

# CERTIFICATE

## about Product Conformity (QAL1)

Number of Certificate: 0000025932

**Certified AMS:** ZFK8 + ZKM for O<sub>2</sub>

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

**Test Institute:** TÜV Rheinland Immissionsschutz und Energiesysteme GmbH

This is certifying that the AMS has been tested and found to comply with:

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  
(see also the following pages).



- EN 15267-3 tested
- QAL1 certified
- TUV approved
- Annual Inspection

Publication in the German Federal Gazette  
(BAnz.) of 2010-02-12

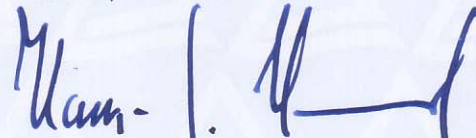
The certificate is valid until: 2015-02-11

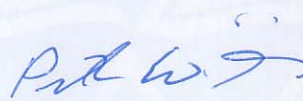
Umweltbundesamt

TÜV Rheinland Immissionsschutz  
und Energiesysteme GmbH

Dessau, 2010-03-15

Köln, 2010-03-10

  
i. A. Dr. Hans-Joachim Hummel

  
i. V. Dr. Peter Wilbring

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Am Grauen Stein  
51105 Köln

Accreditation according to EN ISO/IEC 17025 and ISO 9001:2000.

**Test report:** 936/21200211/A of 2009-10-21  
**First certification:** 2010-02-12  
**Run of validity until:** 2015-02-11  
**Publication** BAnz. 2010-02-12, no.: 24, page: 554

**Approved application:**

The suitability of the AMS was assessed on the basis of a laboratory test and a field test on a municipal waste incinerator. The instrument can be used for all kinds of plants. The AMS is approved for the temperature range from -20 °C to +50 °C.

Any potential user should ensure, in consultation with the manufacturer that this AMS is suitable for the installation on which it will be installed.

**Basis of the certification**

This certification is based on the test report 936/21200211/A of 2009-10-21 of TÜV Rheinland Immissionsschutz und Energiesysteme GmbH and on the relevant bodies (German Umweltbundesamt) assessment and ongoing surveillance of the product and the manufacturing process and the publication in the German Federal Gazette (BAnz.):

**AMS name:**

ZFK8 + ZKM

**Manufacturer:**

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

**Approval:**

For measurements at plants requiring official permission (i. e. 2000-76-EC, waste incineration directive and 2001-80-EC, large combustion plants directive)

**Measuring ranges during the suitability test:**

Component	Certification-range	Supplementary range	Unit
O <sub>2</sub>	<b>0 - 25</b>	-	Vol.-%
O <sub>2</sub>	-	0 - 5	Vol.-%

**Software version:**

2.01d 08/03

**Remarks:**

The maintenance interval is four weeks.

**Test report:**

TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Köln  
 Report-No.: 936/21200211/A of 2008-10-21

**Certified product**

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

The measuring system is a zirconia sensor.

The in-situ zirconia analyzer consist of a probe with a sensor unit (ZFK8), the sensor rod is directly mounted to the stack to send the gas to the sensor and the converter (ZKM) to control the sensor, process the signal, output/display and external transfer, sensor and converter are connected with a cable.

With the converter the measuring- and status-signals can be evaluated. With the keyboard settings and manual calibrations can be done.

**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 DIN 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 certified product is found no longer to comply with the applicable European Standard, TÜV Rheinland Immissionschutz und Energiesysteme GmbH should be notified at the address shown on page 1.

The certification mark with the ID-Number that can be applied to the product or used in publicity material for the certified product is presented on page 1 of this certificate.

This document as well as the certification mark remains the property of TÜV Rheinland Immissionschutz und Energiesysteme GmbH.

With revocation of the publication the certificate loses its validity.

After the expiration of the validity of the certificate and on requests of the TÜV Rheinland Immissionschutz und Energiesysteme GmbH this document shall be returned and the certificate mark must not be employed anymore.

The relevant version of this certificate and the validity is also seen at the Internet Address: [qal1.de](http://qal1.de).

**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 <sub>2</sub>	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 <sup>2</sup>
Standard deviation from paired measurements under field conditions *	u <sub>D</sub> 0.054 Vol.-%	0.003 (Vol.-%) <sup>2</sup>
Lack of fit	u <sub>lof</sub> 0.052 Vol.-%	0.003 (Vol.-%) <sup>2</sup>
Zero drift from field test	u <sub>d,z</sub> 0.081 Vol.-%	0.007 (Vol.-%) <sup>2</sup>
Span drift from field test	u <sub>d,s</sub> 0.110 Vol.-%	0.012 (Vol.-%) <sup>2</sup>
Influence of ambient temperature at span	u <sub>t</sub> 0.140 Vol.-%	0.020 (Vol.-%) <sup>2</sup>
Influence of supply voltage	u <sub>v</sub> 0.051 Vol.-%	0.003 (Vol.-%) <sup>2</sup>
Cross sensitivity (interference)	u <sub>i</sub> -0.156 Vol.-%	0.024 (Vol.-%) <sup>2</sup>
Influence of sample pressure	u <sub>p</sub> 0.100 Vol.-%	0.010 (Vol.-%) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	u <sub>rm</sub> 0.202 Vol.-%	0.041 (Vol.-%) <sup>2</sup>

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

Combined standard uncertainty (u <sub>c</sub> )	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.35 Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.68 Vol.-%

**Relative total expanded uncertainty**

<b>Requirement of 2000/76/EC and 2001/80/EC*<sup>1</sup></b>	<b>U in % of the range 25 Vol.-%</b>	<b>2.7</b>
Requirement of EN 15267-3	U in % of the range 25 Vol.-%	10.0
	U in % of the range 25 Vol.-%	7.5

\*<sup>1</sup> For this component no requirements in the EC-directives 2001/80/EC und 2000/76/EC are given. The chosen value was recommended by the certification body.