

# CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000062062

AMS designation:	ZPA-CEMS for CO, NO, SO <sub>2</sub> , CO <sub>2</sub> and O <sub>2</sub>
Manufacturer:	Fuji Electric France S.A.S. 46, Rue Georges Besse, ZI du Brézet 63039 Clermont-Ferrand Cedex 2, France
Test Laboratory:	TÜV Rheinland Energy GmbH
	This is to certify that the AMS has been tested and found to comply with:
EN	15267-1: 2009, EN 15267-2: 2009, EN 15267-3: 2007 and EN 14181: 2014

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 12 pages).



Suitability Tested EN 15267 QAL1 Certified Regular Surveillance

www.tuv.com ID 0000062062

25 March 2024

Publication in the German Federal Gazette (BAnz) of 26 March 2019

German Federal Environment Agency Dessau, 12 June 2019

Mohl

Dr Marcel Langner Head of Section II 4.1

pulations ppa. Dr Peter Wilbring

This certificate will expire on:

TÜV Rheinland Energy GmbH

Cologne, 11 June 2019

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Test institute accredited to EN ISO/IEC 17025:2005 by DAkkS (German Accreditation Body). This accreditation is limited to the accreditation scope defined in the enclosure to the certificate D-PL-11120-02-00.

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Test Report: Initial certification: Expiry date: Publication: 936/21239789/A dated 21 September 2018 26 March 2019 25 March 2024 BAnz AT 26.03.2019 B7, chapter I number 2.1

#### Approved application

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13<sup>th</sup> BImSchV), and TA Luft. The measured ranges have been selected so as to ensure as broad a field of application as possible.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a field test at a large combustion plant (hard coal firing) for a period of more than three months.

The AMS is approved for an ambient temperature range of +5 °C to +40 °C.

The notification of suitability of the AMS, performance testing and the uncertainty calculation have been effected on the basis of the regulations applicable at the time of testing. As changes in legal provisions are possible, any potential user should ensure that this AMS is suitable for monitoring the limit values relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for the installation at which it will be installed.

#### Basis of the certification

This certification is based on:

- Test report no. 936/21239789/A dated 21 September 2018 issued by TÜV Rheinland Energy GmbH
- Suitability announced by the German Federal Environment Agency (UBA) as the relevant body
- The ongoing surveillance of the product and the manufacturing process

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Publication in the German Federal Gazette:BAnz AT 26.03.2019 B7, chapter I number 2.1, UBA announcement dated 27 February 2019:

#### AMS designation:

ZPA-CEMS for CO, NO, SO<sub>2</sub>, CO<sub>2</sub> and O<sub>2</sub>

#### Manufacturer:

Fuji Electric France S.A.S, 46, Rue Georges Besse, ZI du Brézet, 63039 Clermont-Ferrand CEDEX 2, France

#### Field of application:

Modular AMS for measurement at plants according to the 13<sup>th</sup> BImSchV and TA Luft

#### Measuring ranges during performance testing:

Component	Certification range	supplemer	Unit	
СО	0–375	0–625	0–2 500	mg/m³
NO	0–268	0–670	0–2 680	mg/m³
SO <sub>2</sub>	0–571	0–1 428	0–5 710	mg/m³
CO <sub>2</sub>	0–20		1	vol%
O <sub>2</sub> para.	0–25	0–10	15-	vol%
O <sub>2</sub> (ZrO <sub>2</sub> )	0–25	0–10		vol%

#### Software version:

2.02g

#### **Restrictions:**

None

#### Notes:

- 1. The maintenance interval is four weeks.
- 2. There are two alternatives for measuring oxygen: the paramagnetic oxygen sensor ( $O_2$  (para)) or the zirconium dioxide sensor ( $O_2$  (Zr $O_2$ ).
- 3. For measuring the components CO, NO, SO<sub>2</sub> and CO<sub>2</sub>, the interval for automatic zero point adjustment must be set to 24 h.



4. The measuring system can be distributed with various combinations of measurement channels. The following table lists the AMS designation which indicates the relevant scope of measured components:

12110	Designation		Combination of IR
Without O <sub>2</sub> meas-	With O <sub>2</sub> meas-	With O <sub>2</sub> meas-	components
urement	urement (ZrO <sub>2</sub> )	urement (para)	semperiente
	ZPA-Yz	ZPA-Yp	O <sub>2</sub>
ZPA-B	ZPA-Bz	ZPA-Bp	CO
ZPA-Z	ZPA-Zz	ZPA-Zp	$CO + SO_2$
ZPA-P	ZPA-Pz	ZPA-Pp	NO
ZPA-F	ZPA-Fz	ZPA-Fp	$NO + SO_2$
ZPA-D	ZPA-Dz	ZPA-Dp	CO <sub>2</sub>
ZPA-G	ZPA-Gz	ZPA-Gp	CO + NO
ZPA-J	ZPA-Jz	ZPA-Jp	$CO + CO_2$
ZPA-N	ZPA-Nz	ZPA-Np	$CO + NO + SO_2$
ZPA-W	ZPA-Wz	ZPA-Wp	$CO + NO + CO_2$
ZPA-Q	ZPA-Qz	ZPA-Qp	$CO + NO + SO_2 + CO_2$

5. The system must be operated with the span check deactivated, since this has not been tested. Synthetic air is used for automatic zero point adjustment.

#### **Test Report:**

TÜV Rheinland Energy GmbH, Cologne Report no.: 936/21239789/A dated 21 September 2018 Certificate: 0000062062\_00 / 12 June 2019



#### **Certified product**

This certification applies to automated measurement systems conforming to the following description:

The modular ZPA-CEMS measuring system is an extractive system and comprises the following components:

- Air-conditioned measuring cabinet (SPACIAL SF NSYSF20860P, Schneider Electric),
- Heated sampling probe (SP2000-H with ceramics filter, 180 °C, M&C TechGroup),
- Heated sampling line,
- Compressor cooler (ECM, dew point 5 °C, M&C TechGroup),
- Sample gas pump and
- Analyser modules.

The ZPA analyser itself measures the components CO, NO, SO<sub>2</sub> and CO<sub>2</sub> using NDIR. There are two alternatives for measuring O<sub>2</sub>: either a paramagnetic measuring cell (sensor is installed in the enclosure of the ZPA analyser downstream of the optical benches) or a ZFK-7 zirconium dioxide sensor (sensor is installed upstream of the ZPA analyser enclosure). Module configurations:

	Designation		Combination of IR
Without O <sub>2</sub> meas- urement	With O <sub>2</sub> meas- urement (ZrO <sub>2</sub> )	With O <sub>2</sub> meas- urement (para)	components
	ZPA-Yz	ZPA-Yp	O <sub>2</sub>
ZPA-B	ZPA-Bz	ZPA-Bp	CO
ZPA-Z	ZPA-Zz	$CO + SO_2$	
ZPA-P	ZPA-Pz	ZPA-Pp	NO
ZPA-F	ZPA-Fz	ZPA-Fp	$NO + SO_2$
ZPA-D	ZPA-Dz	ZPA-Dp	CO <sub>2</sub>
ZPA-G	ZPA-Gz	ZPA-Gp	CO + NO
ZPA-J	ZPA-Jz	ZPA-Jp	$CO + CO_2$
ZPA-N	ZPA-Nz	ZPA-Np	$CO + NO + SO_2$
ZPA-W	ZPA-Wz	ZPA-Wp	$CO + NO + CO_2$
ZPA-Q	ZPA-Qz	ZPA-Qp	$CO + NO + SO_2 + CO_2$

The ZFK7 sensor  $(ZrO_2)$  is connected to the ZPA analyser module such that the ZPA analyser module is used entirely for measured value output, operation and parameterisation of the ZFK7.

Measured value output of the measuring system refers to dry gas under normal conditions.

The measuring system provides an option for automatic zero and span check and adjustment. This can be effected directly using (static) test gas application or via a probe when (dynamically) applying test gas.

Zero point adjustment during performance testing was performed every 24 h (6 min. purging duration) for the measured NDIR components. Synthetic air from a pressurised gas cylinder served as zero gas; it is also possible to use nitrogen or dry, clean compressed air/instrument air. Zero gas was provided to the measuring system via (static) application.

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#### **General remarks**

This certificate is based upon the equipment tested. The manufacturer is responsible for ensuring that on-going production complies with the requirements of the EN 15267. The manufacturer is required to maintain an approved quality management system controlling the manufacturing process for the certified product. Both the product and the quality management systems shall be subject to regular surveillance.

If a product of the current production does not conform to the certified product, TÜV Rheinland Energy GmbH must be notified at the address given on page 1.

A certification mark with an ID number that is specific to the certified product is presented on page 1 of this certificate. This certification mark may be applied to the product or used in advertising materials for the certified product.

This document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. Upon revocation of the publication the certificate loses its validity. After the expiration of the certificate and on request of TÜV Rheinland Energy GmbH this document shall be re-turned and the certificate mark must no longer be used.

The relevant version of this certificate and its expiration date are also accessible on the internet at **<u>gal1.de</u>**.

#### **Document history**

Certification of the ZPA-CEMS measuring system is based on the documents listed below and the regular, continuous surveillance of the manufacturer's quality management system:

#### Initial certification according to EN 15267

Certificate No. 0000062062: 12 June 2019 Expiry date of the certificate: 25 March 2024 Test report no.936/21239789/A dated 21 September 2018 TÜV Rheinland Energy GmbH, Cologne Publication: BAnz AT 26.03.2019 B7, chapter I number 2.1 UBA announcement dated 27 February 2019

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#### Calculation of overall uncertainty according to EN 14181 and EN 15267-3

Measuring system Manufacturer AMS designation Serial number of units under test Measuring principle	ZPA-	ilectric CEMS 0387 / N4			
Test report Test laboratory Date of report	TÜVI	1239789 Rheinland 09-21			
Measured component	со				
Certification range	0 -	375	mg/m³		
Evaluation of the cross-sensitivity (CS) (system with largest CS)					
Sum of positive CS at zero point			mg/m³		
Sum of negative CS at zero point			mg/m³		
Sum of postive CS at span point			mg/m³		
Sum of negative CS at span point			mg/m³		
Maximum sum of cross-sensitivities			mg/m <sup>3</sup>		
Uncertainty of cross-sensitivity	ui	2.307	mg/m³		
Calculation of the combined standard uncertainty Tested parameter				U <sup>2</sup>	
Standard deviation from paired measurements under field conditions *	u <sub>D</sub>	1.975	mg/m³	3.901	(mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	Ulof	-1.169	mg/m³	1.367	(mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	U <sub>d,z</sub>	1.588	mg/m³	2.522	(mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	U <sub>d,s</sub>		mg/m³	5.331	(mg/m³)²
Influence of ambient temperature at span	ut		mg/m³	1.960	(mg/m³)²
Influence of supply voltage	uv		mg/m³	2.042	(mg/m <sup>3</sup> ) <sup>2</sup>
Cross-sensitivity (interference)	ui		mg/m³	5.603	(mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	u <sub>p</sub>	-0.992	U	0.984	$(mg/m^3)^2$
Uncertainty of reference material at 70% of certification range  * The larger value is used :     "Repeatability standard deviation at set point" or     "Standard deviation from paired measurements under field conditions"	U <sub>rm</sub>	3.031	mg/m³	9.188	(mg/m³)²
Combined standard uncertainty (u <sub>c</sub> )	u =	$\sqrt{\sum (u_m)}$	.)2	5.74	mg/m³
Total expanded uncertainty (u <sub>C</sub> )		$v \_ (u_m)$ $c^* k = u_c$	ax, j /	5.74 11.24	
	0 = u		, 1.00	11.24	ing/in
Relative total expanded uncertainty	U in 9	% of the	ELV 150 mg/m <sup>3</sup>		7.49
Requirement of 2010/75/EU			ELV 150 mg/m <sup>3</sup>		10.00
Requirement of EN 15267-3			LV 150 mg/m <sup>3</sup>		7.50
			5		

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#### Calculation of overall uncertainty according to EN 14181 and EN 15267-3

Measuring system Manufacturer AMS designation Serial number of units under test Measuring principle	Fuji E ZPA-C N7CC NDIR				
Test report Test laboratory Date of report	936/2 TÜV F 2018-				
Measured component	NO				
Certification range	0 -	268	mg/m³		
Evaluation of the cross-sensitivity (CS) (system with largest CS)					
Sum of positive CS at zero point		2.63	mg/m³		
Sum of negative CS at zero point			mg/m³		
Sum of postive CS at span point			mg/m³		
Sum of negative CS at span point			mg/m³		
Maximum sum of cross-sensitivities			mg/m³		
Uncertainty of cross-sensitivity	ui	1.516	mg/m³		
Calculation of the combined standard uncertainty Tested parameter				U <sup>2</sup>	
Standard deviation from paired measurements under field conditions *	u <sub>D</sub>	2 153	mg/m³	4.635	(mg/m³)²
Lack of fit	u <sub>lof</sub>	0.573	0	0.328	$(mg/m^3)^2$
Zero drift from field test	u <sub>d.z</sub>		mg/m <sup>3</sup>	1.940	$(mg/m^3)^2$
Span drift from field test	U <sub>d.s</sub>		mg/m <sup>3</sup>	4.692	$(mg/m^3)^2$
Influence of ambient temperature at span	U <sub>t</sub>		mg/m³	5.490	$(mg/m^3)^2$
Influence of supply voltage	uv		mg/m³	1.355	(mg/m <sup>3</sup> ) <sup>2</sup>
Cross-sensitivity (interference)	u		mg/m <sup>3</sup>	2.298	(mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	up	-0.484	mg/m <sup>3</sup>	0.234	(mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	Urm	2.166	mg/m³	4.693	(mg/m <sup>3</sup> ) <sup>2</sup>
<ul> <li>The larger value is used : "Repeatability standard deviation at set point" or "Standard deviation from paired measurements under field conditions"</li> </ul>					
Combined standard uncertainty (u <sub>c</sub> )	u. = .	$\sqrt{\sum (u)}$	.)2	5.07	mg/m³
Total expanded uncertainty	U = 11.	$\sqrt{\sum_{m} (u_m)}$	* 1.96	9.93	mg/m <sup>3</sup>
	- u	, u	,	0.00	
Relative total expanded uncertainty	U in %	% of the	ELV 107.2 mg/m <sup>3</sup>	3	9.3
Requirement of 2010/75/EU			ELV 107.2 mg/m <sup>3</sup>		20.0
Requirement of EN 15267-3			LV 107.2 mg/m <sup>3</sup>		15.0
			5		

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#### Calculation of overall uncertainty according to EN 14181 and EN 15267-3

Measuring system Manufacturer AMS designation Serial number of units under test Measuring principle	ZPA-	Electric CEMS O387 / N4			
Test report Test laboratory Date of report	ΤÜV	21239789 Rheinlan -09-21			
and the second	00				
Measured component	SO <sub>2</sub>				
Certification range	0 -	571	mg/m³		
Evaluation of the cross-sensitivity (CS) (system with largest CS)					
Sum of positive CS at zero point		8.11	mg/m³		
Sum of negative CS at zero point		-5.14	mg/m <sup>3</sup>		
Sum of postive CS at span point		3.71	mg/m <sup>3</sup>		
Sum of negative CS at span point		-16.90	mg/m³		
Maximum sum of cross-sensitivities		-16.90	mg/m³		
Uncertainty of cross-sensitivity	ui	-9.758	mg/m³		
Calculation of the combined standard uncertainty Tested parameter				u²	
Standard deviation from paired measurements under field conditions *	u <sub>D</sub>	4 538	mg/m³	20.593	(mg/m³)²
Lack of fit	u <sub>lof</sub>		mg/m <sup>3</sup>	0.352	(mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	u <sub>d.z</sub>		mg/m <sup>3</sup>	15.650	$(mg/m^3)^2$
Span drift from field test	U <sub>d.s</sub>		mg/m <sup>3</sup>	10.870	(mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	U <sub>t</sub>		mg/m <sup>3</sup>	25.090	(mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	uv		mg/m <sup>3</sup>	4.125	$(mg/m^3)^2$
Cross-sensitivity (interference)	u		mg/m <sup>3</sup>	95.219	(mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	up		mg/m <sup>3</sup>	8.720	(mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	u <sub>rm</sub>		mg/m <sup>3</sup>	21.301	(mg/m <sup>3</sup> ) <sup>2</sup>
<ul> <li>* The larger value is used : "Repeatability standard deviation at set point" or "Standard deviation from paired measurements under field conditions"</li> </ul>					
Combined standard uncertainty (u <sub>c</sub> )	$u_c =$	$\sqrt{\sum (u_m)}$	) <sup>2</sup>	14.21	mg/m³
Total expanded uncertainty		$u_c * k = u_c$		27.85	mg/m <sup>3</sup>
Relative total expanded uncertainty	U in 9	% of the	ELV 228.4	mg/m <sup>3</sup>	12.2
Requirement of 2010/75/EU	U in 9	% of the	ELV 228.4	mg/m <sup>3</sup>	20.0
Poquiromont of EN 15267 3	$11 \text{ in } 0/\text{ of the ELV 229.4 mg/m}^3$				15.0

Requirement of EN 15267-3

 U in % of the ELV 228.4 mg/m³
 20.0

 U in % of the ELV 228.4 mg/m³
 15.0

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#### Calculation of overall uncertainty according to EN 14181 and EN 15267-3

Measuring system Manufacturer AMS designation Serial number of units under test Measuring principle Test report Test laboratory	ZPA- N7C0 NDIF 936/2	Electric CEMS O387 / N4 21239789 Rheinlan			
Date of report	2018	-09-21			
Measured component	$CO_2$				
Certification range	0 -	20	Vol%		
Evaluation of the cross-sensitivity (CS) (system with largest CS)					
Sum of positive CS at zero point		0.00	Vol%		
Sum of negative CS at zero point		0.00	Vol%		
Sum of postive CS at span point		0.00	Vol%		
Sum of negative CS at span point		-0.20	Vol%		
Maximum sum of cross-sensitivities			Vol%		
Uncertainty of cross-sensitivity	u <sub>i</sub>	-0.115	Vol%		
Calculation of the combined standard uncertainty				1	
Tested parameter				U <sup>2</sup>	
Standard deviation from paired measurements under field conditions *	u <sub>D</sub>		Vol%		(Vol%) <sup>2</sup>
Lack of fit	Ulof		Vol%		(Vol%) <sup>2</sup>
Zero drift from field test	u <sub>d,z</sub>		Vol%		(Vol%) <sup>2</sup>
Span drift from field test	u <sub>d,s</sub>		Vol%		(Vol%) <sup>2</sup>
Influence of ambient temperature at span	u <sub>t</sub>		Vol%		$(Vol\%)^2$
Influence of supply voltage Cross-sensitivity (interference)	u <sub>v</sub> u <sub>i</sub>		Vol% Vol%		(Vol%)² (Vol%)²
Influence of sample gas flow	u <sub>i</sub> U <sub>p</sub>		Vol%	0.013	
Uncertainty of reference material at 70% of certification range	u <sub>p</sub> U <sub>rm</sub>		Vol%		(Vol%) <sup>2</sup>
<ul> <li>The larger value is used :</li> <li>"Repeatability standard deviation at set point" or</li> <li>"Standard deviation from paired measurements under field conditions"</li> </ul>	urm	0.102	V0170	0.020	(VOI70)
Combined standard uncertainty (u <sub>c</sub> )	u_ =	$\sqrt{\sum (u_m)}$	$\left(\frac{1}{2}\right)^2$	0.40	Vol%
Total expanded uncertainty	U = 1	$u_c * k = u_c$	* 1.96		Vol%
		с <b>ч</b> (		00	
Relative total expanded uncertainty	Uin	% of the	range 20 Vol%		3.9
Requirement of 2010/75/EU			range 20 Vol%		3.9 10.0 **
Requirement of EN 15267-3			ange 20 Vol%		7.5
	0 11				1.5

\*\* The EU-directive 2010/75/EU on industrial emissions provides no requirements for this component. A value of 10.0 % was used for this.

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#### Calculation of overall uncertainty according to EN 14181 and EN 15267-3

Measuring system Manufacturer AMS designation Serial number of units under test Measuring principle	ZPA- N7C0	Electric CEMS D387 / N4 magnetiso			
Test report Test laboratory Date of report	ΤÜV	21239789 Rheinland -09-21			
Measured component	O <sub>2</sub> (P	ara)			
Certification range	0 -		Vol%		
Evaluation of the cross-sensitivity (CS) (system with largest CS)					
Sum of positive CS at zero point		0.00	Vol%		
Sum of negative CS at zero point		0.00	Vol%		
Sum of postive CS at span point			Vol%		
Sum of negative CS at span point			Vol%		
Maximum sum of cross-sensitivities			Vol%		
Uncertainty of cross-sensitivity	ui	0.000	Vol%		
Calculation of the combined standard uncertainty				U <sup>2</sup>	
Tested parameter Standard deviation from paired measurements under field conditions *	u <sub>D</sub>	0.056	Vol%	0.003	(Vol%) <sup>2</sup>
Lack of fit	u <sub>lof</sub>		Vol%	0.003	
Zero drift from field test	U <sub>d,z</sub>		Vol%	0.008	
Span drift from field test	U <sub>d,s</sub>		Vol%		(Vol%) <sup>2</sup>
Influence of ambient temperature at span	u <sub>t</sub>		Vol%	0.000	
Influence of supply voltage	u <sub>v</sub>	0.026	Vol%	0.001	
Cross-sensitivity (interference)	u	0.000	Vol%	0.000	
Influence of sample gas flow	up	-0.058	Vol%	0.003	(Vol%) <sup>2</sup>
Uncertainty of reference material at 70% of certification range * The larger value is used : "Repeatability standard deviation at set point" or "Standard deviation from paired measurements under field conditions"	U <sub>rm</sub>	0.202	Vol%	0.041	(Vol%)²
Combined standard uncertainty (u.)	ц =	$\sqrt{\sum (u_m)}$	)2	0.00	
Combined standard uncertainty (u <sub>C</sub> )		$\sqrt{\sum} (u_m)$			Vol% Vol%
Total expanded uncertainty	0 – u	<sub>c</sub> k – U <sub>c</sub>	; 1.90	0.52	vUI%
Relative total expanded uncertainty	U in 9	% of the	range 25 Vol%		2.1
Requirement of 2010/75/EU			range 25 Vol%		10.0 **
Requirement of EN 15267-3	U in 9	% of the r		7.5	

\*\* EU Directive 2010/75/EU does not define requirements for this component. A value of 10.0% was used instead.

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#### Calculation of overall uncertainty according to EN 14181 and EN 15267-3

Measuring system Manufacturer AMS designation Serial number of units under test Measuring principle Test report Test laboratory Date of report	ZPA-0 N4C1 ZrO2 936/2 TÜV	Electric CEMS 3450+N4 1239789 Rheinland 09-21	60+N4E	0758	
Measured component	O <sub>2</sub>				
Certification range	0 -	25	Vol%		
Evaluation of the cross-sensitivity (CS) (system with largest CS)					
Sum of positive CS at zero point		0.00	Vol%		
Sum of negative CS at zero point		0.00	Vol%		
Sum of postive CS at span point			Vol%		
Sum of negative CS at span point		0.00	Vol%		
Maximum sum of cross-sensitivities			Vol%		
Uncertainty of cross-sensitivity	ui	0.139	Vol%		
Calculation of the combined standard uncertainty Tested parameter Standard deviation from paired measurements under field conditions * Lack of fit Zero drift from field test Span drift from field test Influence of ambient temperature at span Influence of supply voltage Cross-sensitivity (interference) Influence of sample gas flow Uncertainty of reference material at 70% of certification range * The larger value is used : "Repeatability standard deviation at set point" or "Standard deviation from paired measurements under field conditions"	U <sub>D</sub> U <sub>lof</sub> U <sub>d,z</sub> U <sub>d,s</sub> U <sub>t</sub> U <sub>v</sub> U <sub>i</sub> U <sub>p</sub> U <sub>rm</sub>	0.058 0.017 0.115 0.046 0.010 0.139 0.057	Vol% Vol% Vol% Vol% Vol% Vol% Vol%	u <sup>2</sup> 0.001 0.003 0.000 0.013 0.002 0.000 0.019 0.003 0.041	(Vol%) <sup>2</sup> (Vol%) <sup>2</sup> (Vol%) <sup>2</sup> (Vol%) <sup>2</sup> (Vol%) <sup>2</sup> (Vol%) <sup>2</sup> (Vol%) <sup>2</sup>
Combined standard uncertainty (u <sub>c</sub> )	u <sub>c</sub> =	$\sqrt{\sum (u_m)}$	$\frac{1}{(1+1)^2}$	0.29	Vol%
Total expanded uncertainty	U = u	$c^* k = u_c$	* 1.96		Vol%
Relative total expanded uncertainty Requirement of 2010/75/EU Requirement of EN 15267-3	U in 9	% of the	range 25 Vol% range 25 Vol% ange 25 Vol%		2.3 10.0 * 7.5

\*\* EU Directive 2010/75/EU does not define requirements for this component. A value of 10.0% was used instead.