Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000072203

AMS designation:	EM-D5200 for dust
Manufacturer:	HORIBA GmbH Kaplanstraße 5 3430 Tulln Austria
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 7 pages).

Suitability Tested
EN 15267
QAL1 Certified
Regular Surveillance

www.tuv.com
ID 0000072203

Publication in the German Federal Gazette (BAnz) of 31 July 2020

This certificate will expire on:
30 July 2025

German Federal Environment Agency
Dessau, 07 September 2020

Dr. Marcel Langner
Head of Section II 4.1

TÜV Rheinland Energy GmbH
Cologne, 06 September 2020

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 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:	936/21242768/B dated 11 March 2020
Initial certification:	31 July 2020
Expiry date:	30 July 2025
Publication:	BAnz AT 31.07.2020 B10, chapter I number 1.1

Approved application
The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13th BImSchV), chapter IV (17th BImSchV), 30th BImSchV, 44th 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 more than twelve-months field test at a municipal waste incinerator.

The AMS is approved for an ambient temperature range of -40 °C to +60 °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 936/21242768/B dated 11 March 2020 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 31.07.2020 B10, chapter I number 1.1, UBA announcement of 27 May 2020:

AMS designation:
EM-D5200 for dust

Manufacturer:
HORIBA GmbH, Tulln, Austria

Field of application:
For plants requiring official approval and for plants according to the 27th BImSchV

Measuring ranges during performance testing:

Component	Certification range	Unit
Dust	0 – 7.5 *	mg/m³

* corresponds to 0 to 500 SL

Component	supplementary ranges				Unit
Dust	0–1000	0 – 4000	0–20 000	0 -100	SL

Software versions:

EM-D5200:	01.10R0001
EM-5800CU:	02.02R0066
D-ESI 100:	01.11R0018

Restrictions:
None

Notes:

1. The maintenance interval is six months.
2. The AMS can be operated with the EM5800CU control unit, an EM-CB-L supply unit or the EM-CB-S connection box.
3. The AMS may be supplied with purge air either by way of the EM-CB-L supply unit or an external purge air supply.
4. The EM5800CU control unit has a digital Modbus RTU interface and a Modbus TCP in accordance with VDI 4201 parts 1 and 3 (EIA-485, serial and TCP/IP, Ethernet).
5. The EM-D5200 measuring system has a digital Modbus RTU interface in accordance with VDI 4201 parts 1 and 3 (EIA-485, serial).
6. When the EM-D5200 measuring system is combined with the EM5800CU control unit, the instrument's Modbus interface cannot be used. Instead the Modbus interface provided by the EM5800CU control unit is used.
7. When using the AMS without the EM5800CU control unit, the AMS shall be operated by means of the D-ESI 100 software on a customary PC/notebook/tablet.

8. During performance testing in accordance with EN 15267-3, the requirement for the determination coefficient R^2 of the calibration function was not fulfilled.
9. The EM5800CU control unit is available in the following versions:
   - EM5800CU M (standard)
   - EM5800CU C (compact housing)
   - EM5800CU P (c/w purge air blower)
   - EM5800CU R (housing for 19“ rack mounting)

Test Report:
TÜV Rheinland Energy GmbH, Cologne
Report no.: 936/21242768/B dated 11 March 2020

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

The EM-D5200 measuring system is a dust monitor that relies on scattered light (backwards scattering) as its measuring principle. Measurements are made contact-free, continuous and without sampling in the flue gas flow above dew point. The red light from a laser diode is sent into the flue gas duct and illuminates the dust particles in the measuring volume. The particles present in the measurement volume scatter this light. A photodiode then detects the backscattered light. The proportion of the measured intensity of the scattered light to the intensity of the emitted light corresponds to the particle density in the measuring volume.
The measuring system comprises the following main components:

- EM-D5200MH measuring head

  and
- electric EM-CB-S connection box for voltage supply

  or
- EM-CB-L supply unit with built-in purge air blower

  or
- Electronic control unit EM5800CU

When using the EM-CB-S connection box or the EM-CB-L supply unit, the EM-D5200 measuring system is controlled via the D-ESI 100 software installed on a PC. The EM5800CU control unit allows for operation of the AMS without a PC and may also provide additional data outputs. The EM5800CU control unit is available in the following versions:

- EM5800CU M (standard)
- EM5800CU C (compact housing)
- EM5800CU P (c/w purge air blower)
- EM5800CU R (housing for 19“ rack mounting)

When using the EM-CB-S connection box and the EM5800CU control unit, the measuring system must be equipped with an external purge air supply, e.g. pressurised air class 1 as defined in standard ISO 8573-1-1:2010.

The EM-CB-S connection box and the EM-CB-L supply unit are merely used for mains supply, signal transmission (without affecting the actual processing of measured values), and purge air supply (EM-CB-L only). The generating of measured values as well as all calculation processes relevant to measuring (incl. the analogue and digital generating of measurements) occur directly within the measuring head.

The measuring system is available in two different versions for narrower and wider measurement channels (variants “narrow” and “wide”). With respect to the variant for narrow measurement channels, the measuring volume is situated at a distance ranging from 70 to 450 mm from the aperture. As far as the variant for wider measurement channels is concerned, the measuring volume is situated at a distance ranging from 240 to 1200 mm distance from the aperture / duct wall. The performance test was carried out with the variant for larger measurement channels.

Control measurements (control functions, zero point, contamination, span point) are made by use of an automatic swing-in “shuttle” (internal reference standard). A linearity test is effected by pluggable opacity filters. that are placed in a measuring device which can be inserted in the measuring head. By swinging-in the internal reference standard device and dimming the light source, every settable measuring range (min. 0 to 100 SL) can be checked by means of this filter set. For this purpose it is not necessary to remove the instrument from the measuring location as it only needs to be opened up.

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 **qal1.de**.

Document history

Certification of the EM-D5200 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.0000072203: 07 September 2020
Expiry date of the certificate: 30 July 2025
Test report 936/21242768/B dated 11 March 2020
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 31.07.2020 B10, chapter I number 1.1
UBA announcement of 27 May 2020

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

Measuring system					
Manufacturer			HORIBA GmbH		
AMS designation			EM-D5200		
Serial number of units under test			1235301 / 1235302 / 1236093 / 1236094		
Measuring principle			Scattered light analysis (back scattering)		
Test report			936/21242768/B		
Test laboratory			TÜV Rheinland		
Date of report			2020-03-11		
Measured component			Dust		
Certification range			0 - 7.5 mg/m³ (0 - 500 SU)		

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.090	mg/m³	0.008	(mg/m³)²
Lack of fit	u_{lof}	-0.030	mg/m³	0.001	(mg/m³)²
Zero drift from field test	$u_{d.z}$	-0.078	mg/m³	0.006	(mg/m³)²
Span drift from field test	$u_{d.s}$	-0.095	mg/m³	0.009	(mg/m³)²
Influence of ambient temperature at span	u_t	0.020	mg/m³	0.000	(mg/m³)²
Influence of supply voltage	u_v	0.060	mg/m³	0.004	(mg/m³)²
Influence of sample gas pressure	u_p	0.000	mg/m³	0.000	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.061	mg/m³	0.004	(mg/m³)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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.18	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.35	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 5 mg/m³**	**7.0**
Requirement of 2010/75/EU	**U in % of the ELV 5 mg/m³**	**30.0**
Requirement of EN 15267-3	U in % of the ELV 5 mg/m³	22.5