

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000038506_02

AMS designation: Modell 6888A for O₂

Manufacturer: Rosemount Inc.
8200 Market Boulevard
Canhassan, Minnesota 55279
USA

Test Laboratory: 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 8 pages).



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance


www.tuv.com
ID 0000038506

Publication in the German Federal Gazette
(BAnz) of 01 April 2014

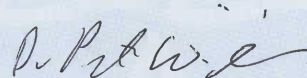
This certificate will expire on:
22 July 2023

German Federal Environment Agency
Dessau, 22 July 2018

TÜV Rheinland Energy GmbH
Cologne, 21 July 2018



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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.

Test Report:	936/21219899/C dated 30 August 2013
Initial certification:	23 July 2013
Expiry date:	22 July 2023
Certificate:	Renewal (of previous certificate 0000038506_01 dated 29 April 2014 valid until 22 July 2018)
Publication:	BAnz AT 01.04.2014 B12, 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), at waste incineration plants according to Directive 2010/75/EU, chapter IV (17th BImSchV), the 27th and 30th BImSchV and TA Luft. The measured ranges have been selected so as to cater for 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 six-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 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 oxygen concentrations 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 936/21219899/C dated 30 August 2013 issued 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 AT 01.04.2014 B12, chapter II number 1.1,
UBA announcement dated 27 February 2014:

AMS designation:

Modell 6888A for O₂

Manufacturer:

Emerson Process Management Rosemount Analytical Inc, Solon, USA

Field of application:

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

Measuring range during performance testing:

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

Software version:

V 1.048

Restrictions:

None

Notes:

1. The maintenance interval is four months.
2. The measuring system is available in two different instrument versions:
Version 6888A-1OXY-4-1-5DR (raw signal processed in external 6888Xi control unit) and version 6888A-1OXY-4-1-1HT (raw signal processed directly in the sampling head).
3. Supplementary testing (extension of the maintenance interval) as regards Federal Environment Agency (UBA) notice of 03 July 2013 (BAnz AT 23.07.2013 B4, chapter II number 1.1).

Test Report:

TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report no.: 936/21219899/C dated 30 August 2013

Publication in the German Federal Gazette: BAnz AT 26.03.2018 B8, chapter V
notification 37, UBA announcement dated 21 February 2018:

**37 Notification as regards Federal Environment Agency (UBA) notices
of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter II number 1.1)**

The responsible certificate holder for the Model 6888A for oxygen manufactured
by Emerson Process Management Rosemount Analytical Inc. has changed to:

Rosemount Inc.
8200 Market Boulevard
Canhassan, Minnesota 55279
USA.

The measuring system is manufactured at the following sites:

Rosemount Inc.
Ascotec Inc.
Circuitio del Progreso 27
Parque Industrial Progreso
Mexicali B.C. 21190
Mexico

and

Rosemount Inc.
Emerson Process Management Asia Pacific Pte. Ltd.
9 Gul Road #01-03
Singapore 629361
Republic of Singapore

Statement issued by TÜV Rheinland Energy GmbH dated 8 December 2017

Certified product

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

The model 6888A measuring system is a zirconium dioxide probe which measures oxygen levels in a range of 0–25 vol.-%.

The continually-heated sensor is situated at the tip of the probe. Thus, the in-situ sensor is exposed to flue gas. It generates a millivolt signal between the sample and the reference electrode. This voltage is the result of a potential difference which is caused by different oxygen partial pressures at the electrodes. The measuring electrode is exposed to the flue gas and the reference electrode is surrounded by span gas (usually ambient or instrument air with 20.95 vol.-% O₂).

As it is placed directly in the flue gas, the ZrO₂ measurement cell measures oxygen contents as a percentage of the total volume including water vapour concentrations.

The model 6888A measuring system consists of the probe with probe head and the Xi electronics.

The instrument is available in two different versions: the 6888A-1OXY-4-1-5DR and the 6888A-1OXY-4-1-1HT.

The 6888A-1OXY-4-1-5DR does not feature evaluation electronics in the probe head. A special 7-core cable sends the raw signals from the measurement cell to the Xi electronics where they are processed.

The Xi electronics use this cable to supply the probe heating with energy and to control the temperature of the ZrO₂ measurement cell.

For instrument version 6888A-1OXY-4-1-1HT, the signal-processing electronics and the voltage supply are situated directly inside the probe head. Inside the probe's enclosure, the raw signal is converted into a linear 4–20 mA signal and the temperature of the probe heater is controlled.

In either case, the Xi electronics serve to control the instrument. For instrument version 6888A-1OXY-4-1-5DR, it is equipped with the circuit board responsible for signal conversion and temperature control. This circuit board is not integrated in instrument version 6888A-1OXY-4-1-1HT with internal processing electronics.

Regardless of the instrument version, various probe configurations are available. Probe lengths are offered between 0.457 m and 5.49 m. A length of 0.91 m was used during performance testing.

A filter is located at the probe tip of the ZrO₂ measurement cell. To cater for the temperature of the waste gas to be measured, filters are available made of sinter metal (up to 500 °C), ceramics (up to 825 °C) or Hastelloy (up to 700 °C). The tested probes were equipped with sinter metal filters.

The instrument provides a 4–20 mA analogue output for measured values in both instrument versions.

Instrument version 6888A-1OXY-4-1-5DR has a relay output for warnings and error messages; version 6888A-1OXY-4-1-1HT provides two including that of the electronics.

Warnings and error messages are also displayed by the electronics and can be accessed via the diagnosis button.

The control unit of the Xi electronics ensures communication between the signal conversion electronics in the probe head and the Xi electronics. Wireless access is also possible via HART (Highway addressable remote transducer) using what is called a THUM adapter.

A calibration gas inlet situated between the probe tube and the probe enclosure facilitates adjustment. A tube inside the probe supplies calibration gas to the sensor at a flow rate of 2.5 l/min. For repeated calibration gas feeding it is important to reproduce the flow rate of 2.5 l/min as accurately as possible. A failure to do so may result in deviations of the measured values.

A span gas inlet is situated next to the calibration gas inlet. From here, an additional line transports span gas to the span gas side of the sensor. Span gas is typically instrument air (20.95 vol.-% O₂). When in operation at the waste gas duct, reference air should be supplied continuously to the sensor at a flow rate of 1 l/min.

The current software version is: V 1.048

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 certification mark may be applied to the product or used in advertising materials for the certified product.

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.

Certification of the Modell 6888A 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. 0000038506: 20 August 2013
Expiry date of the certificate: 22 July 2018

Test report: 936/21219899/B dated 28 March 2013
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Publication: BAnz AT 23.07.2013 B4, chapter II no. 1.1
UBA announcement dated 03 July 2013

Supplementary testing according to EN 15267

Certificate no. 0000038506_01: 29 April 2014
Expiry date of the certificate: 22 July 2018

Test report: 936/21219899/C dated 30 August 2013
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Publication: BAnz AT 01.04.2014 B12, chapter II no. 1.1
UBA announcement dated 27 February 2014

Notification in accordance with EN 15267

Statement issued by TÜV Rheinland Energy GmbH dated 08 December 2017
Publication: BAnz AT 26.03.2018 B8, chapter V notification 37
UBA announcement dated 21 February 2018
(new holder of the certificate)

Renewal of the certificate

Certificate no. 0000038506_02: 22 July 2018
Expiry date of the certificate: 22 July 2023

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

Measuring system

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

Test report

Test laboratory	936/21219899/C
Date of report	TÜV Rheinland
	2013-08-30

Measured component

Certification range	O2	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
Repeatability standard deviation at set point *	u_r	0.020	Vol.-%	0.000 (Vol.-%) ²
Lack of fit	u_{lof}	-0.069	Vol.-%	0.005 (Vol.-%) ²
Zero drift from field test	$u_{d,z}$	0.100	Vol.-%	0.010 (Vol.-%) ²
Span drift from field test	$u_{d,s}$	0.080	Vol.-%	0.006 (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
Influence of sample gas flow	u_p	0.000	Vol.-%	0.000 (Vol.-%) ²
Excursion of measurement beam	u_{mb}	0.000	Vol.-%	0.000 (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)	$u_c = \sqrt{\sum (u_{max, i})^2}$	0.31	Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.60	Vol.-%

Relative total expanded uncertainty

Requirement of 2010/75/EU	U in % of the range 25 Vol.-%	2.4
Requirement of EN 15267-3	U in % of the range 25 Vol.-%	10.0 **
	U in % of the range 25 Vol.-%	7.5

** EU Directive 2010/75/EU does not define requirements for this component.
A value of 10.0% was used instead.