Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000053803_01

AMS designation:	D-R 808 for dust
Manufacturer:	DURAG GmbH Kollaustr. 105 Hamburg Germany
Test Laboratory:	TÜV Rheinland Energy GmbH

This is to certify that the AMS has been tested and certified according to the standards

EN 15267-1 (2009), EN 15267-2 (2009), EN 15267-3 (2008) and EN 14181 (2015).

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 7 pages).
The present certificate replaces certificate 0000053803 of 25 April 2017.

TÜVRheinland®
ZERTIFIZIERT

Performance tested
EN 15267
QAL1 certified
Continuous surveillance

www.tuv.com
ID 0000053803

Publication in the Federal Gazette (BAnz) of 31 July 2017

This certificate will expire on:
14 March 2022

German Federal Environment Agency
Dessau, 08 September 2017

Dr. Marcel Langner
Head of Section II 4.1

TÜV Rheinland Energy GmbH
Cologne, 07 September 2017

ppa. Dr. Peter Wilbring

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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-11120-02-00.

Test Report:	936/21232768/C dated 2 March 2017
Initial certification:	15 March 2017
Expiry date:	14 March 2022
Publication:	BAnz AT 31.07.2017 B12, chapter I number 1.2

Tested application
The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13th BImSchV), at waste incineration plants according to Directive 2010/75/EU, chapter IV (17th BImSchV), the 27th BImSchV and other plants requiring official approval. The measured ranges have been selected so as to cater for 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 six-months field test at a waste incineration plant.

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 performance 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 installation at which it will be installed.

Basis of the certification
This certification is based on:

- Test report 936/21232768/C dated 2 March 2017 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 31.07.2017 B12, chapter I number 1.2
UBA announcement dated 13 July 2017:

AMS designation:
D-R 808 for dust

Manufacturer:
DURAG GmbH, Hamburg

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

Measuring ranges during performance testing:

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

* corresponds to 0–500 SL

Compo-nent	Supplementary range			Unit
Dust	0 – 1,000	0 – 4,000	0 – 20,000	SL

Software versions:
D-R 808: 02.00R0002
D-ISC 100: 01.04R0017
D-ESI 100: 1.1.017

Restrictions:
None

Notes:
1. The maintenance interval is three months.
2. The measuring system comes with either of the following: D-ISC 100 evaluation unit, D-TB 200 supply unit or D-TB 100 supply unit.
3. The measuring system needs to be supplied with purge air (compressed air) via the D-TB 200 supply unit or via an external source.
4. The D-ISC 100 universal control unit has the following interfaces: Modbus RTU and Modbus TCP according to VDI 4201 parts 1 and 3 (EIA-485, serial und TCP/IP, Ethernet).
5. The D-R 808 measuring system has the following interfaces: digital Modbus RTU according to VDI 4201 parts 1 and 3 (EIA-485, serial).
6. When combined with the D-ISC 100 universal control unit, the D-R 808 measuring system's Modbus interface cannot be used. Instead, the interface of the D-ISC 100 universal control unit is used.

7. When operated without the D-ISC 100 universal control unit, the measuring system is controlled via a standard PC/notebook/tablet running the D-ESI 100 software.
8. Supplementary testing (extension of the maintenance interval) as regards Federal Environment Agency notice of 22 February 2017 (BAnz AT 15.03.2017 B5, chapter I number 2.1).

Test Report:

TÜV Rheinland Energy GmbH, Cologne
Report no.: 936/21232768/C dated 2 March 2017

Certified product

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

The D-R 808 is a dust monitor operating on the basis of the scattered light principle. The measuring system is an advancement of the D-R 800 system already certified to EN 15267 manufactured by DURAG GmbH. The D-R 808 uses the principle of forward scattering. Focussed modulated light of a red laser diode beams through the measurement volume. Light scattered as a result of forward scattering is captured with a highly sensitive detector and electronically evaluated. The measured intensity of scattered light is proportional to the dust concentration in the flue gas duct. After a gravimetric calibration the relationship between the scattered light units and the dust concentration can be determined. The D-R 808 is equipped with zero point and span point measurement and determination of soiling for the purpose of functional checks.

The measuring system comprises the following components:

D-R 808 measurement probe and

- Electronic D-TB 100 connection box for voltage supply or
- D-TB 200 supply unit with blower purge or
- Universal D-ISC 100 control panel.

When using the D-TB 100 or the D-TB 200 connection box, the D-R 808 measuring system is controlled via a PC with control software. The universal D-ISC 100 control panel allows operating the measuring system without a PC. When using the D-TB 100 and the D-ISC 100 connection devices, the measuring system needs to be equipped with an external purge air supply, e.g. pressured air with a class 1 specification in accordance with ISO 8573-1:2010.

The connection boxes mentioned function as connection unit with signal transfer without actually influencing processing of the measured values. The D-TB 200 connection box additionally provides purge air supply. The generation of measured values and all measurement relevant calculations (incl. analogue and digital generation of measured values) take place in the measurement head itself. The measuring system has a digital interface in accordance with VDI 4201 part 1 and 3 (EIA-485, serial and TCP/IP, Ethernet).

The measuring system is available with two different lengths of the probe (probe length 400 mm and 800 mm). While the two versions differ in terms of probe length, they are otherwise identical. This particularly applies to the measuring gap and the measured volume.

The measuring probe can be adapted in terms of the direction of connectors in relation to the flow and the situation at the waste gas duct. Thus, purge air supply maybe provided horizontally for example or electrical connectors may face downward. In any case, the flow direction determines the position of the measurement volume.

During performance testing, the averaging time for the measured value was set to 30s.

In addition to the automatic functions zero point check, span checks and contamination check, it is possible to perform manual linearity tests. This is effected by pluggable opacity filters. As long as there is no excess pressure in the measurement channel, the instrument does not have to be removed from the measurement cess for this. For the filter test, the filter holder is screwed into the cleaning opening opposite the purge air connection. The measurement then uses ND filters which can be inserted into the holder.

The current software versions are:
D-R 808: 02.00R0002
D-ISC 100: 01.04R0017
D-ESI 100: 1.1.017.

The current version of the operation manual is 10013349-00-01 dated 18 August 2016.

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**.

Certification of the D-R 808 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. 0000053803: 25 April 2017
Expiry date of the certificate: 14 March 2022

Test report: 936/21232768/B dated 12 October 2016
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 15.03.2017 B6, chapter I no. 2.1
UBA announcement dated 22 February 2017

Supplementary testing according to EN 15267

Certificate no. 0000053803_01: 08 September 2017
Expiry date of the certificate: 14 March 2022

Test report: 936/21232768/C dated 2 March 2017
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 31.07.2017 B12, chapter I number 1.2
UBA announcement dated 13 July 2017

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

Measuring system					
Manufacturer			DURAG GmbH		
AMS designation			D-R 808		
Serial number of units under test			484/485/812/813/814/815		
Measuring principle			Scattered light		
Test report			936/21232768/C		
Test laboratory			TÜV Rheinland		
Date of report			2017-03-02		
Measured component			Dust		
Certification range			0 - 7.5 mg/m³		

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.114	mg/m³	0.013	(mg/m³)²
Lack of fit	u_{lof}	0.030	mg/m³	0.001	(mg/m³)²
Zero drift from field test	$u_{d,z}$	-0.030	mg/m³	0.001	(mg/m³)²
Span drift from field test	$u_{d,s}$	-0.056	mg/m³	0.003	(mg/m³)²
Influence of ambient temperature at span	u_t	0.030	mg/m³	0.001	(mg/m³)²
Influence of supply voltage	u_v	0.030	mg/m³	0.001	(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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.15	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.30	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 5 mg/m³**	**6.0**
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