PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

D-R 290 Opacity and Dust Concentration Monitor with measuring head D-R 290 M EC2

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, Revision 3.4 (July 2012)

Certification Ranges :

Dust (optical transmission) 0-15 mg/m^3 *

* ≡ 0 – 0.1 abs. (based on 2 x 5m measuring paths)

Dust (Optical transmission) 0 – 0.2 Absorbance
Dust (Optical transmission) 0 – 0.5 Absorbance
Dust (Optical transmission) 0 – 1.6 Absorbance
Dust (Optical transmission) 0 – 100 Opacity

Project No:	70041387
Certificate No:	Sira MC150278/00
Initial Certification:	21st August 2015
This Certificate Issued:	21st August 2015
Renewal Date:	21st August 2020

Joe Prince
Deputy Certification Manager

MCERTS is operated on behalf of the Environment Agency by

Sira Certification Service
Unit 6, Hawarden Industrial Park
Hawarden, Deeside, CH5 3US
Tel: +44 (0)1244 670 900

Form 1335
Issue 2

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/IED Chapter III and IED Chapter IV 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 IED Chapter IV applications, and not more than 2.5X the ELV for IED Chapter III and other types of application.

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 Group	Report No: 936/801017/A dated January 31 2003
TÜV Rheinland Group	Report No: 936/21212470/B dated October 1 2010
Sira	Report No: C1239 dated July 2006
TÜV Rheinland Group	Report No: 936/21226948/A dated March 2015

Product Certified

The D-R 290 standard system with measuring head D-R 290 M EC2 consists of the following parts:

- Measuring head D-R 290 M EC2
- Reflector D-R 290 R
- 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 D-R 290 with measuring head D-R 290 M EC2 fitted with software version 05.00R0000 onwards (serial number 1242232 onwards).

Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: -20°C to 50°C
Instrument IP rating: IP65

Results are expressed as error % Certification Range, unless otherwise stated.

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time					< 20s Note 1	<200s
Repeatability standard deviation at zero point	0.1					<2.0%
Repeatability standard deviation at reference point	0.1					<5.0%
Lack-of-fit 0 – 0.1 abs. 0 – 0.2 abs. 0 – 0.5 abs. *Grey glass filters* 0 – 100% op. 0 – 1.6 abs. 0 – 0.5		 0.67 0.80 0.66 -0.78 -0.51 	 -1.48			<3.0%
Influence of ambient temperature zero point		-0.5				<5.0%
Influence of ambient temperature reference point	0.2					<5.0%
Influence of voltage variations Zero Span	 -0.1 -0.1					<2.0%
Influence of vibration Zero Span	 0.0	 0.7				<2.0%
Excursion of measurement beam of cross-stack in-situ CEMS			-1.94			<2.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Measurement uncertainty (based on a limit value of 10 mg/m^3)					5.2%	Guidance - at least 25% below max permissible uncertainty 30% (22.5%) in EN15267-3
Calibration function (field)					0.76-0.90 Note 2	>0.90
Response time (field)					< 20s	<200s
Lack of fit (field)	0.47					<3.0%
Maintenance interval					4 weeks	>8 days
Zero and Span drift requirement	The measuring system executes an automatic internal test cycle. There is no re-adjustment. However, compensation of the contamination does take place.					Clause 6.13 & 10.13 Manufacturer shall provide a description of the technique to determine and compensate for zero and span drift.
Change in zero point over maintenance interval	0.12					<3.0%
Change in reference point over maintenance interval	-0.19					<3.0%
Availability					99.4%	>95%
Reproducibility for concentrations			1.9%			<3.3%
Contamination check of in-situ systems					No deviation reported	<2.0%

Note 1: The response time is adjustable between 5 and 1800 seconds. Standard setting for response time is 20s.

Note 2: The calibration function result / R^2 values are between 0.76 and 0.90 due to low dust levels. The CEMS pass the EN14181 criteria, but not the requirement for R^2 specified within EN15267-3. However, this was also due to the low dust levels, where the measurement uncertainty would decrease the value of R^2. The instruments passed the variability test.

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Description

D-R 290 is a dust concentration and opacity monitor. It is designed for monitoring dust concentrations in industrial plants, even across long measurement paths. The D-R 290 operates according to the principle of auto collimation (double-pass). The system measures and evaluates the attenuation of the light beam caused by the dust in the measuring path. Measuring light is produced by a pulsed super wide band diode. The light beam crosses two times the stack diameter.

Temperature and pressure measurements are not part of the standard system and the uncertainty associated with these measurements is not included in the MCERTS calculations.

When not using the electronic control unit D-ISC 100, the D-R 290 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.

The electrical junction box D-TB 100 is merely used for mains supply and signal transmission. 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.

An automatic zero-point and span check cycle is integrated into the measuring head. In aggressive environments measuring head and reflector can be fitted with fail-safe shutters to protect the optics.

The results can be shown in opacity, optical density or as dust concentration in mg/m^3.

The manufacturer states that the D-R 290 is suitable for coal fired or oil fired combustion plants, cement industry, converter plants, asphalt mixing plants, monitoring/controlling of dust filter devices, steel and glass industry, monitoring technical equipment down-stream of filter systems and other type of plant requiring quantitative monitoring of opacity or dust concentrations.

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 V00 for certificate No. Sira MC150278/00

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.