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Technical Leaflet M 1.2

Elstein Infrared Radiation Elements in special operating conditions

- Position
- Installation in ovens and radiation elements facing each other
- Operation under pressure above atmospheric or in vacuum
- Agressive substances
- Moisture
- Contact heat
- Explosion protection

Elstein Infrared Radiation Elements are used to solve industrial heating tasks worldwide. This Technical Leaflet gives some hints for special operating conditions to users. Should there be no instructions for your special applications, we would recommend that you carry out tests or ask us for technical advice tech@elstein.com .

Position

The ceramic Infrared Radiation Elements are of high mechanical strength. The firm embedding of the heating coil in the ceramics permits the operating of Elstein Infrared Radiation Elements in any conceivable position.

In adverse operating conditions – such as thermal overload – beads can melt off when a radiation element breaks down. In the case of sensitive goods to be heated. For this reason the radiation elements must be positioned in a way that no particles can drop on the goods from the radiation panel area. This can be realized by radiation from the top or from the bottom.

Installation in ovens and radiation elements facing each other

If radiation is unencumbered, Elstein Infrared Radiation Elements can be operated without temperature control. If they are installed in ovens or if they are positioned facing each other, temperature controlling is required. Only in this way it is possible to prevent the permissible surface temperature of the radiation elements from being exceeded, which would reduce the service life of the radiation elements.

The "T-" preceding the identification of the element type indicates radiation element with integrated thermocouple.

Thermocouple radiation elements in connection with our TRD Temperature Control Unit and TSE Thyristor Switching Units make the continuous presetting of any desired radiator surface temperature possible. The permissible maximum surface temperature of the radiation elements must be observed.

Operation under pressure above atmospheric or in vacuum

In connection with temperature controlling Elstein Infrared Radiation Elements can generally be operated under pressure above atmospheric or in a vacuum.

When operated in vacuum, flashovers between the connecting leads are possible.

p.t.o.

Special operating conditions, such as the contamination of the radiation elements in vacuum coating equipment by the coating material for the goods to be heated, may result in a reduced service life.

Aggressive substances

The special glaze on the surface of Elstein Infrared Radiation Elements ensures high emissivity and forms extensive protection against aggressive substances.

The following substances may attack the glaze or the heating conductor material and reduce the service life of the radiation elements:

Alkalis such as sodium and calcium, hydrocarbons, peroxides, chlorine, iodine, bromine, hydrofluoric acid, caustic soda lye, sulphur and protective inert gases such as nitrogen.

The extent of the influence, which the above media have on service life, depends on their concentration and the operating conditions of the radiation elements.

Examples:

For silicone coating, in the course of which peroxides are released, Elstein Infrared Radiation Elements are used because the advantages of the radiation elements are higher valued than a possible reduction of their service life. Elstein Infrared Radiation Elements are equally used in sulphur evaporation equipment; no reduction in service life is noticeable there.

Moisture

Due to their favourable operating temperature range Elstein Infrared Radiation Elements are excellently suitable to dry humid goods.

Because of their resistance to thermal shocks they are susceptible to splashes of cold water.

When being cold, the radiation elements must not get into contact with moisture since when subsequently heated up the developing water vapour pressure could be harmful to the surface of the radiation elements.

Contact heating

It is not permitted to bring Elstein Infrared Radiation Elements in touch with the goods to be heated (contact heating).

Explosion protection

Elstein Infrared Radiation Elements are not available with explosion protection. Technical Leaflet M 1.1 provides information whether the use of Elstein Infrared Radiation Elements is permissible under aspects of explosion protection; the leaflet can be obtained on request.

We always appreciate additional information on special operating conditions given to us by users.