Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000081162_01

Certified AMS:	N100 for Sulphur dioxide
Manufacturer:	Teledyne API 9970 Carroll Canyon Road San Diego, CA, 92131 USA
Test Institute:	TÜV Rheinland Energy & Environment GmbH

This is to certify that the AMS has been tested and found to comply with the standards VDI 4202-1 (2018), EN 14212 (2012), EN 14212 (2024) as well as EN 15267-1 (2009) and EN 15267-2 (2023).

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 11 pages).
This certificate replaces certificate 0000081162_00 dated 12 June 2024.

TÜVRheinland® CERTIFIED

Suitability Tested
Complying with 2008/50/EC
EN 15267
Regular Surveillance
www.tuv.com
ID 0000081162

Publication in the German Federal Gazette (BAnz) of 10 July 2026

This certificate will expire on: 9 July 2031

German Environment Agency
Dessau, 17 September 2026

TÜV Rheinland Energy & Environment GmbH
Cologne, 15 September 2026

Dr. Marcel Langner
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TÜV Rheinland Energy & Environment 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 the certificate D-PL-11120-02-00.

Test report:	EuL/21255654/C dated 28 August 2023 as well as addendum EuL/21272240/C dated 15. July 2025
Initial certification:	10 May 2024
Expiry date:	9 July 2031
Publication:	BAnz AT 10.05.2024 B7, chapter III number 1.1 and BAnz AT 10.07.2026 B5, chapter VI Notification 73

Approved application

The tested AMS is suitable for continuous immission measurement of SO_2 in stationary use.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a three month field test.

The AMS is approved for an ambient temperature range of 0 °C to +45 °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 measured values relevant to the application.

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

Basis of the certification

This certification is based on:

- Test report EuL/21255654/C dated 28 August 2023 of TÜV Rheinland Energy GmbH as well as addendum EuL/21272240/C of 15 July 2025 der TÜV Rheinland Energy & Environment GmbH
- 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 AT 10.05.2024 B7, chapter III Number 1.1, Announcement by UBA dated 19 March 2024:

AMS designation:
N100 for Sulphur dioxide

Manufacturer:
Teledyne API, San Diego, USA

Field of application:
For the continuous determination of sulphur dioxide concentrations in ambient air in stationary use

Measuring ranges during the performance test:

Component	Certification range	Unit
Sulphur dioxide	0 – 1,000	µg/m³

Software version:
Rev. 1.11.1

Restrictions:
none

Notes:

1. The test report on the performance test is available at www.qal1.de.
2. The measuring system is approved for an ambient temperature range of 0 - 45 °C.
3. The N100 measuring system can be equipped with both a regulated pump (PID controlled) and a non-regulated pump (HD Non-PID).
4. The N100 measuring system can be equipped with a standard Teflon particle filter with a pore size of 5 µm and a diameter of 47 mm as well as with a DFU filter cartridge with a pore size of 0.01 µm.

Test Report: TÜV Rheinland Energy GmbH, Cologne
Report No.: EuL/21255654/C dated 28 August 2023

Publication in the German Federal Gazette: BAnz AT 19 May 2025 B3, chapter VI notification 66, Announcement by UBA dated 2 April 2025:

66 Notification as regards Federal Environment Agency (UBA) notice dated 19 March 2024 (BAnz AT 10.05.2024 B7, chapter III number 1.1)

The current software version of the measuring system N100 for Sulphur dioxide manufactured by Teledyne API is:
Rev. 1.11.2

Statement issued by TÜV Rheinland Energy & Environment GmbH dated 26 September 2024

Publication in the German Federal Gazette: BAnz AT 10 July 2026 B5, chapter VI notification 73, Announcement by UBA dated 18 May 2026:

73 Notification as regards Federal Environment Agency (UBA) notice dated 19 March 2024 (BAnz AT 10.05.2024 B7, chapter III number 1.1) and dated 2 April 2025 (BAnz AT 19.05.2025 B3, chapter IV notification 66)

The N100 SO_2 measuring system from Teledyne API complies with the requirements of EN 14212 (2024 edition).
An addendum to the test report, with report number EuL/21272240/C, is available online at www.qal1.de.

Alternatively, the hydrocarbon kicker in the measuring system can also be fitted with the platinum-coated silicone tube P00430764 Bisco Helixmark, manufacturer's pn: 60-795-06 (Nusil).

Statement issued by TÜV Rheinland Energy & Environment GmbH dated 16 January 2026

Certified product

This certificate applies to automated measurement systems conforming to the following description:

The immission measuring device N100 is a continuous sulfur dioxide analyzer. The measuring principle is based on UV fluorescence. The device was developed for continuous measurement of sulfur dioxide in ambient air.

The measurement method is based on the physical principle that fluorescence occurs when sulfur dioxide (SO_2) is excited to an excited state by UV light with wavelengths in the range of 190 nm - 230 nm (SO_2*).

The optical design of the measurement chamber optimizes the fluorescence reaction between SO_2 and UV light, ensuring that only the UV light produced by the decay of SO_2* to SO_2 is detected by the instrument's fluorescence detector.

The N100 Sulfur Dioxide Analyzer determines the concentration of sulfur dioxide (SO_2) in the sample air drawn into the instrument. In doing so, the measurement and also calibration gases must be supplied at atmospheric pressure.

UV radiation is generated by a low pressure zinc vapor lamp. A reference detector converts UV light to a DC current that is used to measure the intensity of the UV excitation source. It is located directly opposite the UV lamp at the end of a narrow tubular light trap, and is thus directly in the path of the UV excitation light.

A window that is transparent to UV light forms an airtight seal to prevent ambient air from contaminating the measurement chamber. Due to the shape of the light trap, and because the detector only detects UV wavelengths, no further optical filtering is necessary.Multiple focusing lenses and optical filters ensure that both detectors are exposed to the op-timal amount of light at only the correct wavelength of UV. To ensure that the PMT detects only the light emitted by the decaying SO_2*, the path of the UV excitation light and the field of view of the PMT are perpendicular to each other. Furthermore, the inner surfaces of the measuring chamber are coated with a layer of black Teflon, which absorbs stray light.

The N100 measuring device has a standard Teflon particle filter with a pore size of 5 µm directly behind the sample gas inlet. The particle filter is located on a flap secured with two screws on the rear of the measuring device. As an alternative to the Teflon filter, the N100 measuring device can be fitted with a DFU-filter cartridge with a pore size of 0.01 µm (a so-called long-life filter). The manufacturer specifies a replacement interval of up to 6 months for this filter. The replacement interval of the particle filter naturally depends on the dust load at the installation site and must be determined individually for each measuring point

General notes

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 manufacture of 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 & Environment 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 certification mark may be applied to the product or used in advertising materials for the certified product.

This document as well as the certification mark remains property of TÜV Rheinland Energy & Environment GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the certificate and on requests of the TÜV Rheinland Energy & Environment GmbH this document shall be returned and the certificate mark must not be employed anymore.

The relevant version of this certificate and its expiration is also accessible on the internet: **qal1.de**.

History of documents

Certification of N100 is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Initial certification according to EN 15267
Certificate No. 0000081162_00: 12 June 2024
Expiry date of the certificate: 9 May 2029
Test report: EuL/21255654/C dated 28 August 2023
TÜV Rheinland Energy GmbH
Publication: BAnz AT 10.05.2024 B7, chapter III number 1.1
UBA announcement dated 19 March 2024

Certificate based on a notification
Certificate No. 0000081162_01: 17 September 2026
Expiry date of the certificate: 9 July 2031
Statement issued by TÜV Rheinland Energy & Environment GmbH dated 16 January 2026
Addendum EuL/21272240/C dated 15 July 2025
Publication: BAnz AT 10.07.2026 B5, chapter IV notification 73
UBA publication dated 18 May 2026

Notifications

Statement issued by TÜV Rheinland Energy & Environment GmbH dated 26 September 2024
Publication: BAnz AT 19.05.2025 B3, chapter IV notification 66,
UBA publication dated 2 April 2025
(Software changes)

Expanded uncertainty laboratory, system 1 (2012)

Measuring device:	N100		Serial-No.:	SN: 54	
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	0.120	$u_{r,z}$	0.03	0.0009
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0.300	$u_{r,lh}$	0.07	0.0053
3	"lack of fit" at 1h-limit value	≤ 4.0% of measured value	0.400	$u_{l,lh}$	0.30	0.0929
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 2.0 nmol/mol/kPa	0.390	u_{gp}	3.17	10.0690
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 1.0 nmol/mol/K	0.050	u_{gt}	0.60	0.3645
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 1.0 nmol/mol/K	0.347	u_{st}	4.25	18.0632
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0.010	u_V	0.09	0.0088
8a	Interferent H_20 with 19 mmol/mol	≤ 10 nmol/mol (Zero)	-0.080	u_{H2O}	-2.40	5.7372
		≤ 10 nmol/mol (Span)	-3.210			
8b	Interferent H_2S with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0.230	$u_{int,pos}$	3.21	10.3045
		≤ 5.0 nmol/mol (Span)	-0.470			
8c	Interferent NH_3 with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0.160			
		≤ 5.0 nmol/mol (Span)	-2.350			
8d	Interferent NO with 500 nmol/mol	≤ 5.0 nmol/mol (Zero)	-0.080			
		≤ 5.0 nmol/mol (Span)	1.180	or		
8e	Interferent NO_2 with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0.550			
		≤ 5.0 nmol/mol (Span)	2.190			
8f	Interferent m-Xylene with 1 µmol/mol	≤ 10 nmol/mol (Zero)	0.940			
		≤ 10 nmol/mol (Span)	2.190	$u_{int,neg}$		
9	Averaging effect	≤ 7.0% of measured value	-1.200	u_{av}	-0.91	0.8364
18	Difference sample/calibration port	≤ 1.0%	-0.140	$u_{\Delta sc}$	-0.18	0.0342
21	Uncertainty of test gas	≤ 3.0%	2.000	u_{cg}	1.32	1.7424

Combined standard uncertainty	u_c	6.8745	nmol/mol
Expanded uncertainty	U	13.7491	nmol/mol
Relative expanded uncertainty	W	10.42	%
Maximum allowed expanded uncertainty	W_{req}	15	%

Expanded uncertainty laboratory, system 2 (2012)

Measuring device:	N100		Serial-No.:	SN: 55	
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	0.100	$u_{r,z}$	0.02	0.0006
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0.230	$u_{r,lh}$	0.06	0.0032
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	0.400	u_{gp}	3.25	10.5920
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 1.0 nmol/mol/K	0.060	u_{gt}	0.72	0.5249
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 1.0 nmol/mol/K	0.356	u_{st}	4.36	19.0123
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0.030	u_V	0.28	0.0794
8a	Interferent H_20 with 19 mmol/mol	≤ 10 nmol/mol (Zero)	0.000	u_{H2O}	-2.22	4.9445
		≤ 10 nmol/mol (Span)	-2.980			
8b	Interferent H_2S with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0.160	$u_{int,pos}$	2.35	5.5216
		≤ 5.0 nmol/mol (Span)	0.080			
8c	Interferent NH_3 with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	-0.160			
		≤ 5.0 nmol/mol (Span)	-2.580			
8d	Interferent NO with 500 nmol/mol	≤ 5.0 nmol/mol (Zero)	0.000			
		≤ 5.0 nmol/mol (Span)	-1.490	or		
8e	Interferent NO_2 with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0.780			
		≤ 5.0 nmol/mol (Span)	1.650			
8f	Interferent m-Xylene with 1 µmol/mol	≤ 10 nmol/mol (Zero)	0.860			
		≤ 10 nmol/mol (Span)	1.410	$u_{int,neg}$		
9	Averaging effect	≤ 7.0% of measured value	-1.700	u_{av}	-1.30	1.6785
18	Difference sample/calibration port	≤ 1.0%	-0.280	$u_{\Delta sc}$	-0.37	0.1366
21	Uncertainty of test gas	≤ 3.0%	2.000	u_{cg}	1.32	1.7424

Combined standard uncertainty	u_c	6.6789	nmol/mol
Expanded uncertainty	U	13.3578	nmol/mol
Relative expanded uncertainty	W	10.12	%
Maximum allowed expanded uncertainty	W_{req}	15	%

Expanded uncertainty, laboratory and field, system 1 (2012)

Measuring device:	N100					Serial-No.:	SN: 54	
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	0.120	$u_{r,z}$	0.03	0.0009	
2	Repeatability standard deviation at 1h-limit value	≤	3.0 nmol/mol	0.300	$u_{r,lh}$	not considered, as ur,lh = 0.07 < ur,f	-	
3	"lack of fit" at 1h-limit value	≤	4.0% of measured value	0.400	$u_{l,lh}$	0.30	0.0929	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤	2.0 nmol/mol/kPa	0.390	u_{gp}	3.17	10.0690	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤	1.0 nmol/mol/K	0.050	u_{gt}	0.60	0.3645	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤	1.0 nmol/mol/K	0.347	u_{st}	4.25	18.0632	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤	0.30 nmol/mol/V	0.010	u_V	0.09	0.0088	
8a	Interferent H_20 with 19 mmol/mol	≤	10 nmol/mol (Zero)	-0.080				
		≤	10 nmol/mol (Span)	-3.210	u_{h2O}	-2.40	5.7372	
8b	Interferent H_2S with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0.230				
		≤	5.0 nmol/mol (Span)	-0.470	$u_{int,pos}$			
8c	Interferent NH_3 with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0.160				
		≤	5.0 nmol/mol (Span)	-2.350				
8d	Interferent NO with 500 nmol/mol	≤	5.0 nmol/mol (Zero)	-0.080				
		≤	5.0 nmol/mol (Span)	1.180	or	3.21	10.3045	
8e	Interferent NO_2 with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0.550				
		≤	5.0 nmol/mol (Span)	2.190				
8f	Interferent m-Xylene with 1 µmol/mol	≤	10 nmol/mol (Zero)	0.940				
		≤	10 nmol/mol (Span)	2.190	$u_{int,neg}$			
9	Averaging effect	≤	7.0% of measured value	-1.200	u_{av}	-0.91	0.8364	
10	Reproducibility standard deviation under field conditions	≤	5.0% of average over 3 months	1.830	$u_{r,f}$	2.42	5.8351	
11	Long term drift at zero level	≤	4.0 nmol/mol	-1.020	$u_{d,l,z}$	-0.59	0.3468	
12	Long term drift at span level	≤	5.0% of max. of certification range	1.020	$u_{d,l,lh}$	0.78	0.6043	
18	Difference sample/calibration port	≤	1.0%	-0.140	$u_{\Delta sc}$	-0.18	0.0342	
21	Uncertainty of test gas	≤	3.0%	2.000	u_{cg}	1.32	1.7424	

Combined standard uncertainty	u_c	7.3512	nmol/mol
Expanded uncertainty	U	14.7024	nmol/mol
Relative expanded uncertainty	W	11.14	%
Maximum allowed expanded uncertainty	W_{req}	15	%

Expanded uncertainty, laboratory and field, system 2 (2012)

Measuring device:	N100					Serial-No.:	SN: 55	
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	0.100	$u_{r,z}$	0.02	0.0006	
2	Repeatability standard deviation at 1h-limit value	≤	3.0 nmol/mol	0.230	$u_{r,lh}$	not considered, as ur,lh = 0.05 < 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	0.400	u_{gp}	3.25	10.5920	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤	1.0 nmol/mol/K	0.060	u_{gt}	0.72	0.5249	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤	1.0 nmol/mol/K	0.356	u_{st}	4.36	19.0123	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤	0.30 nmol/mol/V	0.030	u_V	0.28	0.0794	
8a	Interferent H_20 with 19 mmol/mol	≤	10 nmol/mol (Zero)	0.000				
		≤	10 nmol/mol (Span)	-2.980	u_{h2O}	-2.22	4.9445	
8b	Interferent H_2S with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0.160				
		≤	5.0 nmol/mol (Span)	0.080	$u_{int,pos}$			
8c	Interferent NH_3 with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	-0.160				
		≤	5.0 nmol/mol (Span)	-2.580				
8d	Interferent NO with 500 nmol/mol	≤	5.0 nmol/mol (Zero)	0.000				
		≤	5.0 nmol/mol (Span)	-1.490	or	2.35	5.5216	
8e	Interferent NO_2 with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0.780				
		≤	5.0 nmol/mol (Span)	1.650				
8f	Interferent m-Xylene with 1 µmol/mol	≤	10 nmol/mol (Zero)	0.860				
		≤	10 nmol/mol (Span)	1.410	$u_{int,neg}$			
9	Averaging effect	≤	7.0% of measured value	-1.700	u_{av}	-1.30	1.6785	
10	Reproducibility standard deviation under field conditions	≤	5.0% of average over 3 months	1.830	$u_{r,f}$	2.42	5.8351	
11	Long term drift at zero level	≤	4.0 nmol/mol	-0.630	$u_{d,l,z}$	-0.36	0.1323	
12	Long term drift at span level	≤	5.0% of max. of certification range	0.880	$u_{d,l,lh}$	0.67	0.4498	
18	Difference sample/calibration port	≤	1.0%	-0.280	$u_{\Delta sc}$	-0.37	0.1366	
21	Uncertainty of test gas	≤	3.0%	2.000	u_{cg}	1.32	1.7424	

Combined standard uncertainty	u_c	7.1430	nmol/mol
Expanded uncertainty	U	14.2859	nmol/mol
Relative expanded uncertainty	W	10.82	%
Maximum allowed expanded uncertainty	W_{req}	15	%

Umwelt Bundesamt

Certificate:
0000081162_01 / 17 September 2026

TÜVRheinland®
Precisely Right.

Expanded uncertainty laboratory, system 1 (2024)

Measuring device:	N100			Serial-No.:	SN: 54
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	0,120	$u_{r,z}$	0,03	0,0009
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0,300	$u_{r,lh}$	0,07	0,0053
3	"lack of fit" at 1h-limit value	≤ 4.0% of measured value	1,010	$u_{l,lh}$	0,77	0,5925
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 2.0 nmol/mol/kPa	0,690	u_{gp}	3,74	14,0079
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 1.0 nmol/mol/K	0,020	u_{gt}	0,19	0,0353
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 1.0 nmol/mol/K	0,347	u_{st}	4,25	18,0632
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0,010	u_V	0,09	0,0088
8a	Interferent H_20 with 19 mmol/mol	≤ 10 nmol/mol (Zero)	-0,080	u_{H2O}	-2,40	5,7372
		≤ 10 nmol/mol (Span)	-3,210			
8b	Interferent H_2S with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0,230	$u_{int,pos}$		
		≤ 5.0 nmol/mol (Span)	-0,470			
8c	Interferent NH_3 with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0,160			
		≤ 5.0 nmol/mol (Span)	-2,350			
8d	Interferent NO with 500 nmol/mol	≤ 5.0 nmol/mol (Zero)	-0,080		3,21	10,3045
		≤ 5.0 nmol/mol (Span)	1,180	or		
8e	Interferent NO_2 with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0,550			
		≤ 5.0 nmol/mol (Span)	2,190			
8f	Interferent m-Xylene with 1 µmol/mol	≤ 10 nmol/mol (Zero)	0,940			
		≤ 10 nmol/mol (Span)	2,190	$u_{int,neg}$		
9	Averaging effect	≤ 7.0% of measured value	-1,200	u_{av}	-0,91	0,8364
18	Difference sample/calibration port	≤ 1.0%	-0,140	$u_{\Delta sc}$	-0,18	0,0342
21	Uncertainty of test gas	≤ 3.0%	2,000	u_{cg}	1,32	1,7424

Combined standard uncertainty	u_c	7,1672	nmol/mol
Expanded uncertainty	U	14,3344	nmol/mol
Relative expanded uncertainty	W	10,86	%
Maximum allowed expanded uncertainty	W_{req}	15	%

Expanded uncertainty laboratory, system 2 (2024)

Measuring device:	N100			Serial-No.:	SN: 55
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	0,100	$u_{r,z}$	0,02	0,0006
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0,230	$u_{r,lh}$	0,06	0,0032
3	"lack of fit" at 1h-limit value	≤ 4.0% of measured value	1,670	$u_{l,lh}$	1,27	1,6198
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 2.0 nmol/mol/kPa	0,660	u_{gp}	3,58	12,8163
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 1.0 nmol/mol/K	0,020	u_{gt}	0,19	0,0353
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 1.0 nmol/mol/K	0,356	u_{st}	4,36	19,0123
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0,030	u_V	0,28	0,0794
8a	Interferent H_20 with 19 mmol/mol	≤ 10 nmol/mol (Zero)	0,000	u_{H2O}	-2,22	4,9445
		≤ 10 nmol/mol (Span)	-2,980			
8b	Interferent H_2S with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0,160	$u_{int,pos}$		
		≤ 5.0 nmol/mol (Span)	0,080			
8c	Interferent NH_3 with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	-0,160			
		≤ 5.0 nmol/mol (Span)	-2,580			
8d	Interferent NO with 500 nmol/mol	≤ 5.0 nmol/mol (Zero)	0,000		2,35	5,5216
		≤ 5.0 nmol/mol (Span)	-1,490	or		
8e	Interferent NO_2 with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0,780			
		≤ 5.0 nmol/mol (Span)	1,650			
8f	Interferent m-Xylene with 1 µmol/mol	≤ 10 nmol/mol (Zero)	0,860			
		≤ 10 nmol/mol (Span)	1,410	$u_{int,neg}$		
9	Averaging effect	≤ 7.0% of measured value	-1,700	u_{av}	-1,30	1,6785
18	Difference sample/calibration port	≤ 1.0%	-0,280	$u_{\Delta sc}$	-0,37	0,1366
21	Uncertainty of test gas	≤ 3.0%	2,000	u_{cg}	1,32	1,7424

Combined standard uncertainty	u_c	6,8986	nmol/mol
Expanded uncertainty	U	13,7972	nmol/mol
Relative expanded uncertainty	W	10,45	%
Maximum allowed expanded uncertainty	W_{req}	15	%

Umwelt Bundesamt

Certificate:
0000081162_01 / 17 September 2026

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Expanded uncertainty, laboratory and field, system 1 (2024)

Measuring device:	N100				Serial-No.:	SN: 54	
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	0,120	$u_{r,z}$	0,03	0,0009
2	Repeatability standard deviation at 1h-limit value	≤	3.0 nmol/mol	0,300	$u_{r,lh}$	not considered, as ur,lh = 0,07 < ur,f	-
3	"lack of fit" at 1h-limit value	≤	4.0% of measured value	1,010	$u_{l,lh}$	0,77	0,5925
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤	2.0 nmol/mol/kPa	0,690	u_{gp}	3,74	14,0079
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤	1.0 nmol/mol/K	0,020	u_{gt}	0,19	0,0353
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤	1.0 nmol/mol/K	0,347	u_{st}	4,25	18,0632
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤	0.30 nmol/mol/V	0,010	u_V	0,09	0,0088
8a	Interferent H_20 with 19 mmol/mol	≤	10 nmol/mol (Zero)	-0,080			
		≤	10 nmol/mol (Span)	-3,210	u_{H2O}	-2,40	5,7372
8b	Interferent H_2S with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0,230			
		≤	5.0 nmol/mol (Span)	-0,470	$u_{int,pos}$		
8c	Interferent NH_3 with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0,160			
		≤	5.0 nmol/mol (Span)	-2,350			
8d	Interferent NO with 500 nmol/mol	≤	5.0 nmol/mol (Zero)	-0,080			
		≤	5.0 nmol/mol (Span)	1,180	or	3,21	10,3045
8e	Interferent NO_2 with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0,550			
		≤	5.0 nmol/mol (Span)	2,190			
8f	Interferent m-Xylene with 1 µmol/mol	≤	10 nmol/mol (Zero)	0,940			
		≤	10 nmol/mol (Span)	2,190	$u_{int,neg}$		
9	Averaging effect	≤	7.0% of measured value	-1,200	u_{av}	-0,91	0,8364
10	Reproducibility standard deviation under field conditions	≤	5.0% of average over 3 months	0,230	$u_{r,f}$	0,30	0,0922
11	Long term drift at zero level	≤	4.0 nmol/mol	-1,020	$u_{d,l,z}$	-0,59	0,3468
12	Long term drift at span level	≤	5.0% of max. of certification range	1,020	$u_{d,l,lh}$	0,78	0,6043
18	Difference sample/calibration port	≤	1.0%	-0,140	$u_{\Delta sc}$	-0,18	0,0342
21	Uncertainty of test gas	≤	3.0%	2,000	u_{cg}	1,32	1,7424

Combined standard uncertainty	u_c	7,2392	nmol/mol
Expanded uncertainty	U	14,4784	nmol/mol
Relative expanded uncertainty	W	10,97	%
Maximum allowed expanded uncertainty	W_{req}	15	%

Expanded uncertainty, laboratory and field, system 2 (2024)

Measuring device:	N100				Serial-No.:	SN: 55	
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	0,100	$u_{r,z}$	0,02	0,0006
2	Repeatability standard deviation at 1h-limit value	≤	3.0 nmol/mol	0,230	$u_{r,lh}$	not considered, as ur,lh = 0,05 < ur,f	-
3	"lack of fit" at 1h-limit value	≤	4.0% of measured value	1,670	$u_{l,lh}$	1,27	1,6198
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤	2.0 nmol/mol/kPa	0,660	u_{gp}	3,58	12,8163
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤	1.0 nmol/mol/K	0,020	u_{gt}	0,19	0,0353
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤	1.0 nmol/mol/K	0,356	u_{st}	4,36	19,0123
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤	0.30 nmol/mol/V	0,030	u_V	0,28	0,0794
8a	Interferent H_20 with 19 mmol/mol	≤	10 nmol/mol (Zero)	0,000			
		≤	10 nmol/mol (Span)	-2,980	u_{H2O}	-2,22	4,9445
8b	Interferent H_2S with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0,160			
		≤	5.0 nmol/mol (Span)	0,080	$u_{int,pos}$		
8c	Interferent NH_3 with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	-0,160			
		≤	5.0 nmol/mol (Span)	-2,580			
8d	Interferent NO with 500 nmol/mol	≤	5.0 nmol/mol (Zero)	0,000			
		≤	5.0 nmol/mol (Span)	-1,490	or	2,35	5,5216
8e	Interferent NO_2 with 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0,780			
		≤	5.0 nmol/mol (Span)	1,650			
8f	Interferent m-Xylene with 1 µmol/mol	≤	10 nmol/mol (Zero)	0,860			
		≤	10 nmol/mol (Span)	1,410	$u_{int,neg}$		
9	Averaging effect	≤	7.0% of measured value	-1,700	u_{av}	-1,30	1,6785
10	Reproducibility standard deviation under field conditions	≤	5.0% of average over 3 months	0,230	$u_{r,f}$	0,30	0,0922
11	Long term drift at zero level	≤	4.0 nmol/mol	-0,630	$u_{d,l,z}$	-0,36	0,1323
12	Long term drift at span level	≤	5.0% of max. of certification range	0,880	$u_{d,l,lh}$	0,67	0,4498
18	Difference sample/calibration port	≤	1.0%	-0,280	$u_{\Delta sc}$	-0,37	0,1366
21	Uncertainty of test gas	≤	3.0%	2,000	u_{cg}	1,32	1,7424

Combined standard uncertainty	u_c	6,9471	nmol/mol
Expanded uncertainty	U	13,8941	nmol/mol
Relative expanded uncertainty	W	10,53	%
Maximum allowed expanded uncertainty	W_{req}	15	%