

# PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

**atmosFIR**

Manufactured by:

**Protea Ltd**

10 Prosperity Court, Midpoint 18  
Middlewich, Cheshire  
CW10 0GD

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

**Environment Agency guidance**  
**“MCERTS for stack emissions monitoring equipment at industrial installations”**  
**- continuous emission monitoring systems (CEMS)**

**Published 20 October 2020**

**EN15267-1:2009, EN15267-2:2009 & EN15267-3:2007**

**& QAL 1 as defined in EN 14181: 2014**

Certification ranges:

NO	0 to 80 mg/m <sup>3</sup>	0 to 200 mg/m <sup>3</sup>
NO <sub>2</sub>	0 to 50 mg/m <sup>3</sup>	0 to 200 mg/m <sup>3</sup>
N <sub>2</sub> O	0 to 50 mg/m <sup>3</sup>	
SO <sub>2</sub>	0 to 75 mg/m <sup>3</sup>	0 to 300 mg/m <sup>3</sup>
CO	0 to 75 mg/m <sup>3</sup>	0 to 300 mg/m <sup>3</sup>
HCl	0 to 15 mg/m <sup>3</sup>	
NH <sub>3</sub>	0 to 10 mg/m <sup>3</sup>	
CH <sub>4</sub>	0 to 15 mg/m <sup>3</sup>	
CO <sub>2</sub>	0 to 20% vol.	
O <sub>2</sub>	0 to 21% vol.	
H <sub>2</sub> O	0 to 30% vol.	

Project number: 80080090  
Certificate number: Sira MC190346/01  
Initial certification: 24 April 2019  
This certificate issued: 12 October 2021  
Renewal date: 23 April 2024



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Environmental Team Manager

MCERTS is operated on behalf of the Environment Agency by

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0011

*The MCERTS certificate consists of this document in its entirety.*

*For conditions of use, please consider all the information within.*

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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](http://www.mcerts.net)*

This instrument is considered suitable for use on waste incineration and large combustion plants. This CEMS 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. The lowest certified range for each determinand shall not be more than 1.5 times the daily average emission limit value (ELV) for incineration plants, and not more than 2.5 times the ELV for other types of applications.

A field trial was carried out at an energy from waste incinerator in Berkshire, UK for a period of four months starting in July 2018 and finishing in November 2018. A further field trial was carried out at the National Physical Laboratory(NPL) Stack Gas Simulator during the period March 2020 until June 2020.

## 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:

- Test report reference 2016110046, issue 5, by NPL, dated 6<sup>th</sup> July 2021
- Test report reference 102153/QE2100/PROTEA, version 5, by NPL, dated 4<sup>th</sup> June 2021

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**Product Certified**

The atmosFIR measuring system consists of the following parts:

1. Sample Probe	2. Heated Filter	3. Heated Sample Line	4. Analyser
Model: Tube with pre-filter if required	Model: JES300, PTFE filter heated to 180°C, with calibration port and with blow-back option	Model: PTFE/PFA core, heated to 180°C with integrated span line(s) and probe power/alarm	Model: atmosFIR model AFS-B2 FTIR multigas analyser, with integrated sample filtration and pre-heater Zirconia O2 sensor

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 CEMS.
- 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 PAS-Pro software version v2.5.2 (serial number 1608) onwards.

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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: IP65

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.

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						
NO (0 to 80 mg/m <sup>3</sup> )					120s	<200s
NO (0 to 200 mg/m <sup>3</sup> )					118s	<200s
NO <sub>2</sub> (0 to 50 mg/m <sup>3</sup> )					160s	<200s
NO <sub>2</sub> (0 to 200 mg/m <sup>3</sup> )					157s	<200s
N <sub>2</sub> O (0 to 50 mg/m <sup>3</sup> )					194s	<200s
SO <sub>2</sub> (0 to 75 mg/m <sup>3</sup> )					108s	<200s
SO <sub>2</sub> (0 to 300 mg/m <sup>3</sup> )					104s	<200s
CO (0 to 75 mg/m <sup>3</sup> )					193s	<200s
CO (0 to 300 mg/m <sup>3</sup> )					93s	<200s
HCl (0 to 15 mg/m <sup>3</sup> )					220s	<400s
NH <sub>3</sub> (0 to 10 mg/m <sup>3</sup> )					298s	<400s
CH <sub>4</sub> (0 to 15 mg/m <sup>3</sup> )					192s	<200s
CO <sub>2</sub> (0 to 20% vol)					121s	<200s
O <sub>2</sub> (0 to 21% vol)					198s	<200s
H <sub>2</sub> O (0 to 30% vol)					166s	<200s

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Repeatability standard deviation at zero point						
NO (0 to 80 mg/m <sup>3</sup> )	0.22					<2.0%
NO <sub>2</sub> (0 to 50 mg/m <sup>3</sup> )	0.42					<2.0%
N <sub>2</sub> O (0 to 50 mg/m <sup>3</sup> )	0.44					<2.0%
SO <sub>2</sub> (0 to 75 mg/m <sup>3</sup> )	0.47					<2.0%
CO (0 to 75 mg/m <sup>3</sup> )	0.23					<2.0%
HCl (0 to 15 mg/m <sup>3</sup> )		0.97				<2.0%
NH <sub>3</sub> (0 to 10 mg/m <sup>3</sup> )		0.54				<2.0%
CH <sub>4</sub> (0 to 15 mg/m <sup>3</sup> )	0.23					<2.0%
CO <sub>2</sub> (0 to 20% vol)	0.07					<2.0%
O <sub>2</sub> (0 to 21% vol)	0.01					<0.2%
H <sub>2</sub> O (0 to 30% vol)	0.42					<2.0%
Repeatability standard deviation at reference point						
NO (0 to 80 mg/m <sup>3</sup> )	0.28					<2.0%
NO <sub>2</sub> (0 to 50 mg/m <sup>3</sup> )	0.46					<2.0%
N <sub>2</sub> O (0 to 50 mg/m <sup>3</sup> )		0.56				<2.0%
SO <sub>2</sub> (0 to 75 mg/m <sup>3</sup> )	0.38					<2.0%
CO (0 to 75 mg/m <sup>3</sup> )	0.29					<2.0%
HCl (0 to 15 mg/m <sup>3</sup> )			1.17			<2.0%
NH <sub>3</sub> (0 to 10 mg/m <sup>3</sup> )			1.16			<2.0%
CH <sub>4</sub> (0 to 15 mg/m <sup>3</sup> )	0.32					<2.0%
CO <sub>2</sub> (0 to 20% vol)	0.30					<2.0%
O <sub>2</sub> (0 to 21% vol)	0.01					<0.2%
H <sub>2</sub> O (0 to 30% vol)		0.77				<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						
NO (0 to 80 mg/m <sup>3</sup> )		0.90				<2.0%
NO (0 to 200 mg/m <sup>3</sup> )		0.94				<2.0%
NO <sub>2</sub> (0 to 50 mg/m <sup>3</sup> )			1.92			<2.0%
NO <sub>2</sub> (0 to 200 mg/m <sup>3</sup> )		0.94				<2.0%
N <sub>2</sub> O (0 to 50 mg/m <sup>3</sup> )		0.96				<2.0%
SO <sub>2</sub> (0 to 75 mg/m <sup>3</sup> )		0.87				<2.0%
SO <sub>2</sub> (0 to 300 mg/m <sup>3</sup> )		0.99				<2.0%
CO (0 to 75 mg/m <sup>3</sup> )		0.62				<2.0%
CO (0 to 300 mg/m <sup>3</sup> )		0.98				<2.0%
HCl (0 to 15 mg/m <sup>3</sup> )			1.74			<2.0%
NH <sub>3</sub> (0 to 10 mg/m <sup>3</sup> )			1.45			<2.0%
CH <sub>4</sub> (0 to 15 mg/m <sup>3</sup> )		0.93				<2.0%
CO <sub>2</sub> (0 to 20% vol)			1.56			<2.0%
O <sub>2</sub> (0 to 21% vol)	0.14					<0.2%
H <sub>2</sub> O (0 to 30% vol)			1.97			<2.0%
Influence of ambient temperature zero point (+5°C to +40°C)						
NO (0 to 80 mg/m <sup>3</sup> )		0.78				<5.0%
NO <sub>2</sub> (0 to 50 mg/m <sup>3</sup> )				2.35		<5.0%
N <sub>2</sub> O (0 to 50 mg/m <sup>3</sup> )		0.54				<5.0%
SO <sub>2</sub> (0 to 75 mg/m <sup>3</sup> )		0.84				<5.0%
CO (0 to 75 mg/m <sup>3</sup> )		0.54				<5.0%
HCl (0 to 15 mg/m <sup>3</sup> )			1.61			<5.0%
NH <sub>3</sub> (0 to 10 mg/m <sup>3</sup> )			-1.04			<5.0%
CH <sub>4</sub> (0 to 15 mg/m <sup>3</sup> )	-0.28					<5.0%
CO <sub>2</sub> (0 to 20% vol)	-0.4					<5.0%
O <sub>2</sub> (0 to 21% vol)	0.17					<0.5%
H <sub>2</sub> O (0 to 30% vol)				2.41		<5.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
<b>Influence of ambient temperature reference point (+5°C to +40°C)</b>						
NO (0 to 80 mg/m <sup>3</sup> )			-1.19			<5.0%
NO <sub>2</sub> (0 to 50 mg/m <sup>3</sup> )			-1.99			<5.0%
N <sub>2</sub> O (0 to 50 mg/m <sup>3</sup> )			1.56			<5.0%
SO <sub>2</sub> (0 to 75 mg/m <sup>3</sup> )	-0.38					<5.0%
CO (0 to 75 mg/m <sup>3</sup> )		-0.94				<5.0%
HCl (0 to 15 mg/m <sup>3</sup> )			1.44			<5.0%
NH <sub>3</sub> (0 to 10 mg/m <sup>3</sup> )				-2.23		<5.0%
CH <sub>4</sub> (0 to 15 mg/m <sup>3</sup> )	0.27					<5.0%
CO <sub>2</sub> (0 to 20% vol)		0.71				<5.0%
O <sub>2</sub> (0 to 21% vol)	-0.25					<0.5%
H <sub>2</sub> O (0 to 30% vol)				2.27		<5.0%
<b>Influence of sample gas pressure</b>						
NO (0 to 80 mg/m <sup>3</sup> )	0.43					<2.0%
NO <sub>2</sub> (0 to 50 mg/m <sup>3</sup> )		0.80				<2.0%
N <sub>2</sub> O (0 to 50 mg/m <sup>3</sup> )		0.79				<2.0%
SO <sub>2</sub> (0 to 75 mg/m <sup>3</sup> )		0.82				<2.0%
CO (0 to 75 mg/m <sup>3</sup> )	0.44					<2.0%
HCl (0 to 15 mg/m <sup>3</sup> )		0.73				<2.0%
NH <sub>3</sub> (0 to 10 mg/m <sup>3</sup> )			1.23			<2.0%
CH <sub>4</sub> (0 to 15 mg/m <sup>3</sup> )	0.44					<2.0%
CO <sub>2</sub> (0 to 20% vol)	0.32					<2.0%
O <sub>2</sub> (0 to 21% vol)	0.12					<0.2%
H <sub>2</sub> O (0 to 30% vol)			1.85			<2.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Influence of voltage variations (zero) (195.5VAC to 253VAC)						
NO (0 to 80 mg/m <sup>3</sup> )	-0.18					<2.0%
NO <sub>2</sub> (0 to 50 mg/m <sup>3</sup> )	0.39					<2.0%
N <sub>2</sub> O (0 to 50 mg/m <sup>3</sup> )		0.76				<2.0%
SO <sub>2</sub> (0 to 75 mg/m <sup>3</sup> )	0.34					<2.0%
CO (0 to 75 mg/m <sup>3</sup> )	0.17					<2.0%
HCl (0 to 15 mg/m <sup>3</sup> )		-0.98				<2.0%
NH <sub>3</sub> (0 to 10 mg/m <sup>3</sup> )		0.78				<2.0%
CH <sub>4</sub> (0 to 15 mg/m <sup>3</sup> )	-0.25					<2.0%
CO <sub>2</sub> (0 to 20% vol)	0.08					<2.0%
O <sub>2</sub> (0 to 21% vol)	0.05					<0.2%
H <sub>2</sub> O (0 to 30% vol)	-0.28					<2.0%
Influence of voltage variations (span) (195.5VAC to 253VAC)						
NO (0 to 80 mg/m <sup>3</sup> )		0.64				<2.0%
NO <sub>2</sub> (0 to 50 mg/m <sup>3</sup> )		0.95				<2.0%
N <sub>2</sub> O (0 to 50 mg/m <sup>3</sup> )		-0.94				<2.0%
SO <sub>2</sub> (0 to 75 mg/m <sup>3</sup> )	0.38					<2.0%
CO (0 to 75 mg/m <sup>3</sup> )	0.44					<2.0%
HCl (0 to 15 mg/m <sup>3</sup> )		-0.98				<2.0%
NH <sub>3</sub> (0 to 10 mg/m <sup>3</sup> )		-0.76				<2.0%
CH <sub>4</sub> (0 to 15 mg/m <sup>3</sup> )		-0.77				<2.0%
CO <sub>2</sub> (0 to 20% vol)	0.09					<2.0%
O <sub>2</sub> (0 to 21% vol)	0.03					<0.2%
H <sub>2</sub> O (0 to 30% vol)		-0.95				<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 with interferents: O <sub>2</sub> , H <sub>2</sub> O, CO, CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, NO, NO <sub>2</sub> , NH <sub>3</sub> , SO <sub>2</sub> , HCl						
NO (0 to 80 mg/m <sup>3</sup> )			1.03			<4.0%
NO <sub>2</sub> (0 to 50 mg/m <sup>3</sup> )		-0.65				<4.0%
N <sub>2</sub> O (0 to 50 mg/m <sup>3</sup> )				3.68		<4.0%
SO <sub>2</sub> (0 to 75 mg/m <sup>3</sup> )				-3.0		<4.0%
CO (0 to 75 mg/m <sup>3</sup> )		0.77				<4.0%
HCl (0 to 15 mg/m <sup>3</sup> )			1.03			<4.0%
NH <sub>3</sub> (0 to 10 mg/m <sup>3</sup> )				2.66		<4.0%
CH <sub>4</sub> (0 to 15 mg/m <sup>3</sup> )				2.20		<4.0%
CO <sub>2</sub> (0 to 20% vol)		0.73				<4.0%
O <sub>2</sub> (0 to 21% vol)	0.13					<0.40%
H <sub>2</sub> O (0 to 30% vol)		0.65				<4.0%
Cross-sensitivity at reference with interferents: O <sub>2</sub> , H <sub>2</sub> O, CO, CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, NO, NO <sub>2</sub> , NH <sub>3</sub> , SO <sub>2</sub> , HCl						
NO (0 to 80 mg/m <sup>3</sup> )			1.25			<4.0%
NO <sub>2</sub> (0 to 50 mg/m <sup>3</sup> )				2.31		<4.0%
N <sub>2</sub> O (0 to 50 mg/m <sup>3</sup> )				-2.77		<4.0%
SO <sub>2</sub> (0 to 75 mg/m <sup>3</sup> )				-3.22		<4.0%
CO (0 to 75 mg/m <sup>3</sup> )				-2.52		<4.0%
HCl (0 to 15 mg/m <sup>3</sup> )			1.35			<4.0%
NH <sub>3</sub> (0 to 10 mg/m <sup>3</sup> )				-3.94		<4.0%
CH <sub>4</sub> (0 to 15 mg/m <sup>3</sup> )				2.45		<4.0%
CO <sub>2</sub> (0 to 20% vol)			-1.58			<4.0%
O <sub>2</sub> (0 to 21% vol)	-0.25					<0.40%
H <sub>2</sub> O (0 to 30% vol)				2.05		<4.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Measurement uncertainty					Guidance - at least 25% below max permissible uncertainty	
NO (for an ELV of 200 mg/m <sup>3</sup> )				3.19		<15% (20%)
NO <sub>2</sub> (for an ELV of 200 mg/m <sup>3</sup> )					6.27	<15% (20%)
N <sub>2</sub> O				4.14		<15% (20%)
SO <sub>2</sub> (for an ELV of 50 mg/m <sup>3</sup> )					8.43	<15% (20%)
CO (for an ELV of 50 mg/m <sup>3</sup> )				4.89		<7.5% (10%)
HCl (for an ELV of 10 mg/m <sup>3</sup> )					6.05	<30% (40%)
NH <sub>3</sub>					5.87	<30% (40%)
CH <sub>4</sub>				3.41		<22.5% (30%)
CO <sub>2</sub>				3.54		<7.5% (10%)
O <sub>2</sub>			1.52			<7.5% (10%)
H <sub>2</sub> O					5.29	<7.5% (10%)
Calibration function (field)					Note 1*	
NO (0 to 80 mg/m <sup>3</sup> )		0.90				≥0.90
NO <sub>2</sub> (0 to 50 mg/m <sup>3</sup> )		0.98				≥0.90
N <sub>2</sub> O (0 to 50 mg/m <sup>3</sup> )*		0.67				≥0.90
SO <sub>2</sub> (0 to 75 mg/m <sup>3</sup> )*	0.03					≥0.90
CO (0 to 75 mg/m <sup>3</sup> )*		0.84				≥0.90
HCl (0 to 15 mg/m <sup>3</sup> )*	0.22					≥0.90
NH <sub>3</sub> (0 to 10 mg/m <sup>3</sup> )*	0.001					≥0.90
CH <sub>4</sub> (0 to 15 mg/m <sup>3</sup> )*	0.01					≥0.90
CO <sub>2</sub> (0 to 20% vol)		0.90				≥0.90
O <sub>2</sub> (0 to 21% vol)		0.95				≥0.90
H <sub>2</sub> O (0 to 30% vol)*	0.24					≥0.90

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time (field)						
NO (0 to 80 mg/m <sup>3</sup> )					75s	<200s
NO (0 to 200 mg/m <sup>3</sup> )					85s	<200s
NO <sub>2</sub> (0 to 50 mg/m <sup>3</sup> )					180s	<200s
NO <sub>2</sub> (0 to 200 mg/m <sup>3</sup> )					140s	<200s
N <sub>2</sub> O (0 to 50 mg/m <sup>3</sup> )					80s	<200s
SO <sub>2</sub> (0 to 75 mg/m <sup>3</sup> )					135s	<200s
SO <sub>2</sub> (0 to 300 mg/m <sup>3</sup> )					150s	<200s
CO (0 to 75 mg/m <sup>3</sup> )					85s	<200s
CO (0 to 300 mg/m <sup>3</sup> )					80s	<200s
HCl (0 to 10 mg/m <sup>3</sup> )					240s	<400s
NH <sub>3</sub> (0 to 15 mg/m <sup>3</sup> )					240s	<400s
CH <sub>4</sub> (0 to 15 mg/m <sup>3</sup> )					70s	<200s
CO <sub>2</sub> (0 to 20% vol)					85s	<200s
O <sub>2</sub> (0 to 21% vol)					190s	<200s
H <sub>2</sub> O (0 to 30% vol)					100s	<200s
Lack of fit (field)						
NO (0 to 80 mg/m <sup>3</sup> )			1.7			≤2.0%
NO (0 to 200 mg/m <sup>3</sup> )			1.4			≤2.0%
NO <sub>2</sub> (0 to 50 mg/m <sup>3</sup> )			1.9			≤2.0%
NO <sub>2</sub> (0 to 200 mg/m <sup>3</sup> )			1.8			≤2.0%
N <sub>2</sub> O (0 to 50 mg/m <sup>3</sup> )			1.5			≤2.0%
SO <sub>2</sub> (0 to 75 mg/m <sup>3</sup> )			1.6			≤2.0%
SO <sub>2</sub> (0 to 300 mg/m <sup>3</sup> )			1.0			≤2.0%
CO (0 to 75 mg/m <sup>3</sup> )			1.9			≤2.0%
CO (0 to 300 mg/m <sup>3</sup> )			1.2			≤2.0%
HCl (0 to 15 mg/m <sup>3</sup> )				2.0		≤2.0%
NH <sub>3</sub> (0 to 10 mg/m <sup>3</sup> )			1.1			≤2.0%
CH <sub>4</sub> (0 to 15 mg/m <sup>3</sup> )			1.7			≤2.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
CO <sub>2</sub> (0 to 20% vol)	0.4					≤2.0%
O <sub>2</sub> (0 to 21% vol)	0.1					≤0.2%
H <sub>2</sub> O (0 to 30% vol)			1.8			≤2.0%
Maintenance interval					Note 2 One month	>8 days
Zero and Span drift requirement	<p>The CEM controller records the zero and span gas calibration checks in concentration units. The log of this can be displayed or printed. In addition, where drift occurs outside of a predetermined level, an alarm can be activated.</p> <p>The CEMs can be programmed to provide zero drift and span drift results that conform to the requirements of the EN 14181 standard.</p> <p>The zero and span drifts were determined over a 24 hour period. The CEMs demonstrated that the zero and span drifts over 24 hours were all within the requirements (with the maximum observed drift for any determinand over 24 hours being 1.98% of the maximum of the certification range.)</p>					<p>Clause 6.13 &amp; 10.13</p> <p>Manufacturer shall provide a description of the technique to determine and compensate for zero and span drift.</p>
Change in zero point over maintenance interval						
NO (0 to 80 mg/m <sup>3</sup> )			1.71			≤3.0%
NO <sub>2</sub> (0 to 50 mg/m <sup>3</sup> )				2.96		≤3.0%
N <sub>2</sub> O (0 to 50 mg/m <sup>3</sup> )	0.33					≤3.0%
SO <sub>2</sub> (0 to 75 mg/m <sup>3</sup> )		1.60				≤3.0%
CO (0 to 75 mg/m <sup>3</sup> )		0.69				≤3.0%
HCl (0 to 15 mg/m <sup>3</sup> )				2.95		≤3.0%
NH <sub>3</sub> (0 to 10 mg/m <sup>3</sup> )			1.00			≤3.0%
CH <sub>4</sub> (0 to 15 mg/m <sup>3</sup> )			1.27			≤3.0%
CO <sub>2</sub> (0 to 20% vol)	0.29					≤3.0%
O <sub>2</sub> (0 to 21% vol)	0.22					≤0.2%
H <sub>2</sub> O (0 to 30% vol)		0.97				≤3.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Change in reference point over maintenance interval						
NO (0 to 80 mg/m <sup>3</sup> )			1.59			≤3.0%
NO <sub>2</sub> (0 to 50 mg/m <sup>3</sup> )				2.21		≤3.0%
N <sub>2</sub> O (0 to 50 mg/m <sup>3</sup> )			1.93			≤3.0%
SO <sub>2</sub> (0 to 75 mg/m <sup>3</sup> )				2.75		≤3.0%
CO (0 to 75 mg/m <sup>3</sup> )			1.92			≤3.0%
HCl (0 to 15 mg/m <sup>3</sup> )				2.30		≤3.0%
NH <sub>3</sub> (0 to 10 mg/m <sup>3</sup> )			1.00			≤3.0%
CH <sub>4</sub> (0 to 15 mg/m <sup>3</sup> )				4.36		≤3.0%
CO <sub>2</sub> (0 to 20% vol)		0.97				≤3.0%
O <sub>2</sub> (0 to 21% vol)	0.22					≤0.2%
H <sub>2</sub> O (0 to 30% vol)				2.68		≤3.0%
Availability						
O <sub>2</sub>					98.2	≥98%
All other parameters					97.6	≥95%
Reproducibility						
NO (0 to 80 mg/m <sup>3</sup> )			1.6			≤3.3%
NO <sub>2</sub> (0 to 50 mg/m <sup>3</sup> )				2.1		≤3.3%
N <sub>2</sub> O (0 to 50 mg/m <sup>3</sup> )				2.2		≤3.3%
SO <sub>2</sub> (0 to 75 mg/m <sup>3</sup> )				2.7		≤3.3%
CO (0 to 75 mg/m <sup>3</sup> )		0.9				≤3.3%
HCl (0 to 15 mg/m <sup>3</sup> )				2.5		≤3.3%
NH <sub>3</sub> (0 to 10 mg/m <sup>3</sup> )		0.9				≤3.3%
CH <sub>4</sub> (0 to 15 mg/m <sup>3</sup> )		0.7				≤3.3%
CO <sub>2</sub> (0 to 20% vol)	0.2					≤3.3%
O <sub>2</sub> (0 to 21% vol)	0.1					≤0.2%
H <sub>2</sub> O (0 to 30% vol)			1.1			≤3.3%

Note 1: The calibration function / R2 value for parameters marked \* was <0.9. However this was due to the relatively low levels during the field trial. The instrument passed the variability tests for the limit values stated on the certificate.

Note 2: The atmosFIR has a maintenance interval of 1 month. The work detailed in the operating manual has to be carried out at regular intervals, depending on local conditions.

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## Description

The atmosFIR CEM is a complete multi component emissions gas analyser system using the atmosFIR model AFS-B2 FTIR gas analyser. The atmosFIR CEM incorporates fully integrated sampling control components, as required by an extractive gas analyser, as well as collecting and analysing the FTIR spectral information. The atmosFIR FTIR gas analyser can be removed from the atmosFIR CEM rack.

The atmosFIR FTIR gas analyser samples hot and wet, without the need for sample conditioning. The high resolution (0.7cm<sup>-1</sup> unapodized) is used over a IR range 700-5000 cm<sup>-1</sup> with a multi-pass gas cell (from 4.2m to 6m) and ambient temperature DTGS detector. Internal self-reference of the IR beam eliminates drift in the measurement signal.

A built-in Zirconia O<sub>2</sub> sensor allows for the parallel measurement of Oxygen for measurement correction. An optional FID analyser can be integrated into the atmosFIR CEM, directly coupling with the sampling system already used for the FTIR.

PAS-Pro software runs continuously, with a flexible library of calibration data allows for unlimited gas species to be detected and measured. PAS-Pro also manages span and gas checks as required by QAL3, using span gas cylinders or alternatively internal automated validations (if allowable) without the need for span gas.

A sample probe with PTFE filter is used, with options of blow-back and sample probe pre-filtration for high dust applications. A heated sample transfers the sample to the analyser, with integrated sample probe power, alarms and span gas lines within the line braiding.

The complete sampling system is run at high temperature (180°C), with alarm and status information being reported continuously. A post-analyser sampling eductor pump gives a continuous sample flow through the entire system.

Local data files are saved in .csv format, whilst data outputs over 4-20mA, Modbus Serial, Modbus TCP/IP, OPC and PROFINET are all available. Remote access to the atmosFIR CEM is available over wired or wireless connection, for remote support and diagnostics.

AtmosFIRt AFS-B2T is a portable version of the AFS-B2 and is used in the following configuration:

- atmosFIRt Portable FTIR gas analyser
- Laptop running software
- Heated Sample Line and Line Controller heated to 180°C
- Sample Pump
- Portable Sample Probe and filter heated to 180°C

AtmosFIRi AFI-B2 is a model with low path length gas cell for high concentration applications.

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## 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 MC190346/01.
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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