

# CERTIFICATE

of product conformity (QAL 1)

Certificate number: 2585100-ts

<b>Certified AMS</b>	Hygrophil H 4230-10 Serie A for humidity
<b>Manufacturer</b>	Bartec Benke GmbH Schulstraße 30 94239 Gotteszell Germany

**Test Institute:** TÜV SÜD Industrie Service GmbH

**This is to certify that the AMS has been tested and found to comply with:  
DIN EN 15267-1 (2009), DIN EN 15267-2 (2009), DIN EN 15267-3 (2008) and  
DIN EN 14181 (2015).**

Certification is awarded in respect of the conditions stated in this certificate  
(the certificate consist of 6 pages)



Certificate No.: 2585100-ts

**Publication in the German Federal Gazette**  
(BAnz) of 26 March 2019

German Federal Environment Agency  
Dessau, 06 April 2019



Dr. Marcel Langner  
Head of Section II 4.1

**This certificate will expire on:**  
25 March 2024

TÜV SÜD Industrie Service GmbH  
Testing laboratory emissions measurement/  
calibration  
Munich, 05 April 2019



Hans-Jörg Eisenberger

<b>Test report:</b>	2585100 from 30 September 2018
<b>Initial certification:</b>	26 March 2019
<b>Certificate validity until:</b>	25 March 2024 (5 years)
<b>Publication:</b>	BAnz AT 26 March 2019 B7, chapter II, No. 2.1

### Approved application

The tested AMS is suitable for use at plants requiring official approval and plants in accordance with 27. BImSchV.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a field test over more than three months for the measuring system Hygrophil H 4230-10 Serie A at the waste gas of a plant in compliance with to Directive 2010/75/EU chapter IV (17<sup>th</sup> BImSchV).

The measuring system is approved for an ambient temperature range of +5 °C to +40 °C.

The AMS publication, the suitability test and the performance of the uncertainty calculations were conducted based on the provisions valid at the time of testing.

Due to possible amendments to legal foundations every user should ensure before use of the AMS that it is suitable for monitoring the applicable limit values.

The operator should consult the manufacturer to ensure that the AMS is suitable for the plant where it is being installed.

### Basis of the certification

This certificate is based on:

- TÜV SÜD Industrie Service GmbH test report 2585100 from 30 September 2018
- Suitability announcement by the German Federal Environment Agency (UBA) as the relevant body
- The ongoing surveillance of the product and the manufacturing process



Certificate number: 2585100-ts



Industrie Service

Publication in the German Federal Gazette: BAnz AT 26 March 2019 B7, chapter II, No. 2.1, Announcement by UBA from 27 February 2019:

**AMS designation:** Hygrophil H 4230-10 Serie A for humidity

**Manufacturer:** Bartec Benke GmbH, Gotteszell

**Suitability:** For plants requiring authorisation and plants in compliance with the 27. BImSchV

**Measurement range during the performance test:**

Component	Certification range	Additional range	Unit
H <sub>2</sub> O	0 - 40	-	Vol.-%

**Software version:** 2.000

**Restrictions:**

None

**Notes:**

The maintenance interval is four weeks.

**Test report:** TÜV SÜD Industrie Service GmbH, Munich  
Report-No.: 2585100 from 30 September 2018

### Certified product

This certificate applies to AMS that is conforming to the following description:

The entire tested measuring system Hygrophil H 4230-10 Serie A consist of the measurement gas probe, the heated line, the measurement cell and the electronical unit with the microcomputer and the water tank with the tenside solution. The measurement cell and the electronical unit are located in separate chambers of a stainless-steel cabinet.

The measuring system Hygrophil H 4230-10 Serie A is used for monitoring of the humidity in flue gases. The measuring system feeds the sample gas by an air jet ejector which is located downstream of the measurement chamber. The detection of the humidity in the flue gas works with the principle of the psychrometric gas humidity measurement.

The measurement gas probe is made of stainless-steel with a PTFE-filter heated up to 170 °C. The probe is connected with a sample gas line heated up to 120 °C, equipped with a PTFE core (inner diameter 3/8 inch). The normal length of the sample gas line is 12 m. For longer lines an additional temperature controller is necessary. Downstream of the heated line the sample gas gets into the measurement cell.

The entire system consists of the following components:

#### 1) Probe

Manufacturer: M&C TechGroup Germany GmbH, D - 40885 Ratingen  
Type: SP2000-H/HF  
Filter: F-0,1 GF 150, Glasfaser-Filter 0,1 µm  
Heating temperature: 170 °C  
Controller: integrated

#### 2) Heated line

Manufacturer: Hillesheim GmbH, D – 68753 Waghäusel  
Type: H 300 F  
Heating temperature: 120 °C (160 °C extension), PTFE-core (ID: 3/8 inch),  
Length in suitability testing 12 + 13 m  
Controller: integrated  
Additional Controller: M&C TechGroup Germany GmbH, D - 40885 Ratingen  
Type TRD H3

#### 3) Analyser

Manufacturer: Bartec Benke GmbH, D - 94239 Gotteszell  
Type: Hygrophil H 4230-10 Serie A  
Software: 2.000  
Measurement principle: psychrometric humidity measurement

### General notes

This certificate is based on the analyser tested. The manufacturer is responsible for the continuous compliance of the production to the DIN EN 15267 requirements. The manufacturer is required to maintain an approved quality management system to control the manufacture of the certified product. Regular monitoring must be conducted on both the product and the quality management systems.

If the product from the current production series no longer comply with the certified product, the Environmental Service Department of TÜV SÜD Industrie Service GmbH must be notified (address see footnote).

A certification mark with an ID-Number that is specific to the certified product is presented on page 1 of this certificate. This can be applied to the product or used in publicity material for the certified product.

This document and the certification mark shall remain the property of TÜV SÜD Industrie Service GmbH.

Should the publication be revoked, this certificate will become invalid. This document must be returned when the period of validity has elapsed and at the request of TÜV SÜD Industrie Service GmbH and the certification mark may no longer be used.

The current version of the certificate and its expiration is also accessible on the internet at **qa1.de**.

The certification of the measuring system Hygrophil H 4230-10 Serie A is based on the following documents and the regular continuous monitoring of the manufacturer's quality management system:

#### Initial certification in accordance to DIN EN 15267:

Certificate no. 2585100-ts	26 March 2019
Certificate validity until	25 March 2024 (5 years)

Report no: 2585100 from 30 September 2018  
TÜV SÜD Industrie Service GmbH  
Publication: BAnz AT 26 March 2019 B7, chapter II number 2.1  
UBA publication from 27 February 2019

**Calculation of total uncertainty for the measurement system Hygrophil H 4230-10 Serie A for QAL1 testing to DIN EN 14181 and DIN EN 15267-3**

**Total uncertainty for measurement component H<sub>2</sub>O in the measurement range 0-40 Vol.%**

<i>Performance characteristic</i>	<i>Uncertainty</i>	<i>Value standard uncertainty Vol.%</i>	<i>Square of standard uncertainty Vol.%<sup>2</sup></i>
Lack-of-fit	$u_{lof}$	0,210	0,0441
Zero drift from field test	$u_{d,z}$	-0,416	0,1731
Span drift from field test	$u_{d,s}$	0,462	0,2134
Influence of ambient temperature at span	$u_t$	0,283	0,0801
Influence of sample gas pressure	$u_p$		
Influence of sample gas flow	$u_f$	-0,332	0,1102
Influence of supply voltage	$u_v$	0,140	0,0196
Cross-sensitivity (interference)	$u_i$	0,839	0,7039
Repeatability standard deviation at span	$u_r = s_r$	0,161	$u_r < du$
Standard deviation from paired measurements under field cond.	$u_d = s_d$	0,266	0,0708
Uncertainty of reference material 2 % by 70% of ZR	$u_{im}$	0,3233	0,1045
Excursion of measurement beam	$u_{mb}$		
Converter efficiency for AMS measuring NOx	$u_{ce}$		
Variation of response factors (TOC)	$u_{rf}$		
		<b>total</b>	<b>1,5197</b>
Combined standard uncertainty	$u_c = \sqrt{\sum (u_i)^2}$	1,2328	Vol.%
Total expanded uncertainty	$U_{0,95} = 1,96 \times u_c$	2,4163	Vol.%
Relativ expanded uncertainty	U	6,0	% CR
Permissible uncertainty of EN 15267-3	( of CR 40 Vol.% )	7,5	% CR
Complied with requirements relating to the measurement uncertainty		<b>yes</b>	regarding EN 15267-3
Permissible uncertainty 13. / 17. BImSchV	( of CR 40 Vol.% )	10	% CR
Complied with requirements relating to the measurement uncertainty		<b>yes</b>	regarding 13. / 17. BImSchV