

# PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

## **ProCeas LaserCEM**

Manufactured by:

### **AP2E**

Les Méridiens, Bâtiment A  
240 Rue Louis de Broglie  
CS90537  
13593 Aix-en-Provence Cedex 03  
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 (CEMS), Version 4 dated July 2018  
EN15267-3:2007,  
& QAL 1 as defined in EN 14181: 2014**

#### Certification Ranges :

CO	0 to 75	0 to 1249		mg/m <sup>3</sup>
NO	0 to 78	0 to 150	0 to 2008	mg/m <sup>3</sup>
NH <sub>3</sub>	0 to 15	0 to 45	0 to 76	mg/m <sup>3</sup>
H <sub>2</sub> O	0 to 30	0 to 40		% Vol
O <sub>2</sub>	0 to 21			% Vol
SO <sub>2</sub>	0 to 75	0 to 2,858		mg/m <sup>3</sup>
HCl	0 to 15	0 to 98		mg/m <sup>3</sup>

Project No.: 70205944 / 80033526  
Certificate No: Sira MC190347/02  
Initial Certification: 11 January 2019  
This Certificate issued: 10 February 2020  
Renewal Date: 10 January 2024



Emily Alexander  
Environmental Project Engineer

MCERTS is operated on behalf of the Environment Agency by

## **Sira Certification Service**

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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)*

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 applications, and not more than 2.5X the ELV for IED Chapter III and other types of application.

The field trial took place at Industrial waste incinerator and Municipal waste incinerator for 5 months and 6 months respectively.

## 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:

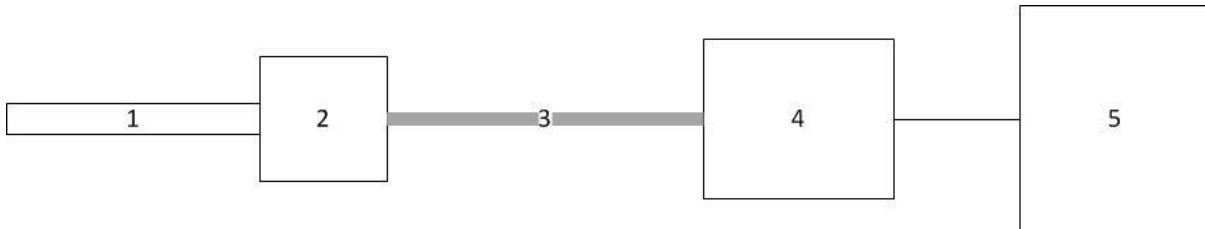
TUV Rheinland Report 936/21228566/B dated 23 February 2018  
TUV Rheinland Report 936/21228566/DE dated 20 May 2019

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**Product Certified**

The ProCease LaserCEM measuring system consists of the following parts:



1. Sample Probe	2. Heated Filter	3. Heated Sample Line	4. Gas Conditioning	5. Analyser
<p>Model: CEM Probe "TOULON"</p> <p>In-situ Gas low pressure sampling probe with 2µm filter in front for Low Pressure Sampling</p>	<p>Model: Integrated within the probe</p> <p>A "Sampling Box" does the interface between the probe and the line.</p>	<p>Model: Self-Heated sample line (Temp 80°C), inside diameter 4.35mm, length 30m (used in certification)</p>	<p>None (low pressure sampling = wet sample analysis)</p> <p>The line is directly connected in the cabinet.</p>	<p>Model: ProCeas LaserCEM</p>

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 (low pressure sampling).
- Additional manifolds and heated valves used to allow more than one analyser to share a sampling system (in accordance with allowable response time).
- Longer/shorter transfer line (in accordance with allowable response time).

This certificate applies to all instruments fitted with software version 3.0.8.24 (serial number SN2015-0120) 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: IP54

Note: For outdoor installations the analyser needs to be mounted into an IP65 environment. 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						Clause 10.9
CO (0-75 mg/m <sup>3</sup> )					85s	<200s
CO (0-1249 mg/m <sup>3</sup> )					174s	<200s
NO (0-78 mg/m <sup>3</sup> )					22s	<200s
NO (0-150 mg/m <sup>3</sup> )					22s	<200s
NO (0-2008 mg/m <sup>3</sup> )					44s	<200s
NH <sub>3</sub> (0-15 mg/m <sup>3</sup> )					153s	<400s
NH <sub>3</sub> (0-76 mg/m <sup>3</sup> )					198s	<400s
H <sub>2</sub> O (0-30 Vol.-%)					55s	<200s
H <sub>2</sub> O (0-40 Vol.-%)					36s	<200s
O <sub>2</sub> (0-21 Vol.-%)					28s	<200s
SO <sub>2</sub> (0-75 mg/m <sup>3</sup> )					85s	<200s
SO <sub>2</sub> (0-2,858 mg/m <sup>3</sup> )					64s	<200s
HCl (0-15 mg/m <sup>3</sup> )					200s	<400s
HCl (0-98 mg/m <sup>3</sup> )					199s	<400s
Repeatability standard deviation at zero point						Clause 10.10
CO	0.0					<2.0%
NO	0.0					<2.0%
NH <sub>3</sub>	0.0					<2.0%
H <sub>2</sub> O	0.0					<2.0%
O <sub>2</sub>	0.0					<0.2%
SO <sub>2</sub>	0.0					<2.0%
HCl	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		
Repeatability standard deviation at reference point						Clause 10.11
CO	0.4					<2.0%
NO	0.2					<2.0%
NH <sub>3</sub>		0.7				<2.0%
H <sub>2</sub> O		0.7				<2.0%
O <sub>2</sub>	0.01					<0.2%
SO <sub>2</sub>	0.1					<2.0%
HCl	0.1					<2.0%
Lack-of-fit						Clause 10.12
CO (0-75 mg/m <sup>3</sup> )		1.00				<2.0%
CO (0-1249 mg/m <sup>3</sup> )	-0.48					<2.0%
NO (0-78 mg/m <sup>3</sup> )		-0.97				<2.0%
NO (0-150 mg/m <sup>3</sup> )		-0.95				<2.0%
NO (0-2008 mg/m <sup>3</sup> )		-1.00				<2.0%
NH <sub>3</sub> (0-15 mg/m <sup>3</sup> )			1.07			<2.0%
NH <sub>3</sub> (0-76 mg/m <sup>3</sup> )		0.66				<2.0%
H <sub>2</sub> O (0-30 Vol.-%)		0.93				<2.0%
O <sub>2</sub> (0-21 Vol.-%)	0.10					<0.2%
SO <sub>2</sub> (0-75 mg/m <sup>3</sup> )			1.4			<2.0%
SO <sub>2</sub> (0-2,858 mg/m <sup>3</sup> )		-0.91				<2.0%
HCl (0-15 mg/m <sup>3</sup> )			1.25			<2.0%
HCl (0-98 mg/m <sup>3</sup> )			-1.94			<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 ambient temperature zero point (+5°C to +40°C)						Clause 10.14
CO	0.3					<5.0%
NO	-0.2					<5.0%
NH <sub>3</sub>	0.3					<5.0%
H <sub>2</sub> O	0.1					<5.0%
O <sub>2</sub>	-0.01					<0.5%
SO <sub>2</sub>	-0.1					<5.0%
HCl	0.1					<5.0%
Influence of ambient temperature reference point (+5°C to +40°C)						Clause 10.15
CO			1.1			<5.0%
NO			-1.7			<5.0%
NH <sub>3</sub>			2.0			<5.0%
H <sub>2</sub> O				-2.3		<5.0%
O <sub>2</sub>	-0.21					<0.50%
SO <sub>2</sub>				-2.3		<5.0%
HCl			-1.3			<5.0%
Influence of sample gas flow for extractive CEMS						Clause 10.16
CO		-0.8				<2.0%
NO		-1.0				<2.0%
NH <sub>3</sub>	0.0					<2.0%
H <sub>2</sub> O	-0.3					<2.0%
O <sub>2</sub>	0.1					<0.2%
SO <sub>2</sub>		0.5				<2.0%
HCl		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		
Influence of voltage variations at zero (196V to 253V)						Clause 10.17
CO	0.2					<2.0%
NO	0.1					<2.0%
NH <sub>3</sub>	0.0					<2.0%
H <sub>2</sub> O	0.0					<2.0%
O <sub>2</sub>	-0.01					<0.2%
SO <sub>2</sub>	0.0					<2.0%
HCl	0.0					<2.0%
Influence of voltage variations at reference point (196V to 253V)						Clause 10.17
CO	-0.2					<2.0%
NO		0.8				<2.0%
NH <sub>3</sub>	-0.3					<2.0%
H <sub>2</sub> O		1.0				<2.0%
O <sub>2</sub>	0.01					<0.2%
SO <sub>2</sub>	-0.3					<2.0%
HCl	0.4					<2.0%
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						Clause 10.18
CO	0.0					<4.0%
NO		0.54				<4.0%
NH <sub>3</sub>	0.0					<4.0%
H <sub>2</sub> O	0.0					<4.0%
O <sub>2</sub>	0.0					<0.40%
SO <sub>2</sub>	0.0					<4.0%
HCl		0.65				<4.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Cross-sensitivity at 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						Clause 10.18
CO			-1.96			<4.0%
NO			-1.67			<4.0%
NH <sub>3</sub>			1.46			<4.0%
H <sub>2</sub> O				2.10		<4.0%
O <sub>2</sub>	-0.34					<0.40%
SO <sub>2</sub>				2.21		<4.0%
HCl			1.19			<4.0%
Measurement uncertainty					Guidance - at least 25% below max permissible uncertainty	
CO (For an ELV of 50 mg/m <sup>3</sup> )					6.3%	<7.5% (10%)
NO (For an ELV of 50 mg/m <sup>3</sup> )					6.5%	<15% (20%)
NH <sub>3</sub> (For an ELV of 10 mg/m <sup>3</sup> )					7.3%	<30% (40%)
H <sub>2</sub> O (For a range of 0-30 Vol.-%)					5.1%	<7.5% (10%)
O <sub>2</sub> (For a range of 0-21 Vol.-%)					2.8%	<7.5% (10%)
SO <sub>2</sub> (For an ELV of 50 mg/m <sup>3</sup> )					7.4%	<15% (20%)
HCl (For an ELV of 10 mg/m <sup>3</sup> )					6.6%	<30% (40%)
Calibration function (field)						Clause 12.1
CO					0.96	>0.90
NO					0.98	>0.90
NH <sub>3</sub> (0-15 mg/m <sup>3</sup> )					0.97	>0.90
NH <sub>3</sub> (0-45 mg/m <sup>3</sup> )					0.95	>0.90
H <sub>2</sub> O					0.92	>0.90
O <sub>2</sub>					0.96	>0.90
SO <sub>2</sub>					0.99	0.90
HCl					0.90	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)						Clause 12.2
CO					60s	<200s
NO					40s	<200s
NH <sub>3</sub> (0-15 mg/m <sup>3</sup> )					128s	<400s
NH <sub>3</sub> (0-45 mg/m <sup>3</sup> )					110s	<400s
H <sub>2</sub> O					53s	<200s
O <sub>2</sub>					35s	<200s
SO <sub>2</sub>					55a	<200s
HCl					108s	<400s
Lack of fit (field)						Clause 12.3
CO	0.13					<2.0%
NO	0.13					<2.0%
NH <sub>3</sub> (0-15 mg/m <sup>3</sup> )		-0.80				<2.0%
NH <sub>3</sub> (0-45 mg/m <sup>3</sup> )		-0.67				<2.0%
H <sub>2</sub> O		0.75				<2.0%
O <sub>2</sub>	0.10					<0.2%
SO <sub>2</sub>			1.33			<2.0%
HCl			-1.4			<2.0%
Maintenance interval					3 months Note 1	Clause 12.4 >8 days
Zero and Span drift requirement	Software permits access to gain and offset adjustment using standard gas bottle, and calibration inlet. It is possible to record zero and span drift (not include). This complies with the requirements of QAL3 according to EN14181 (Note 2).					Clause 6.13 & 10.13 Manufacturer shall provide a description of the technique to determine and compensate for zero and span drift.

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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						Clause 12.5
CO		0.6				<3.0%
NO (0-78 mg/m <sup>3</sup> )		0.7				<3.0%
NO (0-150 mg/m <sup>3</sup> )	0.4					<3.0%
NH <sub>3</sub> (0-15 mg/m <sup>3</sup> )			-1.8			<3.0%
NH <sub>3</sub> (0-45 mg/m <sup>3</sup> )		0.5				<3.0%
H <sub>2</sub> O (0-30 Vol.-%)		0.9				<3.0%
H <sub>2</sub> O (0-40 Vol.-%)		0.7				<3.0%
O <sub>2</sub>	0.11					<0.2%
SO <sub>2</sub>	0.3					<3.0%
HCl			1.6			<3.0%
Change in reference point over maintenance interval						Clause 12.5
CO				2.2		<3.0%
NO				2.4		<3.0%
NH <sub>3</sub> (0-15 mg/m <sup>3</sup> )				2.5		<3.0%
NH <sub>3</sub> (0-45 mg/m <sup>3</sup> )				-2.9		<3.0%
H <sub>2</sub> O (0-30 Vol.-%)				2.5		<3.0%
H <sub>2</sub> O (0-40 Vol.-%)				-2.6		<3.0%
O <sub>2</sub>	0.12					<0.2%
SO <sub>2</sub>				2.0		<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		
Availability					98.5%	Clause 12.6 >95% (>98% for O <sub>2</sub> )
Reproducibility						Clause 12.7
CO			1.3			<3.3%
NO			1.5			<3.3%
NH <sub>3</sub> (0-15 mg/m <sup>3</sup> )				2.2		<3.3%
NH <sub>3</sub> (0-45 mg/m <sup>3</sup> )			1.7			<3.3%
H <sub>2</sub> O			1.2			<3.3%
O <sub>2</sub>	0.10					<0.20%
SO <sub>2</sub>	0.3					<3.3%
HCl		0.8				<3.3%

Note 1: The LaserCEM has a maintenance interval of 3 months. The work has to be carried out at regular intervals, depending on local conditions. This includes a visual inspection of the system and its parameter which are fully monitored. If any is not inside the min/max allowed, general fault alarm will rise.  
A zero check and span check using standard gas bottle should be performed every 3 months. Wet gases must be used for testing NH<sub>3</sub>. If the measure error is more than 2%, a gain can be adjusted (as QAL3 requires). Refer to User Manual for this operation.

Note 2: Refer to the "Monitoring the Calibration" chapter in the User Manual for details on this operation.

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## Description

The ProCeas LaserCEM is an analyser dedicated to CEM analysis, with 4 parts:

- A CEM Probe
- A sampling Box – which permits probe and line interface
- A self-heated line and gas line (for standard gas injection and protection gas injection in front of the probe)
- A full equipped analyser cabinet.

The in-situ probe uses the Low Pressure Sampling technics to sample the gas in the stack and reduce the pressure. The lowered pressure has several effects: lower the gas sample dew point, increase the gas speed inside the line (around 20 times), reduce the gas band self-broadening for spectral resolution. Through the self-heated line at 80°C, the gas is driven to the analyser without any conditioning system. The integrity of the sample is maintained.

The gas is then analysed thanks to an infrared laser spectroscopic technic named OF-CEAS (Optical Feedback Cavity Enhanced Absorption Spectroscopy), which is a high resolution spectroscopic technics (equivalent to laboratory grand instruments), with a pathlength of several kilometre. Low pressure, long pathlength and high spectroscopic resolution provides very linear and repeatable measure, reduced interference, high 10-90 response time, with low sampling flow (20L/h).

## 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'.
2. The design of the product certified is held and maintained by TUV Rheinland for certificate No. Sira MC190347/00
3. 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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