



Information Sheet

Introduction to Purge and Pressurization



OVERVIEW

Purge and Pressurization is a method of protection used in hazardous locations to ensure that the interior of an electrical enclosure is free of flammable gas.

Pressurization is generally used for electrical equipment that cannot be protected by other means, either because it is too large to be made explosion-proof, or too high powered to use intrinsic safety.

A vast range of electrical equipment is regularly protected by this very flexible technique.

Using a suitable purge control system and pressurized enclosure, purge and pressurization, provides an equivalent degree of safety to Flameproof (Explosion-proof) or Intrinsic Safety techniques. It also offers significant advantages of safety and durability.

PRESSURIZATION PROCESS

The pressurization process is very simple. Purge gas, normally compressed air, keeps the internal pressure of an enclosure above the pressure outside. External flammable gas cannot enter the enclosure while it is pressurized.

Before power can be switched on, the enclosure must be purged to remove any flammable gas that may have entered the enclosure before it was pressurized. Purging is the action of replacing the air inside an enclosure with air known to be free of flammable gas.

FEATURES

- + Internationally recognized.
- + Flexible method protects a wide range of equipment.
- + Suitable for one-off equipment or volume production.
- + More than one enclosure can be pressurized in series.

INTERNATIONAL RECOGNITION

Purge and pressurization is an Internationally recognized method of protection for electrical equipment in hazardous locations. Expo products carry certifications and approvals from internationally recognized test laboratories. These confirm compliance with the appropriate standards. For IEC countries IECEx certification has been obtained. In Europe, conformity to the ATEX directive EC94/9 is compulsory. In North America the National Electrical Code or Canadian Electrical Code seeks conformance with NFPA496. The use of purge and pressurization systems approved to the appropriate standard ensures conformance with local requirements. Expo products carry multiple approvals making them truly global products.

TYPICAL APPLICATIONS

Computers
Monitors
Printers
Barcode systems
Data recorders
Condition monitoring systems
Instrumentation and electrical panels
Electric motors
Analyzers
Motor control centers

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EXPO INFORMATION

Purge and Pressurization

PRACTICAL IMPLEMENTATION

Expo manufactures purge control systems and pressurized enclosures. These meet the needs of both local regulations and of the Global OEM who is serving several markets. This is complemented by a range of accessories which enable a full solution to be offered.

The main product ranges are :

Mini-X-Purge

MiniPurge™ is a range of purge and pressurization systems which cover enclosure sizes from small to very large. Carrying IECEx, ATEX (European) and FM and UL approvals, this flexible range meets the needs of the local installation and the global OEM. It employs pneumatic logic, thus remaining independent of electrical supply voltage, ensuring the simplest installation.



**Mini-X-Purge CF
Control Unit**

Mini-Z-Purge systems offer economic protection for Class I Division 2 or Zone 2 applications in accordance with NFPA 496 and IEC/EN60079-2. It offers the ease of use, clear indication and flexibility expected of Expo products.



**Mini-Z-Purge
CF Panel Mount**



**Mini-Z-Purge
LC Back Plate**

SmartPurge™ is a flexible microprocessor controlled system. It is ATEX certified, covering a wide range of applications. The programmable flexibility of this product ensures minimum design effort for the integrator. Clear LCD display gives useful status indication, and universal input voltage suits the Global OEM.



**Control Unit
(SPC-UV)**



**Remote Panel
(SRP-1)**

PRODUCT RANGE

To use purge and pressurization to protect equipment in a hazardous location the equipment must be housed in a suitable enclosure. The correct purge system can then be installed. In some cases, such as large electric motors, the equipment is already in a suitable enclosure. In most cases the enclosure is not leak tight and will not have the strength required to stay sealed under pressure. Expo designs and manufactures standard or customized enclosures specially suited to pressurization. To select a purge system, the Expo Purge System Selection Wizard can be used. This determines the classification of the hazardous location, and the size of the enclosure, and then selects a list of purge systems which may be suitable. This is refined based on the power and signals of the equipment and the acceptable purge time. Different sets of regulations have different methods to decide the purge time required. In general between 4 and 7 volume changes will meet the requirements. These requirements are summarized below.

	Purge Type	Purge Volume
North America Class I Division 1	Type X Automatic	4 x enclosure
Class I Division 2	Type Z Manual	4 x enclosure
IEC/Europe Zone 1	Type px Automatic	5x enclosure or Purge Test
IEC/Europe Zone 2	Type pz Manual	5x enclosure
Zone 2	Type Ex nZ or nP	No longer acceptable

There are also different methods of purging. Most purging is done using compressed air, but in certain cases inert gas is used. Fan generated air can also be used. When using compressed air either Leakage Compensation or Continuous Flow can be used. Continuous Flow passes the same flow rate during purge and afterwards. Leakage Compensation provides an initial high flow of air to purge, then reduces the flow to a small amount, just enough to compensate for leakage from the enclosure. With all but the smallest enclosures, Leakage Compensation systems are preferred, as they minimize the consumption of compressed air, and yet can have quite short purge times.

Where equipment is housed in more than one enclosure, enclosures can be purged in series using one purge system. Interconnection tubes must be of adequate size and other precautions taken. Expo can advise on this if required. The final consideration must be thermal management, as, in order to pressurize an enclosure, free ventilation is usually not possible. Expo can offer advice and solutions for thermal management of pressurized enclosures. Expo has decades of experience and can discuss and advise on specific application problems.

Expo Technologies Ltd

Summer Road, Thames Ditton,
Surrey, KT7 0RH, UK
T +44 (0) 20 8398 8011
F +44 (0) 20 8398 8014
E sales@expoworldwide.com

Expo Technologies Inc

9140 Ravenna Road Unit 3,
Twinsburg, OH 44087, USA
T 888-NFPA-496 (Toll Free)
F +1 440 247 5409
E sales.na@expoworldwide.com

www.expoworldwide.com

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