

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000072199

AMS designation: Transmitter AMS 5200 with Type 3211-600 ZrO₂ probe for oxygen

Manufacturer: AMS Analysen-, Mess- und Systemtechnik GmbH
Industriestraße 9
69234 Dielheim
Germany

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).



Suitability Tested
EN 15267
QAL1 Certified
Regular Surveillance

www.tuv.com
ID 0000072199

Publication in the German Federal Gazette
(BAnz) of 24 March 2020

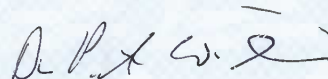
This certificate will expire on:
23 March 2025

German Federal Environment Agency
Dessau, 04 June 2020

TÜV Rheinland Energy GmbH
Cologne, 03 June 2020



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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 certificate D-PL-11120-02-00.

Test Report:	936/21239768/B dated 29 April 2019
Initial certification:	24 March 2020
Expiry date:	23 March 2025
Publication:	BAnz AT 24.03.2020 B7, chapter II number 1.2

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 and plants according to the 27th BImSchV. 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 field test over more than three months 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 intended purpose.

Basis of the certification

This certification is based on:

- Test report no. 936/21239768/B dated 29 April 2019 issued by TÜV Rheinland Energy 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 24.03.2020 B7, chapter II number 1.2,
UBA announcement dated 24 February 2020:

AMS designation:

Transmitter AMS 5200 with Type 3211-600 ZrO₂ probe for oxygen

Manufacturer:

AMS Analysen-, Mess- und Systemtechnik GmbH, Dielheim

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	-	-	Vol.-%

Software version: 1.024

Restrictions:

None

Note:

The maintenance interval is four weeks.

Test Report:

TÜV Rheinland Energy GmbH, Cologne
Report no.: 936/21239768/B dated 29 April 2019

Certified product

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

The Transmitter AMS 5200 with Type 3211-600 ZrO₂ probe is a microprocessor-controlled system for the measurement of the oxygen content of gas mixtures in the range up to 25 vol.-% oxygen.

The operation principle is described below:

A galvanic concentration cell compares the oxygen content in the sample gas to a defined O₂ concentration in a reference gas. This reference gas is ambient air for most applications since its oxygen content is deemed sufficiently stable. The measuring cell comprises two porous platinum electrodes and an ion conductor, ceramics made of zirconium dioxide and stabilising additives. The platinum electrode reduces the oxygen molecules from the reference gas. Oxygen ions thus created move to the second electrode with the help of lattice defects deliberately produced.

Oxygen molecules form again losing electrons: the lower the oxygen concentration of the sample gas, the higher the number of ions moved between the electrodes by zirconium dioxide and thus the electric voltage (EMK). The signal voltage increases when the oxygen concentration decreases.

Oxide-ionic conduction of zirconium dioxide increases exponentially with rising temperatures and reaches sufficiently high values above 600 °C. The temperature of the measuring cell has to be kept constant. At constant oxygen concentrations of the reference gas, the voltage determined at the electrodes is a measure of the oxygen concentration of the sample gas (Nernst equation).

The AMS tested here comprises the following components: the evaluation electronics c/w platinum electrodes in a wall-mounted housing and the type AMS 3211-600 oxygen probe (in-line probe) with zirconium dioxide cell. According to the manufacturer's specifications, the probes are suitable for gas temperatures of up to 1750 °C. At waste gas temperatures of 100–120 °C, typical for municipal waste incinerators, the correct functioning at maximum temperatures could not be verified.

Measurement probe	3211-600
Max. gas temperature	1750 °C
Degree of protection:	IP65
Response time	< 5s
T90 time	≤ 20s
Mounting position	Depends on the material of the sampling tube, recommended vertically suspended
Weight (at length ...)	6.5 kg (1 000 mm)
Dust concentration	No wet dust beyond 20 g/m ³
Sample flow	No limitation
Heating of the probe	5 min

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 gal1.de.

Document history

Certification of the measuring system Transmitter AMS 5200 with Type 3211-600 ZrO₂ probe 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. 0000072199: 04 June 2020
Expiry date of the certificate: 23 March 2025
Test report: 936/21239768/B dated 29 April 2019
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 24.03.2020 B7, chapter II number 1.2
UBA announcement dated 24 February 2020

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

Measuring system

Manufacturer	AMS Analysen-, Mess- und systemtechnik GmbH
AMS designation	AMS 5200 Sonde Typ 3211-600
Serial number of units under test	1624 / 1625 Transmitter 2505 / 2506
Measuring principle	Zirkondioxid

Test report

Test laboratory	936/21239768/C TÜV Rheinland
Date of report	2020-05-07

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	0.21 Vol.-%
Sum of negative CS at zero point	0.00 Vol.-%
Sum of positive CS at span point	0.00 Vol.-%
Sum of negative CS at span point	-0.31 Vol.-%
Maximum sum of cross-sensitivities	-0.31 Vol.-%
Uncertainty of cross-sensitivity	u _i -0.179 Vol.-%

Calculation of the combined standard uncertainty

Tested parameter

			u ²
Standard deviation from paired measurements under field conditions *	u _D	0.048 Vol.-%	0.002 (Vol.-%) ²
Lack of fit	u _{inf}	-0.058 Vol.-%	0.003 (Vol.-%) ²
Zero drift from field test	u _{d,z}	-0.098 Vol.-%	0.010 (Vol.-%) ²
Span drift from field test	u _{d,s}	0.104 Vol.-%	0.011 (Vol.-%) ²
Influence of ambient temperature at span	u _t	0.106 Vol.-%	0.011 (Vol.-%) ²
Influence of supply voltage	u _v	0.020 Vol.-%	0.000 (Vol.-%) ²
Cross-sensitivity (interference)	u _i	-0.179 Vol.-%	0.032 (Vol.-%) ²
Influence of sample gas pressure	u _p	0.026 Vol.-%	0.001 (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 set point" or
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u _c)	$u_c = \sqrt{\sum (u_{max,i})^2}$	0.33 Vol.-%
Total expanded uncertainty	U = u _c * k = u _c * 1.96	0.65 Vol.-%

Relative total expanded uncertainty

Requirement of 2010/75/EU	U in % of the range 25 Vol.-%	2.6
Requirement of EN 15267-3	U in % of the range 25 Vol.-%	10.0 **
	U in % of the range 25 Vol.-%	7.5

** The EU-directive 2010/75/EC on industrial emissions does not define requirements for this component.
A value of 10.0 % was used instead.