PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

D-R 320 particulate analyser

Manufactured by:

DURAG GmbH

Kollaustraße 105
22453
Hamburg
Germany

Has been assessed by Sira Certification Service
And for the conditions stated on this certificate complies with:

MCERTS Performance Standards for Continuous Emission Monitoring Systems, Version 3.4 dated July 2012
EN15267-3:2007,
& QAL 1 as defined in EN 14181: 2004

Certification Ranges :

Dust 0 to 7.5 mg/m^3	0 to 500 SL
	0 to 1,000 SL
	0 to 4,000 SL
	0 to 20,000 SL
	0 to 100 SL

Project No.	:	70004374
Certificate No	:	Sira MC140253/00
Initial Certification	:	22 July 2014
This Certificate issued	:	22 July 2014
Renewal Date	:	21 July 2019

E Jarvis BSc (Hons)
Deputy Certification Manager

MCERTS is operated on behalf of the Environment Agency by

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Certificate Contents

Approved Site Application

Any potential user should ensure, in consultation with the manufacturer, that the monitoring system is suitable for the intended application. For general guidance on monitoring techniques refer to the Environment Agency Monitoring Technical Guidance Notes available at www.mcerts.net

On the basis of the assessment and the ranges required for compliance with EU Directives this instrument is considered suitable for use on waste incineration and large coal-fired combustion plant applications. This CEM has been proven suitable for its measuring task (parameter and composition of the flue gas) by use of the QAL 1 procedure specified in EN14181, for LCPD and WID applications for the ranges specified. The lowest certified range for each determinand shall not be more than 1.5X the daily average emission limit value (ELV) for WID applications, and not more than 2.5X the ELV for LCPD and other types of application.

The field trial took place in the exhaust gas of an incineration plant for 6 months.

Basis of Certification

This certification is based on the following Test Report(s) and on Sira's assessment and ongoing surveillance of the product and the manufacturing process:

TÜV Rheinland Report Number: 936/21222219/B dated 02 April 2014

Product Certified

The D-R 320 particulate measuring system consists of the following parts:

- Measuring head D-R 320 M (Version "near" or "far")
- Supply unit D-TB 200 with built-in purge air or;
  Electronic control unit D-ISC 100 or;
  Electrical junction box for power supply D-TB 100.
- If the measuring device is not connected to the electronic control unit D-ISC 100, the software D-ESI 100 must be used to set-up the device used with a standard PC with USB interface.

This certificate applies to all instruments fitted with software version V1.00R0000 D-R 320 (serial number 1,235,301 onwards).

Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: -40°C to +60°C
Instrument IP rating: IP65

Results are expressed as error as a percentage of certification range 0 to 7.5 mg/m^3 (0 to 500 SL), unless otherwise stated.

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time						
Dust (0 to 500 SL)					18s	<200s
Dust (0 to 4,000 SL)					20s	<200s
Dust (0 to 20,000 SL)					19s	<200s
Dust (0 to 100 SL)					19s	<200s
Repeatability standard deviation at zero point						
Dust	0.40					<2.0%
Repeatability standard deviation at reference point						
Dust		0.70			Note 1	<5.0%
Lack-of-fit						
Dust (0 to 500 SL)		-0.80				<2.0%
Dust (0 to 4,000 SL)			-1.4			<2.0%
Dust (0 to 20,000 SL)		0.78				<2.0%
Dust (0 to 100 SL)		-0.70				<2.0%
Influence of ambient temperature zero point						
Dust		-0.80				<5.0%
Influence of ambient temperature reference point						
Dust		0.50				<5.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Influence of voltage variations 190 to 250V Dust			1.0			<2.0%
Influence of vibration (10 to 60Hz (±0.3mm), 60 to 150Hz at 19.6m/s^2)			1.1			To be reported
Measurement uncertainty Dust (For and ELV of 5 mg/m^3)					Guidance - at least 25% below max permissible uncertainty 7.0%	<22.5% (30%)
Calibration function (field) Dust					0.80-0.88 Note 2	>0.90
Response time (field) Dust (0 to 1,000 SL)					20s	<200s
Lack of fit (field) Dust (0 to 1,000 SL)			1.9			<2.0%
Maintenance interval					Note 3	>8 days
Zero and Span drift requirement	The CEMS allows for recording the zero and span point drift and thus complies with the requirements of QAL3 according to EN 14181. The instrument has a means of automatically checking the zero point, span point and contamination. If the allowed adjustment range is exceeded a status signal is set.					Clause 6.13 & 10.13 Manufacturer shall provide a description of the technique to determine and compensate for zero and span drift.

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Change in zero point over maintenance interval Dust			-1.8		Note 4	<3.0%
Change in reference point over maintenance interval Dust				-2.2		<3.0%
Availability					97.5%	>95%
Reproducibility Dust				2.3	Note 4	<3.3%

Note 1: Reported as a % of ELV 5 mg/m^3

Note 2: The value of R^2 was between 0.8 and 0.9; although below the minimum requirement of 0.9, this was caused by the low levels of emissions. Notably, the instrument passed the variability test whilst the uncertainty was also within the required levels.

Note 3: According to EN 15267-3, the measuring system achieved a three month maintenance interval. The manufacturer recommends the following:

Work required in the maintenance interval:

Every four weeks:

- Perform a zero and span control by use of the device's internal cycle
- Visual inspection
- Control of optical surfaces and the purge air supply
- Follow the manufacturer's instructions

Functional test and calibration (AST and QAL2):

- Visual inspection
- Control of optical surfaces and the purge air supply
- Check the linearity with the test instrument (filter wheel with reference filters)
- Check the zero and span drift after 3 months with activated pollution compensation
- Identify the dead and response time
- Check the data transmission (analog and status signals) to the evaluation system

Further details of the functional testing and calibration can be found in EN 14181; In addition the manufacturer's instructions must be observed.

Note 4: Result reported for 0 to 500 SL (certification range), however test conducted over 0 to 1,000 SL and recalculated.

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 the 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 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;

  Either

- D-ISC 100 universal control unit or;
- D-TB 200 supply unit with integrated purge air blower or;
- D-TB 100 electrical connection box for power supply.

When using either of the connection boxes D-TB 100 or D-TB 200, the D-R 320 measuring system is set-up via PC by means of the D-ESI 100 control software. The D-ISC 100 control unit allows for operation and set-up of the AMS without a PC and may also provide additional data outputs. When not using the connection unit D-TB 200, 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.

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 which 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.

General Notes

1. This certificate is based upon the equipment tested. The Manufacturer is responsible for ensuring that on-going production complies with the standard(s) and performance criteria defined in this Certificate. 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 system shall be subject to regular surveillance according to 'Regulations Applicable to the Holders of Sira Certificates'. The design of the product certified is defined in the Sira Design Schedule for certificate No. Sira MC140253/00.

2. If certified product is found not to comply, Sira Certification Service should be notified immediately at the address shown on this certificate.

3. The Certification Marks that can be applied to the product or used in publicity material are defined in 'Regulations Applicable to the Holders of Sira Certificates'.

4. This document remains the property of Sira and shall be returned when requested by the company.