CERTIFICATE

of Product Conformity (QAL1)

Certificate No: 0000040201_05

Certified AMS:	D-R 320 for dust
Manufacturer:	DURAG GmbH Kollaustr. 105 22453 Hamburg Germany
Test Institute:	TÜV Rheinland Energy & Environment 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 (2023), EN 15267-3 (2007), as well as EN 14181 (2004).

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 11 pages).
The present certificate replaces certificate 0000040201_04 dated 1 July 2020.

Suitability Tested
EN 15267
QAL1 Certified
Regular Surveillance

www.tuv.com
ID 0000040201

Publication in the German Federal Gazette (BAnz) of 26 August 2015

German Environment Agency

Dessau, 27 June 2025

This certificate will expire on:
30 June 2030

TÜV Rheinland Energy & Environment GmbH
Cologne, 26 June 2025

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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 the certificate D-PL-11120-02-00.

Test report:	936/21225028/B dated 2 March 2015
Initial certification:	1 April 2014
Expiry date:	30 June 2030
Certificate:	Renewal (of previous certificate 0000040201_04 of 1 July 2020 valid until 30 June 2025)
Publication:	BAnz AT 26.08.2015 B4, chapter I No. 1.1

Approved application

The tested AMS is suitable for use at plants according to Directive 2010/75/EC, chapter III (combustion plants / 13th BImSchV:2013), Directive 2010/75/EC, chapter IV (waste incineration plants / 17th BImSchV:2013), Directive 2015/2193/EC (44th BImSchV:2022), TA Luft:2002, 30th BImSchV:2009 and 27th BImSchV:2013. 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 twelve month field test at a waste incineration.

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 emission 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.

Note

The legal regulations mentioned correspond to the current state of legislation during certification. Each user should, if necessary, in consultation with the competent authority, ensure that this AMS meets the legal requirements for the intended use. In addition, it cannot be ruled out that legal regulations governing the use of a measuring device for emission monitoring may change during the lifetime of the certificate.

Basis of the certification

This certification is based on:

- Test report 936/21225028/B dated 2 March 2015 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 26.08.2015 B4, chapter I No. 1.1, Announcement by UBA dated 22 July 2015:

AMS designation:
D-R 320 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 the performance test:

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

*equivalent to 0 – 500 SL

Component	supplementary ranges				Unit
Dust	0 – 100	0 – 1,000	0 - 4,000	0 – 20,000	SL

Software version:
D-R 320: 01.02R000
D-ISC 100: 01.03R0000
D-ESI 100: 1.1.015

Restrictions:
None

Notes:
1. The maintenance interval is six months.
2. The AMS can be used with the D-ISC 100 evaluation unit, the D-TB 200 supply unit or the D-TB 100 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 parts 1 and 3 (EIA-485, serial and TCP/IP, Ethernet).
5. The D-FL measuring system has a digital Modbus RTU interface in accordance with VDI 4201 parts 1 and 3.
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. 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. Supplementary test (extension of maintenance interval) as regards Federal Environment Agency notice of 17 July 2014 (BAnz 05.08.2014 chapter I number 1.1 and chapter IV correction 1).

Test Institute:
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report No.: 936/21225028/B dated 2 March 2015

Publication in the German Federal Gazette: BAnz AT 26.03.2018 B8, Chap. V notification 24, Announcement by UBA dated 21 February 2018:

24 Notification as regards Federal Environment Agency notice of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter I number 1.1)

The current software versions of the D-R 320 measuring system for dust manufactured by DURAG GmbH are as follows:
D-R 320: 01.10.R0001
D-ISC 100: 01.04R0007
D-ESI 100: 01.10R0007

Versions of approved intermediate versions are as follows:
D-ISC 100: 01.04R0001; 01.04R0004; 01.04R0006
D-ESI 100: 1.1.016; 1.1.017; 1.2.003

In addition to the existing XPPower DNR240PS24-I power supply, the Phoenix Contact QUINT4-PS/1AC/24DC/10 power supply may be used for the D-ISC 100.

Statement by TÜV Rheinland Energy GmbH dated 8 December 2017

Publication in the German Federal Gazette: BAnz AT 26.03.2019 B7, Chap. IV notification 4, Announcement by UBA dated 27 February 2019:

4 Notification as regards Federal Environment Agency notices of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter I number 1.1) and of 21 February 2018 (BAnz AT 26.03.2018 B8, chapter V notification 24)

The current software versions of the D-R 320 for dust manufactured by DURAG GmbH are:
D-R 320: 01.10.R0001
D-ISC 100: 02.02R0066
D-ESI 100: 01.10R0007

The following software versions have been approved accordingly:
D-ISC 100: 02.00R0048, 02.02R0020

The measuring system may also be equipped with a revised version of the D-ISC 100 control unit. The latter is available in the following versions:
– D-ISC 100 M (standard)
– D-ISC 100 C (compact housing)
– D-ISC 100 P (with purge air blower)
– D-ISC 100 R (housing for installation in a 19” rack)

Furthermore, the D-ISC 100 control unit provides a Modbus interface in accordance with guidelines VDI 4201 part 1. Report No. 936/21242380/A issued by TÜV Rheinland Energy GmbH of 14 September 2018 presents the results on testing the revised D-ISC 100 control unit.

Statement issued by TÜV Rheinland Energy GmbH dated 14 January 2019

Publication in the German Federal Gazette: BAnz AT 24.03.2020 B7, Chap. IV notification 14, Announcement by UBA dated 24 February 2020:

14 Notification as regards Federal Environment Agency (UBA) notices of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter I number 1.1) and of 27 February 2019 (BAnz AT 26.03.2019 B7, chapter IV notification 4)

The latest software versions of D-R 320 measuring system manufactured by DURAG GmbH are:
D-R 320: 01.10.R0001
D-ISC 100: 02.02R0066
D-ESI 100: 01.11R0018
D-ESI 100 software version 01.11R0017 may also be used.

Statement issued by TÜV Rheinland Energy GmbH dated 1 October 2019

Publication in the German Federal Gazette: BAnz AT 28.07.2022 B4, Chap. III notification 5, Announcement by UBA dated 28 June 2022:

5 Notification as regards Federal Environment Agency (UBA) notices of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter I number 1.1) and of 24 February 2020 (BAnz AT 24.03.2020 B7, chapter IV notification 14)

The current software versions of the measuring device D-R 320 for dust of the company DURAG GmbH are:
D-R 320: 01.10.R0001
D-ISC 100: 02.02R0073
D-ESI 100: 01.11R0018
The D-ESI 100 software version 01.11R0017 can also be used.

Statement by TÜV Rheinland Energy GmbH dated 13 April 2022

Publication in the German Federal Gazette: BAnz AT 10.05.2024 B7, Chap. V notification 7, Announcement by UBA dated 19 March 2024:

7 Notification as regards Federal Environment Agency (UBA) notices of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter I number 1.1) and of 28 June 2022 (BAnz AT 28.07.2022 B4, chapter III notification 5)

The D-R 320 measuring system for dust from DURAG GmbH is also suitable for use in plants in accordance with the 44th BImSchV.

Statement by TÜV Rheinland Energy GmbH dated 23 September 2023

Publication in the German Federal Gazette: BAnz AT 31.10.2024 B9, Chap. IV notification 15, Announcement by UBA dated 31 August 2024:

15 Notification as regards Federal Environment Agency (UBA) notices of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter I number 1.1) and of 19 March 2024 (BAnz AT 10.05.2024 B7, chapter V notification 7)

The current software versions for the D-R 320 measuring system for dust from the company DURAG GmbH are:
D-R 320: 01.10R0002
D-ISC 100: 02.02R0073
D-ESI 100: 01.11R0018

Statement by TÜV Rheinland Energy & Environment GmbH dated 10 May 2024

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 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:

- 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 Energy & Environment 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 certification mark may be applied to the product or used in advertising materials for the certified product.

This document as well as the certification mark remains property of TÜV Rheinland Energy & Environment GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the certificate and on requests of the TÜV Rheinland Energy & Environment 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**.

History of documents
Certification of D-R 320 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_00: 29 April 2014
Expiry date of the certificate: 31 March 2019
Test report: 936/21222219/A dated 11 October 2013
TÜV Rheinland Energie und Umwelt GmbH
Publication: BAnz AT 01.04.2014 B12, chapter I number 1.2
UBA announcement dated 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 dated 2 April 2014
TÜV Rheinland Energie und Umwelt GmbH
Publication: BAnz AT 05.08.2014 B11, chapter I number 1.1
UBA announcement dated 17 July 2014

Correction
Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 29 April 2014
Publication: BAnz AT 05.08.2014 B11, chapter IV correction 1
UBA announcement dated 17 July 2014
(corr. name of report)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 30 September 2014
Publication: BAnz AT 02.04.2015 B5, chapter IV notification 29
UBA announcement dated 25 February 2015
(Software changes)

Supplementary testing according to EN 15267
Certificate No. 0000040201_02: 30 September 2015
Expiry date of the certificate: 31 March 2019
Test report: 936/21225028/B dated 2 March 2015
TÜV Rheinland Energie und Umwelt GmbH
Publication: BAnz AT 26.08.2015 B4, chapter I number 1.1
UBA announcement dated 22 July 2015

Notifications
Statement issued by TÜV Rheinland Energy GmbH dated 8 December 2017
Publication: BAnz AT 26.03.2018 B8, chapter V notification 24
UBA announcement dated 21 February 2018
(Soft- and hardware changes)

Renewal of certificates
Certificate No. 0000040201_03: 1 April 2019
Expiry date of the certificate: 30 June 2020

Notifications
Statement issued by TÜV Rheinland Energy GmbH dated 14 September 2018
Test report: 936/21242380/A dated 14 September 2018
Publication: BAnz AT 26.03.2019 B7, chapter IV notification 4
UBA announcement dated 27 February 2019
(Hard and software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 1 October 2019
Publication: BAnz AT 24.03.2020 B7, chapter IV notification 14
UBA announcement dated 24 February 2020
(Software changes)

Renewal of certificates
Certificate No. 0000040201_04: 1 July 2020
Expiry date of the certificate: 30 June 2025

Notifications
Statement issued by TÜV Rheinland Energy GmbH dated 13 April 2022
Publication: BAnz AT 28.07.2022 B4, chapter III notification 5
UBA announcement dated 28 June 2022
(Software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 23 September 2023
Publication: BAnz AT 10.05.2024 B7, chapter V notification 7
UBA announcement dated 19 March 2024
(Comply with 44. BImSchV)

Statement issued by TÜV Rheinland Energy & Environment GmbH dated 10 May 2024
Publication: BAnz AT 31.10.2024 B9, chapter IV notification 15
UBA announcement dated 31 August 2024
(Software changes)

Renewal of certificates
Certificate No. 0000040201_05: 27 June 2025
Expiry date of the certificate: 30 June 2030

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			936/21225028/B		
Test laboratory			TÜV Rheinland		
Date of report			2015-03-02		
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	0.090	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 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/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