

DIN EN 14181 QAL1 Evaluation acc. to DIN EN 14956

Tested AMS:

D-R 300-40

Component

Dust

Suitability test report:

Report-#. 936/ 801004 dated 31.07.1992, TÜV Collogne

QAL1 test report in

English

Measuring range (MBE Mess)	20	mg/m3
Measuring range during suitability test (MBE EP)	2,8	mg/m3
Limit value ctest acc. to EN ISO 14956	2,5	mg/m3
95% Confidence interval	30	%
95% Confidence interval	0,75	mg/m3
95% Confidence interval calculated result	0,72	mg/m3
95% Requirement of confidence range met	yes	

Range of influencing parameters	Min	Max	Delta	Unit
Pressure range	950	1050	100	hPa
Temperature range	100	120	20	°C
Temperature step during test			10	K
Flow influence	55362000	6,1E+07	6021000	l/h
Mains range	210	230	20	V

Unit data acc. to suitability test		Value	Unit	Reference	Deviation at ctest	Unit
Lack of fit		1,60	%	of MBE EP	0,04	mg/m3
Flow influence	per 10 l/h	0,00	%	of MBE EP	0,00	mg/m3
Detection limit		1,00	%	of MBE EP	0,03	mg/m3
Drift at Zero		0,30	%	of MBE EP	0,01	mg/m3
Drift at ctest		1,00	%	of MBE EP	0,03	mg/m3
Pressure influence	per hPa	0,00	%	of MBE EP	0,00	mg/m3
Temperature influence at Zero	per 10 K	0,00	%	of MBE EP	0,00	mg/m3
Temperature influence at ctest	per 10 K	1,60	%	of MBE EP	0,04	mg/m3
Mains influence	per 10 V	0,00	%	of MBE EP	0,00	mg/m3
Test gas uncertainty		0,00	%	of MBE EP	0,00	mg/m3
Soiling uncertainty		0,40	%	of MBE EP	0,01	mg/m3
Deviation uncertainty		0,00	%	of MBE EP	0,00	mg/m3
Sample line loss		0,00	%	of MBE EP	0,00	mg/m3
Repeated precision at ctest		0,88	%	of MBE EP	0,02	mg/m3
Long term stability of calibration standards		0,00	%	of MBE EP	0,00	mg/m3

Cross sensitivities

Component	Unit	lower concentration	upper concentration	Test concentration	Influence suitability test % of MBE EP	Uncertainty acc. 14956 mg/m3
CO	mg/m3	0	300	420	0	0,000
CO2	%	0	15	21	0	0,000
CH4	mg/m3	0	50	420	0	0,000
N2O	mg/m3	0	20	20,6	0	0,000
NO	mg/m3	0	300	39	0	0,000
NO2	mg/m3	0	30	39	0	0,000
NH3	mg/m3	0	20	505	0	0,000
SO2	mg/m3	0	200	218	0	0,000
HCl	mg/m3	0	50	36	0	0,000
H2O	g/m3	0	150	150	0	0,000
Positive sum						0,000
Negative sum						0,000

Uncertainties at ctest		
Detection limit	mg/m3	0,014
Linearity	mg/m3	0,023
Drift at Zero	mg/m3	0,004
Drift at ctest	mg/m3	0,014
Repeated precision at ctest	mg/m3	0,011
Pressure	mg/m3	0,000
Temperature	mg/m3	0,361
Flow	mg/m3	0,000
Mains	mg/m3	0,000
Test gas	mg/m3	0,000
Soiling	mg/m3	0,006
Deviation	mg/m3	0,000
Sample line loss	mg/m3	0,000
CO	mg/m3	0,000
CO2	mg/m3	0,000
CH4	mg/m3	0,000
N2O	mg/m3	0,000
NO	mg/m3	0,000
NO2	mg/m3	0,000
NH3	mg/m3	0,000
SO2	mg/m3	0,000
HCl	mg/m3	0,000
H2O	mg/m3	0,000
Combined uncertainty	mg/m3	0,362
Extended uncertainty	mg/m3	0,724
Calculated sAMS at Zero	mg/m3	0,015
Calculated sAMS at ctest	mg/m3	0,361
sAMS at Zero, corrected	mg/m3	0,600
sAMS at ctest, corrected	mg/m3	0,600

This report confirms that the product
D-R 300-40
 complies with the requirements of EN 14181:2004 QAL 1
 according to the International Standard ISO 14956:2002
 for the above specified operating conditions.

PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

D-R 300-40 Dust Monitor

Manufactured by:

DURAG GmbH

Kollastrasse 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 3.3 dated January 2011

EN15267-3:2007,
& QAL 1 as defined in EN 14181: 2004

Certification Ranges:

Particulate Concentration	0 to 3 mg/m ³
	0 to 15 mg/m ³
	0 to 34 mg/m ³
	0 to 77 mg/m ³

Project No. : 16A25325 Rev 2
Certificate No : Sira MC060074/02
Initial Certification : 16 June 2006
This Certificate issued : 30 August 2012
Renewal Date : 15 June 2016

R Cooper I Eng MInst MC

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: +44 (0)1322 520500 Fax: +44 (0)1322 520501



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Registered Office: Rake Lane, Eccleston, Chester, UK CH4 9JN

To authenticate the validity of this certificate please visit www.siracertification.com/mcerts

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 test was conducted on a lignite and fuel oil combustion plant.

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: 936/21212470/D-R300-40/TP Köln 28/06/2011

Product Certified

The D-R 300-40 measuring system consists of the following parts:

- Measuring head
- Light trap (stacks <2 metres)
- Control unit
- Purge air system

This certificate applies to all instruments fitted with software version 3.5 (standard) onwards and version 4.7 (with auto range function) onwards (serial number 28855 onwards).

Certificate No : Sira MC060074/02
This Certificate issued : 10 August 2012

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Certified Performance

The instrument was evaluated for use under the following conditions:

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

Unless otherwise stated the evaluation was carried out on the certification range 0 to 3 mg/m³

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time					10s	<200s
Repeatability standard deviation at zero point	0.0					<2%
Repeatability standard deviation at reference point	0.1					<2%
Lack-of-fit						
0 to 3 mg/m ³ :	0.33					<3%
0 to 15 mg/m ³ :	0.07					<3%
0 to 34 mg/m ³ :		0.59				<3%
Influence of ambient temperature zero point	0.3					<5%
Influence of ambient temperature reference point		0.7				<5%
Influence of voltage variations 190 to 250V	-0.1				Note 1	<2%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Measurement uncertainty					Guidance - at least 25% below max permissible uncertainty	
0 to 3mg/m ³					- 0.9%	22.5%
0 to 34mg/m ³					- 8.0%	22.5%
Calibration function (field)					Note 2 0.7476 – 0.9776	>0.90
Response time (field)					<10s	<200s
Lack of fit (field)		-0.59				<2%
Maintenance interval					Note 3 4 Weeks	>8 days
Change in zero point over maintenance interval	0.3					<3%
Change in reference point over maintenance interval			-1.75			<3%
Availability					99.8%	>95%
Reproducibility		0.9				<3.3%

Note 1: Influence of voltage should be tested at +15% and -10% according to EN15267. Testing was conducted at +10% and -15% (Test range was 196v to 253v).

Note 2: The calibration function/R² values are between 0.75 and 0.98 due to relatively constant dust levels during the field test. The CEMS pass the EN14181 criteria, but not the requirement for EN15267-3 under these circumstances.

Note 3: The D-R 300-40 has a maintenance interval of 4 weeks. The field test was conducted on a lignite and fuel oil combustion plant. The work described below must be carried out every 4 weeks:

- Regular inspection and cleaning of the lenses and reference filters. (Higher levels of dust may require shorter inspection intervals)
- Check the fasteners, seals and connections.
- Review of the external device components and the fast-closing flap.
- Visual check of filters and depending on their condition, clean or replace as required.
- Checking the zero and reference point drift and contamination with the help of the internal control cycle.

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Description

D-R 300-40 is a monitor for the measurement of extremely low to medium and higher dust concentration in various application processes with a very high accuracy. D-R 300-40 dust concentration monitor operators according to the scattered-light principle. The modulated light of a halogen bulb is sent into the measuring duct. The light is reflected by the particles in the measuring volume (scattered). The reflected scattered light is received in the receiving optic under a defined angle and led to an optical receiver. 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 monitors a volume of stack gas approximately 80 to 280 mm from the stack wall. The maximum resolution being 150 mm from the stack wall. For checking the correct function of the D-R 300-40 an automatic check cycle is performed. During this cycle, the zero point, the contamination of the optical boundary surfaces as well as a reference value are automatically measured and indicated.

The approved version of D-R 300-40 consists of the transceiver unit D-R 300-40, the electronic connection unit D-R 300-40, the light trap and the air purge unit. During the automatic zero point and span check cycle a contamination measurement of all optical components is performed and the measurement values are corrected automatically.

The manufacturer states that the monitor is suited for monitoring low to medium dust concentration or soot values (e.g. toxic dust limit values), i.e. power plant, steel and cement industry, asbestos industry, food industry and waste incinerators.

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 MC060074/02
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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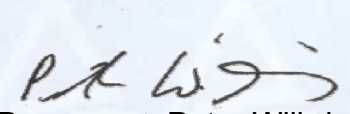
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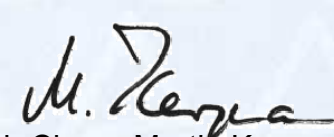
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH

Manufacturer:	DURAG Industrie Elektronik GmbH & Co. KG
Measuring System:	D-R 300-40
Components:	Dust
Test Report:	936/801004 TÜV Rheinland 1992-07-31

The measurement system fulfils
the requirements of
QAL 1
according to EN 14181 and EN ISO 14956
for low dust loading in cleaned waste gas and exit air.

Köln, 2008-10-16


Dr. rer. nat. Peter Wilbring


Dipl.-Chem. Martin Kerpa

DIN EN ISO 14956 and prEN 15267-3 calculation for QAL 1 in DIN EN 14181
Manufacturer data

 Manufacturer
 Measurement System
 Name
 Serial Number
 Measuring Principle

 DURAG Industrie Elektronik
 Dust measurement system
 D-R 300-40
 28855, 28875
 Scattered Light

TÜV Data

 Approval Report
 Date
 Editor

 936/801004
 26.09.2008
 C. Landgraf

Measurement Component

Dust 20 mg/m³

Calculation of the combined standard uncertainty
Test Value

		$\Delta X_{\max, j}$	$u(\Delta X_{\max, j}) = \frac{\Delta X}{\sqrt{3}}$	$u(\Delta X_{\max, j})^2$
Lack of fit	u_L	0,32 mg/m³	0,18 mg/m³	0,034
Biggest interference (positiv or negativ)	u_I	0,00 mg/m³	0,00 mg/m³	0,000
Span shift in the field test	$u_{d,s}$	0,08 mg/m³	0,05 mg/m³	0,002
Zero shift in the field test	$u_{d,z}$	0,06 mg/m³	0,03 mg/m³	0,001
Sensitivity to sample volume flow	u_v	0,00 mg/m³	0,00 mg/m³	0,000
Sensitivity to sample pressure	u_{sp}	0,00 mg/m³	0,00 mg/m³	0,000
Sensitivity to sample temperature	u_{st}	0,00 mg/m³	0,00 mg/m³	0,000
Sensitivity to ambient temperature	u_t	0,14 mg/m³	0,08 mg/m³	0,007
Dependence on supply voltage	u_{sv}	0,08 mg/m³	0,05 mg/m³	0,002
Repeatability at span	u_s	0,00 mg/m³	0,00 mg/m³	0,000
Field reproducibility	u_D	0,09 mg/m³	0,05 mg/m³	0,003
Uncertainty of the test gas at the reference point	u_{ta}	0,00 mg/m³	0,00 mg/m³	0,000
NOx converter efficiency adjustment	u_{NOx}	0,00 mg/m³	0,00 mg/m³	0,000
Variation of response factors (TOC)	$u_{R, TOC}$	0,00 mg/m³	0,00 mg/m³	0,000
Excursion of measurement beam	u_{mb}	0,00 mg/m³	0,00 mg/m³	0,000
Combined standard uncertainty (u_c)	u_c	$u_c = \sqrt{\sum (u_{\max, j})^2}$		0,221
Total expanded uncertainty	$(u_c \cdot k)$	$U_c = u_c \cdot 1,96$		0,433
Relative total expanded uncertainty		Uc in % of the limit 10 mg/m³		4,3
Requirement		Uc in % of the limit 10 mg/m³		30,0

Result: Requirements keep to QAL 1 of EN 14181

Attention: For this component no requirements in the EC-directives 2001/80/EG und 2000/76/EG are given.