Success Story

INGOLD
Leading Process Analytics

Minimizing Corrosion
with Fast, Robust Gas Analysis

Corrosion can never be totally stopped, but significantly slowing its progress can be achieved if analyzers rapidly detect out-of-spec conditions. For a prominent European chemical company, switching from slow electrolytic sensors to almost real-time moisture analysis has made a significant improvement.

Wet chlorine is highly corrosive

Inovyn is a leading producer of general purpose and specialty vinyls, caustic soda and many other compounds used in a diverse range of industries. It is also Europe's largest producer of chlorine, which it manufactures at its Antwerp site in Belgium.

More than 95 % of world chlorine production is achieved using the chlor-alkali process, in which an aqueous salt solution (brine) is converted into chlorine and caustic soda by applying direct electric current.

The obtained raw chlorine gas is dried immediately after electrolysis as wet chlorine is highly corrosive to plant equipment. The water content directly influences the reactivity of the gas and the corrosivity increases steadily above a concentration of around 30 ppm H_2O. "Dry" chlorine contains water in the low ppm range. To prevent downstream corrosion and to control chlorinator efficiency, the water content of the chlorine is constantly monitored.

Slow sensor response is a problem

Inovyn had been using electrolytic P_2O_5 (phosphor pentoxide) sensors for moisture monitoring, but were concerned with the sensors' long reaction time (up to 5 minutes t_{90} time) which increased the risk of damage to downstream equipment should moisture levels rise. Additionally, the sensors required frequent

METTLER TOLEDO

maintenance (due to the need for regular catalyst regeneration), and as oxygen and hydrogen could form water molecules in the sensor, measurements were not always reliable.

Simpler technology means lower maintenance

Eager to find a more dependable, low maintenance solution, Inovyn installed two METTLER TOLEDO GPro 500 tunable diode laser (TDL) spectrometer sensors. TDLs output a laser beam that is tuned to scan the wavelength in the electromagnetic spectrum where absorption lines of the target species, in this case H_2O, are present. The water molecules absorb the laser light and the sensor analyzes the light depletion to determine the water concentration in the dry chlorine.

If process conditions allow, TDLs can be installed in situ. However, to protect measurement integrity at Inovyn, a GPro 500 with an Extractive Cell adaption was connected to a new extractive system.

TDLs are non-contact instruments which means they are low on maintenance compared with other analyzers, such as the electrolytic type, where the sensor is in direct contact with the gas stream and requires frequent maintenance / cleaning to preserve measurement. Maintenance for the GPro 500 amounts to occasional cleaning of the sensor's optical windows and annual verification.

Rapid, reliable moisture measurements

TDLs offer another significant benefit for Inovyn: they have a very fast response time. The t_{90} time for the GPro 500 is less than 2 seconds, a reaction speed Inovyn had never observed with their P_2O_5 sensors.

GPro 500 with insulation and the extractive system

Since its commissioning, plant managers at Inovyn have been delighted with the GPro 500's accuracy, tolerance of process conditions, low maintenance and speed of response. They now have far greater confidence in their chlorinator process than ever before.

Find out more about the GPro 500

► **www.mt.com/GPro500**

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