

# CERTIFICATE

## of Product Conformity (QAL1)

Certificate No: 0000024161\_02

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

**Manufacturer:** ENVEA  
111, Boulevard Robespierre  
78304 Poissy Cedex  
France

**Test Institute:** TÜV Rheinland Energy GmbH

This is to certify that the AMS has been tested  
and found to comply with the standards  
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 13 pages).  
The present certificate replaces certificate 0000024161\_01 dated 05 March 2018.



Suitability Tested  
EN 15267  
QAL1 Certified  
Regular  
Surveillance

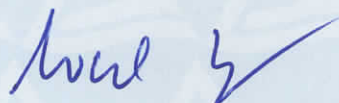
www.tuv.com  
ID 0000024161

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

German Environment Agency  
Dessau, 02 March 2023

This certificate will expire on:  
04 March 2028

TÜV Rheinland Energy GmbH  
Cologne, 01 March 2023



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Test institute accredited to EN ISO/IEC 17025 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 2028
<b>Certificate:</b>	Renewal (of previous certificate 0000024161_01 of 05 March 2018 valid until 04 March 2023)
<b>Publication:</b>	BAnz AT 05.03.2013 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 (13th BImSchV:2012), at waste incineration plants according to EC Directive 2000/76/EC (17th BImSchV:2009), Directive 2015/2193/EC (44th BImSchV:2021), the 27th BImSchV:1997, the 30th BImSchV:2009 and TA Luft:2002. 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° 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 emission limit values and oxygen concentration 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.

### Note:

The legal regulations mentioned correspond to the current state of legislation during certification. Each user should, if necessary, in consultation with the competent authority, ensure that this AMS meets the legal requirements for the intended use. In addition, it cannot be ruled out that legal regulations governing the use of a measuring device for emission monitoring may change during the lifetime of the certificate.

### Basis of the certification

This certification is based on:

- Test report 936/21220780/B dated 05 October 2012 of 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,  
Announcement by UBA dated 12 February 2013:

**AMS designation**

MIR 9000 CLD 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 27th 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, chap. V notification 24,  
Announcement by UBA 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/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> manufactured by Environnement S.A. is:  
v6.58 (Calculation Process)  
v3.3.I (Display Process)

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

Publication in the German Federal Gazette: BAnz AT 26.03.2019 B7, chap. IV notification 28,  
Announcement by UBA dated 27 February 2019:

**28 Notification as regards Federal Environment Agency notices  
of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 5.3) and  
of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter V notification 24)**

The current software version of the MIR 9000 CLD Option  
for NO, NO<sub>2</sub>, NO<sub>x</sub>, N<sub>2</sub>O, CH<sub>4</sub>, CO<sub>2</sub> and O<sub>2</sub> manufactured by Environnement S.A. is:  
V6.58 (calculation process)  
v3.8.c (display process)

Statement issued by TÜV Rheinland Energy GmbH dated 27 September 2018

Publication in the German Federal Gazette: BAnz AT 24.03.2020 B7, chap. IV notification 33,  
Announcement by UBA dated 24 February 2020:

**33 Notification as regards Federal Environment Agency (UBA) notices  
of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 5.3) and  
of 27 February 2019 (BAnz AT 26.03.2019 B7, chapter IV notification 28)**

Environnement S.A., Poissy, France have changed their company name to ENVEA.  
The latest software version of the MIR 9000 CLD Option measuring system  
for NO, NO<sub>2</sub>, NO<sub>x</sub>, N<sub>2</sub>O, CH<sub>4</sub>, CO<sub>2</sub> and O<sub>2</sub> manufactured by ENVEA is:  
V6.58 (calculation process)  
v3.8.d (display process)

Statement issued by TÜV Rheinland Energy GmbH dated 1 October 2019

Publication in the German Federal Gazette: BAnz AT 03.05.2021 B9, chap. III notification 18,  
Announcement by UBA dated 31 March 2021:

**18 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 5.3) and of 24 February 2020 (BAnz AT 24.03.2020 B7, chapter IV notification 33)**

The latest software versions of the MIR 9000 CLD Option measuring system for NO, NO<sub>2</sub>, NO<sub>x</sub>, N<sub>2</sub>O, CH<sub>4</sub>, CO<sub>2</sub> and O<sub>2</sub> manufactured by ENVEA are:

v6.59 (Calculation Process)

v3.8.g (Display Process).

Statement issued by TÜV Rheinland Energy GmbH dated 8 September 2020

Publication in the German Federal Gazette: BAnz AT 11.04.2022 B10,  
chap. VI notification 33, Announcement by UBA dated 9 March 2022:

**33 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 5.3) and of 31 March 2021 (BAnz AT 03.05.2021 B9, chapter III notification 18)**

The current software versions for the measuring device MIR 9000 CLD Option for NO, NO<sub>2</sub>, NO<sub>x</sub>, N<sub>2</sub>O, CH<sub>4</sub>, CO<sub>2</sub> and O<sub>2</sub> of the company ENVEA are:

v6.59 (Calculation Process)

v3.8.h (Display Process)

Statement issued by TÜV Rheinland Energy GmbH dated 16 September 2021

### Certified product

This certificate 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

### General notes

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 manufacture of 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. With revocation of the publication the certificate loses its validity. After the expiration of the certificate and on requests of the TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must not be employed anymore.

The relevant version of this certificate and its expiration is also accessible on the internet: [qal1.de](http://qal1.de).

### **History of documents**

Certification of MIR 9000 CLD Option is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

### **Basic test**

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

### **Initial certification according to EN 15267**

Certificate No. 0000024161\_00: 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  
Publication BAnz AT 05.03.2013 B10, chapter I number 5.3  
UBA announcement dated 12 February 2013

### **Notifications**

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  
(Software changes)

### **Renewal of certificate**

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

### **Notifications**

Statement issued by TÜV Rheinland Energy GmbH dated 27 September 2018  
Publication BAnz AT 26.03.2019 B7, chapter IV notification 28  
UBA announcement dated 27 February 2019  
(software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 1 October 2019  
Publication BAnz AT 24.03.2020 B7, chapter IV notification 33  
UBA announcement dated 24 February 2020  
(Software changes and new producer name formerly Environnement S.A.)

Statement issued by TÜV Rheinland Energy GmbH dated 8 September 2020  
Publication BAnz AT 03.05.2021 B9, chapter III notification 18  
UBA announcement dated 31 March 2021  
(Software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 16 September 2021  
Publication BAnz AT 11.04.2022 B10, chapter VI notification 33  
UBA announcement dated 9 March 2022  
(Software changes)

### **Renewal of certificate**

Certificate No. 0000024161\_02: 02 March 2023  
Expiry date of the certificate: 04 March 2028

**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	936/21220780/B
Date of report	TÜV Rheinland
	2012-10-05

**Measured component**

	NOx
Certification range	0 - 20 mg/m³

**Evaluation of the cross sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.00 mg/m³
Sum of negative CS at zero point	0.00 mg/m³
Sum of positive CS at reference point	0.24 mg/m³
Sum of negative CS at reference point	-0.34 mg/m³
Maximum sum of cross sensitivities	-0.34 mg/m³
Uncertainty of cross sensitivity	-0.200 mg/m³

**Calculation of the combined standard uncertainty**

**Tested parameter**

			$u^2$	
Standard deviation from paired measurements under field conditions *	$u_D$	0.311 mg/m³	0.097	(mg/m³)²
Lack of fit	$u_{lof}$	-0.064 mg/m³	0.004	(mg/m³)²
Zero drift from field test	$u_{d,z}$	0.094 mg/m³	0.009	(mg/m³)²
Span drift from field test	$u_{d,s}$	0.318 mg/m³	0.101	(mg/m³)²
Influence of ambient temperature at span	$u_t$	0.265 mg/m³	0.070	(mg/m³)²
Influence of supply voltage	$u_v$	0.012 mg/m³	0.000	(mg/m³)²
Cross sensitivity (interference)	$u_i$	-0.200 mg/m³	0.040	(mg/m³)²
Influence of sample gas flow	$u_b$	-0.040 mg/m³	0.002	(mg/m³)²
Uncertainty of reference material at 70% of certification range	$u_{rm}$	0.162 mg/m³	0.026	(mg/m³)²
Converter efficiency for AMS measuring NOx		0.208 mg/m³	0.043	(mg/m³)²

\* The larger value is used :

"Repeatability standard deviation at span" or

"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty ( $u_c$ )		0.63 mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.23 mg/m³

**Relative total expanded uncertainty**

<b>Requirement of 2000/76/EC and 2001/80/EC</b>	<b>U in % of the range 20 mg/m³</b>	<b>6.1</b>
Requirement of EN 15267-3	U in % of the range 20 mg/m³	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	936/21220780/B TÜV Rheinland
Date of report	2012-10-05

**Measured component**

	NO <sub>2</sub>
Certification range	0 - 20 mg/m <sup>3</sup>

**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**

			$u^2$	
Standard deviation from paired measurements under field conditions *	$u_D$	0.081 mg/m <sup>3</sup>	0.007	(mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	$u_{lof}$	-0.115 mg/m <sup>3</sup>	0.013	(mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	$u_{d,z}$	-0.102 mg/m <sup>3</sup>	0.010	(mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	$u_{d,s}$	-0.253 mg/m <sup>3</sup>	0.064	(mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	$u_t$	0.100 mg/m <sup>3</sup>	0.010	(mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	$u_v$	0.015 mg/m <sup>3</sup>	0.000	(mg/m <sup>3</sup> ) <sup>2</sup>
Cross sensitivity (interference)	$u_i$	0.346 mg/m <sup>3</sup>	0.120	(mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	$u_b$	-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	$u_{rm}$	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 ( $u_c$ )		0.50 mg/m <sup>3</sup>
Total expanded uncertainty	$U = u_c \cdot k = u_c \cdot 1.96$	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	936/21220780/B
Date of report	TÜV Rheinland
	2012-10-05

**Measured component**

	CO <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	0.10 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**

<b>Requirement of 2000/76/EC and 2001/80/EC</b>	<b>U in % of the range 25 Vol.-%</b>	<b>4.2</b>
Requirement of EN 15267-3	U in % of the range 25 Vol.-%	10.0 **
	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	936/21220780/B
Date of report	TÜV Rheinland
	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**

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

**Test report**

Test laboratory	936/21220780/B
Date of report	TÜV Rheinland
	2012-10-05

**Measured component**

Certification range	N <sub>2</sub> O
	0 - 20 mg/m <sup>3</sup>

**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**

			<i>u</i> <sup>2</sup>
Standard deviation from paired measurements under field conditions *	<i>u<sub>D</sub></i>	0.321 mg/m <sup>3</sup>	0.103 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	<i>u<sub>lof</sub></i>	-0.064 mg/m <sup>3</sup>	0.004 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	<i>u<sub>d,z</sub></i>	0.007 mg/m <sup>3</sup>	0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	<i>u<sub>d,s</sub></i>	0.102 mg/m <sup>3</sup>	0.010 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	<i>u<sub>t</sub></i>	0.346 mg/m <sup>3</sup>	0.120 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	<i>u<sub>v</sub></i>	0.036 mg/m <sup>3</sup>	0.001 (mg/m <sup>3</sup> ) <sup>2</sup>
Cross sensitivity (interference)	<i>u<sub>i</sub></i>	-0.341 mg/m <sup>3</sup>	0.116 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	<i>u<sub>p</sub></i>	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	<i>u<sub>rm</sub></i>	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 ( <i>u<sub>c</sub></i> )		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>
	U in % of the range 20 mg/m <sup>3</sup>	15.0

\*\* 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	936/21220780/B
Date of report	TÜV Rheinland
	2012-10-05

**Measured component**

Certification range	CH <sub>4</sub>
	0 - 10 mg/m <sup>3</sup>

**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>
	U in % of the range 10 mg/m <sup>3</sup>	22.5

\*\* 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.