

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000035005_01

Certified AMS: Endura AZ20 for O₂

Manufacturer: ABB Limited
Oldens Lane
Stonehouse
Gloucestershire
England

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 (2004)**

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 0000035005

Publication in the German Federal Gazette
(BAnz.) of 02 March 2012


German Federal Environment Agency
Dessau, 28 February 2017



Dr. Marcel Langner
Head of Section II 4.1

This certificate will expire on:
01 March 2022

TÜV Rheinland Energy GmbH
Cologne, 27 February 2017



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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

Certificate:
0000035005_01 / 28 February 2017

Test report: 936/21213673/A of 10 October 2011
Initial certification: 02 March 2012
Expiry date: 01 March 2022
Certificate renewal (previous certificate 0000035005 dated from 16 March 2012 with validity up to the 01 March 2017)
Publication: BAnz. 02 March 2012, No. 36, p. 920, 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) 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 three months 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 936/21213673/A of 10 October 2011 of TÜV Rheinland Energie und Umwelt 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. 02 March 2012, No. 36, p. 920, chapter II, No. 1.1,
Announcement by UBA from 23 February 2012:

AMS name:

Endura AZ20 for O₂

Manufacturer:

ABB Limited, Oldens Lane, Stonehouse, Gloucestershire, England

Field of application:

For measurements at plants requiring official approval and plants according to 27th BImSchV

Measuring ranges during the suitability test:

Component	Certification range	Supplementary measurement ranges	Unit
O ₂	0 - 25	0 - 5	Vol.-%

Software version:

2000.01.15

Restrictions:

None

Notes:

A four weeks period has been specified as maintenance interval.

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report-No.: 936/21213673/A dated 10 October 2011

Certified product

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

The Endura AZ20 probe's zirconia cell is a thimble-shaped sensing element fitted with inner and outer electrodes at its closed end. The inner electrode is exposed to the flue gas entering the open end of the cell; the outer electrode is supplied with reference air from a pump or regulator and is therefore exposed to a constant partial pressure of oxygen (20.95 % O₂). The cell is held at a constant 700 °C by a heater and control thermocouple.

Two different models of the measuring system were tested:

- Probe with directly attached measuring transmitter and external pump for reference air.

- Probe with external measuring transmitter and external pump for reference air.

Gas is directly emitted with one bar pre-pressure by the gas bottle. The systems have an internal regulator which guarantees a constant gas flow.

The software version is: 2000.01.15.

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 Endura AZ20 for O₂ 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. 0000035005: 16 March 2012
Expiry date of the certificate: 01 March 2017

Test report: 936/21213673/A of 10 October 2011
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Publication: BAnz. 02 March 2012, No. 36, p. 920, chapter II, No. 1.1
Announcement by UBA from 23 February 2012

Renewal of the certificate

Certificate No. 0000035005_01: 28 February 2017
Expiry date of the certificate: 01 March 2022

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

Measuring system

Manufacturer	ABB Limited
Name of measuring system	Endura AZ 20
Serial number of the candidates	3K220000048375 / 3K220000048374/ 3K220000048388 / 3K220000048389
Measuring principle	Zirkondioxid

Test report

Test laboratory	TÜV Rheinland
Date of report	2011-10-10

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 positive CS at reference point	0.00 Vol.-%
Sum of negative CS at reference point	-0.23 Vol.-%
Maximum sum of cross sensitivities	-0.23 Vol.-%
Uncertainty of cross sensitivity	-0.133 Vol.-%

Calculation of the combined standard uncertainty

Tested parameter

	u	u ²
Standard deviation from paired measurements under field conditions *	u _D 0.097 Vol.-%	0.009 (Vol.-%) ²
Lack of fit	u _{lof} 0.052 Vol.-%	0.003 (Vol.-%) ²
Zero drift from field test	u _{d,z} 0.090 Vol.-%	0.008 (Vol.-%) ²
Span drift from field test	u _{d,s} 0.110 Vol.-%	0.012 (Vol.-%) ²
Influence of ambient temperature at span	u _t 0.081 Vol.-%	0.007 (Vol.-%) ²
Influence of supply voltage	u _v 0.040 Vol.-%	0.002 (Vol.-%) ²
Cross sensitivity (interference)	u _i -0.133 Vol.-%	0.018 (Vol.-%) ²
Influence of sample pressure	u _p 0.100 Vol.-%	0.010 (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)

$$u_c = \sqrt{\sum (u_{\max, j})^2} \quad 0.33 \text{ Vol.-%}$$

Total expanded uncertainty

$$U = u_c * k = u_c * 1.96 \quad 0.65 \text{ Vol.-%}$$

Relative total expanded uncertainty

U in % of the range 25 Vol.-% **2.6**

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.

A value of 10,0 % was used for this.