

PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

MIR-FT Multi-gas analyser

Manufactured by:

Environnement SA

11 Boulevard Robespierre
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 Emission
Monitoring Systems, Version 4 dated July 2018
EN15267-3:2007,
& QAL 1 as defined in EN 14181: 2014**

Certification Ranges :

CO	0 to 75 mg/m ³	0 to 300mg/m	0 to 1500mg/m ³
NO	0 to 150 mg/m ³	0 to 200 mg/m ³	0 to 600mg/m ³ 0 to 2000mg/m ³
SO ₂	0 to 75 mg/m ³	0 to 300mg/m ³	0 to 1500mg/m ³
NO ₂	0 to 200 mg/m ³	0 to 500 mg/m ³	
N ₂ O	0 to 100 mg/m ³	0 to 500mg/m ³	
HCl	0 to 15 mg/m ³	0 to 90mg/m ³	
NH ₃	0 to 15 mg/m ³	0 to 50mg/m ³	
H ₂ O	0 to 30 % vol.	0 to 40 % vol.	
HF	0 to 3 mg/m ³	0 to 10 mg/m ³	
CO ₂	0 to 25 % vol.		
O ₂	0 to 25 % vol. ¹		
O ₂	0 to 25 % vol. ²		
O ₂	0 to 25 % vol. ³		
CH ₄	0 to 15 mg/m ³	0 to 50 mg/m ³	0 to 150 mg/m ³
CHOH	0 to 20 mg/m ³	0 to 30mg/m ³	0 to 90mg/m ³

¹ Certification range only applies to EN4000 analysers with Oxitec 500 E SME 5 oxygen analyser option.

² Certification range only applies to MIR FT oxygen analyser option

³ Certification range only applies to MIR-O2-ZR oxygen analyser option

Project No. : 674/0133 & 6740371 & 70184929
Certificate No : Sira MC040031/09
Initial Certification : 29 April 2004
This Certificate issued : 8 August 2018
Renewal Date : 28 April 2019

Emily Alexander
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
Tel: +44 (0)1244 670 900



The MCERTS certificate consists of this document in its entirety.

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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

On the basis of the assessment and the ranges required for compliance with EU Directives this instrument is considered suitable for use on waste incineration and large coal-fired combustion plant applications. This CEM has been proven suitable for its measuring task (parameter and composition of the flue gas) by use of the QAL 1 procedure specified in EN14181, for IED Chapter III and IED Chapter IV applications for the ranges specified. The lowest certified range for each determinand shall not be more than 1.5X the daily average emission limit value (ELV) for IED Chapter IV

The field tests were conducted on a municipal waste heating plant (initial performance test - March to July 2006 & first supplementary test – March to June 2007) and a domestic waste incineration plant (second supplementary test – December 2010 to March 2011). Further field testing was performed between March 2015 and February 2016, to test the following additional determinands: HF, CHOH, CH₄ and NO. Additional testing was conducted between June 2017 and January 2018 for the additional determinands: O₂ (MIR FT analyser) and O₂ (MIR-O₂-FT analyser).

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: 936/21200448/A, dated 7 th July 2006
TÜV Köln	Report Number: 936/21203240/B, dated 3 rd September 2007
TÜV Köln	Report Number: 936/21206578/C dated 1 st August 2008
TÜV Köln	Report Number: 936/21206578/D dated 1 st August 2008
TÜV Köln	Report Number: 936/21210692/A, dated 30 th March 2011
TÜV Köln	Report Number: 936/21218384/A, dated 16 th March 2012
TÜV Köln	Report Number: 936/21220683/A, dated 27 th March 2013
TÜV Köln	Report Number: 936/21225866/B, dated 23 rd February 2016
TÜV Köln	Report number: 936/21239949/A dated 26 th January 2018
TÜV Köln	Report number: 936/21239949/B dated 26 th January 2018

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Product Certified

The MIR-FT measuring system consists of the following parts:

- Gasmet FTIR Gas Analyser EN4000 (OEM version of the CX4000)
- Environnement SA Sampling Unit
- Enotec Oxygen analyser Oxitec 500 E SME 5 (optional for O₂ measurement)
- MIR-FT-O₂ transmitter (optional for O₂ measurement)
- MIR-O₂-ZR transmitter (optional for O₂ measurement)
- Environnement SA CA-PG Probe

Allowable variations could include:

- A different brand or model of sampling system of the same type, provided that there is evidence the alternative system works with similar types of CEM.
- Additional manifolds and heated valves used to allow more than one analyser to share a sampling system.

This certificate applies to all instruments fitted with software version 4.42.2 and with serial numbers 305 onwards* (which have been fitted with a GICCOR interferometer).

*except model numbers; 440, 456, 457, 460, 463, 464, 468, 471, 490, 491, 506, 507, 509, 532, 535-537, 548-551, 562-568, and 587-595

A new pre-amplifier board enables the measurement of all components with a single analyser (EN4000) with current software version Calcmnet: 12.18 with evaluation unit 4.42.2 and OXITEC Ver. 1.50np. The evaluation algorithm of the Calcmnet software has not changed since the performance test in 2013.

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Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: +5°C to +40°C
Instrument IP rating: IP54

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.

Unless otherwise stated the evaluation was carried out on the certification range CO 0 to 75 mg/m³, SO₂ 0 to 75 mg/m³, HCl 0 to 15 mg/m³, NO 0 to 150 mg/m³, NO₂ 0 to 200 mg/m³, N₂O 0 to 100 mg/m³, NH₃ 0 to 15 mg/m³, CO₂ 0 to 25 % vol, O₂ 0 to 25 % vol, H₂O 0 to 30 % vol, HF 0 to 3 mg/m³, CH₄ 0 to 15 mg/m³, CHOH 0 to 20 mg/m³

Results are expressed as error % of certification range, unless otherwise stated.

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time					Note 1	
O ₂ ¹					20s	<200s
O ₂ ²					93s	<200s
O ₂ ³					98s	<200s
CO, NO, NO ₂ , N ₂ O, CO ₂ , H ₂ O, CH ₄ , CHOH					120s	<200s
SO ₂ , HCl, NH ₃					120s	<400s
HF					120s	<400s
Repeatability standard deviation at zero point						
O ₂ ¹	0.02					<0.2%
O ₂ ²	0.01					<0.2%
O ₂ ³	0.02					<0.2%
CO	0.1					<2.0%
NO	0.0					<2.0%
NO ₂	0.1					<2.0%
N ₂ O	0.0					<0.2%
SO ₂	0.0					<2.0%
HCl	0.0					<2.0%
NH ₃	0.2					<2.0%
CO ₂	0.0					<2.0%
H ₂ O	0.0					<2.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
HF	0.0					<2.0%
CH ₄	0.1					<2.0%
CHOH	0.0					<2.0%
Repeatability standard deviation at span point						
SO ₂ (0 to 1500mg/m ³)	-0.3					<2.0%
O ₂ ¹	0.0					<0.2%
O ₂ ²	0.02					<0.2%
O ₂ ³	0.03					<0.2%
CO	0.4					<2.0%
NO	0.1					<2.0%
NO ₂	0.1					<2.0%
N ₂ O	0.1					<2.0%
SO ₂	0.1					<2.0%
HCl	0.3					<2.0%
NH ₃	0.3					<2.0%
CO ₂	0.1					<2.0%
H ₂ O	0.0					<2.0%
HF	0.2					<2.0%
CH ₄	0.1					<2.0%
CHOH	0.2					<2.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Lack of fit						
O ₂ ¹ (0 to 25 % vol.)	0.16					<0.2%
O ₂ ² (0 to 25 % vol.)	0.1					<0.2%
O ₂ ³ (0 to 25 % vol.)	-0.2					<0.2%
CO (0 to 75 mg/m ³)			1.3			<2.0%
CO (0 to 300 mg/m ³)		-1.0				<2.0%
CO (0 to 1500 mg/m ³)		-0.7				<2.0%
NO (0 to 150mg/m ³)		0.7				<2.0%
NO (0 to 200mg/m ³)		-0.6				<2.0%
NO (0 to 600mg/m ³)	0.5					<2.0%
NO (0 to 2000mg/m ³)	0.4					<2.0%
NO ₂ (0 to 200mg/m ³)	0.5					<2.0%
NO ₂ (0 to 500mg/m ³)	0.2					<2.0%
N ₂ O (0 to 100mg/m ³)	-0.4					<2.0%
N ₂ O (0 to 500mg/m ³)	0.2					<2.0%
SO ₂ (0 to 75mg/m ³)	0.4					<2.0%
SO ₂ (0 to 300mg/m ³)		0.6				<2.0%
SO ₂ (0 to 1500mg/m ³)	-0.3					<2.0%
HCl (0 to 15mg/m ³)		0.7				<2.0%
HCl (0 to 90mg/m ³)		0.9				<2.0%
NH ₃ (0 to 15mg/m ³)			-1.6			<2.0%
NH ₃ (0 to 50mg/m ³)			-1.8			<2.0%
CO ₂ (0 to 30 % vol.)		0.8				<2.0%
H ₂ O (0 to 30 % vol.)			-1.7			<2.0%
H ₂ O (0 to 40 % vol.)		-0.8				<2.0%
HF (0 to 3 mg/m ³)			1.8			<2.0%
HF (0 to 10 mg/m ³)		0.9				<2.0%
CH ₄ (0 to 15 mg/m ³)	0.4					<2.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
CH ₄ (0 to 50 mg/m ³)		-0.6				<2.0%
CH ₄ (0 to 150 mg/m ³)		0.7				<2.0%
CHOH (0 to 20 mg/m ³)		-0.9				<2.0%
CHOH (0 to 30 mg/m ³)		0.7				<2.0%
CHOH (0 to 90 mg/m ³)		0.6				<2.0%
Influence of ambient temperature zero point						
O ₂ ¹	-0.0					<0.5%
O ₂ ²	0.11					<0.5%
O ₂ ³	0.16					<0.5%
CO	-0.1					<5.0%
NO	0.0					<5.0%
NO ₂	0.2					<5.0%
N ₂ O	0.0					<5.0%
SO ₂	0.0					<5.0%
HCl	0.0					<5.0%
NH ₃		0.6				<5.0%
CO ₂	0.0					<5.0%
H ₂ O	0.0					<5.0%
HF	0.0					<5.0%
CH ₄	0.0					<5.0%
CHOH	0.0					<5.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Influence of ambient temperature reference point						
O ₂ ¹	-0.02					<0.5%
O ₂ ²	0.13					<0.5%
O ₂ ³	0.14					<0.5%
CO	0.5					<5.0%
NO		-0.9				<5.0%
NO ₂	0.5					<5.0%
N ₂ O	0.5					<5.0%
SO ₂	0.3					<5.0%
HCl			-1.3			<5.0%
NH ₃			1.3			<5.0%
CO ₂			-1.6			<5.0%
H ₂ O			1.3			<5.0%
HF				-2.4		<5.0%
CH ₄		0.7				<5.0%
CHOH			1.5			<5.0%
Influence of sample gas flow for extractive CEMS						
O ₂ ¹	0.1					<0.2%
O ₂ ²	0.08					<0.2%
O ₂ ³	-0.06					<0.2%
CO	0.3					<2.0%
NO		-0.7				<2.0%
NO ₂	0.3					<2.0%
N ₂ O	-0.2					<2.0%
SO ₂	0.5					<2.0%
HCl	-0.5					<2.0%
NH ₃		0.7				<2.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
CO ₂	-0.4					<2.0%
H ₂ O		0.7				<2.0%
HF	-0.3					<2.0%
CH ₄		-0.7				<2.0%
CHOH	-0.4					<2.0%
Influence of voltage variations 190 to 250V						
O ₂ ¹	0.03					<0.2%
O ₂ ²	-0.06					<0.2%
O ₂ ³	-0.08					<0.2%
CO		-0.6				<2.0%
NO	-0.3					<2.0%
NO ₂		-0.6				<2.0%
N ₂ O		-0.6				<2.0%
SO ₂			1.8			<2.0%
HCl			-1.2			<2.0%
NH ₃			-1.2			<2.0%
CO ₂		0.7				<2.0%
H ₂ O			-1.7			<2.0%
HF		0.8				<2.0%
CH ₄	0.3					<2.0%
CHOH	-0.3					<2.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Cross-sensitivity at zero: O ₂ , H ₂ O, CO ₂ , CO, CH ₄ , N ₂ O, NO, NO ₂ , NH ₃ , SO ₂ , HCl, HF, CH ₄ & CHOH						
O ₂ ¹	0.0					<0.2%
O ₂ ²	0.0					<0.2%
O ₂ ³	0.0					<0.2%
CO		0.8				<2.0%
NO	<0.5					<2.0%
NO ₂		1.0				<2.0%
N ₂ O			1.2			<2.0%
SO ₂		-0.6				<2.0%
HCl			1.6			<2.0%
NH ₃		-0.8				<2.0%
CO ₂	0.0					<2.0%
H ₂ O	<0.5					<2.0%
HF			1.54			<2.0%
CH ₄	<0.5					<2.0%
CHOH		0.8				<2.0%
CO ₂						<2.0%
H ₂ O						<2.0%
Cross-sensitivity at reference: O ₂ , H ₂ O, CO ₂ , CO, CH ₄ , N ₂ O, NO, NO ₂ , NH ₃ , SO ₂ , HCl, HF, CH ₄ & CHOH						
O ₂ ¹	0.0					<0.4%
O ₂ ¹	0.12					<0.4%
O ₂ ¹	-0.1					<0.4%
CO				2.5		<4.0%
NO			-1.7			<4.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
NO ₂				4.0		<4.0%
N ₂ O				3.2		<4.0%
SO ₂				2.6		<4.0%
HCl				-3.4		<4.0%
NH ₃				-4.0		<4.0%
CO ₂				-3.6		<4.0%
H ₂ O		1.0				<4.0%
HF				3.9		<4.0%
CH ₄				-2.5		<4.0%
CHOH			1.8			<4.0%
Measurement uncertainty					Guidance - at least 25% below max permissible uncertainty	
O ₂ ¹					2.4%	<10% (7.5%)
O ₂ ²					2.4%	<10% (7.5%)
O ₂ ³					2.5%	<10% (7.5%)
CO					6.5%	<10% (7.5%)
NO					5.6%	<20% (15%)
NO ₂					6.7%	<20% (15%)
N ₂ O					4.3%	<20% (15%)
SO ₂					9.2%	<20% (15%)
HCl					11.3%	<40% (30%)
NH ₃					9.3%	<40% (30%)
CO ₂					5.0%	<10% (7.5%)
H ₂ O					6.0%	<10% (7.5%)
HF					19.4%	<40% (30%)
CH ₄					6.1%	<30% (22.5%)
CHOH					4.0%	<30% (22.5%)

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Calibration function (field)						
O ₂ ¹					>0.99	>0.90
O ₂ ²					>0.94	>0.90
O ₂ ³					>0.93	>0.90
CO					>1.00	>0.90
NO					>0.91	>0.90
NO ₂					>1.00	>0.90
N ₂ O					>0.98	>0.90
SO ₂					>0.99	>0.90
HCl					>1.00	>0.90
NH ₃					>1.00	>0.90
CO ₂					>0.98	>0.90
H ₂ O					>0.93	>0.90
HF					>0.99	>0.90
CH ₄					>0.99	>0.90
CHOH					>0.99	>0.90
Response Time (Field)						
O ₂ ¹					20s	<200s
O ₂ ²					93s	<200s
O ₂ ³					99s	<200s
CO, NO, NO ₂ , N ₂ O, CO ₂ , H ₂ O, CH ₄ , CHOH					120s	<200s
SO ₂ , HCl, NH ₃					120s	<400s
HF					120s	<400s
Lack of fit (field)						
O ₂ ¹	-0.05					<0.2%
O ₂ ²	0.12					<0.2%
O ₂ ³	0.16					<0.2%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
CO			1.6			<2.0%
NO		-1.0				<2.0%
NO ₂		0.6				<2.0%
N ₂ O		-0.7				<2.0%
SO ₂			1.5			<2.0%
HCl		0.8				<2.0%
NH ₃		-0.6				<2.0%
CO ₂			1.2			<2.0%
H ₂ O			-1.3			<2.0%
HF			1.4			<2.0%
CH ₄			-1.8			<2.0%
CHOH			-1.7			<2.0%
Maintenance interval (field)					MIR-FT, MR-ZR O ₂ analyser: 4 weeks All other ranges: 3 months	>8 days
Availability (field)					98.4% 99.5% (O ₂)	>95% >98% (O ₂)
Zero and Span drift requirement	The AMS provides for the recording zero and span drift and thus fulfils the requirements of QAL3 according to EN14181. See Note 2.				Clause 6.13 & 10.13	

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Change in zero point over maintenance interval (field)						
O ₂ ¹	0.1					<0.2%
O ₂ ²	0.19					<0.2%
O ₂ ³	0.16					<0.2%
CO	0.0					<3.0%
NO	0.1					<3.0%
NO ₂	-0.1					<3.0%
N ₂ O	0.0					<3.0%
SO ₂	0.1					<3.0%
HCl	0.0					<3.0%
NH ₃	0.0					<3.0%
CO ₂	0.0					<3.0%
H ₂ O	0.0					<3.0%
HF	0.1					<3.0%
CH ₄	0.0					<3.0%
CHOH	0.0					<3.0%
Change in reference point over maintenance interval (field)						
O ₂ ¹	0.2					<0.2%
O ₂ ²	-0.2					<0.2%
O ₂ ³	0.2					<0.2%
CO			1.6			<3.0%
NO			1.9			<3.0%
NO ₂		-1.0				<3.0%
N ₂ O		0.6				<3.0%
SO ₂				2.3		<3.0%
HCl				2.4		<3.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
NH ₃				-2.3		<3.0%
CO ₂		-0.9				<3.0%
H ₂ O			-1.9			<3.0%
HF				-2.3		<3.0%
CH ₄			1.8			<3.0%
CHOH				-2.1		<3.0%
Reproducibility (field)						
O ₂ ¹	0.09					<0.2%
O ₂ ²	0.19					<0.2%
O ₂ ³	0.2					<0.2%
CO			1.2			<3.3%
NO	0.5					<3.3%
NO ₂			1.2			<3.3%
N ₂ O			1.2			<3.3%
SO ₂		0.6				<3.3%
HCl				2.7		<3.3%
NH ₃		0.9				<3.3%
CO ₂		0.8				<3.3%
H ₂ O			1.9			<3.3%
HF		0.7				<3.3%
CH ₄	0.4					<3.3%
CHOH	0.4					<3.3%

- Note 1. For all O₂ results, the worst result has been reported from the Gaset Multi-gas analyser EN4000, MIR-FT gas analyser and MIR-O₂-ZR gas analyser
- Note 2. For the span point check (QAL3) of components CO, SO₂, NO, NO₂, HCl, CH₄, N₂O, H₂O, CO₂, HF, CHOH and NH₃, surrogate test gases may be used as detailed in Technical Guidance Note M22 version 3, section 7.4.2.

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Description

The MIR-FT instrument is an infrared (IR) spectroscopic multigas analyser that uses the Fourier Transform Infrared technique to measure several gaseous components including water vapour using sample extraction without dilution or drying of the sample gas. The FTIR instrument operates in the wavenumber range of 4200 to 900cm⁻¹. The heated measuring cell has a path-length of up to 5 metres and the temperature is set to 180°C. The sample extraction system is heated throughout and the sample is transferred through electrically heated sample lines. Sample line length in the field test was 20 meters.

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 V08 for certificate No. Sira MC040031/09
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.

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