

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000040201

Certified AMS: D-R 320 for dust

Manufacturer: DURAG GmbH
Kollaustraße 105
22453 Hamburg
Germany

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).



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000040201


Publication in the German Federal Gazette
(BAnz.) of 01 April 2014

German Federal Environment Agency
Dessau, 29 April 2014


i. A. Dr. Marcel Langner

This certificate will expire on:
31 March 2019

TÜV Rheinland Energie und Umwelt GmbH
Cologne, 28 April 2014


ppa. Dr. Peter Wilbring

www.umwelt-tuv.de / www.eco-tuv.com
teu@umwelt-tuv.de
Tel. +49 221 806-5200

TÜV Rheinland Energie und Umwelt GmbH
Am Grauen Stein
51105 Cologne

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

Test report:	936/21222219/A of 11 October 2013
Initial certification:	01 April 2014
Expiry date:	31 March 2019
Publication:	BAnz AT 01 April 2014 B12, chapter I, No. 1.2

Approved application

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III, at waste incineration plants according to Directive 2010/75/EU, chapter IV and other plants requiring official approval. The tested ranges have been chosen with respect to 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 three-month field test at a municipal waste incinerator.

The AMS is approved for an ambient temperature range of -40 °C to +60 °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 936/21222219/A of 11 October 2013 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 01 April 2014 B12, chapter I, No. 1.2, Announcement by UBA from 27 February 2014)

AMS designation:

D-R 320 for dust

Manufacturer:

DURAG GmbH, Hamburg

Field of application:

For measurements at plants requiring official approval (Directive 2010/75/EU on industrial emissions, chapter III and IV)

Measuring ranges during the performance test:

Component	Certification range	Unit
dust	0 – 7.5 *	mg/m ³

* this corresponds to 0 to 500 SL

Component	Supplementary ranges				Unit
dust	0 - 1000	0 - 4000	0 - 20000	0 - 100	SL

Software versions:

D-R 320: 01.00R000
D-ISC 100: 01.01R0000
D-ESI 100: 1.0.331

Restrictions:

None

Notes:

1. The maintenance interval is four weeks.
2. The AMS can be used with either the D-TB 100 supply unit or the D-TB 200 supply unit or with the evaluation unit D-ISC 100.
3. If the AMS is used with the supply unit D-TB 100 or with the supply unit D-TB 200, the AMS shall be operated using the D-ESI software on a customary PC.
4. If the AMS is used with the supply unit D-TB 100 or with the evaluation unit D-ISC 100, external purge air supply is necessary.
5. The D-R 320 AMS is fitted with the Modbus (EIA-485, series) digital interface in accordance with VDI 4201 Sheet 1 and 3.
6. When using the D-R 320 measuring system with the D-ISC 100 universal control unit, the Modbus interface in accordance with VDI 4201 Sheet 1 and 3 cannot be used.
7. The D-ISC 100 universal control unit is fitted with the Modbus digital interface in accordance with VDI 4201 Sheet 1 and 3 (EIA-485, series and TCP/IP, Ethernet).
8. The performance criterion as related to the correlation coefficient R^2 of the calibration function according to EN 15267-3 was not fulfilled.

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report No.: 936/21222219/A of 11 October 2013

Certified product

This certificate applies to automated measurement systems conforming to the following description: The D-R 320 measuring system uses the principle of optical light scattering (backscattering) to measure dust. Measurements are made contact-free, continuous and without sampling in the flue gas flow above dewpoint. The red light from a laser diode is sent into the flue gas duct and illuminates the dust particles in the measuring volume. The light is scattered by the dust particles in the measuring volume and the light scattered backwards is detected by a photodiode. 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 consists of the following components:

- D-R 320 M measuring head
and
- D-TB 100 electrical connection box for power supply
or
- D-TB 200 supply unit with integrated purge air blower
or
- D-ISC 100 universal control unit

When using either of the connection boxes D-TB 100 or D-TB 200, the D-R 320 measuring system is operated via PC by means of the D-ESI 100 control software. The D-ISC 100 control unit allows for operation of the AMS without a PC and may also provide additional data outputs. When using the connection units D-TB 100 and D-ISC 100, the measuring system needs to be fitted with an external purge air supply, for instance compressed air class 1 in accordance with ISO 8573-1:2010.

The connection boxes are merely used for mains supply, signal transmission (without affecting the actual processing of measured values), and purge air supply (D-TB 200 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 in the range of 70 to 450 mm distance from the aperture. As far as the variant for wider measurement channels is concerned, the measuring volume is in the range of 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). Linearity checks can be performed by means of 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 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 D-R 320 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. 0000040201: 29 April 2014

Expiry date of the certificate: 31 March 2019

Test report: 936/21222219/A of 11 October 2013
TÜV Rheinland Energie und Umwelt GmbH, Cologne

Publication: BAnz AT 01 April 2014 B12, chapter I, No. 1.2
Announcement by UBA from 27 February 2014

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

Measuring system

Manufacturer	DURAG GmbH
AMS designation	D-R 320
Serial number of units under test	1235301 / 1235302 / 1236093 / 1236094
Measuring principle	scattered light measuring (reverse scattering)

Test report

Test laboratory	TÜV Rheinland
Date of report	2013-10-11

Measured component

Certification range	Dust 0 - 7.5 mg/m ³
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Calculation of the combined standard uncertainty

Tested parameter

			u^2
Standard deviation from paired measurements under field conditions *	u_D	0.100 mg/m ³	0.010 (mg/m ³) ²
Lack of fit	u_{lof}	-0.030 mg/m ³	0.001 (mg/m ³) ²
Zero drift from field test	$u_{d,z}$	0.070 mg/m ³	0.005 (mg/m ³) ²
Span drift from field test	$u_{d,s}$	-0.080 mg/m ³	0.006 (mg/m ³) ²
Influence of ambient temperature at span	u_t	0.020 mg/m ³	0.000 (mg/m ³) ²
Influence of supply voltage	u_v	0.060 mg/m ³	0.004 (mg/m ³) ²
Influence of sample gas pressure	u_p	0.000 mg/m ³	0.000 (mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.061 mg/m ³	0.004 (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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.17 mg/m ³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.34 mg/m ³

Relative total expanded uncertainty

Requirement of 2010/75/EC

Requirement of EN 15267-3

U in % of the ELV 5 mg/m³	6.8
U in % of the ELV 5 mg/m³	30.0
U in % of the ELV 5 mg/m ³	22.5