Humidity Measurement and Control in Industrial Drying Processes

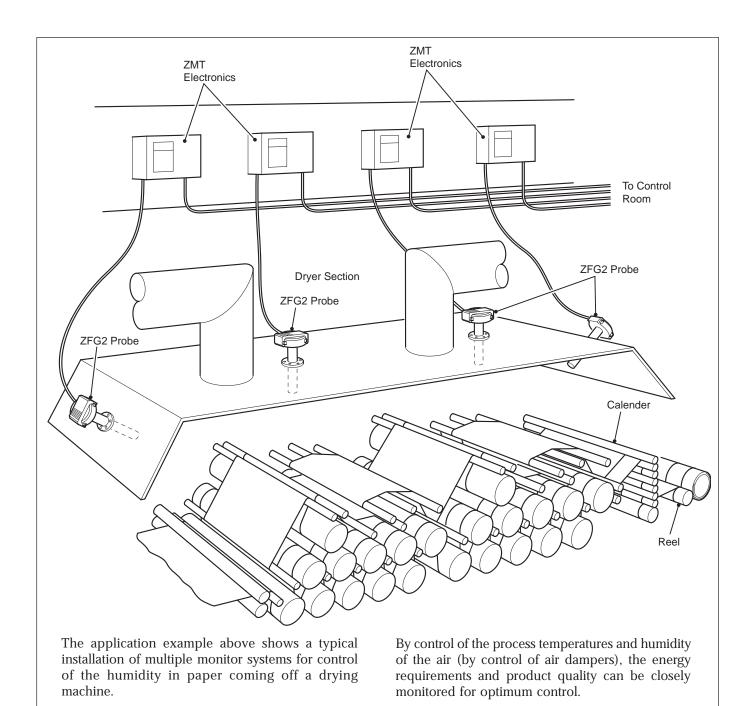


ABB Instrumentation



Why Use Humidity	
in Air	
Monitoring Systems	?

Why Use ABB Instrumentation

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

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 0_2 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.

What ABB Products Are Suitable ?

Humidity Measurement and Control in Industrial Drying Processes

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.
	Basic Measurement/Analysis Theory
Process Description	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% O_2 and 100% humidity contains zero O_2 , we can say that, under these process conditions and at temperatures above 100°C, the range of 20.95% to 0.00% O_2 represents a range of 0.00 to 100% H_2O (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

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



ABB Instrumentation St. Neots

Cambs. England, PE19 3EU Tel: +44 (0) 1480 475321 Fax: +44 (0) 1480 217948

ABB Instrumentation Analytical & Flow Group Stonehouse, Glos. England, GL10 3TA Tel: +44 (0) 1453 826661 Fax: +44 (0) 1453 827856

ABB Instrumentation Inc.

PO Box 20550, Rochester New York 14602-0550 USA Tel: +1 716 292 6050 Fax: +1 716 273 6207

ABB Kent-Taylor SpA

22016 Lenno Como Italy Tel: +39 (0) 344 58111 Fax: +39 (0) 344 58278

The Company's policy is one of continuous product improvement and the right is reserved to modify the information contained herein without notice. This document is supplied as a guide only. It is not intended to form a design plan or to be used in the design of any process or system. © ABB 1999

Printed in UK (01.99)