PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

GRIMM model EDM 180 / EDM 180+ for PM10 and PM2.5

Manufactured by:

GRIMM Aerosol Technik Ainring GmbH & Co.KG

Dorfstrasse 9
D-83404 Ainring
Germany

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

MCERTS Performance Standards for Continuous Ambient Air Quality Monitoring Systems, Version 7, dated October 2010
EN 15267-2:2009

Certification Ranges :

PM_{10}	0 to 10,000µg/m^3
$PM_{2.5}$	0 to 6,000µg/m^3

Project No.:	16A25074
Certificate No:	Sira MC120198/02
Initial Certification:	12 June 2012
This Certificate issued:	22 November 2016
Renewal Date:	11 June 2017

Joe Prince MSc, MInst MC
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
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Form 1335
Issue 3

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

The PM10 & PM2.5 field test was conducted at four sites in Austria, on an urban, traffic charged, high concentration site in winter 2007/2008, an industrial influenced site in summer 2008, a rural site in winter 2008/2009 and an urban background, low concentration level site in summer 2009. The sampling time during the testing was 23 hours in order to enable the daily filter change and visual inspection of the deployed measuring device.

On the basis of these tests this certificate is valid when the instrument is used for urban air quality monitoring and similar applications.

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:

Bureau Veritas Umweltbundesamt	Report ref AGGX04215423/BV/AQ/DH/2665 dated December 2010 Equivalence test of optical PM monitors by order of the company GRIMM at four measurement locations in Austria dated January 2010

Product Certified

The measuring system EDM 180 and EDM 180+ consist of the following parts:

- Sampling tube with a nafion-based drying-system and external pump for conditioning the sampled air in order to avoid losing semi volatile compounds
- Laser Aerosol Spectrometer
- Housing for 19” rack based installation with power supply and interfaces
- Firmware 7.80 onwards

This certificate applies to all PM10 and PM2.5 instruments EDM 180 fitted with firmware version 7.80 onwards (serial number 18A12020 onwards) and EDM 180+ with firmware version 7.80 onwards (serial number 18B16044 onwards).

Certified Performance

Test	Results	MCERTS specification
Constancy of the sample volumetric flow	-2.08%	To remain constant within ± 3% of the rated value
Tightness of the sampling system	0.04%	Leakage not to exceed 1% of the sampled volume
Between sampler/instrument uncertainty for the standard method **$PM_{2.5}$**	Note 1 Note 2	
(LVS), HVS at one site	Note 3	
Full data set	0.90	<2 µg/m^3
>18 µg/m^3	1.02	<2 µg/m^3
Between sampler/instrument uncertainty for the candidate method **$PM_{2.5}$**		
(LVS), HVS at one site		
Full data set	0.30	<2.5 µg/m^3
>18 µg/m^3	0.49	<2.5 µg/m^3
Between sampler/instrument uncertainty for the standard method **$PM_{2.5}$**		
(HVS), LVS at one site		
Full data set	0.81	<2 µg/m^3
>18 µg/m^3	0.92	<2 µg/m^3
Between sampler/instrument uncertainty for the candidate method **$PM_{2.5}$**		
(HVS), LVS at one site		
Full data set	0.31	<2.5 µg/m^3
>18 µg/m^3	0.48	<2.5 µg/m^3

Certificate No : Sira MC120198/02
This Certificate issued : 22 November 2016

Test	Results	MCERTS specification
Between sampler/instrument uncertainty for the standard method **PM_{10}** **(LVS), HVS at one site**		
Full data set	0.97	<2 µg/m^3
>30 µg/m^3	1.05	<2 µg/m^3
Between sampler/instrument uncertainty for the candidate method **PM_{10}** **(LVS), HVS at one site**		
Full data set	0.64	<2.5 µg/m^3
>30 µg/m^3	1.22	<2.5 µg/m^3
Between sampler/instrument uncertainty for the standard method **PM_{10}** **(HVS), LVS at one site**		
Full data set	0.76	<2 µg/m^3
>30 µg/m^3	0.74	<2 µg/m^3
Between sampler/instrument uncertainty for the candidate method **PM_{10}** **(HVS), LVS at one site**		
Full data set	0.60	<2.5 µg/m^3
>30 µg/m^3	1.03	<2.5 µg/m^3

Test	Results	MCERTS specification
Expanded uncertainty calculated at 30 µg/m^3 for **$PM_{2.5}$** **(LVS), HVS at one site**		
Graz	16.71	<25%
Steyregg	23.54	<25%
Wiesefeld	18.67	<25%
Klagenfurt	16.41	<25%
Expanded uncertainty calculated at 30 µg/m^3 for **$PM_{2.5}$** **(HVS), LVS at one site**		
Graz	19.95	<25%
Steyregg	24.92	<25%
Wiesefeld	18.65	<25%
Klagenfurt	15.65	<25%
Expanded uncertainty calculated at 50 µg/m^3 for **PM_{10}** **(LVS), HVS at one site**		
Graz	21.58	<25%
Steyregg	13.14	<25%
Wiesefeld	19.61	<25%
Klagenfurt	8.08	<25%
Expanded uncertainty calculated at 50 µg/m3 for **PM_{10}** **(HVS), LVS at one site**		
Graz	19.27	<25%
Steyregg	18.44	<25%
Wiesefeld	20.01	<25%
Klagenfurt	12.59	<25%

Test	Results	MCERTS specification
Highest resulting uncertainty estimate comparison against data quality objective (combined datasets)	W_{CM} %	25%
$PM_{2.5}$ at 30 µg/m^3 (LVS)		
Full data set	15.11	$W_{CM} \leq W_{dqo}$
Concentrations > 18 µg/m^3	16.79	$W_{CM} \leq W_{dqo}$
$PM_{2.5}$ at 30 µg/m^3 (HVS)		
Full data set	15.89	$W_{CM} \leq W_{dqo}$
Concentrations > 18 µg/m^3	18.46	$W_{CM} \leq W_{dqo}$
PM_{10} at 50 µg/m^3 (LVS)		
Full data set	17.37	$W_{CM} \leq W_{dqo}$
Concentrations > 30 µg/m^3	22.11	$W_{CM} \leq W_{dqo}$
PM_{10} at 50 µg/m^3 (HVS)		
Full data set	16.82	$W_{CM} \leq W_{dqo}$
Concentrations > 30 µg/m^3	20.85	$W_{CM} \leq W_{dqo}$
Maintenance interval	Note 4	Two weeks (defined as filter exchange inlet cleaning frequency)
PM_{10}	4 weeks	
$PM_{2.5}$	4 weeks	

Note 1 – The field tests on the GRIMM model EDM 180 for PM10 and PM2.5 resulted in 32 to 80 paired measurements per site being obtained. The requirement is for a minimum of 40 measurement results per site.

Note 2 – Test results were subjected to correction coefficients for slope, intercept or both.

Note 3 - LVS and HVS refer to Low and High Volume Reference Methods.

Note 4 - The manufacturer recommends letting the laser aerosol spectrometer inspect and recalibrate at the factory every 12 months. For further information on maintenance, contact the manufacturer.

Description:

The measuring device for airborne dust of the series 180 is a stationary instrument which has been designed for the continuous measurement of airborne dust and its particle size distribution. The measured values will be output as mass concentration in the unit µg/m³ and distinguished according the fractions PM10 and PM2.5.

The measuring principle is the scattering light measurement of the single particles, where a semiconductor laser serves as the light source. When particles cross the laser beam they emit a light pulse. The electric signal of the converted light pulse will be classified into 31 different size channels after an adequate amplification. This enables a size determination of the particles and establishes also a weighting curve for PM10 and PM2.5. The sample air which is being volume controlled is sucked through the optical measurement chamber and a fine filter.

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 MC120198/02

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.