

Methods of Protection Purging and Pressurising (Exp)

EN IEC 60079-2 (EN IEC 60079-0 also applies)

This protection method is often used for large electric motors, or large control cabinets containing switchgear, circuit boards etc.

The principle of the protection method is to first pressurise the enclosure with air or inert gas, then to purge any hazardous gas that may be present inside the enclosure by passing a large volume of air or inert gas through the enclosure. Finally, when purging is complete, an overpressure is maintained to prevent hazardous gas from re-entering the enclosure. The equipment can then be energised.

Provided the equipment has an enclosure that will keep pressurising air leakage low, most industrial equipment is suitable with minimal modifications. This has the advantage that changes to adapt an existing product to achieve compliance can be minimised.

Requirements Applicable to all Products

The main features of the purging and protection concept are:

- No external hot surfaces above temperature class.
- Design of enclosure joints must comply with a minimum IP40 protection, although in practice it is more practical to design for a higher rating than this to minimise pressurising air leakage through the enclosure joints.
- Plastic parts contributing to the integrity of the enclosure undergo high temperature and humidity testing.
- Parts fitted inside an enclosure may include sparking contacts, semi-conductor devices and batteries.
- Rotating parts (operating rods or motor shafts) can also be permitted.
- Control equipment to manage purging, pressurising and overpressure is required, however this is available to buy from various suppliers.

Specific Requirements

Motors

Purging and pressurising is a very popular method to achieve an explosion safety solution for large motors. Suitable purge control units can be bought off the shelf, but care must be taken to ensure purging air will effectively scour all areas where gas may become trapped. Sira has a lot of experience testing and certifying motors and can offer expert advice if needed.

Control panels

Ranging from simple enclosures containing printed circuit boards, with switches and pushbuttons to multiple enclosures linked together, purging and pressurising can be used in a variety of ways to achieve compliance for many different types of industrial products.

Internal source of release

Sometimes analysing equipment processes flammable liquid or vapour that is held in a containment system. Although it must be assumed, in the event of a fault, there could be a leak, Sira has experience of calculating and assessing such releases and can assist you through the compliance process.

Method

A preliminary assessment of the design is usually conducted to confirm the basic details required for compliance with the standard. A range of products can be included in one certificate, however the various configurations may require additional tests.

The purging and pressurising tests are conducted on one sample. These tests can be conducted at the manufacturer's factory, or another suitable location, or at Sira's laboratory. The deciding factor for the test location is usually the size of the product being tested.



maximum rated value specified by the manufacturer.

Refer also to General requirements tests EN IEC 60079-0.

Thermal test

The equipment may be subjected to a thermal test to verify external service temperature and the service temperature of any plastic parts contributing to enclosure integrity.

Non-metallic enclosures and cemented joints contributing to the enclosure undergo thermal endurance (high humidity and high temperature) of non-metallic parts. This is followed by impact testing, unless the item is a component intended to be fitted inside another enclosure.

Purging tests

The purging air supply is connected and the purge flow rate is measured.

The enclosure is filled with argon and then purged with the chosen gas, usually air. The time taken to purge is noted.

The enclosure is then filled with helium and is then purged again, the longest of the two times is selected as the purge time.

Overpressure test

The purge outlet is blocked and the enclosure is pressurised, to a value of 1.5 times the maximum overpressure in service.

Leakage test

The enclosure is fed with pressurising air to raise the internal overpressure to the rated minimum. The rate of air leakage is measured and it is verified that the leakage does not exceed the

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