PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

SWAM 5a Dual Channel Monitor

manufactured by:

FAI Instruments S.r.l

Via Aurora
15 Fonte Nuova
Roma
Italy

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, dated December 2008

Certification Ranges :

PM_{10} 0 to 200µg/m^3
$PM_{2.5}$ 0 to 200µg/m^3

Project No:	674/0375
Certificate No:	Sira MC090148/02
Initial Certification:	22 July 2009
This Certificate Issued	02 February 2010
Renewal Date:	21 July 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

Approved Site Application

The instrument is approved for measuring PM_{10} and/or $PM_{2.5}$ concentrations when operated using glass fibre filters at a flow rate of 2.3 m^3/hr and with sampling heads corresponding to EN12341 and EN14907 respectively. Other combinations of flow rate, filter media and sampling head are available, though these have not been tested.

The field test was conducted at four sites in Germany and the UK, on two urban background sites, a traffic site and a site in the vicinity of a gravel pit.

During the tests, it was discovered that the PM_{10} reference method used was not manufactured as per the European standard EN12341. Annex 2 of the TÜV report contains calculations for correcting the expanded uncertainties, should the correct inlets have been installed on the reference methods. Both sets of expanded uncertainties are presented herein

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 ref: 936/21207522/A dated 23rd March 2009

Product Certified

The measuring system consists of the following parts:

- Mass measurement system: The mass measurement module is made up of an arm keeping sealed Source (14C 3.7MBq total activity) and Detector (Geiger Müller sensor ZP1452) mechanically bound. The related electronic circuit (A5ENSHV03DC and A5ENSC-GDUAL)
- Flow measurement system: The sampling flow rate measurement is based on the physical laws controlling the air mass transferring through a nozzle that in SWAM 5a Dual Channel Monitor is placed downstream the regulation valve. The related electronic circuit (A5ENSSENSORSDC and A5ENSENSORI1) and the related pneumatic circuit (MC12P01, MC12P02, MC12P03, MC12P04, DC11P08, DC11P09)

This certificate applies to all instruments fitted with software version 04-08.01.65-30.02.00 (serial number 127 onwards).

Certified Performance

Test	Results expressed as % of measured value				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Constancy of the sample volumetric flow						To remain constant within ± 3% of the rated value
PM_{10}			-1.3			
$PM_{2.5}$		-1.0				
Tightness of the sampling system						Leakage not to exceed 1% of the sampled volume
PM_{10}					0.052%	
$PM_{2.5}$					0.072%	
Between sampler/instrument uncertainty for the standard method						
PM_{10}					0.80 µg/m^3	<2 µg/m^3
$PM_{2.5}$					0.48 µg/m^3	<2 µg/m^3
Between sampler/instrument uncertainty for the complete data set						
PM_{10}					0.66 µg/m^3	<2.5 µg/m^3
$PM_{2.5}$					0.57 µg/m^3	<2.5 µg/m^3
Between sampler/instrument uncertainty for the two data sets obtained by splitting the full data set into values below and above 50% of the limit value						
PM_{10}					0.87 µg/m^3 ≥ 50% 0.42 µg/m^3 ≤ 50%	<2.5 µg/m^3
$PM_{2.5}$					0.57 µg/m^3 ≥ 50% 0.36 µg/m^3 ≤ 50%	<2.5 µg/m^3

Test	Results expressed as % of measured value				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Highest resulting uncertainty estimate comparison against data quality objective					W_{CM} %	25%
PM_{10} at 50 µg/m^3					17.15%	$W_{CM} \leq W_{dqo}$
PM_{10} at 40 µg/m^3					17.85%	$W_{CM} \leq W_{dqo}$
$PM_{2.5}$ at 25 µg/m^3					13.35%	$W_{CM} \leq W_{dqo}$
$PM_{2.5}$ at 20 µg/m^3					15.61%	$W_{CM} \leq W_{dqo}$
Highest resulting uncertainty against data quality objective after corrections, to account for the PM_{10} reference method being non-compliant					W_{CM} %	25%
PM_{10} at 50 µg/m^3					7.03%	$W_{CM} \leq W_{dqo}$
PM_{10} at 40 µg/m^3					8.76%	$W_{CM} \leq W_{dqo}$
Maintenance interval						Two weeks (defined as filter exchange inlet cleaning frequency)
PM_{10}					Two weeks	
$PM_{2.5}$					Two weeks	

Description:

SWAM 5a Dual Channel Monitor is an automatic sampling and mass measurement system of suspended atmospheric particulate matter, working with two independent sampling lines. The particulate matter samples are accumulated on filtering mediums and their mass is contextually determined using an innovative technique (patented) based on the ß attenuation method.
SWAM 5a Dual Channel Monitor allows a high quality standard monitoring of the average mass concentrations trend of two suspended PM_x particulate matter fractions (PM_{10} and $PM_{2,5}$). Moreover, the samples accumulation on filter membranes allows the chemical characterization of the particulate matter and the direct gravimetric determination of the sample mass.

The PM_x mass measurement is based on the ß attenuation technique. This technique has been implemented on the basis of an in-depth theoretic analysis of the interaction between ß rays and matter that led to the formulation of a generalized parametric equation. This equation describes the connection between the attenuation of the ß flux passing through the matter film and the mass thickness of this film (from the operative point of view, this means that it is possible to use different filter medium types with no need of new instrument calibrations within the mass thickness range till 8 mg/cm²).

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 MC090148/00.

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.