

CERTIFICATE

of Product Conformity (QAL1)

Certificate No: 0000072195_01

Certified AMS: PG-350 P-AMS for CO, NO_x, O₂ and CO₂

Manufacturer: HORIBA Europe GmbH
Hans-Mess-Str. 6
61440 Oberursel /Ts.
Germany

Test Institute: TÜV Rheinland Energy & Environment GmbH

**This is to certify that the AMS has been tested
and found to comply with the standards
EN 15267-1 (2009), EN 15267-2 (2023), EN 15267-4 (2017),
EN 14793 (2017), as well as EN 14181 (2014).**

Certification is awarded in respect of the conditions stated in this certificate
(this certificate contains 10 pages).

The present certificate replaces certificate 0000072195_00 dated 7 September 2020.



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000072195

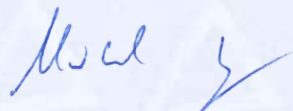
Publication in the German Federal Gazette
(BAnz) of 31 July 2020

German Environment Agency

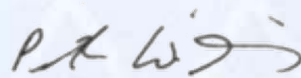
Dessau, 27 June 2025

This certificate will expire on:
30 July 2030

TÜV Rheinland Energy &
Environment GmbH
Cologne, 26 June 2025



Dr. Marcel Langner
Head of Section II 4



ppa. Dr. Peter Wilbring

www.umwelt-tuv.eu
qal1-info@tuv.com
Tel. + 49 221 806-5200

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:	936/21245114/A dated 13 February 2020
Initial certification:	31 July 2020
Expiry date:	30 July 2030
Certificate:	Renewal (of previous certificate 0000072195_00 of 7 September 2020 valid until 30 July 2025)
Publication:	BAnz AT 31.07.2020 B10, chapter I No. 4.1

Approved application

The tested P-AMS is suitable for use for periodic measurements of emissions from stationary sources at plants according to Directive 2010/75/EC, chapter III (combustion plants / 13th BImSchV:2020), chapter IV (waste incineration plants / 17th BImSchV:2013), Directive 2015/2193/EC (44th BImSchV:2022), TA Luft:2002, 30th BImSchV:2019 and 27th BImSchV:2013 for the calibration and validation of stationary AMS within the scope of QAL2 and AST according to EN 14181.

The measured ranges have been selected so as to ensure as broad a field of application as possible.

The suitability of the P-AMS for this application was assessed on the basis of a laboratory test and five field test campaigns at different industrial facilities.

The plants were two waste incineration plants, a coal-fired power plant, a sewage incinerator and a biomass heating plant.

The P-AMS is approved for an ambient temperature range of +5 °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 emission limit values and oxygen concentration relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for the installation at which it will be installed.

Note

The legal regulations mentioned correspond to the current state of legislation during certification. Each user should, if necessary, in consultation with the competent authority, ensure that this AMS meets the legal requirements for the intended use. In addition, it cannot be ruled out that legal regulations governing the use of a measuring device for emission monitoring may change during the lifetime of the certificate.

Basis of the certification

This certification is based on:

- Test report 936/21245114/A dated 13 February 2020 of TÜV Rheinland Energy 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 31.07.2020 B10, chapter I No. 4.1,
Announcement by UBA dated 27 May 2020:

AMS designation:

HORIBA PG-350 P-AMS for CO, NO_x, CO₂ and O₂

Manufacturer:

HORIBA Europe GmbH, Oberursel

Field of application:

Portable AMS for periodic measurements of measurements of emissions from station-ary sources and as a standard reference method for calibrating and validating stationary AMS in the context of QAL2 and AST in accordance with standard EN 14181 at plants requiring official approval and plants within the scope of the 27th and 44th BImSchV.

Measuring ranges during the performance test:

Component	Certification range	supplementary range	Unit
CO	0 – 75	0 – 6,250	mg/m ³
NO _x	0 – 102.5 ¹⁾	0 – 2,050 ²⁾	mg/m ³
CO ₂	0 – 20	-	Vol.-%
O ₂	0 – 25	0 – 10	Vol.-%

¹⁾ as NO₂, this corresponds to apx. 0 – 67 mg/m³ NO

²⁾ as NO₂, this corresponds to apx. 0 – 1340 mg/m³ NO

Software version:

P20007880001F / 1.19

Restrictions:

None

Notes:

In the event of temperature changes of more than 6 °C, it must be checked on-site whether the measurement uncertainty is still within the permissible limits.

Test Institute: TÜV Rheinland Energy GmbH, Cologne

Report No.: 936/21245114/A dated 13 February 2020

Publication in the German Federal Gazette: BAnz AT 03.05.2021 B9, Chap. III
notification 39, Announcement by UBA dated 31 March 2021:

**39 Notification as regards Federal Environment Agency (UBA) notice
of 27 May 2020 (BAnz AT 31.07.2020 B10, chapter I number 4.1)**

The latest software version of the PG-350 P-AMS measuring system for NO_x, CO,
CO₂ and O₂ manufactured by HORIBA Europe GmbH is as follows:
P2000788001G/1.20.

Statement issued by TÜV Rheinland Energy GmbH dated 8 September 2020

Publication in the German Federal Gazette: BAnz AT 20.03.2023 B6, Chap. IV
notification 31, Announcement by UBA dated 21 February 2023:

**31 Notification as regards Federal Environment Agency (UBA) notices
of 27 May 2020 (BAnz AT 31.07.2020 B10, chapter I number 4.2) and
of 31 March 2021 (BAnz AT 03.05.2021 B9, chapter III notification 39)**

The current software version of the PG 350 P-AMS measuring system for NO_x, CO,
CO₂ and O₂ from the company HORIBA Europe GmbH is:
P2000788001H/1.27

Statement issued by TÜV Rheinland Energy GmbH dated 17 September 2022

Certified product

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

The HORIBA PG-350 P-AMS under test comprises the following components: the PG-350EU analyser, a test gas cooler, a heated sample gas line and a heated sampling probe equipped with a filter.

The analyser measures multiple components and uses component-specific measuring principles. NO_x is measured using chemiluminescence (CLD), CO and CO₂ are determined with the help of infrared absorption (NDIR) and O₂ is measured with the help of paramagnetism.

The gas to be measured is led to the analyser via a heated probe. A heated sample gas line transports the sample gas to the cooling unit and then via an unheated PFTE line to the analyser.

The PSS-5H cooler is used for gas conditioning and is installed in a plastic case, which also contains the sample gas pump. The sample gas line can be heated electrically to a maximum of 200 °C. The PSP4000-H sampling probe is portable and is equipped with an external ceramic filter element. The probe can be set to a maximum temperature of 180 °C.

The HORIBA PG-350 P-AMS under test consists of the following components:

- PG-350EU multigas analyser,
- Gas conditioning cooler type PSS-5H,
- Sample gas pump,
- Heated sample gas line, max 200 °C, made of PFTE, max. length used during performance testing: 5 m, and
- PSP4000-H sampling probe, portable and heated to max. 180 °C, ceramic filter, length during performance testing: 1 m.

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 HORIBA PG-350 P-AMS 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. 0000072195_00: 7 September 2020
Expiry date of the certificate: 30 July 2025
Test report: 936/21245114/A dated 13 February 2020
TÜV Rheinland Energy GmbH
Publication: BAnz AT 31.07.2020 B10, chapter I number 4.1
UBA announcement dated 27 May 2020

Notifications

Statement issued by TÜV Rheinland Energy GmbH dated 8 September 2020
Publication: BAnz AT 03.05.2021 B9, chapter III notification 39
UBA announcement dated 31 March 2021
(Software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 17 September 2022
Publication: BAnz AT 20.03.2023 B6, chapter IV notification 31
UBA announcement dated 21 February 2023
(Software changes)

Renewal of certificates

Certificate No. 0000072195_01: 27 June 2025
Expiry date of the certificate: 30 July 2030

Calculation of overall uncertainty according to EN 14181 and EN 15267-4 for both systems during field test 3

Measuring system

Manufacturer	HORIBA Europe GmbH
AMS designation	HORIBA PG-350 P-AMS
Serial number of units under test	7DB92A3P / VWG18APN
Measuring principle	Infrared absorption

Test report

Test laboratory	936/21245114/A TÜV Rheinland
Date of report	13.02.2020

Measured component

Certification range	CO 0 - 75 mg/m ³
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Evaluation of the cross-sensitivity (CS)

(system with largest CS)

The cross-sensitivities were calculated site-specifically as a function of the exhaust gas matrix at the respective field test facility, taking into account the cross-sensitivity influences determined in the laboratory.

Maximum sum of cross-sensitivities	0.29 mg/m ³
Uncertainty of cross-sensitivity	u_i 0.170 mg/m ³

Calculation of the combined standard uncertainty

Test parameter

			u^2
Standard deviation laboratory test	u_r	0.160 mg/m ³	0.026 (mg/m ³) ²
Lack of fit	u_{lof}	0.082 mg/m ³	0.007 (mg/m ³) ²
Zero drift from field test	$u_{d,z}$	0.260 mg/m ³	0.068 (mg/m ³) ²
Span drift from field test	$u_{d,s}$	-0.823 mg/m ³	0.677 (mg/m ³) ²
Influence of ambient temperature from field	u_t	0.600 mg/m ³	0.360 (mg/m ³) ²
Influence of supply voltage field test specific	u_v	0.000 mg/m ³	0.000 (mg/m ³) ²
Cross-sensitivity field test specific	u_i	0.170 mg/m ³	0.029 (mg/m ³) ²
Influence of sample gas flow field test specific	u_p	0.000 mg/m ³	0.000 (mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.606 mg/m ³	0.368 (mg/m ³) ²

Combined standard uncertainty (u_c)	$u_c = \sqrt{\sum (u_{max,i})^2}$	1.24 mg/m ³
Total expanded uncertainty	$U = u_c * k = u_c * 1,96$	2.43 mg/m ³

Relative total expanded uncertainty

Requirement of 2010/75/EU	U in % of the range 50 mg/m³	4.9
Requirement of EN 15267-3	U in % of the range 50 mg/m³	10.0
Requirement for standard reference methods	U in % of the range 50 mg/m ³	7.5
	U in % of the range 50 mg/m ³	6.0

Calculation of overall uncertainty according to EN 14181 and EN 15267-4 for both systems during field test 1

Measuring system

Manufacturer	HORIBA Europe GmbH
AMS designation	HORIBA PG-350 P-AMS
Serial number of units under test	7DB92A3P / VWG18APN
Measuring principle	Infrared absorption

Test report

Test laboratory	936/21245114/A TÜV Rheinland
Date of report	13.02.2020

Measured component

Certification range	CO ₂ 0 - 20 Vol.-%
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Evaluation of the cross-sensitivity (CS)

(system with largest CS)

The cross-sensitivities were calculated site-specifically as a function of the exhaust gas matrix at the respective field test facility, taking into account the cross-sensitivity influences determined in the laboratory.

Maximum sum of cross-sensitivities	0.05 Vol.-%
Uncertainty of cross-sensitivity	u_i 0.031 Vol.-%

Calculation of the combined standard uncertainty

Test parameter

				u^2
Standard deviation laboratory test	u_r	0.020 Vol.-%		0.000 (Vol.-%) ²
Lack of fit	u_{lof}	0.081 Vol.-%		0.007 (Vol.-%) ²
Zero drift from field test	$u_{d,z}$	0.035 Vol.-%		0.001 (Vol.-%) ²
Span drift from field test	$u_{d,s}$	0.173 Vol.-%		0.030 (Vol.-%) ²
Influence of ambient temperature from field	u_t	0.346 Vol.-%		0.120 (Vol.-%) ²
Influence of supply voltage field test specific	u_v	0.000 Vol.-%		0.000 (Vol.-%) ²
Cross-sensitivity field test specific	u_i	0.031 Vol.-%		0.001 (Vol.-%) ²
Influence of sample gas flow field test specific	u_p	0.000 Vol.-%		0.000 (Vol.-%) ²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.162 Vol.-%		0.026 (Vol.-%) ²

Combined standard uncertainty (u_c)	$u_c = \sqrt{\sum (u_{max,i})^2}$	0.43 Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1,96$	0.84 Vol.-%

Relative total expanded uncertainty	U in % of the range 20 Vol.-%	4.2
Requirement of 2010/75/EU	U in % of the range 20 Vol.-%	10.0 **
Requirement of EN 15267-3	U in % of the range 20 Vol.-%	7.5
Requirement for standard reference methods	U in % of the range 20 Vol.-%	6.0

** The EU-directive 2010/75/EC on industrial emissions does not requirements for this component.
A value of 10.0 % was used instead.

Calculation of overall uncertainty according to EN 14181 and EN 15267-4 for both systems during field test 3

Measuring system

Manufacturer	HORIBA Europe GmbH
AMS designation	HORIBA PG-350 P-AMS
Serial number of units under test	7DB92A3P / VWG18APN
Measuring principle	Chemiluminescence

Test report

Test laboratory	936/21245114/A TÜV Rheinland
Date of report	13.02.2020

Measured component

	NO
Certification range	0 - 67 mg/m ³

Evaluation of the cross-sensitivity (CS)

(system with largest CS)

The cross-sensitivities were calculated site-specifically as a function of the exhaust gas matrix at the respective field test facility, taking into account the cross-sensitivity influences determined in the laboratory.

Maximum sum of cross-sensitivities	0.31 mg/m ³
Uncertainty of cross-sensitivity	u_i 0.179 mg/m ³

Calculation of the combined standard uncertainty

Test parameter

		u^2
Standard deviation laboratory test	u_r 0.100 mg/m ³	0.010 (mg/m ³) ²
Lack of fit	u_{lof} -0.348 mg/m ³	0.121 (mg/m ³) ²
Zero drift from field test	$u_{d,z}$ 0.039 mg/m ³	0.002 (mg/m ³) ²
Span drift from field test	$u_{d,s}$ -1.006 mg/m ³	1.012 (mg/m ³) ²
Influence of ambient temperature from field	u_t 0.663 mg/m ³	0.440 (mg/m ³) ²
Influence of supply voltage field test specific	u_v 0,000 mg/m ³	0.000 (mg/m ³) ²
Cross-sensitivity field test specific	u_i 0.179 mg/m ³	0.032 (mg/m ³) ²
Influence of sample gas flow field test specific	u_p 0,000 mg/m ³	0.000 (mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u_{rm} 0.542 mg/m ³	0.293 (mg/m ³) ²
Converter efficiency for AMS measuring NOx	u_{ce} 1.277 mg/m ³	1.630 (mg/m ³) ²

Combined standard uncertainty (u_c)

$$u_c = \sqrt{\sum (u_{max,j})^2} \quad 1.88 \text{ mg/m}^3$$

Total expanded uncertainty

$$U = u_c \cdot k = u_c \cdot 1,96 \quad 3.69 \text{ mg/m}^3$$

Relative total expanded uncertainty

Requirement of 2010/75/EU

Requirement of EN 15267-3

Requirement for standard reference methods

U in % of the range 45 mg/m³ 8.2

U in % of the range 45 mg/m³ 20.0

U in % of the range 45 mg/m³ 15.0

U in % of the range 45 mg/m³ 10.0

Calculation of overall uncertainty according to EN 14181 and EN 15267-4 for both systems during field test 1

Measuring system

Manufacturer	HORIBA Europe GmbH
AMS designation	HORIBA PG-350 P-AMS
Serial number of units under test	7DB92A3P / VWG18APN
Measuring principle	Paramagnetic

Test report

Test laboratory	936/21245114/A TÜV Rheinland
Date of report	13.02.2020

Measured component

Certification range	O ₂ 0 - 25 Vol.-%
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Evaluation of the cross-sensitivity (CS)

(system with largest CS)

The cross-sensitivities were calculated site-specifically as a function of the exhaust gas matrix at the respective field test facility, taking into account the cross-sensitivity influences determined in the laboratory.

Maximum sum of cross-sensitivities	0.00 Vol.-%
Uncertainty of cross-sensitivity	u_i 0.000 Vol.-%

Calculation of the combined standard uncertainty

Test parameter

				u^2
Standard deviation laboratory test	u_r	0.010 Vol.-%		0.000 (Vol.-%) ²
Lack of fit	u_{lof}	0.016 Vol.-%		0.000 (Vol.-%) ²
Zero drift from field test	$u_{d,z}$	-0.017 Vol.-%		0.000 (Vol.-%) ²
Span drift from field test	$u_{d,s}$	-0.046 Vol.-%		0.002 (Vol.-%) ²
Influence of ambient temperature from field	u_t	0.346 Vol.-%		0.120 (Vol.-%) ²
Influence of supply voltage field test specific	u_v	0,000 Vol.-%		0.000 (Vol.-%) ²
Cross-sensitivity field test specific	u_i	0,000 Vol.-%		0.000 (Vol.-%) ²
Influence of sample gas flow field test specific	u_b	0,000 Vol.-%		0.000 (Vol.-%) ²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.202 Vol.-%		0.041 (Vol.-%) ²

Combined standard uncertainty (u_c)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.40 Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1,96$	0.79 Vol.-%

Relative total expanded uncertainty	U in % of the range 25 Vol.-%	3.2
Requirement of 2010/75/EU	U in % of the range 25 Vol.-%	10.0 **
Requirement of EN 15267-3	U in % of the range 25 Vol.-%	7.5
Requirement for standard reference methods	U in % of the range 25 Vol.-%	6.0

** The EU-directive 2010/75/EC on industrial emissions does not requirements for this component. A value of 10.0 % was used instead.