Application Notes

INGOLD
Leading Process Analytics

Oxygen Measurement in Nitrogen Blanketing

Mettler-Toledo in situ amperometric oxygen analyzer provides well-priced alternative to costly paramagnetic system.
The Mettler-Toledo amperometric in situ oxygen analyzer allows reliable oxygen measurement in operations where the presence of oxygen is undesirable. In these so called nitrogen Blanketing or inerting processes, it has proven itself a worthy alternative for paramagnetic systems.

Background

Storage, transportation and handling of flammable liquids and dust can create risk of explosion or fire. Especially milling operations or centrifuges that separate solids from organic solvents, are vulnerable to this threat. The rotating equipment generates heat or may cause electrostatic discharge which is all that is needed to ignite an explosive mixture.

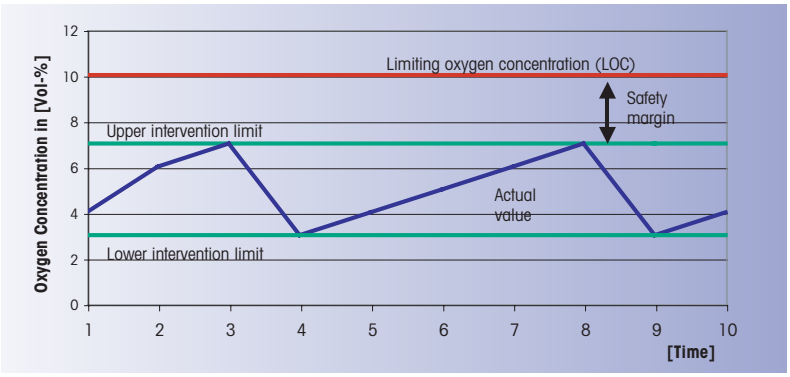
Nitrogen blanketing is therefore carried out to generate a non-combustible atmosphere with low oxygen contents. To achieve this, the centrifuge or tank is purged with a controlled stream of nitrogen to keep the oxygen level below the **L**imiting **O**xygen **C**oncentration **(LOC).**

Efficient Control of LOC

In order to prevent the oxygen concentration from exceeding the limiting oxygen concentration (LOC usually < 10%), the control loop initiates purging of the vessel when an upper intervention limit is exceeded. This threshold value is always well below the limiting oxygen concentration (LOC). On the other hand the nitrogen consumption has to be controlled to reduce operating costs. The purging is therefore stopped when the Lower Intervention Limit is detected. This means that the inerting system keeps the consumption of nitrogen mini-

METTLER TOLEDO

Control of Limiting Oxygen Concentration

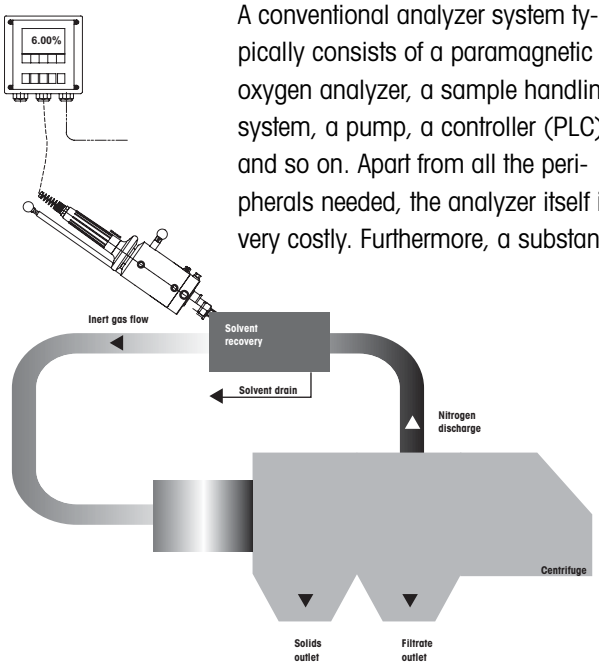


mal while safe operation is ensured. Depending on individual process conditions and solvent concentration, the oxygen level is maintained between 1 and 9 vol %.

Disadvantages of the classical approach

The control loop usually consists of an oxygen analyzer system, a pressure regulator, a control valve, a safety relief valve etc.

A conventional analyzer system typically consists of a paramagnetic oxygen analyzer, a sample handling system, a pump, a controller (PLC) and so on. Apart from all the peripherals needed, the analyzer itself is very costly. Furthermore, a substantial amount of maintenance is required. Faulty sample handling can lead to serious damage to the paramagnetic oxygen cell. This again will lead to reduced capacity and production loss.



METTLER TOLEDO's alternative

With amperometric oxygen measurement, Mettler-Toledo offers a cost efficient and reliable solution. The oxygen probe can be mounted directly into the nitrogen discharge piping. If desired, a retractable sensor mounting assembly allows retrieval of the sensor without interrupting the process. This enables fully automated cleaning and calibration, with normal air used as calibration gas. In very critical applications, the instrument can be equipped with redundant oxygen probes.

Mettler-Toledo's amperometric oxygen analyzer is characterized by robustness, fast response times and moisture resistance. Of course both analog and digital communication are available, whether it's HART®, Foundation Fieldbus or Profibus®.

O_2 sensor
InPro 6800 Gas

Retractable housing
InTrac 777 e

Transmitter O_2 4100 e

www.mt.com/pro

Visit for more information

Mettler-Toledo AG
Process Analytics
Im Hackacker 15
CH-8902 Urdorf
Switzerland

Subject to technical changes.
© 06/07 Mettler-Toledo AG.
Printed in Switzerland.