

CERTIFICATE

of Product Conformity (QAL1)

Certificate No. : 0000025932_01

Certified AMS: ZFK8 + ZKM for O₂

Manufacturer: Fuji Electric Co., Ltd.
No. 1, Fuji-machi, Hino-city
Tokyo 191-8502
Japan

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).



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000025932

Publication in the German Federal Gazette
(BAnz.) of 12 February 2010

German Federal Environment Agency
Dessau, 2 February 2015



i. A. Dr. Marcel Langner

This certificate will expire on:
11 February 2020

TÜV Rheinland Energie und Umwelt GmbH
Cologne, 30 January 2015



ppa. Dr. Peter Wilbring

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51105 Cologne

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

Test report:	936/21200211/A of 21 October 2009
Initial certification:	12 February 2010
Certificate:	renewal (previous certificate 0000025932 of 10 March 2010 valid until 11 February 2015)
Expiry date:	11 February 2020
Publication:	BAnz. 12 February 2010, no. 24, p. 552, chapter II, no. 2.1

Approved application

The tested AMS is suitable for use at large combustion plants according to Directive 2001/80/EC, at waste incineration plants according to Directive 2000/76/EC, and plants according to the German Technical Instruction on Air Quality Control as well as other plants requiring official approval.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a field test at a municipal 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 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 limit values 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 936/21200211/A dated 21 October 2009 of TÜV Rheinland Immissionsschutz und Energiesysteme 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. 12 February 2010, no. 24, p. 552, chapter II, no. 1.1, UBA announcement of 25 January 2010)
- publication in the German Federal Gazette (BAnz. 29 July 2011, no. 113, p. 2725, chapter III, notification 8, UBA announcement of 15 July 2011)
- publication in the German Federal Gazette (BAnz. 2 March 2012, no. 36, p. 920, chapter V, notification 4, UBA announcement of 23 February 2012)

AMS designation:

ZFK8 + ZKM

Manufacturer:

Fuji Electric Systems Co., Ltd., Tokyo, Japan

Field of application:

For measurements at plants requiring official approval (e.g. Directive 2001/80/EC regarding large combustions plants, Directive 2000/76/EC regarding waste incineration plants)

Measuring ranges during the performance test:

Component	Certification-range	Supplementary range	Unit
O ₂	0 - 25	-	Vol.-%
O ₂	-	0 - 5	Vol.-%

Software version:

2.01d 08/03

Notes:

The maintenance interval is four weeks.

Test report:

TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Cologne
Report no.: 936/21200211/A of 21 October 2009

8 Notification as regards Federal Environment Agency notices of 25 January 2010 (BAnz. p. 552, chapter II no. 1.1)

The current software version of the ZFK8 + ZKM measuring system for O₂ manufactured by Fuji Electric Systems Co., Ltd. is:

2.13B

The versions 2.13A, 2.12 and 2.10 are also approved.

Statement of TÜV Rheinland Energie und Umwelt GmbH of 24 March 2011

4 Notification as regards Federal Environment Agency notices of 25 January 2010 (Federal Gazette (BAnz.) p. 552, chapter II, no. 1.1) and 15 July 2011 (Federal Gazette (BAnz.) p. 2725, chapter III, 8th notification)

The company Fuji Electric Systems Co., Ltd., manufacturer of the ZFK8 + ZKM measuring system for O₂, was renamed. The new company name is:

Fuji Electric Co., Ltd.

Statement of TÜV Rheinland Energie und Umwelt GmbH of 26 September 2011

Certified product

This certificate applies to automated measurement systems conforming to the following description:
The measuring system is a zirconia sensor.

The in-situ zirconia oxygen analyser consists of a probe with a sensor unit (ZFK8), a sensor rod which is mounted directly in the stack to send the gas to the sensor, and a converter (ZKM) for controlling the sensor, processing the signal, output/display, and external transfer. Sensor and converter are connected with a cable.

With the help of the converter the measuring- and status-signals can be evaluated. By means of the keyboard, settings and manual calibrations can be made.

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 ZFK8 + ZKM 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. 0000025932: 10 March 2010

Expiry date of the certificate: 11 February 2015

Test report: 936/21200211/A of 21 October 2009

TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Cologne

Publication: BAnz. 12 February 2010, no. 24, p. 552, chapter II, no. 1.1

UBA announcement of 25 January 2010

Notifications

Statement of TÜV Rheinland Energie und Umwelt GmbH of 24 March 2011

Publication: BAnz. 29 July 2011, no. 113, p. 2725, chapter III, notification 8 (new software version)

UBA announcement of 15 July 2011

Statement of TÜV Rheinland Energie und Umwelt GmbH of 26 September 2011

Publication: BAnz. 2 March 2012, no. 36, p. 920, chapter V, notification 4 (change of manufacturer name)

UBA announcement of 23 February 2012

Renewal of the certificate

Certificate No. 0000025932_01 2 February 2015

Expiry date of the certificate: 11 February 2020

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data

Manufacturer	Fuji Electric Systems Co., Ltd
Name of measuring system	ZFK8 + ZKM
Serial Number	Q8M3535T / Q8M3534T
Measuring Principle	zirconia

TÜV Data

Approval Report	936/21200211/A
Editor	Ruth Steinhagen
Date	2009-10-21

Measurement Component

Certificated range	O ₂	25	Vol.-%
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Evaluation of the cross sensitivity (CS)

Sum of positive CS at zero point	0.000	Vol.-%
Sum of negative CS at zero point	-0.110	Vol.-%
Sum of positive CS at reference point	0.000	Vol.-%
Sum of negative CS at reference point	-0.270	Vol.-%
Maximum sum of cross sensitivities	-0.270	Vol.-%
Uncertainty of cross sensitivity	-0.156	Vol.-%

Calculation of the combined standard uncertainty

Test Value

	u	u ²
Standard deviation from paired measurements under field conditions *	u _D 0.054 Vol.-%	0.003 (Vol.-%) ²
Lack of fit	u _{lof} 0.052 Vol.-%	0.003 (Vol.-%) ²
Zero drift from field test	u _{d,z} 0.081 Vol.-%	0.007 (Vol.-%) ²
Span drift from field test	u _{d,s} 0.110 Vol.-%	0.012 (Vol.-%) ²
Influence of ambient temperature at span	u _t 0.140 Vol.-%	0.020 (Vol.-%) ²
Influence of supply voltage	u _v 0.051 Vol.-%	0.003 (Vol.-%) ²
Cross sensitivity (interference)	u _i -0.156 Vol.-%	0.024 (Vol.-%) ²
Influence of sample pressure	u _p 0.100 Vol.-%	0.010 (Vol.-%) ²
Uncertainty of reference material at 70% of certification range	u _{rm} 0.202 Vol.-%	0.041 (Vol.-%) ²

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u _c)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.35 Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1,96$	0.68 Vol.-%

Relative total expanded uncertainty

Requirement of 2000/76/EC and 2001/80/EC	U in % of the range 25 Vol.-%	2.7
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/EC und 2000/76/EC are given.
A value of 10 % was used for this.