Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000081158_00

Certified AMS:	D-R 909 for dust
Manufacturer:	DURAG GmbH Kollaustr. 105 22453 Hamburg Germany
Test Institute:	TÜV Rheinland Energy 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 (2009), EN 15267-3 (2007) as well as EN 14181 (2014).

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 7 pages).

TÜVRheinland® CERTIFIED

Suitability Tested
EN 15267
QAL1 Certified
Regular Surveillance

www.tuv.com
ID 0000081158

Publication in the German Federal Gazette (BAnz) of 02 August 2023

This certificate will expire on: 01 August 2028

German Environment Agency
Dessau, 05 September 2023

TÜV Rheinland Energy GmbH
Cologne, 04 September 2023

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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:	936/21255596/B dated 10 February 2023
Initial Certification	02 August 2023
Expiry date:	01 August 2028
Publication:	BAnz AT 02.08.2023 B7, chapter I No. 1.2

Approved application
The tested AMS is suitable for use at plants according to Directive 2010/75/EC, chapter III (combustion plants / 13th BImSchV:2021), chapter IV (waste incineration plants / 17th BImSchV:2021), Directive 2015/2193/EC (44th BImSchV:2022), 30th BImSchV:2019, TA Luft:2021 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 six month field test at a power plant.

The AMS is approved for an ambient temperature range of -40 ° 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 936/21255596/B dated 10 February 2023 of 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 02.08.2023 B7, chapter I No. 1.2, Announcement by UBA dated 05 July 2023:

AMS designation:
D-R 909 for dust

Manufacturer:
DURAG GmbH, Hamburg, Germany

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

Measuring ranges during the performance test:

Component	Certification range	Additional range			Unit
Dust	0 - 7,5	0 - 15	0 - 45	0 - 100	mg/m³

Software versions:
D-R 909: 01.04R0580
D-ISC: 02.02R0073
D-ESI: 01.11R0018

Restrictions:
None

Notes:
1. The maintenance interval is three months.
2. The measuring system is usually operated and controlled with the D-ESI 100 software running on a Windows PC. Alternatively, an universal control unit (D-ISC 100) can be used.
3. The measuring system also meets the minimum requirements in the temperature range from -40 °C to +60 °C.
4. The suitability of the measuring system for use in systems with significantly fluctuating waste gas velocities must be evaluated on site when checking for proper installation.

Test institute: TÜV Rheinland Energy GmbH, Cologne
Report No.: 936/21255596/B dated 10 February 2023

Certified product

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

The D-R 909 measuring device is an extractive dust measuring system whose sampling probe is placed directly in the flue gas stream and continuously extracts gas from it through the probe tip. The gas flows through the probe, is heated in the process and then diluted with air. The sample gas prepared in this way is passed through the measuring cell. There, the sample gas is surrounded by purge air. This ensures that the sample gas flows directly through the measuring cell and is not dispersed within it. This creates a clearly defined measuring volume through which the light from the laser shines. Dust is measured in the measuring cell according to the scattered light principle. The dust particles contained in the sample gas scatter the laser light in the forward direction onto a photodiode, which measures the intensity of the scattered light. From this, the measuring system calculates the dust concentration. In addition to the dilution air and the purge air, the supply unit also provides the so-called propellant air. This ensures that the sample gas is directed back into the duct through the probe flange after leaving the measuring cell.

The measuring system is usually operated and controlled using the D-ESI 100 software, which runs on a Windows PC. Alternatively, an universal operating unit (D-ISC 100) can be used for this purpose.

A sample gas flow is taken from the stack. According to the set operating parameters, this is mixed with dilution air, if necessary, and then heated in the probe heater. The sample gas prepared in this way is fed to the dust measurement. To prevent contamination of the optical interfaces, the dust measurement is supplied with purge air. This is branched off from the motive air mass flow and the required purge air temperature is ensured by the associated conditioning.

The conveyance of the sample gas mass flow through the dust measurement and its return to the stack is made possible by the ejector. This is driven by a motive air mass flow, which is also heated to prevent condensation.

The scattered light cell installed in the D-R 909 diverts a partial beam from the laser beam via the double reflection of the light at the boundary surfaces of a prism and guides it past the measuring volume to a second photodiode. Both light beams (measurement and reference light) pass through the same optical interfaces (window and lens).

This reference light beam is used to measure and compensate for possible contamination of the optical interfaces. At the same time, it is used for reference point measurement, with the laser power then being attenuated. The zero point measurement is realized with the D-R 909 by the transition of the extraction system into the backflush mode. The scattered light then measured corresponds to the zero point signal.

Linearity testing/feeding of reference material is realized by introducing externally traceable calibrated optical filters of different transmittances into the laser beam of the scattered light cell.

The D-R 909 is equipped with an automatic sensor check. The following control measurements are carried out one after the other and in the sequence shown: Contamination measurement, zero point measurement, reference point measurement and background light correction.

Automated execution takes place when the automatic control cycle is activated. The interval for the automatic control cycle can be set as required.
The reference light beam is used to check compensation for possible contamination of the optical interfaces.

The measuring system consists of two main components, a measuring unit "D-R 909 M" and a supply unit "D-R 909 SU". Both are installed on the outside of the channel, with the sampling probe of the measuring unit projecting into the channel. There it takes samples from the passing gas for measuring the dust concentration contained in the gas.

The measuring unit contains the components probe incl. probe heating, dust measurement, dilution air heating, purge air preparation, motive air heating and ejector. The supply unit includes the components dilution air compressor, driving air compressor, filter and power supply. Both units are connected via hose connections for gas supply and cable connections for power supply and data transmission.

The measuring system consists of the following components:

- Measuring unit contains the components probe (including probe heating, dust measurement, dilution heating, purge air preparation, motive air heating and ejector)
- Supply unit includes the components dilution air compressor, driving air compressor, filter and power supply
- Hose connections between the measuring units
- Windows PC with D-ESI 100 software or D-ISC 100 operating 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 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 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 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 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 909 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. 0000081158_00: 05 September 2023
Expiry date of the certificate: 01 August 2028
Test report: 936/21255596/B dated 10 February 2023
TÜV Rheinland Energy GmbH
Publication: BAnz AT 02.08.2023 B7, chapter I number 1.2
UBA announcement dated 5 July 2023

Umwelt Bundesamt

Certificate:
0000081158_00 / 05 September 2023

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

Measuring system					
Manufacturer			Durag		
AMS designation			D-R909		
Serial number of units under test			1304751/1304752		
Measuring principle			Streulicht extraktiv		
Test report			936/21255596/B		
Test laboratory			TÜV Rheinland		
Measured component			Dust		
Certification range			0 - 7.5	mg/m³	
Calculation of the combined standard uncertainty					
Tested parameter				u^2	
	u_D	0.114	mg/m³	0.013	(mg/m³)²
Lack of fit	u_{lof}	0.006	mg/m³	0.000	(mg/m³)²
Zero drift from field test	$u_{d,z}$	-0.048	mg/m³	0.002	(mg/m³)²
Span drift from field test	$u_{d,s}$	-0.039	mg/m³	0.002	(mg/m³)²
Influence of ambient temperature at span	u_t	0.058	mg/m³	0.003	(mg/m³)²
Influence of supply voltage	u_v	0.006	mg/m³	0.000	(mg/m³)²
Influence of sample gas flow	u_b	0.300	mg/m³	0.090	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.061	mg/m³	0.004	(mg/m³)²
Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$			0.34	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$			0.66	mg/m³
Relative total expanded uncertainty	**U in % of the ELV 5 mg/m³**				**13,2**
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

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