

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000038506

Certified AMS: Model 6888A for O₂

Manufacturer: Emerson Process Management Rosemount Analytical Inc.
6565P Davis Industrial Parkway
Solon, OH 44139
USA

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: 2007
and EN 14181: 2004**

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

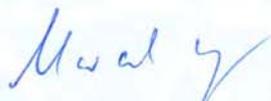


Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000038506

Publication in the German Federal Gazette
(BAnz.) of 23 July 2013

German Federal Environment Agency
Dessau, 20 August 2013


i. A. Dr. Marcel Langner

This certificate will expire on:
22 July 2018

TÜV Rheinland Energie und Umwelt GmbH
Cologne, 19 August 2013


ppa. Dr. Peter Wilbring

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Am Grauen Stein
51105 Cologne

Accreditation according to EN ISO/IEC 17025 and certified according to ISO 9001:2008.

Test report:	936/21219899/B of 28 March 2013
Initial certification:	23 July 2013
Expiry date:	22 July 2018
Publication:	BAnz AT 23 July 2013 B4, 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 tested ranges have been chosen with respect to 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 five 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 936/21219899/B of 28 March 2013 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 AT 23 July 2013 B4, chapter II, No. 1.1)

AMS designation:

Model 6888A for O₂

Manufacturer:

Emerson Process Management Rosemount Analytical Inc., Solon, USA

Field of application:

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

Measuring range during the performance test:

Component	Certification range	Unit
O ₂	0 - 25	Vol.-%

Software version:

V 1.048

Restrictions:

None

Notes:

1. The maintenance interval is four weeks.
2. The AMS is available in two configurations: Model 6888AOXY-4-1-5DR (the raw signal is processed by the external control unit 6888Xi) and Model 6888A-1OXY-4-1-1HT (the raw signal is processed directly at the probe head).

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report No.: 936/21219899/B dated 28 March 2013

Certified product

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

The measuring system model 6888A is a zirconium dioxide probe for the measurement of oxygen with a measurement range of 0 – 25 Vol.-%.

The continuously heated sensor is fitted to the tip of the probe so that it is exposed to the flue gas in its in-situ position. It generates a millivolt signal between the measuring and the reference electrodes. This current is caused by a potential difference which is a result of different oxygen particle pressures. The measuring electrode is exposed to the flue or exhaust gas, while the reference electrode is surrounded by span gas (usually ambient or instrument air with 20.95 Vol.-% O₂).

Due to its direct position in the exhaust gas, the ZrO₂ measuring cell measures the oxygen concentration as a percentage of the overall volume, including the steam concentration.

The measuring system model 6888A comprises a measuring probe with probe head as well as Xi electronics.

The measuring system is available in two configurations: model 6888A-1OXY-4-1-5DR; and model 6888A-1OXY-4-1-1HT.

There are no processing electronics in the probe head in variant 6888A-1OXY-4-1-5DR. The raw signals from the measuring cell are transmitted via a 7-core special cable from the probe housing to the Xi electronics, where they are then processed.

Furthermore, the Xi electronics provide the heating element of the probe with electricity and regulates the temperature of the ZrO₂ measuring cell.

In variant 6888A-1OXY-4-1-1HT the signal-processing electronics and the electricity supply are located directly in the probe head on the probe. The raw signal is transformed into a linear 4-20 mA analogue signal in the probe housing and the temperature of the probe heating is regulated.

Both system variants are controlled by Xi electronics. In the case of variant 6888A-1OXY-4-1-5DR the electronics are fitted with a circuit board for signal processing and temperature control. This circuit board is not present in variant 6888A-1OXY-4-1-1HT which has probe-internal processing electronics.

Regardless of the variant, the probes are available in various configurations. Probes are available in lengths between 0.457 m and 5.49 m. Probes of 0.91 m length were used in the performance test.

A filter is fitted on the probe head before the ZrO₂ measuring cell. Depending on the temperature of the exhaust gas to be measured, filters made from sintered metal (up to 500 °C), ceramic (up to 825 °C) or Hastelloy (up to 700 °C) are available. The probes tested contained sintered metal filters.

The measuring system has a 4 – 20 mA analogue output for measurement values in both variants.

Variant 6888A-1OXY-4-1-5DR contains one relay output for error or warning messages, variant 6888A-1OXY-4-1-1HT with probe-internal electronics contains two.

Error and warning messages are also shown on the Xi electronics display and can be identified by activating the diagnosis switch.

Communication with the measuring signal converter electronics in the probe head and the Xi electronics is performed using the Xi electronics control unit. Wireless access is however also possible via HART (highway addressable remote transducer) using a THUM adapter.

Adjustment is carried out via a calibration gas input which is located between the probe tube and the probe housing. The calibration gas is directed to the sensor on the probe tip via a tube within the probe with a volume flow of 2.5 l/min. In the event of repeated calibration gas injection it is important to reproduce the volume flow of 2.5 l/min as exactly as possible, otherwise measured value deviations can occur.

The reference gas input is located directly next to the calibration gas input. The reference gas flows from there via an extra gas line to the reference gas side of the sensor. The reference gas consists predominantly of instrument air (20.95 Vol.-% O₂). The sensor must be permanently supplied with reference air with approx. 1 l/m when used at the exhaust gas duct.

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 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 its expiration is also accessible on the internet: **qal1.de**.

Certification of Model 6888A 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. 0000038506: 20 August 2013

Expiry date of the certificate: 22 July 2018

Test report: 936/21219899/B of 28 March 2013
TÜV Rheinland Energie und Umwelt GmbH, Cologne

Publication: BAnz AT 23 July 2013 B4, chapter II, No. 1.1
Announcement by UBA from 03 July 2013

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

Measuring system

Manufacturer	Emerson Process Management Rosemount Analytical Inc.
Name of measuring system	Modell 6888A
Serial number of the candidates	M-110150 / M-110152
Measuring principle	Zirconia

Test report

Test laboratory	936/21219899/B TÜV Rheinland
Date of report	2013-04-12

Measured component

Certification range	O ₂ 0 - 25 Vol.-%
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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	0.17 Vol.-%
Sum of negative CS at reference point	0.00 Vol.-%
Maximum sum of cross sensitivities	0.17 Vol.-%
Uncertainty of cross sensitivity	0.100 Vol.-%

Calculation of the combined standard uncertainty

Tested parameter

				u ²	
Standard deviation from paired measurements under field conditions *	u _D	0.020	Vol.-%	0.000	(Vol.-%) ²
Lack of fit	u _{lof}	-0.069	Vol.-%	0.005	(Vol.-%) ²
Zero drift from field test	u _{d,z}	0.030	Vol.-%	0.001	(Vol.-%) ²
Span drift from field test	u _{d,s}	0.070	Vol.-%	0.005	(Vol.-%) ²
Influence of ambient temperature at span	u _t	0.115	Vol.-%	0.013	(Vol.-%) ²
Influence of supply voltage	u _v	0.025	Vol.-%	0.001	(Vol.-%) ²
Cross sensitivity (interference)	u _i	0.100	Vol.-%	0.010	(Vol.-%) ²
Influence of sample pressure	u _p	0.085	Vol.-%	0.007	(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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.29	Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.56	Vol.-%

Relative total expanded uncertainty

Requirement of 2000/76/EC and 2001/80/EC	U in % of the range 25 Vol.-%	2.3
Requirement of EN 15267-3	U in % of the range 25 Vol.-%	10.0 **
	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.
The chosen value is recommended by the certification body.