

PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

ES-405

Manufactured by:

Met One Instruments Inc

1600 NW Washington Blvd
Grants Pass
OR, 97526
USA

has been assessed by CSA Group
and for the conditions stated on this certificate complies with:

**MCERTS Performance Standards for Indicative Ambient Particulate Monitors
Environment Agency, August 2017, version 4**

Certification ranges:

PM _{2.5}	0 - 500 µg/m ³
PM ₁₀	0 - 500 µg/m ³

Project No.:	80103108
Certificate No:	Sira MC220397/00
Initial Certification:	25 May 2022
This Certificate issued:	25 May 2022
Renewal Date:	24 May 2027



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Environmental Team Manager

MCERTS is operated on behalf of the Environment Agency by

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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 indicative dust monitoring analyser(s) can be operated in one of two ways:

For qualitative measurements: Providing qualitative measurement data for the analysis of particulate pollution trends, and source identification studies based for example on pollution roses etc. Such application can rely on instrument factory calibration only.

For quantitative measurements: Providing measurement data with the uncertainty defined for indicative instruments (+/- 50%). This can be achieved on condition that each instrument used for measurement has been calibrated on the specific site where monitoring is taking place against a standard reference method for a period of two weeks and the resulting slope and intercept have been used for instrument calibration. Using non-standard filters and procedures for this purpose is not acceptable. To maintain the validity of data this calibration has to be repeated at least every twelve months or when the instrument is moved to a different site.

They cannot be used on national automatic monitoring networks for compliance reporting against the Ambient Air Quality Directives.

The field tests were carried out from the 24th December 2020 to the 24th February 2021 on two candidate ES-405 samplers, collocated with a Teledyne T640 in Rubidoux, CA USA.

Basis of Certification

This certification is based on the following test report(s) and on CSA Group's assessment and ongoing surveillance of the product and the manufacturing process:

Bureau Veritas, Test report ref. AIR12437177, dated 17 February 2022, "Met One Instruments, Test of the ES-405 for use as an Indicative Monitor for PM₁₀ and PM_{2.5}, February 2022"

Product Certified

The "ES-405" measuring system consists of the following parts:

ES-405 monitor and associated firmware.

This certificate applies to all instruments fitted with firmware version '83904 R2.2.2' onwards (serial number A21746).

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Certified Performance

Test (<i>Laboratory</i>)	Other results	MCERTS specification
Constancy of the sample volumetric flow - Average sample volumetric flow - All instantaneous values	-2.9% -3.1%	To remain constant within $\pm 3\%$ To remain constant within $\pm 5\%$
Tightness of the sampling system	0.12%	Leakage not to exceed 2% of sampled volume

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Test (Field)	Other results	MCERTS specification
Intra-instrument uncertainty for the reference method		
PM ₁₀	0.67 µg/m ³	≤2.5µg/m ³
PM _{2.5}	0.67 µg/m ³ Note 1	≤2.5µg/m ³
Intra-instrument uncertainty for the candidate method		
PM ₁₀		
All data (n=61)	0.50 µg/m ³	≤5µg/m ³ for all data as well as for the subsets:
≥ 30 µg/m ³ (n=34)	0.64 µg/m ³	< or ≥ 30 µg/m ³
< 30 µg/m ³ (n=27)	0.22 µg/m ³	
PM _{2.5}		
All data (n=61)	0.13 µg/m ³	≤5µg/m ³ for all data as well as for the subsets:
≥ 18 µg/m ³ (n=13)	0.88 µg/m ³	< or ≥ 30 µg/m ³
< 18 µg/m ³ (n=48)	0.06 µg/m ³	
Highest resulting uncertainty estimate comparison against data quality objective (Measurement Uncertainty)		
PM ₁₀		W _{CM} ≤50%
All data (n=61)	29.2%	W _{CM} ≤ W _{dpo}
≥ 30 µg/m ³ (n=34)	30.5%	(W _{dpo}
		Measurement uncertainty defined as 50% for indicative instruments)
PM _{2.5}		
All data (n=61)	23.9%	
≥ 18 µg/m ³ (n=13)	25.9%	
Maintenance Interval	24 months Note 2	≥2 weeks

Note 1 - Only a single T640 was operated during the testing of the ES-405. In accordance with the performance standard, a default of 0.67 µg/m³ is used in the calculations.

Note 2 - For the maintenance interval the instruments were operational at Rubidoux, CA USA where no maintenance was required. The manufacturer states the following:

- WARNING: The ES-405 Particulate profiler can only be serviced or calibrated by factory authorised personnel. Unauthorised maintenance on the Particle Profiler may result in exposure to laser radiation that can cause blindness and void warranty.
- The ES-405 is an extremely component dense assembly. Only skilled and trained electromechanical technicians should attempt any disassembly or repairs inside the ES-405. Routine maintenance procedures do not involve removing the ES-405 assembly from the enclosure. Calibrating particle sensors like the one in the ES-405 Particle profiler requires specialised equipment and a skilled technician. Met One Instruments maintains a calibration facility for calibrating particle counters according to industry-accepted methods using NIST traceable standards. The ES-405 Particle Profiler should be calibrated on a 24-month basis.

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Description

The ES-405 is an air quality sensor designed to provide accurate real time measurements of PM₁₀ and PM_{2.5} particulate concentrations simultaneously. The inlet heater reduces moisture-related measurement error.

Sample air is drawn into the ES-405 by an internal pump. Flow rate is controlled with a flow sensor to maintain constant 1 LPM flow on the inlet nozzle. The sensor incorporates sheath air to prevent particles from contaminating the internal optics of the sensor.

Due to its principle of operation it can measure and report data at one to sixty minute intervals. The unit can be wall mounted or installed on a vertical mast.

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 CSA Group Testing UK Ltd Certificates'.
2. The design of the product certified is defined in the CSA Group design schedule V00 for certificate no. Sira MC220397/00.
3. If a certified product is found not to comply, CSA Group should be notified immediately at the address shown on this certificate.
4. The certification marks that can be applied to the product or used in publicity material are defined in 'Regulations Applicable to the Holders of CSA Group Testing UK Ltd Certificates'.
5. This document remains the property of CSA Group and shall be returned when requested by CSA Group.

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