
- has been checked for compliance with mounting and connection requirements,
- is protected by a protective barrier when IS circuits are integrated into the equipment,
- and if the electrical and/or electronic compartments have been closed properly (containment enclosure) and secured by the special locking provided.
- The system user must check the device before commissioning in accordance with the prevailing national regulations for pre-commissioning checks.

Opening of the housing (explosion-proof enclosure or dust-proof enclosure) in an explosive atmosphere area is only permitted if the device is switched off.

Maintenance

The necessary safety work for hazardous area protection should only be carried out by the manufacturer or under the supervision of specialists and trained ATEX hazards. To maintain systems in potentially explosive atmospheres, it is necessary to check them regularly.

The following checks are recommended :

- Check whether the housing, cable gland and connecting cables are corroded and / or damaged.
- Check for leaks and connections to piping.
- Check the duct heater for dust deposits.
- Integrate the duct heater into the regular pressure monitoring of the piping.

Disassembly

Disassembly and assembly are the responsibility of the end user.

Due to the design of the duct heater, their components can be replaced by identical replacement parts from a safety point of view.

Before connecting or disconnecting the electrical connection cables of the equipment, make sure that all cables are at the same ground potential for the hazardous area.

This also applies to protective conductors (PE) or functional earth (FE) and equipotential conductors (PA).

After opening the housing of the duct heater, lubricate the anti-ignition threads of the cover and the cover seals if necessary. Use suitable multi-purpose grease.

Before commissioning

For a complete assembly, the integrator must (if necessary) carry out the necessary procedures with the notified bodies.

For periodic inspection and requalification, comply with the instructions in the operating manual supplied by the manufacturer of the complete assembly.

Warning

All modification work on the duct heater such as cutting, heating, grinding, welding or modification of equipment without analysis and written agreement of the company CETAL is prohibited.

All parts on the assembly must be replaced identically and with the agreement of the company CETAL.

Comply the medium and the technical characteristics (pressure, flow, direction of circulation and operating temperature) indicated on the duct heater drawing. They can not be changed without prior agreement.

The manufacturer can not be held responsible for failures in the event that the electrical equipment has to withstand particular stresses in service (eg sudden handling, effects of moisture, variation in ambient temperature, effects of chemical agents, corrosion) if these had not been provided at order stage.

Due to the evolution of the standards and the material, the characteristics indicated by the texts and the pictures of this document can change from time to time. Please ask the company CETAL for confirmation of the given information.