

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000069252

AMS designation: ZFDM-4 for dust

Manufacturer: Fuji Electric France S.A.S.
46, Rue Georges Besse, ZI du Brézet
63039 Clermont-Ferrand Cedex 2,
France

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 (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 0000069252

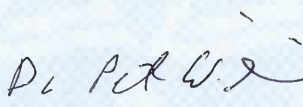
Publication in the German Federal Gazette
(BAnz) of 24 March 2020

This certificate will expire on:
23 March 2025

German Federal Environment Agency
Dessau, 04 June 2020

TÜV Rheinland Energy GmbH
Cologne, 03 June 2020


Dr. Marcel Langner
Head of Section II 4.1


ppa. Dr Peter Wilbring

www.umwelt-tuv.eu
tre@umwelt-tuv.eu
Phone: + 49 221 806-5200

TÜV Rheinland Energy GmbH
Am Grauen Stein
51105 Köln

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:	936/21246878/A dated 2 October 2019
Initial certification:	24 March 2020
Expiry date:	23 March 2025
Publication:	BAnz AT 24.03.2020 B7, chapter I number 2.1

Approved application

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13th 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 four-months field test at a municipal waste incinerator.

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 limit values 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 936/21246878/A dated 2 October 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 I number 2.1,
UBA announcement dated 24 February 2020:

AMS designation:

ZFDM-4 for dust

Manufacturer:

Fuji Electric France S.A.S, Clermont-Ferrand, France

Field of application:

For plants according to the 13th and 17th BImSchV as well as TA Luft

Measuring ranges during performance testing:

Component	Certification range	Unit
Dust	0–20	mg/m ³

Component	supplementary ranges		Unit
Dust	0–15 ¹⁾	0–100 ²⁾	SE

¹⁾ corresponds to ~ 0 to 9 mg/m³ of dust

²⁾ corresponds to ~ 0 to 60 mg/m³ of dust

Software versions:

V 1.3

Restrictions:

None

Notes:

1. The maintenance interval is two weeks.
2. During performance testing in accordance with EN 15267-3, the requirement for the determination coefficient R^2 of the calibration function was not fulfilled.

Test Report:

TÜV Rheinland Energy GmbH, Cologne
Report no.: 936/21246878/A dated 2 October 2019

Certified product

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

The ZFDM-4 is a dust measuring system which uses a scattered light measuring principle (backwards scattering). The measuring system comprises the following main components:

- Electronic switch box with LED light source, receiver unit, processing electronics and control unit
- Two fibre optic cables for the transmission of emitted and received light
- A sensor for attachment of the fibre optic cables at the waste gas channel including heat resistance, temperature sensor and mounting flange
- Instrument software and control blocks

The two fibre optic cables (available at 1.20 m and 2.20 m length) are fastened in the sensor. This sensor in turn is mounted to the flue gas duct on a rectangular flange.

Particles in the duct reflect the light entering the measuring volume at a 45° angle in different directions. Part of the reflected light hits the tip of the receiver cable. The intensity of the reflected light compared to the intensity of the emitted light depends on the angle between sender and receiver as well as the shape, colour and size of the particles. For any given type of dust, the light intensity received is proportional to the dust concentration present.

The light transmitted via the emitter cable is modulated by a generator at a frequency of 1000 Hz to prevent light interference.

Two separately adjustable fixed measuring ranges serve the purpose of data output.

Thanks to the optical fibre cables, it is possible to install the electronic switch box separately from the sensor. The electronic switch box contains the main board with the logical functions for control and supply. It comprises a micro-processor which carries out the following functions:

- Evaluation of measurement data
- Monitoring of emitted light and sensor temperature
- Management of instrument display and 4–20 mA analogue outputs
- Manage warnings and errors

The measuring system is equipped with a purge air supply at the sensor. To prevent condensation, purge air is heated. It is also used to distribute heat inside the sensor. Temperatures at the sensor can be set to 130 °C to 400 °C. The optical fibres have been designed for a permanent maximum temperature of 250 °C.

Three control or adjustment blocks as well as a zero point block are required for the purpose of lack-of-fit tests and drift checks, which are delivered by the manufacturer. The centre of the adjustment block contains tempered, pigmented glass. The thickness of the glass is proportional to the optical density.

In the context of performance testing, the measuring system was operated with a moving average over 10 s.

The measuring system can perform zero checks automatically every 24 h or manually. Span checks can only be performed manually with the help adjustment blocks. Instead of automatic zero checks, zero checks can also be performed with the help of a calibration block.

In the event of demanding measurement conditions (small duct diameter, reflection inside the waste gas duct etc.), the zero point in the absence of dust concentrations may be moved. The measuring system provides an offset correction for such situations.

The measuring system provides a compensation for contamination. For deviations of at least 10%, it is possible to calculate correction factors. This correction factor is used to correct output data for the following measuring values. The correction factor can be switched on and off.

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 ZFDM-4 measuring system 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. 0000069252: 04 June 2020
Expiry date of the certificate: 23 March 2025
Test report no. 936/21246878/A dated 2 October 2019
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 24.03.2020 B7, chapter I number 2.1
UBA announcement dated 24 February 2020

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

Measuring system

Manufacturer	Fuji Electric France S.A.S
AMS designation	ZFDM-4
Serial number of units under test	11090001 / 11090002 / 11090016 / 11090017
Measuring principle	scattered light measuring (reverse scattering)

Test report

Test laboratory	TÜV Rheinland
Date of report	2019-08-07

Measured component

Certification range	Dust	0 - 20 mg/m ³
---------------------	------	--------------------------

Calculation of the combined standard uncertainty

Tested parameter

			u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.314 mg/m ³	0.099	(mg/m ³) ²
Lack of fit	u_{lof}	0.035 mg/m ³	0.001	(mg/m ³) ²
Zero drift from field test	$u_{d,z}$	0.000 mg/m ³	0.000	(mg/m ³) ²
Span drift from field test	$u_{d,s}$	-0.346 mg/m ³	0.120	(mg/m ³) ²
Influence of ambient temperature at span	u_t	-0.454 mg/m ³	0.206	(mg/m ³) ²
Influence of supply voltage	u_v	0.114 mg/m ³	0.013	(mg/m ³) ²
Influence of sample gas pressure	u_n	0.000 mg/m ³	0.000	(mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.162 mg/m ³	0.026	(mg/m ³) 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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.68 mg/m ³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.34 mg/m ³

Relative total expanded uncertainty

Requirement of 2010/75/EU	U in % of the ELV 10 mg/m³	13.4
Requirement of EN 15267-3	U in % of the ELV 10 mg/m ³	30.0
	U in % of the ELV 10 mg/m ³	22.5