

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000025932_02

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 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 (2004).**

Certification is awarded in respect of the conditions stated in this certificate
(this certificate contains 7 pages).
The present certificate replaces certificate 0000025932_01 of 02 February 2015.

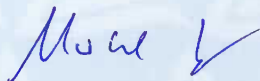


Publication in the German Federal Gazette
(BAnz.) of 12 February 2010

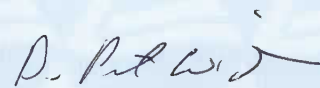
This certificate will expire on:
11 February 2025

German Federal Environment Agency
Dessau, 12 February 2020

TÜV Rheinland Energy GmbH
Cologne, 11 February 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 the certificate D-PL-1120-02-00.

Certificate:
0000025932_02 / 12 February 2020

Test report: 936/21200211/A of 21 October 2009
Initial certification: 12 February 2010
Expiry date: 11 February 2025
Certificate: renewal (previous 0000025932_01 dated 02 February 2015
with validity up to the 11 February 2020)
Publication: BAnz. 12 February 2010, no. 24, p. 552, chapter II no. 1.1

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 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 936/21200211/A of 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, Announcement by UBA from 25 January 2010:

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	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

Publication in the German Federal Gazette: BAnz. 29 July 2011, no. 113, p. 2725, chapter III notification 8, Announcement by UBA from 15 July 2011:

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

Publication in the German Federal Gazette: BAnz. 2 March 2012, no. 36, p. 920, chapter V notification 4, Announcement by UBA from 23 February 2012:

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

Publication in the German Federal Gazette: BAnz AT 26.08.2015 B4, chapter V notification 21, Announcement by UBA from 22 July 2015:

21 Notification as regards Federal Environment Agency (UBA) notices of 25 January 2010 (Federal Gazette (BAnz.) p. 552, chapter II number 1.1) and of 23 February 2012 (Federal Gazette (BAnz.) p. 920, chapter V 4th notification)

The ZFK8 + ZKM measuring system for O₂, manufactured by Fuji Electric Co., Ltd. has been equipped with a new display. The new display differs from the old version in its background colour. The current software version for the AMS is:

V 3.00

Statement of TÜV Rheinland Energie und Umwelt GmbH of 25 March 2015

Publication in the German Federal Gazette: BAnz AT 17.07.2018 B9, chapter III notification 12, Announcement by UBA from 03 July 2018:

12 Notification as regards Federal Environment Agency (UBA) notices dated 25 January 2010 (BAnz. p. 552, chapter II number 1.1) and dated 22 July 2015 (BAnz AT 26.08.2015 B4, chapter V 21st notification)

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

V 3.05

As an alternative, the measuring system may be equipped with a transducer/converter, type ZKM-2. In that case, the AMS designation is ZFK8 + ZKM-2 for O₂ with its current software version:

VER AC 15/12

Statement issued by TÜV Rheinland Energy GmbH dated 21 February 2018

Publication in the German Federal Gazette: BAnz AT 22.07.2019 B8, chapter V notification 4, Announcement by UBA from 28 June 2019:

4 Notification as regards Federal Environment Agency (UBA) notices of 25 January 2010 (BAnz. p. 552, chapter II number 1.1 and of 3 July 2018 (BAnz AT 17.07.2018 B9, chapter III 12th notification)

A different insulating material may now be used for the ZFK8/ZKM oxygen analyser manufactured by Fuji Electric Ltd. Moreover, the software of the ZKM-2 converter has been updated.

The latest software version of the ZFK8/ZKM is VER AG 17/12; for the ZKM-2 converter it remains V3.05.

Statement issued by TÜV Rheinland Energy GmbH dated 6 March 2019

Certified product

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

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 respectively ZKM-2) 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 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. 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: qal1.de.

History of documents

Certification of ZFK8 + ZKM 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 dated 21 October 2009
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Cologne
Publication: BAnz. 12 February 2010, no. 24, p. 552, chapter II no. 1.1
Announcement by UBA dated 25 January 2010

Notifications according to EN 15267

Statement of TÜV Rheinland Energy GmbH dated 24 March 2011
Publication: BAnz. 29 July 2011, no. 113, p. 2725, chapter III notification 8
Announcement by UBA dated 15 July 2011
(software changes)

Statement of TÜV Rheinland Energie und Umwelt GmbH dated 26 September 2011
Publication: BAnz. 02 March 2012, no. 36, p. 920, chapter V notification 4
Announcement by UBA dated 23 February 2012
(new manufacturer name)

Renewal of the certificate

Certificate No. 0000025932_01: 02 February 2015
Expiry date of the certificate: 11 February 2020

Notifications according to EN 15267

Statement of TÜV Rheinland Energie und Umwelt GmbH dated 25 March 2015
Publication: BAnz AT 26.08.2015 B4, chapter V notification 21
Announcement by UBA dated 22 July 2015
(software and hardware changes)

Statement of TÜV Rheinland Energy GmbH dated 21 February 2018
Publication: BAnz AT 17.07.2018 B9, chapter III notification 12
Announcement by UBA dated 03 July 2018
(software and hardware changes)

Statement of TÜV Rheinland Energy GmbH dated 06 March 2019
Publication: BAnz AT 22.07.2019 B8, chapter V notification 4
Announcement by UBA dated 28 June 2019
(software and hardware changes)

Renewal of the certificate

Certificate No. 0000025932_02: 12 February 2020
Expiry date of the certificate: 11 February 2025

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	U in % of the range 25 Vol.-%	2.7
Requirement of 2000/76/EC and 2001/80/EC	U in % of the range 25 Vol.-%	10.0 **
Requirement of EN 15267-3	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.