

# CERTIFICATE

on Product Conformity (QAL1)

Number of Certificate: 0000035005

**Certified AMS:** Endura AZ20 for O<sub>2</sub>

**Manufacturer:** ABB Limited  
Oldens Lane  
Stonehouse  
Gloucestershire  
England

**Test Institute:** TÜV Rheinland Energie und Umwelt GmbH

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

**EN 15267-1: 2009, EN 15267-2: 2009, EN 15267-3: 2008  
and EN 14181: 2004**

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



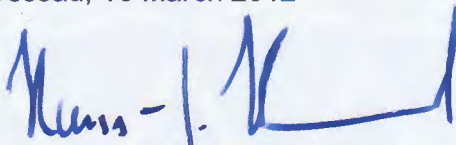
- EN 15267-3 tested
- QAL1 certified
- TUV approved
- Annual inspection

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


The certificate is valid until:  
01 March 2017

Umweltbundesamt  
Dessau, 16 March 2012

TÜV Rheinland Energie und Umwelt GmbH  
Köln, 15 March 2012



i. A. Dr. Hans-Joachim Hummel



ppa. Dr. Peter Wilbring

[www.umwelt-tuv.de](http://www.umwelt-tuv.de) / [www.eco-tuv.com](http://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.

<b>Test report:</b>	936/21213673/A of 10 October 2011
<b>First certification:</b>	02 March 2012
<b>Validity ends:</b>	01 March 2017
<b>Publication:</b>	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 EC directive 2001-80-EC, at waste incineration plants according to EC directive 2000-76-EC 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.

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 dated 10 October 2011 of TÜV Rheinland Energie und Umwelt GmbH
- suitability announced by the German Environmental 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 O<sub>2</sub>

**Manufacturer:**

ABB Limited, Oldens Lane, Stonehouse, Gloucestershire, England

**Field of application:**

For measurements at plants requiring official approval (i. e. plants according to 2000-76-EC waste incineration directive and 2001-80-EC large combustion plants directive)

**Measuring ranges during the suitability test:**

Component	Certification range	Supplementary measurement ranges	Unit
O <sub>2</sub>	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, Köln  
Report-No.: 936/21213673/A dated 10 October 2011

**Certified product**

This certificate applies to automated measurement systems confirming 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 % O<sub>2</sub>). 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 of an internal regulator which guarantees a constant gas flow.

**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 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 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 relevant version of this certificate and the validity is also accessible on the internet Address: **qal1.de**.

Certification of Endura AZ20 for O<sub>2</sub> 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

Validity of the certificate: 01 March 2017

Test report: 936/21213673/A of 10 October 2011  
TÜV Rheinland Energie und Umwelt GmbH, Köln

Publication: BAnz. 02 March 2012, No. 36, p. 920, chapter II, No. 1.1:  
Announcement by UBA from 23 February 2012

**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**

Certification range	O <sub>2</sub> 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 <sup>2</sup>
Standard deviation from paired measurements under field conditions *	u <sub>D</sub> 0.097 Vol.-%	0.009 (Vol.-%) <sup>2</sup>
Lack of fit	u <sub>lof</sub> 0.052 Vol.-%	0.003 (Vol.-%) <sup>2</sup>
Zero drift from field test	u <sub>d,z</sub> 0.090 Vol.-%	0.008 (Vol.-%) <sup>2</sup>
Span drift from field test	u <sub>d,s</sub> 0.110 Vol.-%	0.012 (Vol.-%) <sup>2</sup>
Influence of ambient temperature at span	u <sub>t</sub> 0.081 Vol.-%	0.007 (Vol.-%) <sup>2</sup>
Influence of supply voltage	u <sub>v</sub> 0.040 Vol.-%	0.002 (Vol.-%) <sup>2</sup>
Cross sensitivity (interference)	u <sub>i</sub> -0.133 Vol.-%	0.018 (Vol.-%) <sup>2</sup>
Influence of sample pressure	u <sub>p</sub> 0.100 Vol.-%	0.010 (Vol.-%) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	u <sub>rm</sub> 0.202 Vol.-%	0.041 (Vol.-%) <sup>2</sup>

\* The larger value is used :

"Repeatability standard deviation at span" or

"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u <sub>c</sub> )	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.33 Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.65 Vol.-%

**Relative total expanded uncertainty**

Requirement of 2000/76/EC and 2001/80/EC	<b>U in % of the range 25 Vol.-%</b>	<b>2.6</b>
Requirement of EN 15267-3	<b>U in % of the range 25 Vol.-%</b>	<b>10.0</b>
	<b>U in % of the range 25 Vol.-%</b>	<b>7.5</b>

\*\* 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.