

# CERTIFICATE

## of Product Conformity (QAL1)

Certificate No.: 0000040201\_01

**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).

The present certificate replaces Certificate No. 0000040201 of 29 April 2014



Suitability Tested  
EN 15267  
QAL1 Certified  
Regular  
Surveillance

www.tuv.com  
ID 0000040201

Publication in the German Federal Gazette  
(BAnz.) of 5 August 2014

German Federal Environment Agency  
Dessau, 9 September 2014



i. A. Dr. Marcel Langner

This certificate will expire on:  
31 March 2019

TÜV Rheinland Energie und Umwelt GmbH  
Cologne, 8 September 2014



ppa. Dr. Peter Wilbring

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

<b>Test report:</b>	936/21222219/B of 2 April 2014
<b>Initial certification:</b>	1 April 2014
<b>Expiry date:</b>	31 March 2019
<b>Publication:</b>	BAnz AT 5 August 2014 B11, chapter I, no. 1.1

### **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 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 six-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/B of 2 April 2014 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 5 August 2014 B11, chapter I, no. 1.1 and chapter IV, correction 1  
UBA announcement of 17 July 2014



**AMS designation:**

D-R 320 for dust

**Manufacturer:**

DURAG GmbH, Hamburg

**Field of application:**

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

**Measuring ranges during the performance test:**

Component	Certification range	Unit
dust	0 - 7.5*	mg/m <sup>3</sup>

\* this corresponds to 0 to 500 SL

Component	Supplementary ranges				Unit
dust	0 - 1000	0 - 4000	0 - 20.000	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 three months.
2. The AMS can be used with the D-ISC 100 evaluation unit, the D-TB 200 supply unit or the D-TB 200 supply unit.
3. The AMS may be supplied with purge air either by way of the D-TB 200 supply unit or an external purge air supply.
4. The D-ISC 100 universal control unit has a digital Modbus RTU interface and a Modbus TCP in accordance with VDI 4201 Sheets 1 and 3 (EIA-485, serial and TCP/IP, Ethernet).
5. The D-R 320 measuring system is fitted with the Modbus RTU digital interface in accordance with VDI 4201 Sheets 1 and 3 (EIA-485, serial).
6. When using the D-R 320 measuring system with the D-ISC 100 universal control unit, the Modbus interface of the D-R 320 measuring system cannot be used. Instead the Modbus digital interface of the D-ISC 100 universal control unit is used.
7. When using the AMS without the D-ISC 100 evaluation unit, the AMS shall be operated by means of the D-ESI 100 software on a customary PC / notebook / tablet.
8. The performance criterion as related to the determination coefficient  $R^2$  of the calibration function according to EN 15267-3 was not fulfilled.
9. Supplementary testing (extension of the maintenance interval) as regards Federal Environmental Agency (UBA) notices of 27 February 2014 (Federal Gazette (BAnz) AT 1 April 2014 B12, chapter I Number 1.2).

**Test report:**

TÜV Rheinland Energie und Umwelt GmbH, Cologne  
Report no.: 936/2122219/B of 2 April 2014

**1 Adjustment of the notice of 27 February, 2014 of the Federal Environment Agency (BAnz AT 1 April, 2014 B12, chapter I number 1.2)**

The correct test report number for the performance test of the D-R 320 dust monitor manufactured by DURAG GmbH is: 936/2122219/A

Statement of TÜV Rheinland Energie und Umwelt GmbH of 29 April 2014

**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 back 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 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). 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 1 April 2014 B12, chapter I, no. 1.2  
UBA announcement of 27 February 2014

**Supplementary testing according to EN 15267**

Certificate no. 0000040201\_01: 9 September 2014  
Expiry date of the certificate: 31 March 2019  
Test report: 936/21222219/B of 2 April 2014  
TÜV Rheinland Energie und Umwelt GmbH, Cologne  
Publication: BAnz AT 5 August 2014 B11, chapter I, no. 1.1  
UBA announcement of 17 July 2014  
Correction:  
Publication: BAnz AT 5 August 2014 B11, chapter IV, no. 1 (correction report number)  
UBA announcement of 17 July 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 analysis (back scattering)

**Test report**

Test laboratory	936/21222219/B
Date of report	TÜV Rheinland
	2014-04-02

**Measured component**

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

**Tested parameter**

			$u^2$
Standard deviation from paired measurements under field conditions *	$u_D$	0.090 mg/m <sup>3</sup>	0.008 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	$u_{lof}$	-0.030 mg/m <sup>3</sup>	0.001 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	$u_{d,z}$	-0.078 mg/m <sup>3</sup>	0.006 (mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	$u_{d,s}$	-0.095 mg/m <sup>3</sup>	0.009 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	$u_t$	0.020 mg/m <sup>3</sup>	0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	$u_v$	0.060 mg/m <sup>3</sup>	0.004 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas pressure	$u_p$	0.000 mg/m <sup>3</sup>	0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$	0.061 mg/m <sup>3</sup>	0.004 (mg/m <sup>3</sup> ) <sup>2</sup>

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

Combined standard uncertainty ( $u_c$ )	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.18 mg/m <sup>3</sup>
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.35 mg/m <sup>3</sup>

**Relative total expanded uncertainty**

Requirement of 2010/75/EU	<b>U in % of the ELV 5 mg/m<sup>3</sup></b>	<b>7.0</b>
Requirement of EN 15267-3	<b>U in % of the ELV 5 mg/m<sup>3</sup></b>	<b>30.0</b>
	<b>U in % of the ELV 5 mg/m<sup>3</sup></b>	<b>22.5</b>