Umwelt Bundes Amt
For our Environment

TÜVRheinland®
Precisely Right.

CERTIFICATE

about Product Conformity (QAL1)

Number of Certificate: 0000001015

Certified AMS:	PG 250 SRM for CO, NO_x and O_2
Manufacturer:	Horiba Europe GmbH Julius Kronenberg Straße 6 42799 Leichlingen Germany
Test Institute:	TÜV Rheinland Energie und Umwelt GmbH

This is certifying that the AMS has been tested and found to comply with:

EN 15267-1: 2009, EN 15267-2: 2009, EN 15267-3: 2007 and EN 14181: 2004

Certification is awarded in respect of the conditions stated in this certificate (see also the following pages).

www.tuv.com TÜVRheinland® ID.: 0000001015

- EN 15267-3 tested
- QAL1 certified
- TUV approved
- Annual inspection

Publication in the German Federal Gazette (BAnz.) of 29 July 2011

Umweltbundesamt
Dessau, 19 August 2011

i. A. Dr. Hans-Joachim Hummel

The certificate is valid until:
28 July 2016

TÜV Rheinland Energie und Umwelt GmbH
Köln, 17 August 2011

ppa. Dr. Peter Wilbring

www.umwelt-tuv.de / www.eco-tuv.com teu@umwelt-tuv.de Tel. +49 - 221 - 806 - 2756	TÜV Rheinland Energie und Umwelt GmbH Am Grauen Stein 51105 Köln
Accreditation according to EN ISO/IEC 17025 and certified according to ISO 9001:2008.	

10/221 2.08

Test report:	936/21206693/B of 28 March 2011
First certification:	29 July 2011
Run of validity until:	28 July 2016
Publication	BAnz. 29 July 2011, No 113, page 2725, chapter I, No 4.2

Authorised application
The tested AMS is suitable for the use at combustion plants according to EC directive 2001-80-EC, at waste incinerations plants according to EC directive 2000-76-EC and other plants requiring official permission. The tested measurement ranges were selected in order to secure an application range for the AMS as wide as possible.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a three month field test at a municipal waste incinerator. The AMS is authorised for the ambient temperature range from +5 °C to +40 °C.

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

Basis of the certification
This certification is based on:

- test report 936/21206693/B of 28 March 2011 of TÜV Rheinland Energie und Umwelt GmbH
- suitability announced by the German Environmental Agency (UBA) as relevant body
- the ongoing surveillance of the product and the manufacturing process
- publication in the German Federal Gazette (BAnz. 29 July 2011, No 113, p. 2725, chapter I, No 4.2: Announcement by UBA from 15 July 2011)

AMS name:
PG 250 SRM for CO, NO_x and O_2

Manufacturer:
Horiba Europe GmbH, Leichlingen

Suitability:
For measurements at plants requiring official permission (i. e. 2000-76-EC, waste incineration directive and 2001-80-EC, large combustion plants directive).

Measuring ranges during the suitability test:

Component	Certification ranges	Supplementary measurement ranges	Unit
CO	0 – 75	0 – 625	mg/m³
NO_X as NO	0 – 134	0 – 670	mg/m³
NO_X as NO_2	0 – 205	0 – 1025	mg/m³
O_2	0 – 25	-	Vol.-%

Software version:
P 1000500001 C

Restrictions:
None

Remarks:

1. An eight days period has been specified as maintenance interval.
2. The AMS as well contains measuring channels for CO_2 and SO_2. This system version is not suitability tested for the CO_2 and SO_2 channels.
3. Supplementary test (transfer to the EN 15267, supplementary ranges) to the announcement of the Umweltbundesamt of 12 August 2008 (BAnz. p. 3243, chapter I number 2.4).
4. For the component CO the requirement of the measurement uncertainty according to EN 15267-3 is not fulfilled.

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Köln
Report-No.: 936/21206693/B of 28 March 2011

Certified product

This certificate applies to automatic measurement systems confirming to the following description:

The measuring system HORIBA PG 250 SRM, tested during the suitability testing, consists of the following main components described as follows:

Sampling

Probe:	M&C type PSP 4000-H, measurement gas filter heated type SP-2K ceramic material fineness 2µm
Heated line:	M&C type PSP 4M4 / 6 (length during suitability testing approx. 5 m) (120 °C)

Analyzer

Horiba:	PG 250 SRM (inclusive Teflon filter type DIF-K-20T and bypassed internal cooler for measuring gas)

Gas dryer

Horiba permeation dryer type PD-100 with 100 permeation pipes: AGC type: Air Drier SWG-100-06/66 (100 pieces)

Software

Evaluation-software P 1000500001 C

The following additional options are applicable:

- Permeation pipes of Perma-Pure Inc. PD-100T-24 instead of previously mentioned permeation pipes
- A M&C condensation dryer type PSS 5 instead of the permeation dryer (the permeation dryer is recommended with NO_2 concentrations > 10 % of total nitrogen oxides)
- Instead of Teflon filter type DIF-K-20T a combination of Tipp Filter and Mist Catcher MC-050A can be implemented.

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 Energie und Umwelt GmbH must be notified at the given address on page 1.

The certification mark with the product specific ID-Number that can be applied to the product or used in publicity material for the certified product is presented on page 1 of this certificate.

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

The current version of this certificate and its validity is also listed at the Internet Address: **qal1.de**.

Certification of PG 250 SRM for CO, NO_x und O_2 is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Basic test

Test report: 936/21206693/A from 06 March 2008
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Köln

Publication: BAnz. 03 September 2008, No 133, p. 3243, chapter I No 2.4:
UBA announcement from 12 August 2008

Notification

Publication: BAnz. 11 March 2009, No 38, p. 899, chapter IV notification 4:
UBA announcement from 19 February 2009 (Condensation dryer)

Publication: BAnz. 25 August 2009, No 125, p. 2929, chapter III notification 5:
UBA announcement from 03. August 2009 (other permeation dryer)

Publication: BAnz. 12 February 2010, No 24, p. 552, chapter IV notification 1:
UBA announcement from 25. January 2010 (Filter changing)

Publication: BAnz. 26 January 2011, No 14, p. 294, chapter IV notification 16:
UBA announcement from 10 January 2011 (Dryer)

Initial certification according to EN 15267

Certificate No 0000001015 of: 19 August 2011

Validity of the certificate: 28 July 2016

Test report: 936/21206693/B of 28 March 2011
TÜV Rheinland Energie und Umwelt GmbH, Köln

Publication: BAnz. 29 July 2011, No 113, p. 2725, chapter I No 4.2:
UBA announcement from 15 July 2011.

Calculation of overall uncertainty according to EN 14181 and EN 15267-3

Measuring system			
Manufacturer	Horiba Europe GmbH		
Name of measuring system	PG 250 SRM		
Serial number of the candidates	H0002Z8D / G0800X2D / NOC497VF / NJC3FLW9		
Measuring principle	NDIR		
Test report	936/21206693/B		
Test laboratory	TÜV Rheinland Energie und Umwelt GmbH		
Date of report	2011-03-28		
Measured component	CO		
Certification range	0 - 75	mg/m³	

Evaluation of the cross sensitivity (CS)
(system with largest CS)

Sum of positive CS at zero point	1.12	mg/m³
Sum of negative CS at zero point	0.00	mg/m³
Sum of postive CS at reference point	0.50	mg/m³
Sum of negative CS at reference point	-0.30	mg/m³
Maximum sum of cross sensitivities	1.12	mg/m³
Uncertainty of cross sensitivity	0.645	mg/m³

Calculation of the combined standard uncertainty

Tested parameter		u		u²	
Standard deviation from paired measurements under field conditions *	u_D	1.089	mg/m³	1.186	(mg/m³)²
Lack of fit	u_{lof}	0.290	mg/m³	0.084	(mg/m³)²
Zero drift from field test	$u_{d,z}$	-1.212	mg/m³	1.469	(mg/m³)²
Span drift from field test	$u_{d,s}$	-1.299	mg/m³	1.687	(mg/m³)²
Influence of ambient temperature at span	u_t	0.586	mg/m³	0.343	(mg/m³)²
Influence of supply voltage	u_v	0.188	mg/m³	0.035	(mg/m³)²
Cross sensitivity (interference)	u_i	0.645	mg/m³	0.416	(mg/m³)²
Influence of sample gas flow	u_p	-0.027	mg/m³	0.001	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.606	mg/m³	0.368	(mg/m³)²

* The larger value is used :
"Repeatability standard deviation at span" or
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max\ j})^2}$	2.36	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	4.63	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 50 mg/m³**	**9.3**
Requirement of 2000/76/EC and 2001/80/EC	**U in % of the ELV 50 mg/m³**	**10.0**
Requirement of EN 15267-3	U in % of the ELV 50 mg/m³	7.5

Calculation of overall uncertainty according to EN 14181 and EN 15267-3

Measuring system			
Manufacturer	Horiba Europe GmbH		
Name of measuring system	PG 250 SRM		
Serial number of the candidates	H0002Z8D / G0800X2D / NOC497VF / NJC3FLW9		
Measuring principle	CLD		
Test report	936/21206693/B		
Test laboratory	TÜV Rheinland Energie und Umwelt GmbH		
Date of report	2011-03-28		
Measured component	NO		
Certification range	0 - 134	mg/m³	

Evaluation of the cross sensitivity (CS)
(system with largest CS)

Sum of positive CS at zero point	0.00	mg/m³
Sum of negative CS at zero point	0.00	mg/m³
Sum of postive CS at reference point	1.70	mg/m³
Sum of negative CS at reference point	-2.60	mg/m³
Maximum sum of cross sensitivities	-2.60	mg/m³
Uncertainty of cross sensitivity	-1.501	mg/m³

Calculation of the combined standard uncertainty

Tested parameter		u		u²	
Standard deviation from paired measurements under field conditions *	u_D	1.005	mg/m³	1.010	(mg/m³)²
Lack of fit	u_{lof}	-0.580	mg/m³	0.336	(mg/m³)²
Zero drift from field test	$u_{d,z}$	0.619	mg/m³	0.383	(mg/m³)²
Span drift from field test	$u_{d,s}$	2.321	mg/m³	5.387	(mg/m³)²
Influence of ambient temperature at span	u_t	3.153	mg/m³	9.941	(mg/m³)²
Influence of supply voltage	u_v	0.125	mg/m³	0.016	(mg/m³)²
Cross sensitivity (interference)	u_i	-1.501	mg/m³	2.253	(mg/m³)²
Influence of sample gas flow	u_p	-0.081	mg/m³	0.007	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	1.083	mg/m³	1.173	(mg/m³)²
Converter efficiency for AMS measuring NOx	u_{ce}	3.484	mg/m³	12.138	(mg/m³)²

* The larger value is used :
"Repeatability standard deviation at span" or
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max\ j})^2}$	5.71	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	11.20	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 131 mg/m³**	**8.5**
Requirement of 2000/76/EC and 2001/80/EC	**U in % of the ELV 131 mg/m³**	**20.0**
Requirement of EN 15267-3	U in % of the ELV 131 mg/m³	15.0

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Certificate:
0000001015 / 19 August 2011

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Calculation of overall uncertainty according to EN 14181 and EN 15267-3

Measuring system			
Manufacturer	Horiba Europe GmbH		
Name of measuring system	PG 250 SRM		
Serial number of the candidates	H0002Z8D / G0800X2D / NOC497VF / NJC3FLW9		
Measuring principle	Paramagnetism		
Test report	936/21206693/B		
Test laboratory	TÜV Rheinland Energie und Umwelt GmbH		
Date of report	2011-03-28		
Measured component	O_2		
Certification range	0 - 25	Vol.-%	

Evaluation of the cross sensitivity (CS)
(system with largest CS)

Sum of positive CS at zero point	0.00	Vol.-%
Sum of negative CS at zero point	0.00	Vol.-%
Sum of postive CS at reference point	0.32	Vol.-%
Sum of negative CS at reference point	0.00	Vol.-%
Maximum sum of cross sensitivities	0.32	Vol.-%
Uncertainty of cross sensitivity	0.185	Vol.-%

Calculation of the combined standard uncertainty

Tested parameter		u		u²	
Standard deviation from paired measurements under field conditions *	u_D	0.053	Vol.-%	0.003	(Vol.-%)²
Lack of fit	u_{lof}	-0.035	Vol.-%	0.001	(Vol.-%)²
Zero drift from field test	$u_{d,z}$	-0.029	Vol.-%	0.001	(Vol.-%)²
Span drift from field test	$u_{d,s}$	0.029	Vol.-%	0.001	(Vol.-%)²
Influence of ambient temperature at span	u_t	0.072	Vol.-%	0.005	(Vol.-%)²
Influence of supply voltage	u_v	0.027	Vol.-%	0.001	(Vol.-%)²
Cross sensitivity (interference)	u_i	0.185	Vol.-%	0.034	(Vol.-%)²
Influence of sample gas flow	u_p	-0.006	Vol.-%	0.000	(Vol.-%)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.202	Vol.-%	0.041	(Vol.-%)²

* The larger value is used :
"Repeatability standard deviation at span" or
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max\ j})^2}$	0.29	Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.58	Vol.-%

Relative total expanded uncertainty	**U in % of the range 25 Vol.-%**	**2.3**
Requirement of 2000/76/EC and 2001/80/EC	**U in % of the range 25 Vol.-%**	**10.0**
Requirement of EN 15267-3	U in % of the range 25 Vol.-%	7.5

** For this component no requirements in the EC-directives 2001/80/EG und 2000/76/EG are given.
The chosen value is recommended by the certification body.