



ENVIRONMENT
AGENCY

PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

***Model 5030 SHARP Particulate Monitor
With PM₁₀ & PM_{2.5} heads***

manufactured by:

Thermo Fisher Scientific
Environmental Instruments Division
Air Quality Instruments
Frauenauracher Straße 96
91056 Erlangen
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 5 (May 2007)**

Certification Ranges :

Particulate matter (PM ₁₀)	0 to 200 µg/m ³
Particulate matter (PM _{2.5})	0 to 200 µg/m ³

Project No:	674/0265
Certificate No:	Sira MC 070108/03
Initial Certification:	21 May 2007
This Certificate Issued	29 July 2010
Renewal Date:	20 May 2012

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

This certificate may only be reproduced in its entirety and without change



ENVIRONMENT
AGENCY

Tel: 01322 520500 Fax: 01322 520501

Approved Site Application

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

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

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 Köln Report Number: 936/21203481/A dated 06/12/06
TÜV Köln Report Number: 936/21203481/B dated 06/12/06

Product Certified

The SHARP 5030 PM Monitor measuring system consists of the following parts:

- Inlet (PM_{2.5} or PM₁₀)
- Heated Sample Tube with smart temperature regulation
- Relative Humidity sensor
- Nephelometer (light-scattering photometer)
- Beta Attenuation detector
- Filter tape
- Vacuum pump (speed controlled)

This certificate applies to all instruments fitted with software version V1.15 onwards (serial number SN20 onwards).

Certificate No: Sira MC 070108/03
This Certificate Issued: 29 July 2010

This certificate may only be reproduced in its entirety and without change



ENVIRONMENT
AGENCY

Certified Performance

Unless otherwise stated the evaluation was carried out on the certification range 0 to 200 $\mu\text{g}/\text{m}^3$.

Test	Results expressed as % of measured value				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Constancy of the sampling volumetric flow (PM_{10})				2.8	Deviations of daily averages found to be <3%. All instantaneous flow measurements were <5%. Largest deviations from nominal value reported.	<3% Averaged sample volumetric flow <5% Instantaneous values
Constancy of the sampling volumetric flow ($\text{PM}_{2.5}$)			1.6		Deviations of daily averages found to be <3%. All instantaneous flow measurements were <5%. Largest deviations from nominal value reported.	<3% Averaged sample volumetric flow <5% Instantaneous values
Tightness of the sampling system (PM_{10})	0.04					<1% Leakage
Tightness of the sampling system ($\text{PM}_{2.5}$)	0.03					<1% Leakage
Between sampler uncertainty for the reference samplers (PM_{10}) ^{Note 1}					1.27 $\mu\text{g}/\text{m}^3$	<2 $\mu\text{g}/\text{m}^3$
Between sampler uncertainty for the reference samplers ($\text{PM}_{2.5}$) ^{Note 1}					1.63 $\mu\text{g}/\text{m}^3$	<2 $\mu\text{g}/\text{m}^3$
Between sampler uncertainty (all sampling runs) (PM_{10}) ^{Note 1}					0.90 $\mu\text{g}/\text{m}^3$	<3 $\mu\text{g}/\text{m}^3$
Between sampler uncertainty (all sampling runs) ($\text{PM}_{2.5}$) ^{Note 1}					0.80 $\mu\text{g}/\text{m}^3$	<3 $\mu\text{g}/\text{m}^3$

Certificate No: Sira MC 070108/03
This Certificate Issued: 29 July 2010

This certificate may only be reproduced in its entirety and without change



ENVIRONMENT
AGENCY

Test	Results expressed as % of measured value				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Highest resulting uncertainty estimate comparison with the data quality objective (daily limit value of $50\mu\text{g}/\text{m}^3$, $W_{\text{dqp}} = 25\%$) (PM_{10}) ^{Note 1}					Run 1 12.8%	$W_{\text{cm}} < W_{\text{dqp}}$
					Run 2 12.0%	$W_{\text{cm}} < W_{\text{dqp}}$
					Run 3 14.0%	$W_{\text{cm}} < W_{\text{dqp}}$
					Run 4 9.30%	$W_{\text{cm}} < W_{\text{dqp}}$
Highest resulting uncertainty estimate comparison with the data quality objective (daily limit value of $35\mu\text{g}/\text{m}^3$, $W_{\text{dqp}} = 25\%$) ($\text{PM}_{2.5}$) ^{Note 1}					Run 1 20.4%	$W_{\text{cm}} < W_{\text{dqp}}$
					Run 2 21.4%	$W_{\text{cm}} < W_{\text{dqp}}$
					Run 3 23.3%	$W_{\text{cm}} < W_{\text{dqp}}$
					Run 4 19.6%	$W_{\text{cm}} < W_{\text{dqp}}$

Note 1: The SHARP 5030 was assessed on the basis of four field trials on the following applications; urban, urban background, open mining for gravel site and rural. The field trials were performance over a time period of two and four months.

Certificate No: Sira MC 070108/03
This Certificate Issued: 29 July 2010

This certificate may only be reproduced in its entirety and without change



ENVIRONMENT
AGENCY

Description:

The Model 5030 is based on the principles of aerosol light scattering (nephelometry) and beta attenuation to measure precise and accurate ambient aerosol concentrations. The SHARP optical assembly senses the light scattered by the aerosol passing through an 880 nm illumination beam. The nephelometry response is linear with aerosol concentration, but independent of sample flow rate.

A running one-minute average of the temperature-corrected nephelometer concentration and a dynamic average are continuously calculated. Within the base of the optical assembly, a relative humidity (RH) sensor is located immediately upstream of the sample filter-tape assuring a representative measurement of the aerosol conditioning prior to real-time mass determination.

The aerosol is deposited onto a glass fiber filter tape. The filter tape will accumulate an aerosol sample towards a threshold value, whereupon the filter tape will automatically advance prior to reaching saturation. During the collection of aerosol onto the filter tape the SHARP Monitor uses the radiometric principle of beta attenuation through a known sample area to continuously collect and detect the deposited mass. Additionally, the beta-attenuation chamber measures alpha emissions from the accumulated aerosol and excludes negative mass artifacts due to the presence of daughter nuclides from radon gas decay to achieve a "refined mass" measurement. Simultaneous refined mass measurements of sampled aerosol on the filter tape and sample volume measurement through a calibrated orifice provide a continuous concentration measurement of the ambient mass concentration. The collected sample temperature is measured within the attenuation chamber.

Through proper sensor placement a continuous air density correction is applied to the beta attenuation derived concentration. A dynamic average of this concentration is continuously calculated. The ratio of the dynamic beta concentration to the dynamic nephelometer concentration is also continuously calculated. This ratio is then used as a correction factor (CF) for the one-minute average nephelometer reading.

The Model 5030 SHARP provides an updated concentration every 4 seconds via the analog output, serial output, and user menu. User selected 30-minute or 60-minute concentrations are date and time stamped with any status/error conditions logged to the internal memory.

Certificate No: Sira MC 070108/03
This Certificate Issued: 29 July 2010

This certificate may only be reproduced in its entirety and without change



ENVIRONMENT
AGENCY

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 070108/01.
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.

Certificate No: Sira MC 070108/03
This Certificate Issued: 29 July 2010

This certificate may only be reproduced in its entirety and without change