Application Note

INGOLD
Leading Process Analytics

Ensuring Safety in Reactor and Centrifuge

With Oxygen Gas Monitoring System

Critical reaction and extraction stage in an API production process can be ensured safe with inline gas-phase oxygen sensing technology which eliminates costly and maintanence-intensive systems.

Divis Laboratories Ltd., India

Established in the year 1990, with Research & Development as its prime fundamental, Divis Laboratories focuses on developing new processes for the production of Active Pharmaceutical Ingredients (APIs) and intermediates. The company in a short matter of time expanded its breadth of operations to provide complete turnkey solutions to the domestic Indian pharmaceutical industry. Divis Laboratories Limited, whose head office is located in Hyderabad, owns two API manufacturing units, one some 60 km from Hyderabad employing approximately 1500 people, the second similar at Vizag in Andhra Pradesh. Both units are involved in the production of Active Pharmaceutical Ingredients and Intermediates for generics, custom synthesis of API's and advance intermediates for the giants of the pharmaceutical industry.

Applications

There were two processes in particular which have to be carefully monitored and controlled for safety reasons. The first is a batch reaction process in a glass-lined reactor using highly flammable / volatile organic solvents with strong chemically corrosive properties. The second process, solvent recovery by centrifugation, involves flammable vapors which at an oxygen presence of more than 8 % could lead to a dangerous

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explosion. Therefore, in order to minimize oxygen intrusion, inert nitrogen gas is purged into the reactor and centrifuge. Vapors are collected at the vents at slight vacuum. To ensure safety, effective and reliable monitoring of the oxygen percentage concentration is highly essential in order to be able to control the amount of oxygen that can intrude into the reactor or centrifuge.

Problem

Originally, the customer had been using an oxygen measuring system from one of our competitors. According to Gopal Krishna, the application engineer, and S. Rama Krishna, the general manager of production, it was found that the system performance was affected by moisture content and traces of organic solvents on the sensing element. They required a more confident system.

Customer's expectations

There were four main points which would have to be fulfilled in order to enter a successful partnership:

- Sensors resistant to organic solvent vapors and moisture
- System repeatability
- Minimum maintenance time
- Reasonable cost of ownership

METTLER TOLEDO solution

Based on experience, the following METTLER TOLEDO inertization control systems were proposed:

- Measuring system in the reactor:
  Oxygen sensor InPro 6800 G with Hastelloy C wetted parts, housing InFit 761, and multi-parameter transmitter M700.
- Measuring system at the centrifuge:
  O_2 sensor in combination with housing InFit 761 and transmitter M420
- For each of two auxiliary centrifuges:
  O_2 sensor InPro 6800 G in combination with housing InFit 761 and multi-parameter transmitter M420

Customer satisfaction

The very challenging performance expectations of our customer were fully realized. Therefore, after the first few months of use, an overall positive conclusion was made:

- The sensors are compact, simple and easy to install
- Maintenance effort is clearly reduced
- Proven track record for similar applications
- The measuring systems are accurate and reliable
- The measuring system were appreciated by the customer inspectors

Solution Benefits

With direct in-line measurement of oxygen in the centrifuge, there is no need for a gas sampling and conditioning system. Amperometric sensors are insensitive to humidity and a wide range of organic solvents typically used in centrifuges. Because no gas sampling and conditioning system is requiered, the simple and easy-to-use measurement systems from METTLER TOLEDO are more rugged and significantly contribute to a higher process reliability.

For more information:
www.mt.com/o2-gas

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