Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000053806

Certified AMS:	NZ-5000 for O_2
Manufacturer:	HORIBA GmbH Kaplanstrasse 5 A-3430 Tulln Austria
Test Institute:	TÜV Rheinland Energy GmbH

This is to certify that the AMS has been tested and certified according to the standards

EN 15267-1 (2009), EN 15267-2 (2009), EN 15267-3 (2007) and EN 14181 (2014)

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 6 pages).

TÜVRheinland® CERTIFIED

Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000053806

Publication in the German Federal Gazette (BAnz.) of 15 March 2017

This certificate will expire on: 14 March 2022

German Federal Environment Agency
Dessau, 25 April 2017

Dr. Marcel Langner
Head of Section II 4.1

TÜV Rheinland Energy GmbH
Cologne, 24 April 2017

ppa. Dr. Peter Wilbring

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TÜV Rheinland Energy GmbH
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51105 Köln

Test institute accredited to EN ISO/IEC 17025:2005 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:	936/21230407/A dated 4 October 2016
Initial certification:	15 March 2017
Expiry date:	14 March 2022
Publication:	BAnz AT 15.03.2017 B6, chapter II no. 1.2

Approved application
The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13. BImSchV), at waste incineration plants according to Directive 2010/75/EU, chapter IV (17. BImSchV), at plants according to 27. BImSchV and other plants requiring official approval. The measured ranges have been selected considering the wide application range of the AMS.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a twelvemonth field test at a waste incineration plant.

The AMS is approved for an ambient temperature range of -20 °C to +50 °C.

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

Basis of the certification
This certification is based on:

- Test report 936/21230407/A dated 4 October 2016 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

Umwelt Bundesamt

Certificate:
0000053806 / 25 April 2017

TÜVRheinland®
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Publication in the German Federal Gazette: BAnz AT 15.03.2017 B6, chapter II no. 1.2, Announcement by UBA of 22 February 2017:

AMS designation:
NZ-5000 for O_2

Manufacturer:
Horiba GmbH, Tulln, Austria

Field of application:
For measurements at plants requiring official approval and plants according to the 27th BImSchV

Measuring ranges during the performance test:

Component	Certification range	Unit
Oxygen	0 - 25	Vol.-%

Software version:
4.10

Restrictions:
none

Notes:
1. The maintenance interval is six months.
2. The measuring system may only be operated with active drift check (every three days).

Test report:
TÜV Rheinland Energy GmbH, Cologne
Report No.: 936/21230407/A dated 4 October 2016

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

The NZ 5000 measuring system determines the oxygen content in the exhaust gas. The measuring system consists of an in-situ probe which is mounted at the waste gas duct in the gas flow to be monitored. Furthermore, it comes with evaluation electronics (SME 5) for voltage and gas supply as well as signal processing. A pneumatic cable (FEP-0002) and a probe cable (FEP-0001) connect the measuring probe to the evaluation electronics.

The probe consists of a cladding tube in which the zirconium dioxide probe – heated to 800 °C – is situated downstream of a sintered metal filter. A roof-shaped plate protects the filter head from gross contamination. For the purpose of measuring the O_2 concentration or for 1-point determination the NZ 5000 requires reference air with 20.95 vol.-% O_2. Instrument air from a gas bottle or compressed air may be used for this purpose. It is also possible to connect another reference gas with a different concentration for the purpose of 2-point adjustment. A 1-point adjustment needs to be carried out every three days. This can be predefined in the system's menu. Regular drift checks in the maintenance interval need to be carried out as 2-point adjustments.

The current software version is 4.10.
The current version of the operation manual is version 03.

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 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 can be applied to the product or used in publicity material for the certified product.

This document as well as the certification mark remains property of TÜV Rheinland Energy 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 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**.

Certification of NZ-5000 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. 0000053806: 25 April 2017
Expiry date of the certificate: 14 March 2022

Test report: 936/21230407/A dated 4 October 2016
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 15.03.2017 B6, chapter II no. 1.2
Announcement by UBA dated 22 February 2017

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

Measuring system			
Manufacturer		Horiba GmbH	
AMS designation		NZ-5000 ***	
Serial number of units under test		11549192SE / 11549292SE / 11631892SS	
Measuring principle		circonia	
Test report		936/21230407/A	
Test laboratory		TÜV Rheinland	
Date of report		2016-10-04	
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		0.19	Vol.-%
Sum of negative CS at zero point		0.00	Vol.-%
Sum of postive CS at span point		0.37	Vol.-%
Sum of negative CS at span point		0.00	Vol.-%
Maximum sum of cross-sensitivities		0.37	Vol.-%
Uncertainty of cross-sensitivity	u_i	0.214	Vol.-%

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.036	Vol.-%	0.001	(Vol.-%)²
Lack of fit	u_{lof}	0.058	Vol.-%	0.003	(Vol.-%)²
Zero drift from field test	$u_{d,z}$	0.029	Vol.-%	0.001	(Vol.-%)²
Span drift from field test	$u_{d,s}$	-0.023	Vol.-%	0.001	(Vol.-%)²
Influence of ambient temperature at span	u_t	0.138	Vol.-%	0.019	(Vol.-%)²
Influence of supply voltage	u_v	0.017	Vol.-%	0.000	(Vol.-%)²
Cross-sensitivity (interference)	u_i	0.214	Vol.-%	0.046	(Vol.-%)²
Influence of sample gas pressure	u_p	0.095	Vol.-%	0.009	(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 set point" or
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max\ j})^2}$	0.35	Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.68	Vol.-%

Relative total expanded uncertainty	**U in % of the range 25 Vol.-%**	**2.7**
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

** The EU-directive 2010/75/EU on industrial emissions provides no requirements for this component.
A value of 10.0 % was used for this.

*** During performance test, the tests were carried out with the Oxitec5000+ system, manufactured by ENOTEC GmbH.