

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000035005_02

AMS designation: Endura AZ20 for O₂

Manufacturer: ABB Ltd.
Oldens Lane
GL10 3TA Stonehouse / Gloucestershire
United Kingdom

Test Laboratory: TÜV Rheinland Energy 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 (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).
The present certificate replaces certificate 0000035005_01 of 28 February 2017.



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, 16 February 2022

This certificate will expire on:
01 March 2027

TÜV Rheinland Energy GmbH
Cologne, 15 February 2022



Dr. Marcel Langner
Head of Section II 4.1



ppa. Dr. Peter Wilbring

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

TÜV Rheinland Energy 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 certificate D-PL-11120-02-00.

Test report:	936/21213673/A of 10 October 2011
Initial certification:	16 March 2012
Expiry date:	01 March 2027
Certificate	Renewal (of previous certificate 0000035005_01 of 28 February 2017 valid until 1 March 2022)
Publication:	BAnz. 02 March 2012, no. 36, p. 920, chapter II number 1.1

Approved application

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13th BImSchV), chapter IV (17th BImSchV), 30th BImSchV, plants in compliance with TA Luft, plants according to the 27th BImSchV and other plants requiring official approval. The measured ranges have been selected so as to ensure as broad a field of application as possible.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a 3-month field test at a waste incineration plant.

The AMS is approved for an ambient temperature range of -20° 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 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 limit values and oxygen concentrations relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for the intended purpose.

Basis of the certification

This certification is based on:

- Test report 936/21213673/A of 10 October 2011 by 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. 2 March 2012, no. 36, p. 920, chapter II number 1.1, UBA announcement dated 23 February 2012:

AMS designation:

Endura AZ20 for O₂

Manufacturer:

ABB Limited, Oldens Lane, Stonehouse, Gloucestershire, England

Field of application:

For plants requiring official approval and for plants according to the 27th BImSchV

Measuring ranges during performance testing:

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

Software version:

2000.01.15

Restrictions:

None

Notes:

The maintenance interval is four weeks.

Test Report:

TÜV Rheinland Energy GmbH, Cologne

Report no.: 936/21213673/A of 10 October 2011

Certified product

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

The Endura AZ20 measuring system is based on a zirconium dioxide cell. The zirconia cell of the Endura AZ20 probe is a thimble-shaped sensor element with internal and external electrodes at the closed end. The inner electrode is exposed to the waste gas entering at the open end of the cell. The outer electrode is supplied with reference air by a pump and is therefore exposed to a constant partial pressure of oxygen (20.95 vol.-% O₂). The cell is kept at a constant temperature of 700 °C by a heater and a control thermocouple.

Two different designs of the measuring system were tested.

- Measuring probe with transmitter mounted directly on the probe head and external reference air pump.
- Measuring probe with external transmitter and external reference air pump.

The systems have an internal regulator that ensures a constant test gas flow. The Endura AZ20 measuring system operates with a pressure of one bar.

General remarks

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 manufacturing process for 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 document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. Upon revocation of the publication the certificate loses its validity. After the expiration of the certificate and on request of TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must no longer be used.

The relevant version of this certificate and its expiration date are also accessible on the internet at qal1.de.

Document history

Certification of the Endura AZ20 measuring system is based on the documents listed below and the regular, continuous surveillance of the manufacturer's quality management system:

Initial certification according to EN 15267

Certificate no. 0000035005_00: 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
Publication: BAnz. 02 March 2012, no. 36, p. 920, chapter II number 1.1
UBA announcement dated 23 February 2012

Renewal of the certificate

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

Certificate no. 0000035007_02: 16 February 2022
Expiry date of the certificate: 01 March 2027

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	936/21213673/A 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.