

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000053804

Certified AMS: OXITEC 5000+ for O₂

Manufacturer: ENOTEC GmbH
Höher Birken 6
51709 Marienheide
Germany

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).



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

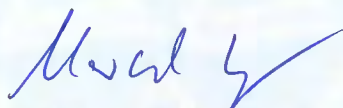
www.tuv.com
ID 0000053804

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

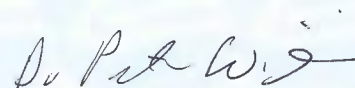
This certificate will expire on:
14 March 2022

German Federal Environment Agency
Dessau, 25 April 2017

TÜV Rheinland Energy GmbH
Cologne, 24 April 2017



Dr. Marcel Langner
Head of Section II 4.1



ppa. Dr. Peter Wilbring

www.umwelt-tuv.eu
tre@umwelt-tuv.eu
Tel. + 49 221 806-5200

TÜV Rheinland Energy GmbH
Am Grauen Stein
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:	936/21228221/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. 1.1

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 936/21228221/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

Publication in the German Federal Gazette: BAnz AT 15.03.2017 B6, chapter II no. 1.1,
Announcement by UBA from 22 February 2017:

AMS designation:

OXITEC 5000+ for O₂

Manufacturer:

ENOTEC GmbH, Marienheide

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.: 936/21228221/A dated 4 October 2016

Certified product

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

The OXITEC 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 O₂ concentration or for 1-point determination the OXITEC 5000+ requires reference air with 20.95 vol.-% O₂. 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 29.

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 request 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 OXITEC 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. 0000053804: 25 April 2017
Expiry date of the certificate: 14 March 2022

Test report: 936/21228221/A dated 4 October 2016
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 15.03.2017 B6, chapter II no. 1.1
Announcement by UBA dated 22 February 2017

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

Measuring system

Manufacturer	Enotec GmbH
AMS designation	Oxitec 5000+
Serial number of units under test	11549192SE / 11549292SE / 11631892SS
Measuring principle	Circonium dioxide

Test report

Test laboratory	936/21228221/A TÜV Rheinland
Date of report	2016-10-04

Measured component

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 positive 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)

$$u_c = \sqrt{\sum (u_{max,j})^2} \quad 0.35 \text{ Vol.-%}$$

Total expanded uncertainty

$$U = u_c * k = u_c * 1.96 \quad 0.68 \text{ Vol.-%}$$

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.