BARTEC BENKE

HYGROPHIL®

HYGROPHIL® H 4230 Gas Humidity Measurement

Measuring. Evaluating. Documenting.

HYGROPHIL® H 4230 Gas Humidity Measurement

HYGROPHIL®

Measuring. Evaluating. Documenting.

For years now, BARTEC BENKE measurement engineering has proven successfully in processes with high gas temperatures and in the presence of aggressive and dusty gases. The precise recording of the high moisture levels forms the basis for first-class production results with the most favourable level of energy consumption.

The HYGROPHIL® H 4230 is a process hygrometer for the toughest industrial demands in terms of corrosion resistance, continuous operation and insensitivity to dirt.

BARTEC BENKE

YOUR competent partner for safe plants

The specialists from BARTEC BENKE have many years of experience in plant safety. They create solutions which you can rely on: economical, reliable and for the future.

The ultimate in precision, long-time stability

No need for calibration, self-cleaning

Resistant to aggressive gases (such as SO_2, SO_3, HCl)

Tested and approved by TÜV in acc. with BImSchV (13., 17., 27., 30.)

Further product advantages

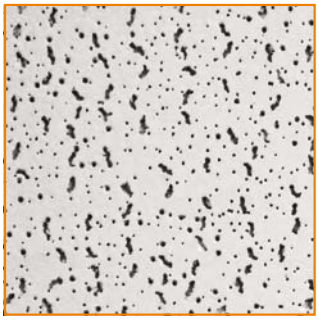
- Easy-to-understand operations
- Resistant to oil, tar and other components in the exhaust air
- Option of complete on-site service
- Works extractively and is therefore suitable for all process gas temperatures

Fields of application

- **Power stations, waste and biomass incineration:** emission measurement, firing rate control, filter protection, detection of boiler damage
- **High-capacity dryers:** energy savings due to the regulation of exhaust air moisture, drying of solid matter and liquid substances, such as goods on rolls, bulk material, milk, coffee, tea
- **Baking and cooking ovens:** regulation of the process climate
- **Future-oriented technologies:** process measurements in institutes and research institutions (example: biomass gasification oxy-fuel process)
- **Chemical Industry**

Drying of bulk material

Tissue paper



Gypsum fibreboards

Coffee roasting

Function of the psychrometer

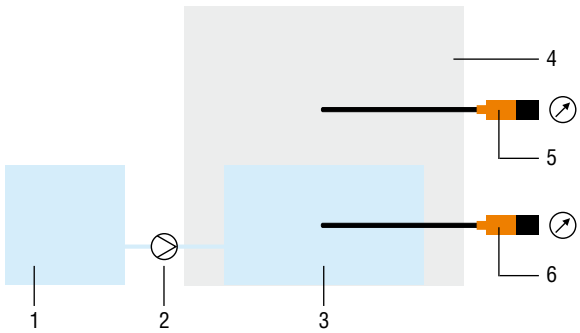
Description of the psychrometer consists of two thermometers, of which one, the wet-bulb thermometer, is located in a measuring cell filled with water. The other thermometer measures the gas temperature directly which is the dry-bulb temperature.

The dryer the air is, the more water evaporates, the evaporation causes more cooling and this increases the difference in temperature between the two thermometers.

Using psychrometric formulas, it is possible to determine the absolute air humidity and other parameters from the difference in temperature. The psychrometric measuring principle is one of the most precise methods and it is drift-free, even in processes with corrosive gases.

The calculation basis is specified in a standard. Our expertise lies in the measuring chamber.

Physical Principle of the HYGROPHIL® H 4230



1 Water tank
2 Water pump
3 Measuring cell
4 Gas stream
5 Pt100: dry-bulb temperature (DB)
6 Pt100: wet-bulb temperature (WB)

HYGROPHIL® H 4230 Hygrometer

BARTEC BENKE

Technical Data

Measurement principle	Psychrometric gas humidity measurement in accordance with the impact jet process
Measurement transducer	Pt100/4-wire according to DIN IEC 751
Settling time T90	90 s (if there is a change in specific humidity from 10 to 190 g/kg)
Air/gas throughput	max. 17.5 Nl/min
Water supply	max. 25 ml/h (peristaltic pump)
Water storage	2 l (enough for approx. 3 days) alternatively 11 l
Compressed-air supply	2 to 5 bar (air consumption max. 2000 Nl/h)

Measured variable inputs

■ **Measured value** ■ **Measuring range** ■ **Resolution** ■ **Accuracy** ■ **Type**

Dry-bulb temperature	0 to 140 °C	
Wet-bulb temperature	0 to 140 °C	
Temperature T1ext.	0 to 200 °C 0.1 °C ≤ 0.5 % of the measuring range	
Absolute pressure	500 to 1500 hPa	1 hPa ≤ 1 % primary
Dewpoint temperature	20 to 100 °C	0.1 °C
Volume fraction	H_2O Vol.-% 2 to 100 %	0.1 %
Absolute humidity	15 to 1000 g/kg	1 g/kg
Specific humidity	15 to 1000 g/kg	1 g/kg
Enthalpy	35 to 1000 kJ/kg	1 kJ/kg
Current vapour pressure	10 to 1000 hPa	1 hPa
Saturation deficit	0 to 1000 hPa	1 hPa calculated

Outputs

Signal output	analog output: 2 galvanically isolated output channels, can be assigned to each of the measuring ranges, spread, error behaviour programmable
Output signal	0 to 20 mA or 4 to 20 mA (programmable), linear
Permissible load	≤ 500 Ω Accuracy ≤ 0.2 % of the relevant measurement
Inputs	Water detector external DC 24 V, NPN $T1_{external}$ Pt100/4-wire acc. with DIN IEC 751
Data interface	PROFIBUS field bus interface

Electrical Data

Auxiliary energy measuring device	AC 90 to 264 V, 47 to 63 Hz, approx. 30 VA
Heating hose	AC 230 V and 115 V; 6 A max.

Relay

Warning relay	Display of warnings Load capacity: 1 A/DC 24 V, mini. of 10 mA
ERROR relay	Display of errors Load capacity: 1 A/DC 24 V, mini. of 10 mA

Ambient conditions

Permissible working temperature	+5 °C to +50 °C, with outer enclosure 4230-119 for Ex Zone 22: -30 °C to +50 °C
Permissible storage temperature	-20 °C to +70 °C (without water)
Climate category	KWF in accordance with DIN 40040
Nominal conditions	23 °C ±2 °C/230 V ±2 %

Mechanical Data

Enclosure	Stainless-steel enclosure Degree of protection IP 64 acc. with DIN 40050
Dimensions	450 x 410 x 150 mm (without brackets)
Mounting bores	347 x 330 mm, 4 x ∅ 7 x 13 (M6)
Weight	approx. 12.5 kg
Connections	Electrical connection Screw-type terminals 0.5 to 1.5 mm²; Cable feed through cable gland M16 x 1,5 Compressed-air connection G 1/4" Heating hose connection G 3/8" (IP 54) Universal conical nipple DKR DIN 3863

Interested in more information?
Benefit from the know-how of our specialists!

BARTEC BENKE GmbH
Germany

Schulstraße 30
24239 Gotteszell

Phone: +49 (0) 9929 301-0
Fax: +49 (0) 9929 301-112

bms@bartec-benke.de
www.bartec-benke.com

UK-D-BBS250313-05/2013-BARTEC WerbeAgentur-354159