



PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

Multi-gas Micro Monitoring Station (MMS) Portable version

manufactured by:

Environnement SA

*111 Boulevard Robespierre
BP 4513
78304 Poissy Cedex
France*

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 6, December 2008

Certification Ranges :

| | | |
|-----------------|-----------------------------|----------------------------|
| CO | 0 to 60 mg/m ³ | 0 to 100 mg/m ³ |
| O ₃ | 0 to 360 µg/m ³ | 0 to 500 µg/m ³ |
| NO | 0 to 1200 µg/m ³ | |
| NO ₂ | 0 to 400 µg/m ³ | 0 to 500 µg/m ³ |

Certification is awarded in respect of the conditions stated in this certificate

Project No: 674/0412
Certificate No: Sira MC 090161/01
Initial Certification: 13 November 2009
This Certificate Issued: 03 December 2009
Renewal Date: 12 November 2014

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

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



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 these tests this certificate is valid when the instrument is used for urban air quality monitoring and similar applications and rural/remote sites.

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:

| | |
|------------|---|
| TUV Report | Report Number 936/21205818/C dated 05/03/07 |
| TUV Report | Report Number 936/21205818/D dated 05/03/07 |
| TUV Report | Report Number 936/21206773/D dated 06/06/08 |

Product Certified

The Multi-gas Micro Monitoring Station (MMS) measuring system consists of the following parts:

- AC32M NO_x analyser
- CO12M CO analyser
- O342M O₃ analyser

This certificate applies to all instruments fitted with software version 2.45 (NO_x), software version 1.26 (CO) and software version 1.31 (O₃) and software version 3.0 onwards (MMS) (serial number 10 onwards).

Certificate No: Sira MC 090161/01
This Certificate Issued: 03 December 2009

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



Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: +0°C to +30°C

Note: If the instrument is supplied with an enclosure then the ambient temperature shall be monitored inside the enclosure to ensure that it stays within the above ambient temperature range.

| Test | Results expressed as % of measured value | | | | Other results | MCERTS specification |
|--|--|------|------|-----|---------------|-----------------------------|
| | <0.5 | <1 | <2 | <5 | | |
| Repeatability standard deviation at zero | | | | | | |
| CO | | | | | 0.20 µmol/mol | <1.0 µmol/mol |
| O ₃ | | | | | 0.40 nmol/mol | <1.0 nmol/mol |
| NO _x | | | | | 0.60 nmol/mol | <1.0 nmol/mol |
| Repeatability at hourly limit value | | | | | | |
| CO | | | | | 0.10 µmol/mol | <3.0 µmol/mol |
| O ₃ | | | | | 1.0 nmol/mol | <3.0 nmol/mol |
| NO _x | | | | | 2.7 nmol/mol | <3.0 nmol/mol |
| Lack of fit (largest residual from the linear regression line) | | | | | | |
| CO | | | | 2.1 | | <4.0% of the measured value |
| O ₃ | | | -1.8 | | | <4.0% of the measured value |
| NO _x | | 0.80 | | | | <4.0% of the measured value |
| Sensitivity coefficient to sample gas pressure | | | | | | |
| CO | | | | | See Note 1 | <0.7 µmol/mol/kPa |
| O ₃ | | | | | | <2.0 nmol/mol/kPa |
| NO _x | | | | | | <8.0 nmol/mol/kPa |

Certificate No: Sira MC 090161/01
This Certificate Issued: 03 December 2009

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



| Test | Results expressed as % of measured value | | | | Other results | MCERTS specification |
|--|--|----|----|----|------------------|----------------------|
| | <0.5 | <1 | <2 | <5 | | |
| Sensitivity coefficient to sample gas temperature | | | | | | |
| CO | | | | | 0.02 µmol/mol/K | <0.3 µmol/mol/K |
| O ₃ | | | | | 0.04 nmol/mol/K | <1.0 nmol/mol/K |
| NO _x | | | | | -0.06 nmol/mol/K | <3.0 nmol/mol/K |
| Sensitivity coefficient of surrounding air temperature | | | | | | |
| CO | | | | | 0.05 µmol/mol/K | <0.3 µmol/mol/K |
| O ₃ | | | | | 0.07 nmol/mol/K | <1.0 nmol/mol/K |
| NO _x | | | | | 0.20 nmol/mol/K | <3.0 nmol/mol/K |
| Sensitivity coefficient of electrical supply voltage | | | | | | |
| CO | | | | | 0.0 µmol/mol/V | <0.3 µmol/mol/V |
| O ₃ | | | | | -0.04 nmol/mol/V | <0.3 nmol/mol/V |
| NO _x | | | | | 0.09 nmol/mol/V | <0.3 nmol/mol/V |
| Converter efficiency | | | | | | |
| NO _x | | | | | 98.4% | >98% |
| Interferents by H ₂ O (at concentration of 19 nmol/mol) | | | | | | |
| CO | | | | | 0.07 µmol/mol | <1.0 µmol/mol |
| O ₃ | | | | | 1.1 nmol/mol | <10 nmol/mol |
| NO _x | | | | | 2.3 nmol/mol | <5.0 nmol/mol |
| Interferents by CO ₂ (at concentration of 500 µmol/mol) | | | | | | |
| CO | | | | | -0.14 µmol/mol | <0.5 µmol/mol |
| NO _x | | | | | 2.0 nmol/mol | <5.0 nmol/mol |
| Interferents by NO (at concentration of 1 µmol/mol) | | | | | | |
| CO | | | | | 0.13 µmol/mol | <0.5 µmol/mol |

Certificate No: Sira MC 090161/01
This Certificate Issued: 03 December 2009

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



| Test | Results expressed as % of measured value | | | | Other results | MCERTS specification |
|---|--|----|----|----|---------------|----------------------|
| | <0.5 | <1 | <2 | <5 | | |
| Interferents by N ₂ O (at concentration of 50 nmol/mol) CO | | | | | 0.14 µmol/mol | <0.5 µmol/mol |
| Interferents by ozone (at concentration of 200 nmol/mol) NO _x | | | | | 1.0 nmol/mol | <2.0 nmol/mol |
| Interferents by NH ₃ (at concentration of 200 nmol/mol) NO _x | | | | | 1.7 nmol/mol | <5.0 nmol/mol |
| Interferents by toluene (at concentration of 0.5 µmol/mol) O ₃ | | | | | 2.6 nmol/mol | <5.0 nmol/mol |
| Interferents by m-xylene (at concentration of 0.5 µmol/mol) O ₃ | | | | | 2.5 nmol/mol | <5.0 nmol/mol |

Certificate No: Sira MC 090161/01
This Certificate Issued: 03 December 2009

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



| Test | Results expressed as % of measured value | | | | Other results | MCERTS specification |
|---|--|------|------|------|---------------|---|
| | <0.5 | <1 | <2 | <5 | | |
| Averaging effect | | | | | | |
| CO | | | | -3.9 | | <7.0% of the measured value |
| O ₃ | | | | 3.0 | | <7.0% of the measured value |
| NOx | | | 1.9 | | | <7.0% of the measured value |
| Reproducibility standard deviation under field conditions | | | | | | |
| CO | | | | 3.4 | | <5.0% of average of 3 months period |
| O ₃ | | | | 3.2 | | <5.0% of average of 3 months period |
| NOx | | | | 4.9 | | <5.0% of average of 3 months period |
| Long term zero drift | | | | | | |
| CO | | | | | 0.38 µmol/mol | <5.0 µmol/mol |
| O ₃ | | | | | 0.79 nmol/mol | <5.0 nmol/mol |
| NOx | | | | | 0.78 nmol/mol | <5.0 nmol/mol |
| Long term span drift | | | | | | |
| CO | | | 1.38 | | | <5.0% of the average of 3 months period |
| O ₃ | | | | 3.55 | | <5.0% of the average of 3 months period |
| NOx | | 0.79 | | | | <5.0% of the average of 3 months period |

Certificate No: Sira MC 090161/01
This Certificate Issued: 03 December 2009

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



| Test | Results expressed as % of measured value | | | | Other results | MCERTS specification |
|--|--|----|----|-----|----------------|--------------------------|
| | <0.5 | <1 | <2 | <5 | | |
| Short term drift at zero (12hrs) | | | | | | |
| CO | | | | | 0.10 µmol/mol | <2.0 µmol/mol |
| O ₃ | | | | | -0.60 nmol/mol | <2.0 nmol/mol |
| NO _x | | | | | -0.70 nmol/mol | <2.0 nmol/mol |
| Short term drift at span (12 hrs) | | | | | | |
| CO | | | | | 0.10 µmol/mol | <6.0 µmol/mol |
| O ₃ | | | | | 0.30 nmol/mol | <6.0 nmol/mol |
| NO _x | | | | | 1.2 nmol/mol | <6.0 nmol/mol |
| Response time (rise) | | | | | | |
| CO | | | | | 32 s | <180 s |
| O ₃ | | | | | 14 s | <180 s |
| NO _x | | | | | 18 s | <180 s |
| Response time (fall) | | | | | | |
| CO | | | | | 31 s | <180 s |
| O ₃ | | | | | 15 s | <180 s |
| NO _x | | | | | 19 s | <180 s |
| Difference between rise and fall time | | | | | | |
| CO | | | | 2.4 | | <10% relative difference |
| O ₃ | | | | | 7.8% | <10% relative difference |
| NO _x | | | | | 6.2% | <10% relative difference |
| Difference between sample and calibration port | | | | | | |
| CO | | | | | See Note 1 | <1.0% |
| O ₃ | | | | | | <1.0% |
| NO _x | | | | | | <1.0% |

Certificate No: Sira MC 090161/01
This Certificate Issued: 03 December 2009

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



| Test | Results expressed as % of measured value | | | | Other results | MCERTS specification |
|--|--|----|----|----|---------------|--------------------------------|
| | <0.5 | <1 | <2 | <5 | | |
| Difference in NO ₂ due to residence time in analyser NOx | | | | | 0.35 nmol/mol | <4.0 nmol/mol |
| Period of unattended operation CO | | | | | 4 weeks | 3 months not less than 2 weeks |
| O ₃ | | | | | 4 weeks | 3 months not less than 2 weeks |
| NOx | | | | | 4 weeks | 3 months not less than 2 weeks |
| Availability CO | | | | | 98.7% | >90% |
| O ₃ | | | | | 98.7% | >90% |
| NOx | | | | | 98.1% | >90% |
| Total expanded measurement uncertainty (laboratory and field) CO | | | | | 10.29% | 15% |
| O ₃ | | | | | 9.63% | 15% |
| NOx | | | | | 4.99% | 15% |

Note 1: Test not applicable.

Certificate No: Sira MC 090161/01
This Certificate Issued: 03 December 2009

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



Description:

The Micro Monitoring Station (MMS) consists of a single IP54 enclosure, in which up to 3 modules can be housed.

NO_x module: the NO_x sample concentration is determined by chemiluminescence. The chemiluminescence reaction between ozone and nitric oxide (NO) yield electronically excited nitrogen dioxide (NO₂). The transition to the mass flow rate of NO₂ into a temperature controlled reaction chamber. The light is measured with a PM tube.

O₃ module: the O₃ sample concentration is determined by UV absorption, which consists in measuring UV absorption of ozone molecules. Ozone concentration is determined by difference between UV absorption of the gas sample and the sample without ozone after filtration performed by a catalytic converter.

CO module: the CO sample concentration is determined by IR GFC (Infra Red Gas Filter Correlation). IR GFC consists in measuring how much infrared light the sample gas absorbs as it flows through a multi-cell correlation wheel filled on one side with a reference CO cell (reference beam) and on the other side with an empty cell (the measurement beam). As the wheel turns around, the light beam passes alternatively through the CO cell and the empty cell and then through an interference optical filter before reaching the optical detector. If the sample contains CO, the reference beam will not be attenuated by it, since it was attenuated by the CO of the reference cell. The measurement beam however will be attenuated by the CO in the sample.

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 090161/00.
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 090161/01
This Certificate Issued: 03 December 2009

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