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Umwelt Bundesamt

Certificate number: 3300458-ts

TÜV SÜD Industrie Service

CERTIFICATE

of product conformity (QAL 1)

Certificate number: 3300458-ts

Certified AMS	Hygrophil H 4230-10 Serie A for humidity
Manufacturer	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 the standards DIN EN 15267-1 (2009), DIN EN 15267-2 (2009), DIN EN 15267-3 (2008) and DIN EN 14181 (2015).

Certification applies to the conditions listed in this certificate (the certificate consists of 7 pages).

This certificate replaces certificate 2585100-ts dated 05 April 2019.

DIN EN 15267 TÜV SÜD Eignungsprüfung Valid until 03/2024 Produktion überwacht

Certificate No.: 3300458-ts

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

This certificate will expire on: 25 March 2024

Umweltbundesamt
Dessau, 05 May 2021

Dr. Marcel Langner
Head of Section II 4.1

TÜV SÜD Industrie Service GmbH
Testing laboratory emission measurement/ calibration
Munich, 04 May 2021

Hans-Jörg Eisenberger

TÜV®

Umwelt Bundesamt

Certificate number: 3300458-ts

TÜV SÜD Industrie Service

Test report	3300458 from 15 August 2020
Initial certification	26 March 2019
Certification validity until	25 March 2024 (5 years)
Certificate	Renewed issuing (previous certificate 258100-ts dated 26 March 2019 valid until bis 25 March 2024)
Publication	BAnz AT 03 May 2019 B9, chapter II, no. 2.1

Approved application

The tested AMS is suitable for use at plants requiring authorisation (13. BImSchV, 17. BImSchV, TA Luft) as well as at plants in accordance with the 27. BImSchV. The suitability for this application was assessed on the basis of a laboratory test and a field test of the AMS Hygrophil H 4230-10 Serie A lasting over more than three months at plant according to Directive 2010/75/EU chapter IV (17. BImSchV). The measuring system is approved for ambient temperatures between +5 °C bis +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 values.

The operator should consult the manufacturer to ensure that the AMS is suitable for the plant at which it is to be installed.

Certification basis

This certificate is based on:

- TÜV SÜD Industrie Service GmbH test report 3300458 from 15 August 2020
- Suitability announcement by the German Federal Environmental Agency as relevant body
- The ongoing surveillance of the product and the manufacturing process

- Publication in the German Federal Gazette (BAnz AT 03 May 2021 B9, chapter II, no. 2.1, UBA publication from 31 March 2021)

AMS: Hygrophil H 4230-10 Serie A for humidity

Manufacturer: Bartec Benke GmbH, Gotteszell

Suitability: For plants requiring authorisation, plants in compliance with the 27. BImSchV and plants in compliance with TA Luft

Measurement range in the suitability test:

Component	Certification range	Supplementary measurement ranges	Unit
H_2O	0 - 40	-	Vol.-%

Software version: 2.000

Restrictions:

None

Notes:

1. The maintenance interval is four weeks.
2. Wet calibration gases should be applied for zero point and reference point at eight-month intervals.
3. Supplementary suitability test (extension of interval for the application of wet calibration gases) to the UBA publication from 27 February 2019 (BAnz AT 22 July 2019 B8, chapter II number 1.1).

Test report: TÜV SÜD Industrie Service GmbH, Munich
Report no.: 3300458 from 15 August 2020

Certified Product

The certificate applies to AMS that comply with the following description:

The entire tested measuring system H 4230-10 Serie A consists of the sampling probe, the heated measurement gas 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-stell 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 down-stream 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-steal 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:

Probe	
Manufacturer:	M&C TechGroup Germany GmbH, D - 40885 Ratingen
Type:	SP2000-H/HF
Filter:	F-0,1 GF 150, fibreglass 0,1 µm
Heating temperature:	170 °C
Controller:	integrated
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
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 informed (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 on 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 **qal1.de**.

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

Initial certification in accordance with 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 no. 2.1,
UBA publication from 27 February 2019

Supplementary test in accordance to DIN EN 15267:

Report no.: 2928790 from 15 February 2019,
TÜV SÜD Industrie Service GmbH
Publication: BAnz AT 22 July 2019 B8, chapter II no. 1.1,
UBA publication from 28 June 2019

Supplementary test in accordance to DIN EN 15267:

Certificate no. 3300458-ts	03 May 2021
Certificate validity until	25 March 2024 (5 years)

Report no.: 3300458 from 15 August 2020,
TÜV SÜD Industrie Service GmbH
Publication: BAnz AT 03 May 2021 B9, chapter II no. 2.1,
UBA publication from 31 March 2021

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

Total uncertainty for the measurement component H_2O in the measuring range 0-40 Vol.%

Performance characteristic	*Uncertainty*	*Value standard uncertainty Vol.%*	*Square of standard uncertainty Vol.%²*
Lack-of-fit	u_{lof}	0,210	0,0441
Zero drift from field test	$u_{d,z}$	-0,439	0,1927
Span drift from field test	$u_{d,s}$	0,554	0,3069
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	ur < 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 CR	u_{rm}	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}		
		total	1,6328
Combined standard uncertainty	$u_c = \sqrt{\sum (u_i)^2}$	1,2778	Vol.%
Total expanded uncertainty	$U_{0,95} = 1,96 \times u_c$	2,5045	Vol.%
Relativ expanded uncertainty	U	6,3	% CR
Permissible uncertainty of EN 15267-3	(of CR 40 Vol.%)	7,5	% CR
Complied with requirements relating to the measurement uncertainty		yes	regarding EN 15267-3
Permissible uncertainty 13. / 17. BImSchV	(of CR 40 Vol.%)	10	% CR
Complied with requirements relating to the measurement uncertainty		yes	regarding 13. / 17. BImSchV