



## HEATING ELEMENTS INTO THE ENVIRONMENT RISK OF EXPLOSION - ATEX

Heating bodies and heating elements are designed in accordance with the international standards IEC / EN 60079-0, IEC / EN 60079-1, EN 60079-7 and IEC / EN 60079-31 in order to meet the demanding conditions in operations where maximum emphasis on safety, especially in zones with a risk of explosion. Thanks to their properties, they will also find application where IEC, CSA (Canada), INMETRO (Brazil) standards and schemes are implemented, as well as regulations in force in the United States. Entities with valid notifications or accreditations according to the reference certification scheme are involved in the certifications.

After passing the explosion, overpressure and heat tests required by C.E.S.I.C regulations, the components of the heating elements are also certified. They are mainly covers, flanges, pressure vessels or containers, in such a way that they cover the widest possible conditions and possibilities of use for direct heating of flammable gases and explosive dusts with IP 68 degree of protection.

To date, our portfolio includes products suitable for use in potentially explosive areas. For example: flange heaters, electric heat exchangers, indirect heaters for explosive gases, immersion heaters - both threaded and cantilever, heating coils in Combo design, anti-condensation heaters. Furthermore, simple smooth and ribbed radiators designed on the basis of functional requirements agreed with the customer and in accordance with thermodynamic properties and requirements set by regulations.

We cover these typical average applications in potentially explosive areas:

- preheating of heating oils
- heating and regeneration through passage technical and process gases
- heating of flammable gases (e.g. methane) in gas stations and in facilities at energy production
- heating of flammable storage areas materials- indirect heating of natural gas at high pressure (Seal Gas Heaters)
- separation and filtration of solvents and oil
- protection against frost and condensation
- contact heating of small tanks
- heating forms or bases with circulating oil circuits

Due to the individual approach to the customer, we are able to define a reasonable safety margin and properties of protective devices and then verify them with verification calculations.

## CLASSIFICATION OF EXPLOSION ENVIRONMENTS AND PRODUCT LABELING

| II                      | It indicates the environment where the device is installed, and the subsequent determination of a suitable heating element for heating. Group II environments are open spaces (not closed spaces/mines) in which gas or potentially explosive dust is present. Group I environments are open spaces/mines with the presence of gas. The supplied heating elements are intended for heating in a group II environment.  |                         |               |            |                         |                         |                         |    |      |    |      |    |      |    |     |
|-------------------------|--|-------------------------|---------------|------------|-------------------------|-------------------------|-------------------------|----|------|----|------|----|------|----|-----|
| 2                       | <p>An environment with a risk of explosion is divided into zones according to the probability of an explosion. It is marked with the numbers 0-1-2 (indicates the presence of explosive gases) or 20-21-22 (indicates the presence of explosive dust). As the number decreases, the probability of an explosive atmosphere is created in the environment. Electrical equipment used in this explosive environment is further divided into CATEGORIES. The equipment is divided into categories according to the following table.</p> <table border="1" data-bbox="368 528 1166 607"> <thead> <tr> <th>Category 1</th> <th>Category 2</th> <th>Category 3</th> </tr> </thead> <tbody> <tr> <td>Suitable for the zone 0</td> <td>Suitable for the zone 1</td> <td>Suitable for the zone 2</td> </tr> </tbody> </table> <p>Product suitable for highly explosive environments, can also be used for less explosive environments. The supplied heating elements belong to category 2, so they can be installed in zones 1 and 2.</p> | Category 1              | Category 2    | Category 3 | Suitable for the zone 0 | Suitable for the zone 1 | Suitable for the zone 2 |    |      |    |      |    |      |    |     |
| Category 1              | Category 2   | Category 3              |               |            |                         |                         |                         |    |      |    |      |    |      |    |     |
| Suitable for the zone 0 | Suitable for the zone 1  | Suitable for the zone 2 |               |            |                         |                         |                         |    |      |    |      |    |      |    |     |
| G<br>D                  | The letters G, D indicate whether the device is suitable for operation in an environment with the presence of explosive gases (G) or explosive dust (D). If both letters ( G-D) are present, the device is suitable for an environment that simultaneously assumes the presence of explosive gases and explosive dust. In these cases, the products are marked with explosion resistance and data regarding protection against gas and explosive dust. The supplied heating elements are suitable for environments with explosive gas (G) and explosive dust (D).  |                         |               |            |                         |                         |                         |    |      |    |      |    |      |    |     |
| EX                      | EX is the designation of equipment for an environment with a risk of explosion. The EX symbol is always followed by one or more letters indicating different protection modes. Example: EX d (explosion protection); EX e (increased security)   |                         |               |            |                         |                         |                         |    |      |    |      |    |      |    |     |
| e/d e/tb<br>-/d -/tb    | Symbols of the type of equipment protection used with regard to the danger posed by the presence of gas or explosive dust, how it suppresses or prevents the effects of deflagration. The device may have more than one method of protection, and in this case they are all listed on the label. If the protection mode is separated by "/ ", the mode on the left is the relative protection of the process side and the protection of the external environment on the right side.  |                         |               |            |                         |                         |                         |    |      |    |      |    |      |    |     |
| IIC<br>IIIA             | Indicates the hazard level of explosive gas or dust for which the device is suitable. Gases are divided into three groups of increasing danger depending on temperature and percentage of ignition: group IIA (e.g. Methyl alcohol), IIB (e.g. Methane), IIC (e.g. Hydrogen). Explosive dust is divided into three groups of increasing danger IIIA, IIIB and IIIC, according to size and electrical conductivity (conductive or non-conductive).  |                         |               |            |                         |                         |                         |    |      |    |      |    |      |    |     |
| T1<br>÷<br>T6           | <table border="1" data-bbox="368 1234 687 1346"> <thead> <tr> <th>Temperature class</th> <th>Temperature°C</th> </tr> </thead> <tbody> <tr> <td>T1</td> <td>&lt;450</td> </tr> <tr> <td>T2</td> <td>&lt;300</td> </tr> <tr> <td>T3</td> <td>&lt;200</td> </tr> <tr> <td>T4</td> <td>&lt;135</td> </tr> <tr> <td>T5</td> <td>&lt;100</td> </tr> <tr> <td>T6</td> <td>&lt;85</td> </tr> </tbody> </table> <p>T1 - temperature class<br/>T140°C - max. surface temperature of equipment exposed to an explosive atmosphere</p>  | Temperature class       | Temperature°C | T1         | <450                    | T2                      | <300                    | T3 | <200 | T4 | <135 | T5 | <100 | T6 | <85 |
| Temperature class       | Temperature°C  |                         |               |            |                         |                         |                         |    |      |    |      |    |      |    |     |
| T1                      | <450   |                         |               |            |                         |                         |                         |    |      |    |      |    |      |    |     |
| T2                      | <300   |                         |               |            |                         |                         |                         |    |      |    |      |    |      |    |     |
| T3                      | <200   |                         |               |            |                         |                         |                         |    |      |    |      |    |      |    |     |
| T4                      | <135   |                         |               |            |                         |                         |                         |    |      |    |      |    |      |    |     |
| T5                      | <100   |                         |               |            |                         |                         |                         |    |      |    |      |    |      |    |     |
| T6                      | <85  |                         |               |            |                         |                         |                         |    |      |    |      |    |      |    |     |
| Gb/Db                   | Equipment protection level against explosive gases ( G) and explosive dust ( D). There are three levels of protection: Ga/Da = very high, Gb/Db = high, Gc/Dc = increased. The supplied heating elements have a high level of Gb/Db protection.  |                         |               |            |                         |                         |                         |    |      |    |      |    |      |    |     |
| IP65                    | Resistance of the electrical devices:<br>1.number: protection against intrusion of solid bodies<br>2.number: protection against liquid ingress   |                         |               |            |                         |                         |                         |    |      |    |      |    |      |    |     |

Heating elements are equipped as standard with one or more safety systems with manual reset mode. If the nominal operating limits are exceeded, they are responsible for sending an alarm signal with a subsequent request to immediately cut off the heater. Setting alarms with manual reset forces the operator to check the cause of the circuit break before restoring operating conditions and restarting the process to avoid subsequent irreversible damage. If the control system is far from the heating, it is possible to control the safety intervention remotely. equipment in the control room if it is guaranteed that recovery after an intervention is not automatic. The choice of the most suitable temperature sensor is agreed after an individual consultation with the customer, taking into account the characteristics of the system and the requirements for the process. All power cables and cable grommets are connected directly to the housing, without the insertion of other elements. This accessory is also certified as standard for use in explosive environments.