

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000036414_01

Certified AMS: SERVOFLEX MiniMP 5200 for O₂

Manufacturer: Servomex Group Limited,
Jarvis Brook,
Crowborough,
East Sussex,
TN6 3FB,
UK

Test Institute: 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 6 pages).



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000036414

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

German Federal Environment Agency
Dessau, 28 February 2017



Dr. Marcel Langner
Head of Section II 4.1

This certificate will expire on:
01 March 2022

TÜV Rheinland Energy GmbH
Cologne, 27 February 2017



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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
qal1.de info@qal1.de page 1 of 6

Certificate:
0000036414_01 / 28 February 2017

Test report: 936/21216148/B of 26 September 2011
Initial certification: 02 March 2012
Expiry date: 01 March 2022
Certificate renewal (previous certificate 0000036414 dated from 16 March 2012 with validity up to the 01 March 2017)
Publication: BAnz. 02 March 2012, No. 36, p. 920, chapter II, No. 1.2

Approved application

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13. BImSchV), at waste incineration plants according to Directive 2010/75/EU, chapter IV (17. BImSchV) and other plants requiring official approval. The tested ranges have been chosen with respect to the wide application range of the AMS. 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 municipal waste incinerator.

The AMS is approved for an ambient temperature range of +5 °C to +40 °C.

The notification of suitability of the AMS, performance testing, and the uncertainty calculation have been effected on the basis of the regulations valid at the time of performance testing. As changes in legal regulations are possible, any potential user should ensure that this AMS is suitable for monitoring the Oxygen concentration 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 936/21216148/B of 26 September 2011 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. 02 March 2012, No. 36, p. 920, chapter II, No. 1.2
Announcement by UBA from 23 February 2012:

AMS name:

SERVOFLEX MiniMP 5200 for O₂

Manufacturer:

Servomex Group Ltd., East Sussex, England

Field of application:

For measurements at plants requiring official approval and plants according to 27th BImSchV

Measuring range during the suitability test:

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

Software version:

05000-cu0-18

Restrictions:

None

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Köln
Report No.: 936/21216148/B of 26 September 2011

Certified product

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

The measuring system uses a paramagnetic transducer. This physical measurement method is based on the exceptionally large magnetic susceptibility of oxygen.

The measuring cell comprises two hollow spheres filled with nitrogen, which are interconnected by a bar to form a dumbbell. A small mirror is placed at the dumbbell's centre of rotation. A wire loop, which is required for the purpose of re-adjustment, is attached to the dumbbell. This system is then fixed inside a glass tube with a platinum strap to ensure axial symmetry. It is screwed on with two pole pieces. This allows disassembly of the measuring cell for cleaning.

If the measuring cell is placed in an inhomogeneous magnetic field generated by two permanent magnets and oxygenic gas flows into the measuring cell, oxygen molecules will be attracted by the magnetic field, which will have an effect on the magnetic lines of force near the wedge-shaped magnetic poles. This effect also affects the diamagnetic hollow spheres; it displaces them out of the magnetic field. This causes the dumbbell to rotate, which is then registered by an optical system. It comprises a light-emitting diode, the mirror fixed to the dumbbell and a differential photodiode.

If the dumbbell is displaced due to the existence of oxygen molecules, the electric tension of the photodiode will immediately change. The latter produces a suitable current using an amplifier. By means of the wire loop, the current produces an opposing electromagnetic current, which restores the dumbbell to its original position. This compensational current is proportional to the oxygen content in the measuring cell. It is also completely linear which means that the content can be displayed in vol.-%.

The measuring system SERVOFLEX MiniMP 5200 consists of the following components:

1. Sampling probe type M&C PS4000-H
2. Heated test gas line, up to 10m length, material: PTFE, inner diameter 4mm.
3. Test gas cooler M&C PSS5
4. SERVOFLEX MiniMP 5200 O₂-Analyser (mains operation) with
5. Software: 05000-cu0-18

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 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 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 Energy GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the certificate and on requests of the TÜV Rheinland Energy 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: gal1.de.

Certification of SERVOFLEX MiniMP 5200 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. 0000036414: 16 March 2012
Expiry date of the certificate: 01 March 2017

Test report: 936/21216148/B of 26 September 2011
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Publication: BAnz. 02 March 2012, No. 36, p. 920, chapter II, No. 1.2
Announcement by UBA from 23 February 2012

Renewal of the certificate

Certificate No. 0000036414_01: 28 February 2017
Expiry date of the certificate: 01 March 2022

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

Measuring system

Manufacturer	Servomex
Name of measuring system	SERVOFLEX MiniMP 5200
Serial number of the candidates	11691 / 11692
Measuring principle	paramagnetic

Test report

Test laboratory	936/21216148/B
Date of report	TÜV Rheinland 2011-09-26

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	-0,22 Vol.-%
Sum of positive CS at reference point	0,18 Vol.-%
Sum of negative CS at reference point	0,00 Vol.-%
Maximum sum of cross sensitivities	-0,22 Vol.-%
Uncertainty of cross sensitivity	-0,127 Vol.-%

Calculation of the combined standard uncertainty

Tested parameter

	u	u ²
Standard deviation from paired measurements under field conditions *	u _D 0,031 Vol.-%	0,001 (Vol.-%) ²
Lack of fit	u _{lof} -0,046 Vol.-%	0,002 (Vol.-%) ²
Zero drift from field test	u _{d,z} 0,007 Vol.-%	0,000 (Vol.-%) ²
Span drift from field test	u _{d,s} -0,017 Vol.-%	0,000 (Vol.-%) ²
Influence of ambient temperature at span	u _t 0,095 Vol.-%	0,009 (Vol.-%) ²
Influence of supply voltage	u _v 0,009 Vol.-%	0,000 (Vol.-%) ²
Cross sensitivity (interference)	u _i -0,127 Vol.-%	0,016 (Vol.-%) ²
Influence of sample gas flow	u _p -0,024 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 span" or

"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u _c)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0,26 Vol.-%
Total expanded uncertainty	U = u _c * k = u _c * 1.96	0,52 Vol.-%

Relative total expanded uncertainty

Requirement of 2000/76/EC and 2001/80/EC	U in % of the range 25 Vol.-%	2.1
Requirement of EN 15267-3	U in % of the range 25 Vol.-%	10.0 **
Requirement for standard reference methods	U in % of the range 25 Vol.-%	7.5
	U in % of the range 25 Vol.-%	6.0

** For this component no requirements in the EC-directives 2001/80/EG and 2000/76/EG are given.

A value of 10.0 % was used for this.