

CERTIFICATE

of product conformity (QAL 1)

Certificate number: 3308477_01-ts

Certified AMS EL3000-Limas23 for NO, NO₂, SO₂ and O₂

Manufacturer ABB AG
Stierstädter Str. 5
60488 Frankfurt
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 15267-2:2023, DIN EN 15267-3:2008 and
DIN EN 14181:2015.**

**Certification applies to the conditions listed in this certificate
(the certificate consists of 15 pages).**

This certificate replaces certificate 3308477-ts dated
01 December 2020.



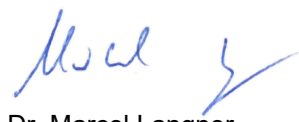
Certificate No.: 3308477_01-ts

Publication in the German Federal Gazette
(BAnz) of 14 March 2016

This certificate will expire on:
13 March 2031

Umweltbundesamt
Dessau, 12 March 2026

TÜV SÜD Industrie Service GmbH
Testing laboratory emission measurement/
calibration
Munich, 11 March 2026



Dr. Marcel Langner
Head of Section II 4



Simon Gerstlacher

Certificate number: 3308477_01-ts

Test report	2231669.2, Rev. 01 from 29 September 2016
Initial certification	14 March 2016
Certificate validity until	13 March 2031 (5 years)
Certificate	Re-issuance (previous certificate No. 3308477-ts dated 01 December 2020, valid until 13 March 2026)
Publication	BAnz AT 14 March 2016 B7, chapter I, no. 4.2

Approved application

The tested AMS is suitable for use at plants requiring authorisation (13. BImSchV:2021, the 17. BImSchV:2024, the 30. BImSchV:2022 and the TA-Luft:2021) and plants in accordance with the 44. BImSchV:2021. The suitability for this application was assessed based on a laboratory test and a field test of the AMS EL3000-Limas23 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.

Note / Disclaimer

The cited legal regulations do not necessarily reflect the current state of legislation at the time of certification in all cases. Each user should, if necessary and in coordination with the competent authority, ensure that this AMS meets the legal requirements for the intended purpose of use. Furthermore, it cannot be ruled out that legal regulations governing the use of a measuring device for monitoring emissions may change during the validity period of the certificate.

Certification basis

This certificate is based on:

- TÜV SÜD Industrie Service GmbH test report 2231669.2, Rev. 01 from 29 September 2016
- Suitability announcement by the German Federal Environmental Agency as relevant body
- The ongoing surveillance of the product and the manufacturing process

Certificate number: 3308477_01-ts

- Publication in the German Federal Gazette (BANZ AT 14 March 2016 B7, chapter I, no. 4.2, UBA publication from 18 February 2016)

AMS: EL3000-Limas23 for NO, NO₂, SO₂ and O₂

Manufacturer: ABB Automation GmbH, Frankfurt am Main

Suitability: Measuring systems for plants according to 2010/75/EU chapter III (13. BImSchV) and to 2010/75/EU chapter IV (17. BImSchV) and for plants according to TA Luft

Measurement ranges in the suitability test:

Component	Certification range	Supplementary measurement range	Unit
NO	0 - 33,5	0 - 200	mg/m ³
NO ₂	0 - 125	0 - 500	mg/m ³
SO ₂	0 - 75	0 - 300	mg/m ³
O ₂ , electro-chemical	0 - 25	-	Vol.-%

Software version: 3.4.5

Restrictions:

None

Notes:

1. The maintenance interval is two weeks.
2. The AMS should be operated at an interval of 24 hours for automatic alignment. The zero points for components NO, NO₂ and SO₂ and the reference point for O₂ shall be realigned with prepared ambient air.
3. The analyser can be used in the versions EL3020 (19" rack cabinet) and EL3040 (cabinet for wall mounting).

Test report: TÜV SÜD Industrie Service GmbH, Munich
Report no.: 2231669.2 from 30 September 2015

- Publication in the German Federal Gazette (BANZ AT 01 August 2016 B11, chapter V, 22. notification, UBA publication from 14 July 2016):

22 Notification to the publications by the German Federal Environmental Agency from 18 February 2016 (BANZ AT 14 March 2016, B7, chapter I number 4.2):

The current software version for the analyzer module (AMC) of the AMS EL3000-Limas23 for NO, NO₂, SO₂ and O₂ from ABB Automation GmbH, Frankfurt, is 3.4.8.

Statement from TÜV Süd Industrie Service GmbH from 27 September 2016

- Correction in the German Federal Gazette (BANZ AT 15 March 2017 B6, chapter IV, no. 6, UBA publication from 22 February 2017):

6 Correction of the publication by the German Federal Environmental Agency from 18 February 2016 (BANZ AT 14 March 2016 B7, chapter I number 4.2)

In the publication named above for the EL3000-Limas23 AMS for NO, NO₂, SO₂ and O₂ by ABB Automation GmbH there is an error:

The suitability publication for the EL3000-Limas23 is based on the TÜV SÜD Industrie Service GmbH test report, report no. 2231669.2 from 30 September 2015. The test report number 2331669.2 named in the publication is incorrect. The report was also corrected and now bears the report number 2231669.2, Rev. 01, and is dated 29 September 2016.

Statement of TÜV SÜD Industrie Service GmbH from 29 September 2016

- Publication in the German Federal Gazette (BANZ AT 15 March 2017 B6, chapter V, 30. notification, UBA publication from 22 February 2017):

30 Notification to the publications by the German Federal Environmental Agency from 18 February 2016 (BANZ AT 14 March 2016, B7, chapter I number 4.2) and from 14 July 2016 (BANZ AT 01 August 2016 B11, chapter V 22. notification):

The current software version for the analyzer module (AMC) of the AMS EL3000-Limas23 for NO, NO₂, SO₂ and O₂ from ABB Automation GmbH, Frankfurt, is 3.4.10. The Version 3.4.9 is included herein.

Statement from TÜV Süd Industrie Service GmbH from 27 September 2016

- Publication in the German Federal Gazette (BANZ AT 31 July 2017 B12, chapter II, 5. notification, UBA publication from 13 July 2017):

5 Notification to the publications by the German Federal Environmental Agency from 18 February 2016 (BANZ AT 14 March 2016, B7, chapter I number 4.2) and from 22 February 2017 (BANZ AT 15 March 2017 B6, 6. correction and chapter V 30. notification):

The current software version for the AMS EL3000-Limas23 for NO, NO₂, SO₂ and O₂ from ABB Automation GmbH is:

Limas23 (AMC-Board): 3.8.0

The Inpotron power supply, type PSU-0261-12-14, can be used as a 24-volt power supply.

Statement from TÜV Rheinland Energy GmbH from 7 March 2017

- Publication in the German Federal Gazette (BANZ AT 26 March 2018 B8, chapter V, 20. notification, UBA publication from 21 February 2018):

20 Notification to the publications by the German Federal Environmental Agency from 18 February 2016 (BANZ AT 14 March 2016, B7, chapter I number 4.2) and from 13 July 2017 (BANZ AT 31 July 2017 B12, chapter II 5. notification):

The current software version for the AMS EL3000-Limas23 for NO, NO₂, SO₂ and O₂ from ABB Automation GmbH is:

Limas23 (AMC-Board): 3.8.2

Statement from TÜV Rheinland Energy GmbH from 7 December 2017

Certificate number: 3308477_01-ts

- Publication in the German Federal Gazette (BAnz AT 17 July 2018 B9, chapter III, 8. notification, UBA publication from 3 July 2018):

8 Notification to the publications by the German Federal Environmental Agency from 18 February 2016 (BAnz AT 14 March 2016, B7, chapter I number 4.2) and from 21 February 2018 (BAnz AT 26 March 2018 B8, chapter V 20. notification):

The current software version for the AMS EL3000-Limas23 for NO, NO₂, SO₂ and O₂ from ABB Automation GmbH is:

Limas23 (AMC-Board): 3.8.6

The version 3.8.4 of the AMC-Board is included herein.

Statement from TÜV Rheinland Energy GmbH from 2 May 2018

- Publication in the German Federal Gazette (BAnz AT 24 March 2020 B7, chapter IV, 4. notification, UBA publication from 24 February 2020):

4 Notification to the publications by the German Federal Environmental Agency from 18 February 2016 (BAnz AT 14 March 2016, B7, chapter I number 4.2) and from 3 July 2018 (BAnz AT 17 July 2018 B9, chapter III 8. notification):

The current software version for the AMS EL3000-Limas23 for NO, NO₂, SO₂ and O₂ from ABB Automation GmbH is:

Limas23 (AMC-Board): 3.9.0

Statement from TÜV Rheinland Energy GmbH from 13 September 2019

- Publication in the German Federal Gazette (BAnz AT 05 August 2021 B5, chapter IV, 22. notification, UBA publication from 29 June 2021):

22 Notification to the publications by the German Federal Environmental Agency from 18 February 2016 (BAnz AT 14 March 2016, B7, chapter I number 4.2) and from 24 February 2020 (BAnz AT 24 March 2020 B7, chapter IV 3. notification):

The current software version for the AMS EL3000-Limas23 for NO, NO₂, SO₂ and O₂ from ABB Automation GmbH is:

Limas23 (AMC-Board): 3.9.3

Statement from TÜV Rheinland Energy GmbH from 19 February 2021

- Publication in the German Federal Gazette (BANz AT 11 April 2022 B10, chapter VI, 25. notification, UBA publication from 09 March 2022):

25 Notification to the publications by the German Federal Environmental Agency from 18 February 2016 (BANz AT 14 March 2016, B7, chapter I number 4.2) and from 29 June 2021 (BANz AT 05 August 2021 B5, chapter IV 22. notification):

The current software version for the AMS EL3000-Limas23 for NO, NO₂, SO₂ and O₂ from ABB Automation GmbH is:

Limas23 (AMC-Board): 3.9.4

The measuring system may alternatively also be operated with hardware version 08 of the pressure sensor assembly.

As of 13 September, ABB Automation GmbH has been merged with its parent company ABB AG. The new manufacturer's name is ABB AG.

Statement from TÜV Rheinland Energy GmbH from 14 September 2021

- Publication in the German Federal Gazette (BANz AT 11 March 2023 B6, chapter IV, 5. notification, UBA publication from 21 February 2023):

5 Notification to the publications by the German Federal Environmental Agency from 18 February 2016 (BANz AT 14 March 2016, B7, chapter I number 4.2) and from 9 March 2022 (BANz AT 11 April 2022 B10, chapter VI 25. notification):

The current software version for the AMS EL3000-Limas23 for NO, NO₂, SO₂ and O₂ from ABB AG is:

Limas23 (AMC-Board): 3.9.8

The version 3.9.6 of the AMC-Board is included herein.

Statement from TÜV Rheinland Energy GmbH from 5 September 2022

- Publication in the German Federal Gazette (BANz AT 31 October 2024 B9, chapter IV, 8. notification, UBA publication from 31 October 2024):

8 Notification to the publications by the German Federal Environmental Agency from 18 February 2016 (BANz AT 14 March 2016, B7, chapter I number 4.2) and from 21 February 2023 (BANz AT 20 March 2023 B6, chapter IV 5. notification):

The current software version for the AMS EL3000-Limas23 for NO, NO₂, SO₂ and O₂ from ABB AG is:

Limas23 (AMC-Board): 3.9.10

Statement from TÜV Rheinland Energy GmbH from 20 February 2024

Certificate number: 3308477_01-ts

- Publication in the German Federal Gazette (BAnz AT 19 May 2025 B3, chapter IV, 32. notification, UBA publication from 2 April 2025):

32 Notification to the publications by the German Federal Environmental Agency from 18 February 2016 (BAnz AT 14 March 2016, B7, chapter I number 4.2) and from 21 August 2024 (BAnz AT 31 October 2024 B9, chapter IV 8. notification):

The current software version for the AMS EL3000-Limas23 for NO, NO₂, SO₂ and O₂ from ABB AG is:

Limas23 (AMC-Board): 3.9.12

Statement from TÜV Rheinland Energy GmbH from 20 February 2024

- Publication in the German Federal Gazette (BAnz AT 18 May 2026 B5, Chapter VI, 15. Notification, UBA publication from 10 July 2026)

15 Notification regarding the announcement of the German Environment Agency from 18 February 2016 (BAnz AT 14 March 2016, B7, chapter I number 4.2) and from 2 April 2025 (BAnz AT 19 May 2025 B3, chapter IV, 32. Notification):

The current software version for the AMS EL3000-Limas23 for NO, NO₂, SO₂ and O₂ from ABB AG is:

Limas23 (AMC-Board): 3.9.14

Statement from TÜV Rheinland Energy GmbH from 24 September 2025

Certified Product

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

The entire tested EL3000-Limas23 AMS consisted of a heated sampling probe, the heated measurement gas line, the magnetic valve (3-way valve), sample gas cooler, sample gas feed unit and the analyser from the EL3000-Limas23 product series with up to three UV measurement channels and oxygen. To measure NO, the analyser works according to the gas filter correlation principle (GFC), to measure NO₂ and SO₂, according to the interference filter correlation principle (IFC). The component O₂ is determined using an electro-chemical oxygen measurement cell.

The sample gas extraction consists of a stainless-steel extraction probe with a heated ceramic filter. A heated sample gas pipe, fitted with a PTFE-seal (interior diameter 6mm), is attached to the probe. After the heated pipe, the sample gas flows through the magnetic valve (3-way valve) into a compressor cooler. The sample gas feed unit with integrated rotameter and flow sensor for setting measurement gas flow and a fine filter can be found after the cooler. After the gas feed unit, the measured gas flows into the analyser. The magnetic valve activates the flow of zero and test gases. The zero points for the components NO, NO₂ and SO₂ and the span point for O₂ are realigned via the magnetic valve with ambient air. This auto-alignment is triggered at an interval of 24 hours by the analyser. Alternatively, zero gas / test gas can be applied manually via the second gas connection on the probe. The analyser is equipped with a measurement gas cuvette made of aluminium. The analyser is available in the versions EL3020 (19" rack cabinet) and EL3040 (cabinet for wall mounting).

The AMS consists of the following components:

Probe

Manufacturer: ABB Automation GmbH, 60488 Frankfurt, Germany
 Type: 40 or 42 (heated), with ceramic filter, PFE 3 of the modular system of PFE series
 Regulator: PSG

Heated sampling hose

Manufacturer: ABB Automation GmbH, 60488 Frankfurt, Germany
 Heated temperatures: 180 °C
 Length: 30 m in the field test
 Diameter: 6 mm ID
 Controller
 Manufacturer: Jumo GmbH & Co. KG
 Sensor: PT 100

Compressor cooler

Manufacturer: ABB Automation GmbH, 60488 Frankfurt, Germany
 Type: Advance SCC-C

Sample gas feed unit

Manufacturer: ABB Automation GmbH, 60488 Frankfurt Germany
 Type: Advance SCC-F

Magnetic valve

Manufacturer: Bürkert GmbH & Co. KG
 Type: 0124

Certificate number: 3308477_01-ts

Analyser

Manufacturer: ABB Automation GmbH, 60488 Frankfurt, Germany
Type: EL3020- or EL3040-Limas23 (Limas-identification: CEM236A)
Software: 3.9.0

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 complies with the certified product, the Environmental Engineering 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**.

Document History:

The certification of the EL3000-Limas23 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. 2231669.2-ts	14 March 2016
Certificate validity until	13 March 2021 (5 years)

Report no.: 2231669.2 from 30 September 2015,
TÜV SÜD Industrie Service GmbH
Publication: BAnz AT 14 March 2016 B7, chapter I no. 4.2
UBA publication from 18 February 2016

Notification:

Statement from TÜV Süd Industrie Service GmbH from 26 February 2016
Publication: BAnz AT 01 August 2016 B11, chapter V, notification 22,
UBA publication from 14 July 2016 (software modification)

Certificate number: 3308477_01-ts

Correction:

Statement from TÜV SÜD Industrie Service GmbH from 29 September 2016
Publication: BAnz AT 15 March 2017 B6, chapter IV, correction 6 (error correction in the publication and in the test report)
UBA publication from 22 February 2017

Report no.: 2231669.2, Rev. 01 from 29 September 2016,
TÜV SÜD Industrie Service GmbH

Correction of certificate:

Certificate no. 2704952-ts	14 March 2016
Certificate validity until	13 March 2021 (5 years)

Notification:

Statement from TÜV Süd Industrie Service GmbH from 27 September 2016
Publication: BAnz AT 15 March 2017 B12, chapter II, notification 30,
UBA publication from 22 February 2017 (software modification)

Notification:

Statement from TÜV Rheinland Energy GmbH from 07 March 2017
Publication: BAnz AT 31 July 2017 B12, chapter II, notification 5,
UBA publication from 13 July 2017 (software and hardware modification)

Notification:

Statement from TÜV Rheinland Energy GmbH from 07 December 2017
Publication: BAnz AT 26 March 2018 B8, chapter V, notification 20,
UBA publication from 21 February 2018 (software modification)

Notification:

Statement from TÜV Rheinland Energy GmbH from 02 May 2018
Publication: BAnz AT 17 July 2018 B9, chapter III, notification 8,
UBA publication from 03 July 2018 (software modification)

Notification:

Statement from TÜV Rheinland Energy GmbH from 13 September 2019
Publication: BAnz AT 24 March 2020 B7, chapter IV, notification 4,
UBA publication from 24 February 2020 (software modification)

Certificate re-issuance:

Certificate-No. 3307340-ts	01.12.2020
Certificate valid until	13.03.2026

Notification:

Statement from TÜV Rheinland Energy GmbH from 19 February 2021
Publication: BAnz AT 05 August 2021 B5, chapter IV, notification 22,
UBA publication from 29 June 2021 (software modification)

Certificate number: 3308477_01-ts

Notification:

Statement from TÜV Rheinland Energy GmbH from 14 September 2021
Publication: BAnz AT 11 April 2022 B10, chapter VI, notification 25,
UBA publication from 9 March 2022 (software modification, company merge)

Notification:

Statement from TÜV Rheinland Energy GmbH from 05 September 2022
Publication: BAnz AT 20 March 2023 B6, chapter IV, notification 5,
UBA publication from 21 February 2023 (software modification)

Notification:

Statement from TÜV Rheinland Energy & Environment GmbH from 20 February 2024
Publication: BAnz AT 31 October 2024 B9, chapter IV, notification 8,
UBA publication from 21 August 2024 (software modification)

Notification:

Statement from TÜV Rheinland Energy & Environment GmbH from 20 Dezember 2024
Publication: BAnz AT 19 May 2025 B3, chapter IV, notification 32,
UBA publication from 02 April 2025 (software modification)

Notification:

Statement from TÜV Rheinland Energy & Environment GmbH from 24 September 2025
Publication: BAnz AT 10.07.2026 B5, Chapter VI, Notification 15,
UBA publication dated 18 May 2026 (software modification)

Certificate re-issuance:

Certificate-No. 3299856_01-ts 14.03.2026
Certificate valid until 13.03.2031 (5 Years)

Calculation of total uncertainty for QAL1 testing according to DIN EN 14181 and DIN EN 15267-3

Total uncertainty for the measurement component NO in the measuring range 0 – 33,5 mg/m³

<i>Performance characteristic</i>	<i>Uncertainty</i>	<i>Value standard uncertainty mg/m³</i>	<i>Square of standard uncertainty (mg/m³)²</i>
Lack-of-fit	u_{lof}	0,039	0,0015
Zero drift from field test	$u_{d,z}$	0,155	0,024
Span drift from field test	$u_{d,s}$	-0,309	0,0955
Influence of ambient temperature at span	u_t	0,173	0,0299
Influence of sample gas pressure	u_p		
Influence of sample gas flow	u_f	0,040	0,0016
Influence of supply voltage	u_v	0,041	0,0017
Cross-sensitivity (interference)	u_i	0,261	0,0682
Repeatability standard deviation at span	$u_r = s_r$	0,023	$u_r < du$
Standard deviation from paired measurements under field cond.	$u_d = s_d$	0,249	0,062
Uncertainty of reference material 2 % by 70% of ZR	u_{rm}	0,271	0,0733
Excursion of measurement beam	u_{mb}		
Converter efficiency for AMS measuring NOx	u_{ce}		
Variation of response factors (TOC)	u_{rf}		
		total	0,3577
Combined standard uncertainty	$u_c = \sqrt{\sum (u_i)^2}$	0,5981	mg/m ³
Total expanded uncertainty	$U_{0,95} = 1,96 \times u_c$	1,1723	mg/m ³
Relativ expanded uncertainty	U	3,6	% ELV
Permissible uncertainty of EN 15267-3	(of ELV 32,6 mg/m ³)	15	% ELV
Complied with requirements relating to the measurement uncertainty		yes	regarding EN 15267-3
Permissible uncertainty 13. / 17. BImSchV	(of ELV 32,6 mg/m ³)	20	% ELV
Complied with requirements relating to the measurement uncertainty		yes	regarding 13. / 17. BImSchV

Total uncertainty for the measurement component NO₂ in the measuring range 0-125 mg/m³

<i>Performance characteristic</i>	<i>Uncertainty</i>	<i>Value standard uncertainty mg/m³</i>	<i>Square of standard uncertainty (mg/m³)²</i>
Lack-of-fit	u_{lof}	0,664	0,4408
Zero drift from field test	$u_{d,z}$	-2,165	4,6872
Span drift from field test	$u_{d,s}$	-2,093	4,3806
Influence of ambient temperature at span	u_t	0,775	0,6006
Influence of sample gas pressure	u_p		
Influence of sample gas flow	u_f	-0,945	0,893
Influence of supply voltage	u_v	0,153	0,0234
Cross-sensitivity (interference)	u_i	1,415	2,0022
Repeatability standard deviation at span	$u_r = s_r$	0,166	$u_r < du$
Standard deviation from paired measurements under field cond.	$u_d = s_d$	0,555	0,308
Uncertainty of reference material 2 % by 70% of ZR	u_{rm}	1,010	1,0208
Excursion of measurement beam	u_{mb}		
Converter efficiency for AMS measuring NOx	u_{ce}		
Variation of response factors (TOC)	u_{rf}		
		total	14,3566
Combined standard uncertainty	$u_c = \sqrt{\sum (u_i)^2}$	3,789	mg/m ³
Total expanded uncertainty	$U_{0,95} = 1,96 \times u_c$	7,4264	mg/m ³
Relativ expanded uncertainty	U	14,9	% ELV
Permissible uncertainty of EN 15267-3	(of ELV 50 mg/m ³)	15	% ELV
Complied with requirements relating to the measurement uncertainty		yes	regarding EN 15267-3
Permissible uncertainty 13. / 17. BImSchV	(of ELV 50 mg/m ³)	20	% ELV
Complied with requirements relating to the measurement uncertainty		yes	regarding 13. / 17. BImSchV

Total uncertainty for the measurement component SO₂ in the measuring range 0-75 mg/m³

<i>Performance characteristic</i>	<i>Uncertainty</i>	<i>Value standard uncertainty mg/m³</i>	<i>Square of standard uncertainty (mg/m³)²</i>
Lack-of-fit	u_{lof}	-0,204	0,0414
Zero drift from field test	$u_{d,z}$	0,823	0,6773
Span drift from field test	$u_{d,s}$	1,299	1,6874
Influence of ambient temperature at span	u_t	1,467	2,1521
Influence of sample gas pressure	u_p		
Influence of sample gas flow	u_f	-0,217	0,0469
Influence of supply voltage	u_v	0,221	0,0488
Cross-sensitivity (interference)	u_i	-1,334	1,7787
Repeatability standard deviation at span	$u_r = s_r$	0,196	$u_r < du$
Standard deviation from paired measurements under field cond.	$u_d = s_d$	0,413	0,1706
Uncertainty of reference material 2 % by 70% of ZR	u_{rm}	0,606	0,3675
Excursion of measurement beam	u_{mb}		
Converter efficiency for AMS measuring NOx	u_{ce}		
Variation of response factors (TOC)	u_{rf}		
		total	6,9707
Combined standard uncertainty	$u_c = \sqrt{\sum (u_i)^2}$	2,6402	mg/m ³
Total expanded uncertainty	$U_{0,95} = 1,96 \times u_c$	5,1748	mg/m ³
Relativ expanded uncertainty	U	10,3	% ELV
Permissible uncertainty of EN 15267-3	(of ELV 50 mg/m ³)	15	% ELV
Complied with requirements relating to the measurement uncertainty		yes	regarding EN 15267-3
Permissible uncertainty 13. / 17. BImSchV	(of ELV 50 mg/m ³)	20	% ELV
Complied with requirements relating to the measurement uncertainty		yes	regarding 13. / 17. BImSchV

Certificate number: 3308477_01-ts

Total uncertainty for the measurement component O₂ in the measuring range 0-25 Vol.-%

<i>Performance characteristic</i>	<i>Uncertainty</i>	<i>Value standard uncertainty Vol.%</i>	<i>Square of standard uncertainty Vol.%²</i>
Lack-of-fit	u_{lof}	-0,046	0,0021
Zero drift from field test	$u_{d,z}$	-0,075	0,0056
Span drift from field test	$u_{d,s}$	-0,081	0,0066
Influence of ambient temperature at span	u_t	0,095	0,0090
Influence of sample gas pressure	u_p		
Influence of sample gas flow	u_f	-0,048	0,0023
Influence of supply voltage	u_v	0,006	0,00000
Cross-sensitivity (interference)	u_i	0,208	0,0432
Repeatability standard deviation at span	$u_r = s_r$	0,061	0,0037
Standard deviation from paired measurements under field cond.	$u_d = s_d$	0,055	$u_d < u_r$
Uncertainty of reference material 1 % by 70% of ZR	u_{rm}	0,101	0,0102
Excursion of measurement beam	u_{mb}		
Converter efficiency for AMS measuring NOx	u_{ce}		
Variation of response factors (TOC)	u_{rf}		
		total	0,0827
Combined standard uncertainty	$u_c = \sqrt{\sum (u_i)^2}$	0,2876	Vol.%
Total expanded uncertainty	$U_{0,95} = 1,96 \times u_c$	0,5637	Vol.%
Relativ expanded uncertainty	U	2,3	% CR
Permissible uncertainty of EN 15267-3	(of CR 25 Vol.%)	7,5	% CR
Complied with requirements relating to the measurement uncertainty		yes	regarding EN 15267-3
Permissible uncertainty 13. / 17. BImSchV	(of CR 25 Vol.%)	10	% CR
Complied with requirements relating to the measurement uncertainty		yes	regarding 13. / 17. BImSchV