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# PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

## ***D-R 290 Opacity and Dust Concentration Monitor***

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 (January 2011)**

Certification Ranges :

Dust (optical transmission ) 0-15 mg/m<sup>3</sup>\*

\* ≡ 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: 674/0067B  
Certificate No: Sira MC 060073/02  
Initial Certification: 16 June 2006  
This Certificate Issued: 26 October 2011  
Renewal Date: 15 June 2016

Technical Director

*MCERTS is operated on behalf of the Environment Agency by*

## **Sira Certification Service**

12 Acorn Industrial Park, Crayford Road, Crayford  
Dartford, Kent, UK, DA1 4AL  
Tel: 01322 520500 Fax: 01322 520501

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## Approved Site Application

Any potential user should ensure, in consultation with the manufacturer that the emission monitoring system is suitable for the process on which it will be installed.

*For general guidance on stack emission monitoring techniques refer to Environment Agency Technical Guidance Note M2: Monitoring of stack emissions to air. Operators with installations falling under the Large Combustion Plant Directive or Waste Incineration Directive must refer to Technical Guidance Note M20: Quality Assurance of Continuous Emission Monitoring Systems, for guidance on the suitability of CEMS for their installations. M2 and M20 are available on the Agency's website at [www.mcerts.net](http://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 emission limit value (ELV) for WID applications, and not more than 2.5X the ELV for LCPD and other types of application.

The three month field trial was conducted in the flue gas of a waste incineration plant in the untreated gas duct downstream of the precipitators.

## 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

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## Product Certified

The D-R 290 standard system consists of the following parts:

- Measuring head
- Reflector
- Evaluation unit D-R 290 AW
- Welding flanges
- Purge air unit

This certificate applies to all D-R 290 AW fitted with software version P4.37 onwards and all D-R 290 MK fitted with software version 3.21 onwards (serial number 406752 dated 28/06/02 onwards).

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## Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: -20°C to +50°C  
IP rating: IP 65

Unless otherwise stated the evaluation was carried out on the certification range 0 – 15 mg/m<sup>3</sup> ± 0 – 0.1 abs.

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	0.0					<2.0%
Repeatability standard deviation at reference point	0.0					<5.0%
Lack-of-fit 0 – 0.1 abs. 0 – 0.2 abs. 0 – 0.5 abs.  <i>Grey glass filters</i> 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			-1.90			<5.0%
Influence of ambient temperature reference point		0.60				<5.0%
Influence of voltage variations Zero Span	0.5 -0.2					<2.0%
Influence of vibration Zero Span			1.06 1.00			To be reported
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 <sup>3</sup> )					5.2%	Guidance - at least 25% below max permissible uncertainty  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<sup>2</sup> 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<sup>2</sup> specified within EN15267-3. However, this was also due to the low dust levels, where the measurement uncertainty would decrease the value of R<sup>2</sup>. 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.

The instrument consists of the transceiver unit (D-R 290 MK), the retro reflector (D-R 290 R1 (up to 2.25 m path length) or D-R 290 R2 (more than 1.5 m path length)), an electronic connection unit (D-R 290 AW) and an air purge system for the transceiver and retro reflector. Additionally an automatic zero-point and span check cycle is integrated. In aggressive environments this unit 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<sup>3</sup>.

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 for certificate No. Sira MC 060073/01.
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.

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