



Any questions?...

Customers ask – we give the answers



Can induction lamps be used in hazardous areas?

Induction lamps have a very long service life, a lower starting temperature (with suitable ballasts down to -40°C), and feature the possibility of immediate re-starting after extinguishing. These properties permit reduced maintenance cycles and ensure the high availability of the light.

In conventional discharge lamps the correct function of the electrode is usually the limiting factor for the service life. On the other hand, induction lamps do not feature the classic electrode arrangement, i.e. there is no electrode ageing. In induction lamps the electrical energy needed for striking is generated by a high frequency electromagnetic field without any electrode.

In many hazardous areas, maintenance and repair work are extremely laborious as the applications are difficult to access. Here induction lamps are ideal.

Induction lamps can be realized in luminaires with type of protection increased safety »e«, luminaires with restricted breathing »nR« and also in flameproof enclosure designs »d«. To realize the advantages of a long service life as described in each of the types of protection stated above, attention must be paid to ensuring that the internal temperatures of the electronic ballast unit and the lamp socket do not exceed the recommended and required limits. Exceeding the temperatures at the lamp socket and at the ballast will result in a significant reduction in the service life of the lamp.

In addition, a temperature increase at the lamp socket will result in a reduction in the luminous flux, i.e. the illuminances defined in the application cannot be guaranteed over the entire service life.

Does explosion protection for electrical equipment change at low temperatures?

The temperature range defined in IEC 60079 Explosive atmospheres Part 0: Equipment – General requirements is normally from -20°C to $+40^{\circ}\text{C}$. However, the products must often be used in environments in which the predominant temperatures are either significantly higher than $+40^{\circ}\text{C}$ or way below -20°C . For many items of explosion protected equipment, this aspect is not a problem in relation to the explosion protection – however more severe test conditions are required for certain type tests and routine tests than used in the standard case. In certain circumstances, some modifications to the products may be necessary to pass these tests. →

For this reason the modification of various type tests during the certification procedure of the products is necessary. E.g. the thermal endurance test to cold lasting 24 hours for plastic enclosures and seals must be performed at an ambient temperature corresponding to the foreseen minimum service temperature before the mechanical impact test is performed on the plastic parts. During this test the material must not become so brittle that the sealing fails.

A further example is the type testing of flameproofness of flameproof enclosures. This test is either performed at the low temperatures foreseen or more severe requirements are placed on the routine tests at the manufacturer. E.g., if usage below -55°C is foreseen, the overpressure during the routine test is increased by 62% compared to the standard test overpressure.

On usage in low temperatures, restrictions and other special aspects must be taken into account.

Restricted functionality

- › It may no longer be possible to operate moving parts such as actuators for switches after condensation and subsequent freezing.
- › Some lamp types cannot be started or can only be started with difficulty at temperatures below 0°C , and they also suffer a significant reduction in performance.
- › The accuracy of many measuring instruments drops with reducing temperature.
- › The trigger characteristic of circuit breakers with bi-metallic trigger mechanisms changes.

Cable glands

- › Some cable glands only have the mechanical impact strength necessary for explosion protection down to -20°C .
- › For applications below this temperature, metal cable glands must be used.

Flameproof enclosures (Ex d)

- › In the event of an explosion at low temperatures, internal pressures can occur that significantly exceed the values determined in the standard conditions.

Seals

- › The majority of seal materials adhere at temperatures below -20°C . Opening enclosures must therefore be avoided. Installation, maintenance and repair work should not be performed at low temperatures.

Cables

- › Many types of cable are not suitable for usage at low temperatures or are only of limited use.
- › The permissible bending radii as a function of the temperature are to be noted.

Fluorescent luminaires

- › The reduced performance of fluorescent luminaires can be avoided by the installation of additional heaters in the luminaire enclosure.

Mechanical effects

- › Plastics in particular react to low temperatures with reduced mechanical strength. For this reason, the certificate often stipulates that the equipment must be protected mechanically at low ambient temperatures.
- › Mechanical loads such as bending or compressive loads are to be avoided in particular.

In summary, it can be stated that the usage of electrical explosion protected equipment at low temperatures places special requirements on explosion protection. These requirements can be met for the majority of applications by modifications and changes to the products.