



Why Use Humidity in Air Monitoring Systems ?

- ▶ To ensure continuity of end product quality.
- ▶ To minimise material wastage.
- ▶ To minimise power consumption by ancillary plant.

Why Use ABB Instrumentation

- ▶ ABB offer greater security at a lower cost by having:
 - Proven reliability – over 100 years of process instrumentation experience and over 27 years applicational experience in Zirconia oxygen analysis.
 - Full installation, commissioning and routine servicing facilities available. plus a worldwide network of companies and agents to ensure backup in most areas,(in the UK and some other countries this is covered by the **Assist**[™] Customer Support Programme).
- ▶ Transmitters and probes designed, manufactured and supported by the same company.
- ▶ Comprehensive range of field-proven products available.

What ABB Products Are Suitable ?

- ▶ **ZFG2 /ZMT Zirconia Probe system.**
 - The ZFG2 probe is truly in situ, requiring no sampling.
 - Range of probe lengths available, 1.0m, 1.5m and 2.0m – to suit all applications.
 - Low maintenance requirements and unique design features, ensure low cost-of-ownership – even under the most arduous conditions.
 - Fully site-serviceable, requiring no special tools over the life of the probe.
 - Long intervals between calibration (the auto-calibration option reduces the need for routine attention).
 - Simple calibration as an O₂ analyser.
 - Innovative sensor technology gives long sensor life (from 4 to 10 years) on normal applications and reduced long-term drift.
 - Speed of response is maintained over long time periods on the dirtiest applications.
 - Our probe design ensures system accuracy is maintained over the full working process temperature range without recalibration.

Installation

- ▶ The IP rating of the probe ensures trouble free operation on both indoor and outdoor installations.
- ▶ The ZMT transmitter can be mounted adjacent to the probe or up to 100 metre from the probe.
- ▶ The ZFG2 probe can be mounted in any orientation.

Process Description

Basic Measurement/Analysis Theory

All Zirconia oxygen analyzers, whether extractive or in-situ type, utilize a ceramic (Zirconia) solid electrolyte sensor which is specific to oxygen.

When the solid electrolyte temperature is 600°C or higher and a difference in partial pressure of oxygen exists across the sensor, a flow of oxygen ions takes place from the higher to the lower partial pressure.

Air is used to give a reference potential against which the process sample is compared.

Accurate sensor temperature control and compensation for process temperature generated thermoelectric effects ensure accurate measurement under all normal process conditions.

On-line manual (semi-automatic) or automatic calibration is either single point or two-point by means of test gas injection.

For drying processes where hot air is the means of drying the product, the on-line humidity of the process can be measured by using a Zirconia Oxygen Analyzer.

Given that dry air has an Oxygen content of 20.95% O₂ and 100% humidity contains zero O₂, we can say that, under these process conditions and at temperatures above 100°C, the range of 20.95% to 0.00%O₂ represents a range of 0.00 to 100% H₂O (water vapour).

Product Quality

For some products, such as paper coming off a paper machine or fibre board/plywood coming from the drying oven, the level of residual water is critical to the quality of the finished product. Over-drying results in excess energy consumption and produces an inferior product .

On other applications, such as synthetic fibre and textile drying processes, drying beyond the normal ambient background level results in considerable energy wastage.



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