

CERTIFICATE

on Product Conformity (QAL1)

Certificate No.: 0000037054

Certified AMS: EM-D 5100 for dust

Manufacturer: HORIBA GmbH
Kaplanstraße 5
3430 Tulln
Austria

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: 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
- TÜV approved
- Annual inspection

Publication in the German Federal Gazette
(BAnz.) of 05 March 2013

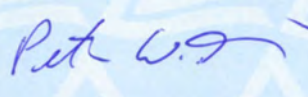
This certificate will expire on:
04 March 2018

German Federal Environment Agency
Dessau, 22 March 2013

TÜV Rheinland Energie und Umwelt GmbH
Cologne, 21 March 2013



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Am Grauen Stein
51105 Cologne

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

Test report:	936/21220824/A of 10 October 2012
Initial certification:	05 March 2013
Expiry date:	04 March 2018
Publication:	BAnz AT 05 March 2013 B10, chapter I, No. 1.3

Approved application

The tested AMS is suitable for use at combustion plants according to EC Directive 2001/80/EC and at waste incineration plants according to EC Directive 2000/76/EC. The measured ranges have been selected considering the wide application range of the AMS.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a threemonth field test on a municipal waste incineration plant.

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 at which it will be installed.

Basis of the certification

This certification is based on:

- test report 936/21220824/A of 10 October 2012 of TÜV Rheinland Energie und Umwelt 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 05 March 2013 B10, chapter I, No. 1.3

AMS designation:

EM-D 5100

Manufacturer:

HORIBA GmbH, Tulln, Austria

Approval:

Measurement at plants requiring official approval as well as plants within the scope of 2000/76/EC (waste incineration directive) and 2001/80/EC (large combustion plants directive)

Measuring ranges during performance test:

Component	Certification range	Supplementary ranges			
Dust (optical transmission)	0 - 15 mg/m ³	0 – 0.2 Ext.	0 – 0.5 Ext.	0 – 1.6 Ext.	0 - 100 % Opacity

0 - 0.1 Ext. equals 0 - 16 mg/m³ with an optical length of 5 m

Software versions:

3.21 (measuring head),

4.37 (evaluation unit)

Restrictions:

None

Notes:

1. The dust concentration is measured in wet gas under operating conditions.
2. The maintenance interval is four weeks.
3. With the measuring path length of 5 m and the measuring range of 16 mg/m³ determined during the calibration a product of 80 mg/m³ m results for the field test plant.
4. The requirements of the determination coefficient of the calibration function R² according to EN 15267-3 have not been fulfilled.

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Cologne

Report No.: 936/21220824/A of 10 October 2012

Certified product

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

The measuring system uses the two beam alternate light method, based on the autocollimation principle. The measuring light crosses the measuring path twice.

The attenuation of the measuring light beam due to the dust concentration is measured. An optical recorder receives the measuring and comparison light beams alternately. The changeover between measuring light and comparison light is performed using a step motor every 2 min for 2 s. There is a common amplifier for signal processing of measuring and comparison light, temperature influences and long-term drift effects of the amplifier are compensated. The measuring light beam is generated by a Super Wide Band Diode (SWBD) without any influence of d.c. light (daylight). With the Wide Band performance of the SWBD the measuring result is independent against temperature and other influences and provides a very stable measuring.

The measurement system EM-D 5100 has two analogue outputs. Each of these outputs has two freely selectable extinction and opacity measuring ranges, which are external changeable. The ranges are freely adjustable from 0.1 to 1.6 Extinction and from 20 to 100 % Opacity.

To check proper functioning of the EM-D 5100, a control cycle is performed in adjustable periodic intervals. In this cycle, the contamination of the optical interfaces, the span and the zero point are automatically measured and displayed. The results of the following measurements are corrected by the magnitude of the measured difference (contamination). If the contamination exceeds 6 % a status signal is given. By heating the optical discs, condensation and contamination are reduced as far as possible.

The standard system version EM-D 5100 consists of:

- measuring head
- reflector
- evaluation unit EM-D 5100 AW
- welding flanges and
- purge air unit

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 EM-D 5100 for dust 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. 0000037054: 22 March 2013

Expiry date of the certificate: 04 March 2018

Test report: 936/21220824/A of 10 October 2012
TÜV Rheinland Energie und Umwelt GmbH, Cologne

Publication: BAnz AT 05 March 2013 B10, chapter II, No. 1.3
Announcement by UBA from 12 February 2013

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

Measuring system

Manufacturer	HORIBA GmbH
Name of measuring system	EM-D 5100
Serial number of the candidates	406752 (142) / 406753 (158) / 1214444 / 1214434
Measuring principle	Opacity

Test report

Test laboratory	TÜV Rheinland
Date of report	2010-10-10

Measured component

Certification range	Dust
	0 - 15 mg/m ³

Calculation of the combined standard uncertainty

Tested parameter

	u	u ²
Standard deviation from paired measurements under field conditions *	u _D 0.143 mg/m ³	0.020 (mg/m ³) ²
Lack of fit	u _{lof} 0.058 mg/m ³	0.003 (mg/m ³) ²
Zero drift from field test	u _{d,z} 0.012 mg/m ³	0.000 (mg/m ³) ²
Span drift from field test	u _{d,s} 0.017 mg/m ³	0.000 (mg/m ³) ²
Influence of ambient temperature at span	u _t 0.052 mg/m ³	0.003 (mg/m ³) ²
Influence of supply voltage	u _v 0.040 mg/m ³	0.002 (mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u _{rm} 0.121 mg/m ³	0.015 (mg/m ³) ²
Excursion of measurement beam	u _{mb} 0.167 mg/m ³	0.028 (mg/m ³) ²

* The larger value is used :
"Repeatability standard deviation at span" or
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u _c)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.27 mg/m ³
Total expanded uncertainty	U = u _c * k = u _c * 1.96	0.52 mg/m ³

Relative total expanded uncertainty

Requirement of 2000/76/EC and 2001/80/EC	U in % of the ELV 10 mg/m³	5.2
Requirement of EN 15267-3	U in % of the ELV 10 mg/m³	30.0
	U in % of the ELV 10 mg/m³	22.5

* The performance test and calculation of measurement uncertainties was carried out during the original testing with the D-R 290 measuring systems of identical design manufactured by Durag GmbH.