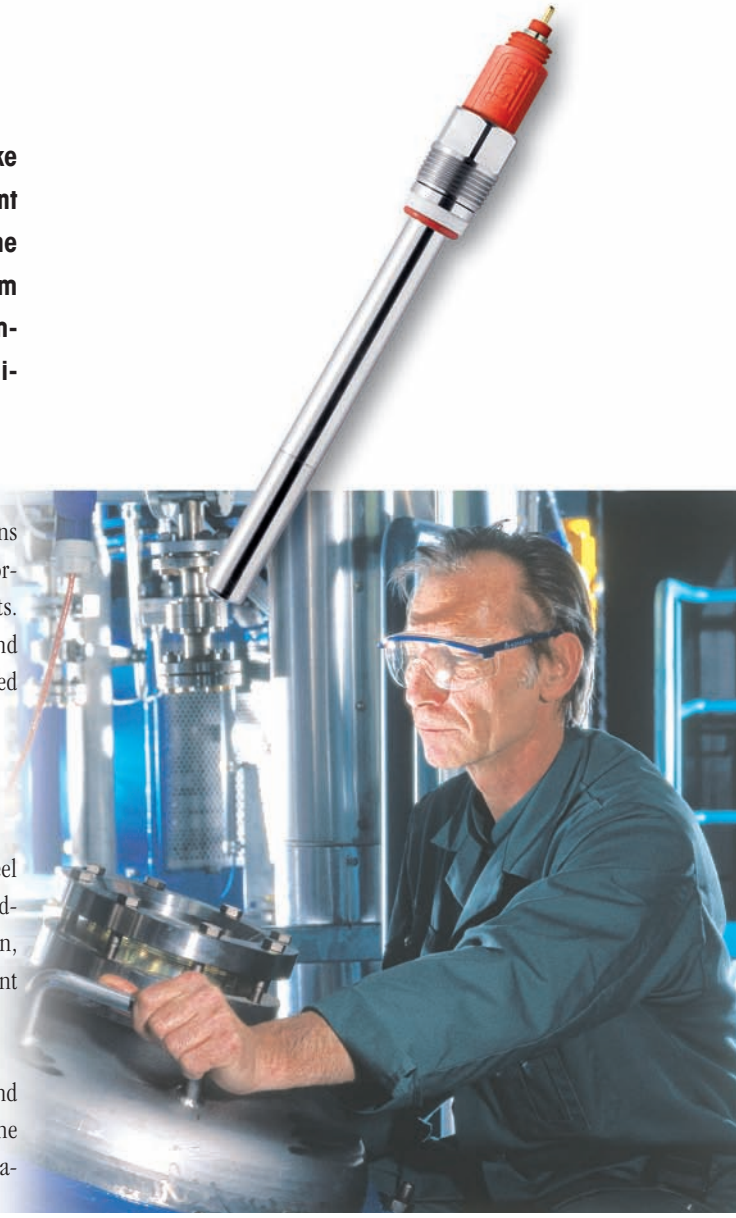
Application Note

INGOLD
Leading Process Analytics

In-line O_2 Measurement
for Inertization Control



For safety reasons, some chemical reactions take place in an inert gas environment where the amount of oxygen present is tightly controlled. The METTLER TOLEDO gas-phase measurement system showed the best price/performance ratio in comparison to others in a polymeration reactor application.

Our customer, an international leader

One of the world leaders in specialty chemicals maintains manufacturing facilities in Brazil producing, besides performance and process chemicals, a range of different detergents. These are based on anionic and cationic surfactants and polymers, as well as bleach activators. The products are used in many industries in countless applications.

Measurement of oxygen concentration on inertized atmosphere

The application in question takes place in a stainless steel reactor, where certain organic compounds react. The headspace of the reactor must be filled with inert gas, i.e. nitrogen, as there is a clear explosion risk. An oxygen measurement system was installed to keep the situation under control.

In the reactor headspace itself, besides the nitrogen (around 94 %), some traces of volatiles organics coming from the liquid phase, (around 2 % isopropanol) are also in the measurement media.

METTLER TOLEDO

The customer used to measure the oxygen concentration in the inertized atmosphere by using equipment from another supplier. The measurement cell, however, was very difficult to maintain reliably, and its installation needed an awkward sample system. Additionally, some components of the measured gas stream interfered with the measurement result.

The measurement media is at 50 °C (122 °F) and at atmospheric pressure. The maximum oxygen concentration allowed in the mixture of gases in the headspace is 7 % vol.

Customer's expectation

The customer made clear statements, requesting easy maintenance possibilities and above all drastic reductions in replacement costs.

METTLER TOLEDO solution and expertise

Based on the application features itself, an oxygen system was specified. System components were installed at the vent of the polymerization reactor, constantly inertized. They will enable prevention of the creation of a hazardous atmosphere caused by H_2O_2 decomposition in the process.

The complete system consisted of the following METTLER TOLEDO products:

- InPro 6850 i G oxygen sensor
- M420 / 2-wire transmitter
- InTrac 777 e retractable housing

The InPro 6850 i G sensor with gas-phase oxygen membrane was tested for one month. The system performance fulfilled all process requirements within the set test period. Due to this performance, the customer purchased the complete oxygen measurement loop.

Since the measurement is related to the reactor safety condition, the oxygen sensor was mounted in a retractable housing InTrac 777 e that allows to test the system response time and its accuracy, by injecting air (21 % vol. of oxygen) into the housing washing chamber when the sensor is retracted. Such mounting also allows easier sensor maintenance and cleaning.

Customer benefits

The technical advantages of the products selected for this application fully met up to the requirements specified by the customer. Besides all the technical advantages offered by the METTLER TOLEDO system itself, the customer now no longer needs a sample conditioning device and its replacement parts or any special measuring reagents. The customer will also experience a significant reduction in process downtime. It is important to point out that the investment in the new solution will pay-off over a period of about one year.

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

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