Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000028757_04

AMS designation:	APSA 370 for SO_2
Manufacturer:	HORIBA, Ltd. 2 Miyanohigashi Kisshoin Minami-ku Kyoto 610-8510 Japan
Test Laboratory:	TÜV Rheinland Energy GmbH

This is to certify that the AMS has been tested and found to comply with:
VDI 4202-1 (2002), VDI 4203-3 (2004), EN 14212 (2012), EN 15267-1 (2009) and EN 15267-2 (2009)

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 12 pages).
The present certificate replaces certificate 0000028757_03 of 21 January 2016

TÜVRheinland® CERTIFIED

Suitability Tested
Equivalent to
2008/50/EC
EN 15267
Regular Surveillance

www.tuv.com
ID 0000028757

Publication in the German Federal Gazette (BAnz) of 14 October 2006

This certificate will expire on:
25 January 2026

German Federal Environment Agency
Dessau, 25 January 2021

Dr. Marcel Langner
Head of Section II 4.1

TÜV Rheinland Energy GmbH
Cologne, 24 January 2021

ppa. Dr. Peter Wilbring

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TÜV Rheinland Energy GmbH
Am Grauen Stein
51105 Köln

Test institute accredited to EN ISO/IEC 17025 by DAkkS (German Accreditation Body).
This accreditation is limited to the accreditation scope defined in the enclosure to certificate D-PL-11120-02-00.

10/221 2.08

Test Report:	936/21204643/D dated 7 July 2006
Initial certification:	26 January 2011
Expiry date:	25 January 2026
Certificate:	Renewal (of previous certificate 0000028757_03 dated 21 January 2016 valid until 25 January 2021)
Publication:	BAnz. 14 October 2006, no. 194, page 6715, chapter IV Number 2.1

Approved application
The certified AMS is suitable for continuous ambient air monitoring of SO_2 (stationary operation). The suitability of the AMS for this application was assessed on the basis of a laboratory test and a four-months field test.

The AMS is approved for an ambient temperature range of 0 °C to +40 °C.

The notification of suitability of the AMS, performance testing and the uncertainty calculation have been effected on the basis of the regulations applicable at the time of testing. As changes in legal provisions are possible, any potential user should ensure that this AMS is suitable for monitoring the limit values relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for the intended purpose.

Basis of the certification
This certification is based on:

- Test report 936/21204643/D dated 7 July 2006 issued by TÜV Rheinland Immissionsschutz und Energiesysteme
- Addenda 936/21204643/D1 dated 27 July 2011 and 936/21222689/D dated 5 October 2013
- Suitability announced by the German Federal Environment Agency (UBA) as the relevant body
- The ongoing surveillance of the product and the manufacturing process

Publication in the German Federal Gazette: BAnz. 14 October 2006, no. 194, page 6715, chapter IV Number 2.1, UBA announcement dated 12 September 2006:

AMS designation:
APSA 370

Manufacturer:
HORIBA, Ltd., Kyoto, Japan

Distribution:
HORIBA Europe GmbH, Leichlingen

Field of application:
For continuous ambient air monitoring of sulphur dioxide (stationary operation)

Measuring ranges during performance testing

SO2	0 to 700 µg/m³
	0 to 1000 µg/m³

Software version:
P1000878001C

Test Laboratory:
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Cologne
TÜV Rheinland Group

Test Report:
Report no. 936/21204643/D dated 7 July 2006

Publication in the German Federal Gazette: BAnz. 25 August 2009, no. 125, p. 2655, chapter III Notification 4, UBA announcement dated 3 August 2009:

4 Notification as regards Federal Environment Agency notice of 12 September 2006 (BAnz. p. 6717)

The latest software version of the APSA 370 ambient air measuring system manufactured by Horiba Europe GmbH is:

P1000878001J

The type GD-6 EH sample gas pump manufactured by Horiba may be used instead of the N 86.0 KNE sample gas pump manufactured by KNF.

Statement issued by TÜV Rheinland Immissionsschutz und Energiesysteme GmbH dated 31 March 2009

Publication in the German Federal Gazette: BAnz. 26 January 2011, No. 14, p. 294, chapter IV notification 7, UBA announcement dated 10 January 2011:

7 Notification as regards Federal Environment Agency (UBA) notices of 12 September 2006 (BAnz. p. 6715, chapter IV number 2.1) and of 3 August 2009 (BAnz. p. 2929, chapter III 4th notification)

The APSA 370 measuring system for SO_2 manufactured by Horiba Ltd, Japan, and Horiba Europe GmbH meets the requirements defined in standard EN 14212. Furthermore, the manufacturing process and the quality management for the Model APSA 370 for SO_2 measuring system meet the requirements of EN 15267.
The test report on performance testing is available on the internet at www.qal1.de.

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 6 October 2010

Publication in the German Federal Gazette: BAnz. 2 March 2012, no. 36, p. 920, chapter V notification 18, UBA announcement dated 23 February 2012:

18 Notification as regards Federal Environment Agency (UBA) notices of 12 September 2006 (p. 6715, chapter IV number 2.1) and of 10 January 2011 (BAnz. p. 294, chapter IV 7th notification)

There is an addendum to test report no. 936/21204643/D for thee APSA 370 measuring system for SO_2 manufactured by Horiba, Ltd., Japan and Horiba Europe GmbH. The addendum is assigned report no. 936/21204643/D1 and after its publication is an integral part of the test report no. 936/21204643/D and is also available online at www.qal1.de.

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 3 November 2011

Publication in the German Federal Gazette: BAnz AT 05.03.2013 B10, chapter V notification 10, UBA announcement dated 12 February 2013:

10 Notification as regards Federal Environment Agency (UBA) notices of 12 September 2006 (p. 6715, chapter IV number 2.1) and of 23 February 2012 (BAnz. p. 920, chapter V 18th notification)

The APSA 370 measuring system for SO_2 manufactured by Horiba Ltd, Japan, and Horiba Europe GmbH may optionally be equipped with an additional calibration port. Calibration gas may be fed upstream or downstream of the sample gas filter using a three-way valve.

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 11 October 2012

Publication in the German Federal Gazette: BAnz AT 01.04.2014 B12, chapter VI notification 29, UBA announcement dated 27 February 2014:

29 Notification as regards Federal Environment Agency (UBA) notices of 12 September 2006 (p. 6715, chapter IV number 2.1) and of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter V 10th notification)

The APSA 370 measuring system for SO_2 manufactured by Horiba Ltd, Japan, and Horiba Europe GmbH meets the requirements defined in standard EN 14212 (November 2012 version) An addendum as integral part of test report no. 936/21222689/D is available online at www.qal1.de. In addition to the reference diode type S7798 used so far for measuring the UV light intensity a type S12698 (TO5) diode may be used.

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 8 October 2013

Publication in the German Federal Gazette: BAnz AT 01.08.2016 B11, chapter V notification 33, UBA announcement dated 14 July 2016:

33 Notification as regards Federal Environment Agency (UBA) notices of 12 September 2006 (BAnz. p. 6715, chapter IV number 2.1) and of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter VI 29th notification)

The APSA-370 measuring system for SO_2 manufactured by HORIBA Ltd. is equipped with a new display which, in design and functionality, largely corresponds to its predecessor. In addition, the power supply ZWS-BAF may also be used.
The current software version of the APSA-370 measuring system for SO_2 is:
P1000878001K

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 29 February 2016.

Publication in the German Federal Gazette: BAnz AT 22.07.2019 B8, chapter V notification 12, UBA announcement dated 28 June 2019:

12 Notification as regards Federal Environment Agency (UBA) notices of 12 September 2006 (BAnz. p. 6715, chapter IV number 2.1) and of 14 July 2016 (BAnz AT 01.08.2016 B11, chapter V 33rd notification)

The latest software version of the APSA-370 for SO_2 manufactured by HORIBA Ltd. is:
P1000878001L
The rear of the housing was modified to cater for additional cable connections. Instead of the xenon lamp type L4646 with opaque socket, the new version of this lamp with a transparent socket and the same designation may be used.

Statement issued by TÜV Rheinland Energy GmbH dated 5 March 2019

Publication in the German Federal Gazette: BAnz AT 07.05.2020 B8, chapter III notification 3, UBA announcement dated 31 March 2020:

3	**Notification as regards Federal Environment Agency (UBA) notices of 12 September 2006 (p. 6715, chapter IV number 2.1) and of 28 June 2019 (BAnz AT 22.07.2019 B8, chapter V 12th notification)** The latest software version of the APSA-370 for SO_2 manufactured by HORIBA Ltd. is: P1000878001M The xenon lamp may optionally be equipped with an additional fixation. Statement issued by TÜV Rheinland Energy GmbH dated 06 December 2019

Certified product
This certification applies to automated measurement systems conforming to the following description:

The APSA 370 SO_2 analyser measures sulphur dioxide by means of ultraviolet fluorescence.

The measuring principle corresponds to the setup and functioning of the measuring principle described in EN 14212 (2012) section 5.2 for the component SO_2.

The sample air first passes a filter in the APSA 370, where coarse dirt particles are filtered out. The sample is drawn through the appropriate inlet. First, the sampled air is drawn through a hydrocarbon scrubber to remove any interference by aromatic hydrocarbons that may be present. SO_2 molecules remain unaffected. The sample is than introduced into a reaction chamber, where it is irradiated by UV light in the wave-length range between 200 nm and 220 nm. The radiation excites the SO_2 molecules energetically. The 4 mirrors upstream of UV lamp only allow those wavelengths to pass which excite the SO_2 molecules.

When the SO_2 molecules return to their lower energy state, they emit UV fluorescent light in a wavelength range of 240 nm to 420 nm. Only this light reaches the photomultiplier (PMT) after having passed the filter. The PMT measures the UV emission and converts it to an electric signal. A photo detector at the end of the reaction chamber continuously measures the lamp radiation and corrects the measuring result in the event of fluctuations.

General remarks

This certificate is based upon the equipment tested. The manufacturer is responsible for ensuring that on-going production complies with the requirements of the EN 15267. The manufacturer is required to maintain an approved quality management system controlling the manufacturing process for the certified product. Both the product and the quality management systems shall be subject to regular surveillance.

If a product of the current production does not conform to the certified product, TÜV Rheinland Energy GmbH must be notified at the address given on page 1.

A certification mark with an ID-Number that is specific to the certified product is presented on page 1 of this certificate.

This document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. Upon revocation of the publication the certificate loses its validity. After the expiration of the certificate and on request of TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must no longer be used.

The relevant version of this certificate and its expiration date are also accessible on the internet at **qal1.de**.

Document history

Certification of the APSA 370 measuring system is based on the documents listed below and the regular, continuous surveillance of the manufacturer's quality management system:

Basic testing

Test Report: 936/21204643/D dated 07 July 2006
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Cologne
Publication: BAnz. 14 October 2006, no. 194, p. 6715, chapter IV number 2.1
UBA announcement dated 12 September 2006

Notifications

Statement issued by TÜV Rheinland Immissionsschutz und Energiesysteme GmbH dated 31 March 2009
Publication: 25 August 2009, no. 125, p. 2929, chapter III notification 4
UBA announcement dated 03 August 2009
(Changes to software and hardware extension)

Initial certification according to EN 15267

Certificate no. 0000028757: 09 February 2011
Expiry date of the certificate: 25 January 2016
Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 6 October 2010, test report no.: 936/21204643/D dated 07 July 2006
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz. 26 January 2011, no. 14, p. 294, chapter IV notification 7
UBA announcement dated 10 January 2011

Notifications in accordance with EN 15267

Certificate no. 0000028757_01: 16 March 2012
Expiry date of the certificate: 25 January 2016

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 3 November 2011
and Addendum no. 936/21204643/D1 dated 27 July 2011
Publication: BAnz. 2 March 2012, no. 36, p. 920, chapter V notification 18
UBA announcement dated 23 February 2012
(Supplemented by an addendum)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 11 October 2012
Publication: BAnz AT 05.03.2013 B10, chapter V notification 10
UBA announcement dated 12 February 2013
(Additional hardware)

Certificate no. 0000028757_02: 29 April 2014
Expiry date of the certificate: 25 January 2016
Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 8 October 2013
and Addendum No. 936/21222689/D dated 05 October 2013
Publication: BAnz AT 01.04.2014 B12, chapter VI notification 29
UBA announcement dated 27 February 2014
(EN 14212 (2012) and design changes)

Renewal of the certificate

Certificate no. 0000028757_03: 21 January 2016
Expiry date of the certificate: 25 January 2021

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 29 February 2016.
Publication: BAnz AT 01.08.2016 B11, chapter V notification 33
UBA announcement dated 14 July 2016
(new display)

Statement issued by TÜV Rheinland Energy GmbH dated 5 March 2019
Publication: BAnz AT 22.07.2019 B8, chapter V notification 12
UBA announcement dated 28 June 2019
(new software version)

Statement issued by TÜV Rheinland Energy GmbH dated 6 December 2019
Publication: BAnz AT 07.05.2020 B8, chapter III notification 3
UBA announcement dated 31 March 2020
(new software version)

Renewal of the certificate

Certificate no. 0000028757_04: 25 January 2021
Expiry date of the certificate: 25 January 2026

Expanded uncertainty from the results obtained in the laboratory tests for analyser 1

Measuring device:	Horiba APSA 370		Serial-No.:	SN 10012		
Measured component:	SO2		1h-limit value:	132		nmol/mol

No.	Performance characteristic	Performance criterion	Result	Partial uncertainty		Square of partial uncertainty	
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0.070	$u_{r,z}$	0.02	0.0005	
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0.140	$u_{r,lh}$	0.39	0.1507	
3	"lack of fit" at 1h-limit value	≤ 4.0% of measured value	0.600	$u_{l,lh}$	0.46	0.2091	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 2.0 nmol/mol/kPa	0.020	u_{gp}	0.17	0.0291	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 1.0 nmol/mol/K	-0.010	u_{gt}	-0.09	0.0079	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 1.0 nmol/mol/K	0.060	u_{st}	0.54	0.2871	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	-0.010	u_V	-0.10	0.0101	
8a	Interferent H_20 with 21 mmol/mol	≤ 10 nmol/mol (Zero)	0.070	u_{H2O}	-0.56	0.3179	
		≤ 10 nmol/mol (Span)	-1.500				
8b	Interferent H_2S with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	-0.100	$u_{int,pos}$	2.25	5.0840	
		≤ 5.0 nmol/mol (Span)	0.030				
8c	Interferent NH_3 with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0.000				
		≤ 5.0 nmol/mol (Span)	-0.400				
8d	Interferent NO with 500 nmol/mol	≤ 5.0 nmol/mol (Zero)	3.010	or			
		≤ 5.0 nmol/mol (Span)	4.200				
8e	Interferent NO_2 with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0.070				
		≤ 5.0 nmol/mol (Span)	-0.500				
8f	Interferent m-Xylene with 1 µmol/mol	≤ 10 nmol/mol (Zero)	0.030				
		≤ 10 nmol/mol (Span)	0.470	$u_{int,neg}$			
9	Averaging effect	≤ 7.0% of measured value	-3.600	u_{av}	-2.74	7.5272	
18	Difference sample/calibration port	≤ 1.0%	0.000	$u_{\Delta sc}$	0.00	0.0000	
21	Uncertainty of test gas	≤ 3.0%	2.000	u_{cg}	1.32	1.7424	
			Combined standard uncertainty	u_c		3.9200	nmol/mol
			Expanded uncertainty	U		7.8399	nmol/mol
			Relative expanded uncertainty	W		5.94	%
			Maximum allowed expanded uncertainty	W_{req}		15	%

Expanded uncertainty from the results obtained in the laboratory tests for analyser 2

Measuring device:	Horiba APSA 370				Serial-No.:		SN 10011	
Measured component:	SO2				1h-limit value:		132	nmol/mol
No.	**Performance characteristic**	**Performance criterion**		**Result**	**Partial uncertainty**		**Square of partial uncertainty**	
1	Repeatability standard deviation at zero	≤	1.0 nmol/mol	0.080	$u_{r,z}$	0.02	0.0006	
2	Repeatability standard deviation at 1h-limit value	≤	3.0 nmol/mol	0.130	$u_{r,lh}$	0.36	0.1315	
3	"lack of fit" at 1h-limit value	≤	4.0% of measured value	-0.800	$u_{l,lh}$	-0.61	0.3717	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤	2.0 nmol/mol/kPa	0.010	u_{gp}	0.09	0.0073	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤	1.0 nmol/mol/K	-0.090	u_{gt}	-0.80	0.6361	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤	1.0 nmol/mol/K	0.250	u_{st}	2.22	4.9081	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤	0.30 nmol/mol/V	0.020	u_V	0.20	0.0405	
8a	Interferent H_20 with 21 mmol/mol	≤	10 nmol/mol (Zero)	0.070	u_{H2O}	-0.59	0.3432	
		≤	10 nmol/mol (Span)	-1.530				
8b	Interferent H_2S with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	-0.030	$u_{int,pos}$	2.22	4.9344	
		≤	5.0 nmol/mol (Span)	0.570				
8c	Interferent NH_3 with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0.000				
		≤	5.0 nmol/mol (Span)	-0.270				
8d	Interferent NO with 500 nmol/mol	≤	5.0 nmol/mol (Zero)	3.100				
		≤	5.0 nmol/mol (Span)	3.710	or			
8e	Interferent NO_2 with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0.100				
		≤	5.0 nmol/mol (Span)	-0.930				
8f	Interferent m-Xylene with 1 µmol/mol	≤	10 nmol/mol (Zero)	0.030				
		≤	10 nmol/mol (Span)	0.230	$u_{int,neg}$			
9	Averaging effect	≤	7.0% of measured value	-4.300	u_{av}	-3.28	10.7390	
18	Difference sample/calibration port	≤	1.0%	0.000	$u_{\Delta sc}$	0.00	0.0000	
21	Uncertainty of test gas	≤	3.0%	2.000	u_{cg}	1.32	1.7424	
				Combined standard uncertainty	u_c		4.8841	nmol/mol
				Expanded uncertainty	U		9.7683	nmol/mol
				Relative expanded uncertainty	W		7.40	%
				Maximum allowed expanded uncertainty	W_{req}		15	%

Expanded uncertainty from the results obtained in the laboratory and field tests for analyser 1

Measuring device:	Horiba APSA 370				Serial-No.:		SN 10012	
Measured component:	SO2				1h-limit value:		132	nmol/mol
No.	**Performance characteristic**		**Performance criterion**	**Result**	**Partial uncertainty**		**Square of partial uncertainty**	
1	Repeatability standard deviation at zero	≤	1.0 nmol/mol	0.070	$u_{r,z}$	0.02	0.0005	
2	Repeatability standard deviation at 1h-limit value	≤	3.0 nmol/mol	0.140	$u_{r,lh}$	not considered, as ur,lh = 0,38 < ur,f	-	
3	"lack of fit" at 1h-limit value	≤	4.0% of measured value	0.600	$u_{l,lh}$	0.46	0.2091	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤	2.0 nmol/mol/kPa	0.020	u_{gp}	0.17	0.0291	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤	1.0 nmol/mol/K	-0.010	u_{gt}	-0.09	0.0079	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤	1.0 nmol/mol/K	0.060	u_{st}	0.54	0.2871	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤	0.30 nmol/mol/V	-0.010	u_V	-0.10	0.0101	
8a	Interferent H_20 with 21 mmol/mol	≤	10 nmol/mol (Zero)	0.070				
		≤	10 nmol/mol (Span)	-1.500	u_{H2O}	-0.56	0.3179	
8b	Interferent H_2S with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	-0.100				
		≤	5.0 nmol/mol (Span)	0.030	$u_{int,pos}$			
8c	Interferent NH_3 with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0.000				
		≤	5.0 nmol/mol (Span)	-0.400				
8d	Interferent NO with 500 nmol/mol	≤	5.0 nmol/mol (Zero)	3.010				
		≤	5.0 nmol/mol (Span)	4.200	or	2.25	5.0840	
8e	Interferent NO_2 with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0.070				
		≤	5.0 nmol/mol (Span)	-0.500				
8f	Interferent m-Xylene with 1 µmol/mol	≤	10 nmol/mol (Zero)	0.030				
		≤	10 nmol/mol (Span)	0.470	$u_{int,neg}$			
9	Averaging effect	≤	7.0% of measured value	-3.600	u_{av}	-2.74	7.5272	
10	Reproducibility standard deviation under field conditions	≤	5.0% of average over 3 months	4.240	$u_{r,f}$	5.60	31.3242	
11	Long term drift at zero level	≤	4.0 nmol/mol	0.800	$u_{d,l,z}$	0.46	0.2133	
12	Long term drift at span level	≤	5.0% of max. of certification range	1.310	$u_{d,l,lh}$	1.00	0.9967	
18	Difference sample/calibration port	≤	1.0%	0.000	$u_{\Delta sc}$	0.00	0.0000	
21	Uncertainty of test gas	≤	3.0%	2.000	u_{cg}	1.32	1.7424	
				Combined standard uncertainty		u_c	6.9101	nmol/mol
				Expanded uncertainty		U	13.8202	nmol/mol
				Relative expanded uncertainty		W	10.47	%
				Maximum allowed expanded uncertainty		W_{req}	15	%

Expanded uncertainty from the results obtained in the laboratory and field tests for analyser 2

Measuring device:	Horiba APSA 370	Serial-No.:	SN 10011
Measured component:	SO2	1h-limit value:	132 nmol/mol

No.	Performance characteristic		Performance criterion	Result	Partial uncertainty		Square of partial uncertainty	
1	Repeatability standard deviation at zero	≤	1.0 nmol/mol	0.080	$u_{r,z}$	0.02	0.0006	
2	Repeatability standard deviation at 1h-limit value	≤	3.0 nmol/mol	0.130	$u_{r,lh}$	not considered, as ur,lh = 0,36 < ur,f	-	
3	"lack of fit" at 1h-limit value	≤	4.0% of measured value	-0.800	$u_{l,lh}$	-0.61	0.3717	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤	2.0 nmol/mol/kPa	0.010	u_{gp}	0.09	0.0073	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤	1.0 nmol/mol/K	-0.090	u_{gt}	-0.80	0.6361	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤	1.0 nmol/mol/K	0.250	u_{st}	2.22	4.9081	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤	0.30 nmol/mol/V	0.020	u_V	0.20	0.0405	
8a	Interferent H_20 with 21 mmol/mol	≤	10 nmol/mol (Zero)	0.070				
		≤	10 nmol/mol (Span)	-1.530	u_{H2O}	-0.59	0.3432	
8b	Interferent H_2S with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	-0.030				
		≤	5.0 nmol/mol (Span)	0.570	$u_{int,pos}$			
8c	Interferent NH_3 with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0.000				
		≤	5.0 nmol/mol (Span)	-0.270				
8d	Interferent NO with 500 nmol/mol	≤	5.0 nmol/mol (Zero)	3.100				
		≤	5.0 nmol/mol (Span)	3.710	or	2.22	4.9344	
8e	Interferent NO_2 with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0.100				
		≤	5.0 nmol/mol (Span)	-0.930				
8f	Interferent m-Xylene with 1 µmol/mol	≤	10 nmol/mol (Zero)	0.030				
		≤	10 nmol/mol (Span)	0.230	$u_{int,neg}$			
9	Averaging effect	≤	7.0% of measured value	-4.300	u_{av}	-3.28	10.7390	
10	Reproducibility standard deviation under field conditions	≤	5.0% of average over 3 months	4.240	$u_{r,f}$	5.60	31.3242	
11	Long term drift at zero level	≤	4.0 nmol/mol	0.700	$u_{d,l,z}$	0.40	0.1633	
12	Long term drift at span level	≤	5.0% of max. of certification range	0.630	$u_{d,l,lh}$	0.48	0.2305	
18	Difference sample/calibration port	≤	1.0%	0.000	$u_{\Delta sc}$	0.00	0.0000	
21	Uncertainty of test gas	≤	3.0%	2.000	u_{cg}	1.32	1.7424	
				Combined standard uncertainty		u_c	7.4459	nmol/mol
				Expanded uncertainty		U	14.8918	nmol/mol
				Relative expanded uncertainty		W	11.28	%
				Maximum allowed expanded uncertainty		W_{req}	15	%