

# CERTIFICATE

## of Product Conformity (QAL1)

Certificate No.: 000024161\_01

**AMS designation:** MIR 9000CLD Option for NO/NO<sub>x</sub>, NO<sub>2</sub>, CO<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub>O and CH<sub>4</sub>

**Manufacturer:** Environnement S.A.  
111 Boulevard Robespierre  
78304 Poissy Cedex  
France

**Test Laboratory:** TÜV Rheinland Energy GmbH

This is to certify that the AMS has been tested and certified  
according to the standards

EN 15267-1: 2009, EN 15267-2: 2009, EN 15267-3: 2007  
and EN 14181: 2004

Certification is awarded in respect of the conditions stated in this certificate  
(this certificate contains 13 pages).

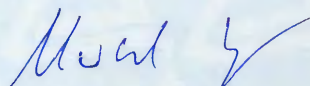


Suitability Tested  
EN 15267  
QAL1 Certified  
Regular  
Surveillance

www.tuv.com  
ID 000024161

Publication in the German Federal Gazette  
(BAnz) of 05 March 2013

German Federal Environment Agency  
Dessau, 05 March 2018



Dr. Marcel Langner  
Head of Section II 4.1

This certificate will expire on:  
04 March 2023

TÜV Rheinland Energy GmbH  
Cologne, 04 March 2018



ppa. Dr. Peter Wilbring

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51105 Köln

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.

<b>Test Report:</b>	936/21220780/B dated 05 October 2012
<b>Initial certification:</b>	05 March 2013
<b>Expiry date:</b>	04 March 2023
<b>Certificate:</b>	Renewal (of previous certificate 0000024161 dated 22 March 2013 valid until 04 March 2018)
<b>Publication:</b>	BAnz AT 05.08.2013 B10, chapter I no. 5.3

### **Approved application**

The tested AMS is suitable for use at combustion plants according to EC Directive 2001/80/EC (13<sup>th</sup> BImSchV), at waste incineration plants according to EC Directive 2000/76/EC (17<sup>th</sup> BImSchV), the 27<sup>th</sup> BImSchV, the 30<sup>th</sup> BImSchV and TA Luft. The measured ranges have been selected so as to cater for 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 three-months field test at a municipal sewage-sludge incineration plant.

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 and oxygen concentrations 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 936/21220780/B dated 05 October 2012 issued by TÜV Rheinland Energie und Umwelt GmbH
- Suitability announced by the German Federal Environment Agency (UBA) as the relevant body
- The ongoing surveillance of the product and the manufacturing process



Publication in the German Federal Gazette: BAnz AT 05.03.2013 B10, chapter I no. 5.3,  
UBA announcement dated 12 February 2013:

**AMS designation:**

MIR 9000CLD Option for NO/NO<sub>x</sub>, NO<sub>2</sub>, CO<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub>O and CH<sub>4</sub>

**Manufacturer:**

Environnement S.A., Poissy Cedex, France

**Field of application:**

For plants requiring official approval and for plants according to the 27<sup>th</sup> BImSchV

**Measuring ranges during performance testing:**

Component	Certification range	Supplementary range	Unit
NO/NO <sub>x</sub>	0–20	0–2000	mg/m <sup>3</sup>
NO <sub>2</sub>	0–20	0–200	mg/m <sup>3</sup>
CO <sub>2</sub>	0–25	-	Vol.-%
O <sub>2</sub>	0–10	0–25	Vol.-%
N <sub>2</sub> O	0–20	0–200	mg/m <sup>3</sup>
CH <sub>4</sub>	0–10	0–200	mg/m <sup>3</sup>

**Software version:**

V6.5

**Restriction:**

During performance testing in accordance with EN 15267-3, the requirement for the degree of protection provided by the enclosure was not fulfilled. The measuring system has to be installed in an environment sheltered from dust and precipitation.

**Notes:**

1. The maintenance interval is two weeks.
2. Supplementary testing (migration to EN 15267) as regards Federal Environment Agency notice of 19 February 2009 (BAnz p. 899, chapter I no. 2.4).

**Test Report:**

TÜV Rheinland Energie und Umwelt GmbH, Köln  
Report no. 936/21220780/B dated 5 October 2012

Publication in the German Federal Gazette: BAnz AT 26.08.2015 B4, chapter V notification 24,  
UBA announcement dated 22 July 2015:

**24 Notification as regards Federal Environment Agency (UBA) notice of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 5.3)**

The current software version of the MIR 9000 CLD Option for NO/NOx, NO<sub>2</sub>, CO<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub>O and CH<sub>4</sub> manufactured by Environnement S.A. is:

v6.58 (Calculation Process)  
v3.3.1 (Display Process)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 14 March 2015.

### Certified product

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

The MIR 9000 CLD Option measuring system operates on the basis of infrared spectroscopy with gas filter correlation (components CO<sub>2</sub>, N<sub>2</sub>O and CH<sub>4</sub>) chemiluminescence (NO/NO<sub>x</sub> expressed as NO<sub>2</sub>) and paramagnetism (O<sub>2</sub>).

#### Infrared spectroscopy with gas filter correlation

Polyatomic gases absorb an electromagnetic radiation of a specific wavelength. The qualitative and quantitative analysis based on this phenomenon is known as absorption spectroscopy.

#### Chemiluminescence

The chemiluminescence module analyses nitrogen oxide and nitrogen dioxide present in waste gas. The instrument uses the fact that nitrogen oxide (NO) emits light in the presence of strongly oxidising ozone molecules (chemiluminescence).

#### Paramagnetism

This principle uses the magnetic susceptibility of oxygen.

The measuring system comprises the following components:

An "SEC" probe

Unheated line (50 m standard)

Air-conditioned analyser cabinet with

- Processing and distribution unit for pressured air (M.D.S.)
- Junction box
- Automatic switch box for gas (TIG) with ports
- Heater with integrated thermostat
- Air conditioner

The current software version is:

v6.58 (Calculation Process)  
v3.3.1 (Display Process)

The current manual version is:

March 2016



### 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 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 returned 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 [qal1.de](http://qal1.de).

Certification of the MIR 9000CLD Option measuring system is based on the documents listed below and the regular, continuous surveillance of the manufacturer's quality management system:

### Basic testing

Test report: 936/21206578/E dated 10 October 2008  
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Cologne  
Publication: BAnz 11 March 2009, no. 38, p. 899, chapter I no. 2.4  
UBA announcement dated 19 February 2009

### Initial certification according to EN 15267

Certificate no. 0000024161: 22 March 2013  
Expiry date of the certificate: 04 March 2018

Test report: 936/21220780/B dated 5 October 2012  
TÜV Rheinland Energie und Umwelt GmbH, Cologne  
Publication: BAnz AT 05.03.2013 B10, chapter I no. 5.3  
UBA announcement dated 12 February 2013

### Notification in accordance with EN 15267

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 14 March 2015  
Publication: BAnz AT 26.08.2015 B4, chapter V notification 24  
UBA announcement dated 22 July 2015  
(New software version)

**Renewal of the certificate**

Certificate no. 0000024161\_01: 05 March 2018  
Expiry date of the certificate: 04 March 2023

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

**Measuring system**

Manufacturer	Environnement S.A.
Name of measuring system	MIR 9000 CLD Option
Serial number of the candidates	1912 / 1913
Measuring principle	CLD

**Test report**

Test laboratory	TÜV Rheinland
Date of report	2012-10-05

**Measured component**

Certification range	NOx 0 - 20 mg/m <sup>3</sup>
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**Evaluation of the cross sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.00 mg/m <sup>3</sup>
Sum of negative CS at zero point	0.00 mg/m <sup>3</sup>
Sum of positive CS at reference point	0.24 mg/m <sup>3</sup>
Sum of negative CS at reference point	-0.34 mg/m <sup>3</sup>
Maximum sum of cross sensitivities	-0.34 mg/m <sup>3</sup>
Uncertainty of cross sensitivity	-0.200 mg/m <sup>3</sup>

**Calculation of the combined standard uncertainty**

**Tested parameter**

			u <sup>2</sup>
Standard deviation from paired measurements under field conditions *	u <sub>D</sub>	0.311 mg/m <sup>3</sup>	0.097 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	u <sub>lof</sub>	-0.064 mg/m <sup>3</sup>	0.004 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	u <sub>d,z</sub>	0.094 mg/m <sup>3</sup>	0.009 (mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	u <sub>d,s</sub>	0.318 mg/m <sup>3</sup>	0.101 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	u <sub>t</sub>	0.265 mg/m <sup>3</sup>	0.070 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	u <sub>v</sub>	0.012 mg/m <sup>3</sup>	0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Cross sensitivity (interference)	u <sub>i</sub>	-0.200 mg/m <sup>3</sup>	0.040 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	u <sub>b</sub>	-0.040 mg/m <sup>3</sup>	0.002 (mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	u <sub>rm</sub>	0.162 mg/m <sup>3</sup>	0.026 (mg/m <sup>3</sup> ) <sup>2</sup>
Converter efficiency for AMS measuring NOx		0.208 mg/m <sup>3</sup>	0.043 (mg/m <sup>3</sup> ) <sup>2</sup>

\* The larger value is used :

"Repeatability standard deviation at span" or

"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u <sub>c</sub> )		0.63 mg/m <sup>3</sup>
Total expanded uncertainty	U = u <sub>c</sub> * k = u <sub>c</sub> * 1.96	1.23 mg/m <sup>3</sup>

**Relative total expanded uncertainty**

**Requirement of 2000/76/EC and 2001/80/EC**

Requirement of EN 15267-3

U in % of the range 20 mg/m <sup>3</sup>	6.1
U in % of the range 20 mg/m <sup>3</sup>	20.0
U in % of the range 20 mg/m <sup>3</sup>	15.0



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

**Measuring system**

Manufacturer	Environnement S.A.
Name of measuring system	MIR 9000 CLD Option
Serial number of the candidates	1912 / 1913
Measuring principle	CLD

**Test report**

Test laboratory	TÜV Rheinland
Date of report	2012-10-05

**Measured component**

Certification range	NO <sub>2</sub> 0 - 20 mg/m <sup>3</sup>
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**Evaluation of the cross sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.24 mg/m <sup>3</sup>
Sum of negative CS at zero point	0.00 mg/m <sup>3</sup>
Sum of positive CS at reference point	0.60 mg/m <sup>3</sup>
Sum of negative CS at reference point	-0.10 mg/m <sup>3</sup>
Maximum sum of cross sensitivities	0.60 mg/m <sup>3</sup>
Uncertainty of cross sensitivity	0.346 mg/m <sup>3</sup>

**Calculation of the combined standard uncertainty**

**Tested parameter**

			u <sup>2</sup>
Standard deviation from paired measurements under field conditions *	u <sub>D</sub>	0.081 mg/m <sup>3</sup>	0.007 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	u <sub>lof</sub>	-0.115 mg/m <sup>3</sup>	0.013 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	u <sub>d,z</sub>	-0.102 mg/m <sup>3</sup>	0.010 (mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	u <sub>d,s</sub>	-0.253 mg/m <sup>3</sup>	0.064 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	u <sub>t</sub>	0.100 mg/m <sup>3</sup>	0.010 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	u <sub>v</sub>	0.015 mg/m <sup>3</sup>	0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Cross sensitivity (interference)	u <sub>i</sub>	0.346 mg/m <sup>3</sup>	0.120 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	u <sub>p</sub>	-0.023 mg/m <sup>3</sup>	0.001 (mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	u <sub>rm</sub>	0.162 mg/m <sup>3</sup>	0.026 (mg/m <sup>3</sup> ) <sup>2</sup>

\* The larger value is used :

"Repeatability standard deviation at span" or

"Standard deviation from paired measurements under field conditions"

$$u_c = \sqrt{\sum (u_{max,j})^2}$$

Combined standard uncertainty (u <sub>c</sub> )		0.50 mg/m <sup>3</sup>
Total expanded uncertainty	U = u <sub>c</sub> * k = u <sub>c</sub> * 1.96	0.98 mg/m <sup>3</sup>

**Relative total expanded uncertainty**

Requirement of 2000/76/EC and 2001/80/EC

Requirement of EN 15267-3

<b>U in % of the range 20 mg/m<sup>3</sup></b>	<b>4.9</b>
<b>U in % of the range 20 mg/m<sup>3</sup></b>	<b>20.0</b>
U in % of the range 20 mg/m <sup>3</sup>	15.0

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

**Measuring system**

Manufacturer	Environnement S.A.
Name of measuring system	MIR 9000 CLD Option
Serial number of the candidates	1912 / 1913
Measuring principle	NDIR

**Test report**

Test laboratory	TÜV Rheinland
Date of report	2012-10-05

**Measured component**

Certification range	CO <sub>2</sub>	0 - 25 Vol.-%
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**Evaluation of the cross sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.10 Vol.-%
Sum of negative CS at zero point	-0.10 Vol.-%
Sum of positive CS at reference point	0.60 Vol.-%
Sum of negative CS at reference point	-0.40 Vol.-%
Maximum sum of cross sensitivities	0.60 Vol.-%
Uncertainty of cross sensitivity	0.346 Vol.-%

**Calculation of the combined standard uncertainty**

**Tested parameter**

				$u^2$
Standard deviation from paired measurements under field conditions *	$u_D$	0.222 Vol.-%		0.049 (Vol.-%) <sup>2</sup>
Lack of fit	$u_{lof}$	-0.087 Vol.-%		0.008 (Vol.-%) <sup>2</sup>
Zero drift from field test	$u_{d,z}$	0.144 Vol.-%		0.021 (Vol.-%) <sup>2</sup>
Span drift from field test	$u_{d,s}$	0.144 Vol.-%		0.021 (Vol.-%) <sup>2</sup>
Influence of ambient temperature at span	$u_t$	0.173 Vol.-%		0.030 (Vol.-%) <sup>2</sup>
Influence of supply voltage	$u_v$	0.012 Vol.-%		0.000 (Vol.-%) <sup>2</sup>
Cross sensitivity (interference)	$u_i$	0.346 Vol.-%		0.120 (Vol.-%) <sup>2</sup>
Influence of sample gas flow	$u_p$	-0.035 Vol.-%		0.001 (Vol.-%) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$	0.202 Vol.-%		0.041 (Vol.-%) <sup>2</sup>

\* The larger value is used :

"Repeatability standard deviation at span" or

"Standard deviation from paired measurements under field conditions"

$$u_c = \sqrt{\sum (u_{max,j})^2}$$

Combined standard uncertainty ( $u_c$ )		0.54 Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.06 Vol.-%

**Relative total expanded uncertainty**

Requirement of 2000/76/EC and 2001/80/EC	<b>U in % of the range 25 Vol.-%</b>	<b>4.2</b>
Requirement of EN 15267-3	<b>U in % of the range 25 Vol.-%</b>	<b>10.0 **</b>
	U in % of the range 25 Vol.-%	7.5

\*\* For this component no requirements in the EC-directives 2001/80/EG und 2000/76/EG are given.

A value of 10.0 % was used for this.



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

**Measuring system**

Manufacturer	Environnement S.A.
Name of measuring system	MIR 9000 CLD Option
Serial number of the candidates	1912 / 1913
Measuring principle	Paramagnetismus

**Test report**

Test laboratory	TÜV Rheinland
Date of report	2012-10-05

**Measured component**

Certification range	O <sub>2</sub>	0 - 10 Vol.-%
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**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 positive CS at reference point	0.09	Vol.-%
Sum of negative CS at reference point	-0.24	Vol.-%
Maximum sum of cross sensitivities	-0.24	Vol.-%
Uncertainty of cross sensitivity	-0.139	Vol.-%

**Calculation of the combined standard uncertainty**

**Tested parameter**

				$u^2$
Standard deviation from paired measurements under field conditions *	$u_D$	0.073	Vol.-%	0.005 (Vol.-%) <sup>2</sup>
Lack of fit	$u_{lof}$	-0.009	Vol.-%	0.000 (Vol.-%) <sup>2</sup>
Zero drift from field test	$u_{d,z}$	-0.075	Vol.-%	0.006 (Vol.-%) <sup>2</sup>
Span drift from field test	$u_{d,s}$	0.110	Vol.-%	0.012 (Vol.-%) <sup>2</sup>
Influence of ambient temperature at span	$u_t$	0.038	Vol.-%	0.001 (Vol.-%) <sup>2</sup>
Influence of supply voltage	$u_v$	0.012	Vol.-%	0.000 (Vol.-%) <sup>2</sup>
Cross sensitivity (interference)	$u_i$	-0.139	Vol.-%	0.019 (Vol.-%) <sup>2</sup>
Influence of sample gas flow	$u_p$	-0.017	Vol.-%	0.000 (Vol.-%) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$	0.081	Vol.-%	0.007 (Vol.-%) <sup>2</sup>

\* The larger value is used :

"Repeatability standard deviation at span" or

"Standard deviation from paired measurements under field conditions"

$$u_c = \sqrt{\sum (u_{max,j})^2}$$

Combined standard uncertainty ( $u_c$ )		0.23	Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.44	Vol.-%

**Relative total expanded uncertainty**

Requirement of 2000/76/EC and 2001/80/EC	<b>U in % of the range 10 Vol.-%</b>	<b>4.4</b>
Requirement of EN 15267-3	<b>U in % of the range 10 Vol.-%</b>	<b>10.0 **</b>
	<b>U in % of the range 10 Vol.-%</b>	<b>7.5</b>

\*\* For this component no requirements in the EC-directives 2001/80/EG und 2000/76/EG are given.  
A value of 10.0 % was used for this.

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

**Measuring system**

Manufacturer	Environnement S.A.
Name of measuring system	MIR 9000 CLD Option
Serial number of the candidates	1912 / 1913
Measuring principle	NDIR

**Test report**

Test laboratory	TÜV Rheinland
Date of report	2012-10-05

**Measured component**

Certification range	N <sub>2</sub> O 0 - 20 mg/m <sup>3</sup>
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**Evaluation of the cross sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.25 mg/m <sup>3</sup>
Sum of negative CS at zero point	-0.27 mg/m <sup>3</sup>
Sum of positive CS at reference point	0.19 mg/m <sup>3</sup>
Sum of negative CS at reference point	-0.59 mg/m <sup>3</sup>
Maximum sum of cross sensitivities	-0.59 mg/m <sup>3</sup>
Uncertainty of cross sensitivity	-0.341 mg/m <sup>3</sup>

**Calculation of the combined standard uncertainty**

**Tested parameter**

			$u^2$
Standard deviation from paired measurements under field conditions *	$u_D$	0.321 mg/m <sup>3</sup>	0.103 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	$u_{lof}$	-0.064 mg/m <sup>3</sup>	0.004 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	$u_{d,z}$	0.007 mg/m <sup>3</sup>	0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	$u_{d,s}$	0.102 mg/m <sup>3</sup>	0.010 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	$u_t$	0.346 mg/m <sup>3</sup>	0.120 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	$u_v$	0.036 mg/m <sup>3</sup>	0.001 (mg/m <sup>3</sup> ) <sup>2</sup>
Cross sensitivity (interference)	$u_i$	-0.341 mg/m <sup>3</sup>	0.116 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	$u_p$	0.017 mg/m <sup>3</sup>	0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$	0.162 mg/m <sup>3</sup>	0.026 (mg/m <sup>3</sup> ) <sup>2</sup>

\* The larger value is used :

"Repeatability standard deviation at span" or

"Standard deviation from paired measurements under field conditions"

$$u_c = \sqrt{\sum (u_{max,j})^2}$$

Combined standard uncertainty ( $u_c$ )		0.62 mg/m <sup>3</sup>
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.21 mg/m <sup>3</sup>

**Relative total expanded uncertainty**

Requirement of 2000/76/EC and 2001/80/EC	<b>U in % of the range 20 mg/m<sup>3</sup></b>	<b>6.0</b>
Requirement of EN 15267-3	<b>U in % of the range 20 mg/m<sup>3</sup></b>	<b>20.0 **</b>
	<b>U in % of the range 20 mg/m<sup>3</sup></b>	<b>15.0</b>

\*\* For this component no requirements in the EC-directives 2001/80/EG und 2000/76/EG are given.

A value of 20.0 % was used for this.



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

**Measuring system**

Manufacturer	Environnement S.A.
Name of measuring system	MIR 9000 CLD Option
Serial number of the candidates	1912 / 1913
Measuring principle	NDIR

**Test report**

Test laboratory	TÜV Rheinland
Date of report	2012-10-05

**Measured component**

Certification range	CH <sub>4</sub> 0 - 10 mg/m <sup>3</sup>
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**Evaluation of the cross sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.05 mg/m <sup>3</sup>
Sum of negative CS at zero point	-0.29 mg/m <sup>3</sup>
Sum of positive CS at reference point	0.12 mg/m <sup>3</sup>
Sum of negative CS at reference point	-0.28 mg/m <sup>3</sup>
Maximum sum of cross sensitivities	-0.29 mg/m <sup>3</sup>
Uncertainty of cross sensitivity	-0.167 mg/m <sup>3</sup>

**Calculation of the combined standard uncertainty**

**Tested parameter**

			$u^2$
Standard deviation from paired measurements under field conditions *	$u_D$	0.085 mg/m <sup>3</sup>	0.007 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	$u_{lof}$	0.046 mg/m <sup>3</sup>	0.002 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	$u_{d,z}$	-0.094 mg/m <sup>3</sup>	0.009 (mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	$u_{d,s}$	-0.133 mg/m <sup>3</sup>	0.018 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	$u_t$	0.231 mg/m <sup>3</sup>	0.053 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	$u_v$	0.012 mg/m <sup>3</sup>	0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Cross sensitivity (interference)	$u_i$	-0.167 mg/m <sup>3</sup>	0.028 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	$u_p$	0.017 mg/m <sup>3</sup>	0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$	0.081 mg/m <sup>3</sup>	0.007 (mg/m <sup>3</sup> ) <sup>2</sup>

\* The larger value is used :

"Repeatability standard deviation at span" or

"Standard deviation from paired measurements under field conditions"

$$u_c = \sqrt{\sum (u_{max,j})^2}$$

Combined standard uncertainty ( $u_c$ )		0.35 mg/m <sup>3</sup>
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.69 mg/m <sup>3</sup>

**Relative total expanded uncertainty**

Requirement of 2000/76/EC and 2001/80/EC	<b>U in % of the range 10 mg/m<sup>3</sup></b>	<b>6.9</b>
Requirement of EN 15267-3	<b>U in % of the range 10 mg/m<sup>3</sup></b>	<b>30.0 **</b>
	<b>U in % of the range 10 mg/m<sup>3</sup></b>	<b>22.5</b>

\*\* For this component no requirements in the EC-directives 2001/80/EG und 2000/76/EG are given.

A value of 30.0 % was used for this.