

Purged Enclosures in Hazardous Areas

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Does your plant have enclosures in hazardous areas which must be purged with air or other gas and maintained at a pressure above atmospheric pressure? Some examples include electrical equipment enclosures, enclosures for analyzers such as shown in Picture 1, and even control rooms or other occupied rooms. The enclosures are maintained at a pressure above atmospheric so that any flow through openings or leaks in the enclosure will be from inside the enclosure to the outside atmosphere. This prevents flammable vapors or gases getting into the enclosure, where the electrical equipment might be an ignition source for a fire or explosion.

Usually these enclosures are purged with clean air, but alternatively, or from a backup system, they may have a nitrogen purge and atmosphere (Picture 2). If your enclosures have a nitrogen purge, or a nitrogen backup for an air purge, be aware of the potential of an asphyxiating atmosphere (4/2004 and 6/2012 *Beacons*) inside, or outside near enclosure openings.



1. A pressurized and purged analyzer building (air purged with nitrogen backup)
 2. Warning signs for potential nitrogen atmosphere inside enclosure
 3. Examples of enclosure pressure gauges
- (Photos 1 and 2 courtesy of Roy E. Sanders)

Did you know?

- Electrical codes and standards, which may vary in different countries and local areas, will tell your engineers and managers how purged enclosures are to be designed and operated.
- Generally, the pressure inside a purged enclosure must be maintained within a specified range, and monitored (Pictures 3 and 4) to ensure that any leakage of vapor is actually from inside the enclosure to the outside atmosphere.
- A pressure above the specified range can also be hazardous. In May 2017, an engineer was removing a 14 in (0.36 m) diameter cover weighing 12 lb (5.4 kg) from an enclosure. The enclosure had excess pressure inside, from leaking purge gas components. As the cover was being removed, it flew off and hit the engineer in the head, resulting in a fatal injury. (Reference: http://safetyzone.ioapp.org/SafetyAlerts/alerts/Detail.asp?alert_id=288)
- To maintain the correct pressure inside the enclosure, it is important to keep any doors or other openings properly closed and sealed.

What can you do?

- Be aware of any purged enclosures in your plant, and check for proper operation as you do your routine plant rounds.
- Check the pressure in enclosures, and report to management if it is not in the proper range. Follow up to make sure the problem is fixed. Picture 4 shows a pressure gauge which clearly indicates the proper range.
- Check that all doors or other openings in purged enclosures are closed, and that the enclosure is properly sealed.
- If you are doing maintenance inside a purged enclosure, be sure to get the proper permits for the work. Be aware of the potential hazard of high pressure when opening enclosures, and check the pressure before opening. Make sure the enclosure is properly closed, sealed, and that the purge is operating properly when the work is finished.
- If your enclosures have a nitrogen backup for an air purge, or if the normal purge uses nitrogen gas, be aware of the potential for an inert atmosphere inside or near the enclosure. Check the atmosphere for oxygen before going inside, even if there is a nitrogen alarm and it is not warning of high nitrogen concentration.



Make purged enclosure checks a part of your plant routine!