

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000074636_00

Certified AMS: MIR 9000P for CO, NO_x, N₂O, O₂ and CO₂

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 15267-4 (2018),
EN 14793 (2017) and EN 14181 (2014).

Certification is awarded in respect of the conditions stated in this certificate
(this certificate contains 10 pages).



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000074636

Publication in the German Federal Gazette
(BAnz) of 11 April 2022

German Environment Agency
Dessau, 31 May 2022

This certificate will expire on:
11 April 2027

TÜV Rheinland Energy GmbH
Cologne, 30 May 2022



Dr. Marcel Langner
Head of Section II 4.1



ppa. Dr. Peter Wilbring

www.umwelt-tuv.eu
tre@umwelt-tuv.eu
Tel. + 49 221 806-5200

TÜV Rheinland Energy GmbH
Am Grauen Stein
51105 Köln

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.

Test report: 936/21248796/A dated 06 September 2021

Expiry date: 11 April 2027

Publication: BAnz AT 11.04.2022 B10, Chap. II No. 1.1

Approved application

The tested P-AMS is suitable for use for periodic measurements of emissions from stationary sources at plants according to directive 2010/75/EC chapter III (13th BImSchV:2021), chapter IV (17th BImSchV:2021), 2015/2193/EC (44th BImSchV:2021), 30th BImSchV:2019, 27th BImSchV:2013 and TA Luft:2021 for the calibration and validation of stationary AMS within the scope of QAL2 and AST according to EN 14181.

The components CO, N₂O, CO₂ and O₂ are measured according to the standard reference measurement method and the component NO_x is measured according to an alternative method to the standard reference measurement method.

The measured ranges have been selected so as to ensure as broad a field of application as possible.

The suitability of the P-AMS for this application was assessed on the basis of a laboratory test and five field test campaigns at different industrial facilities.

The facilities in question were three waste incineration plants, one coal-fired power plant, one sewage sludge incineration plant and a Biomasseheizkraftwerk.

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

The notification of suitability of the P-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 P-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 intended use.

Note:

The legal regulations mentioned do correspond to the current state of. Each user should, if necessary, in consultation with the competent authority, ensure that this P-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 life-time of the certificate.

Basis of the certification

This certification is based on:

- Test report 936/21248796/A dated 06 September 2021 of TÜV Rheinland Energy GmbH
- Suitability announced by the German 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 11.04.2022 B10, Chap. II No. 1.1,
Announcement by UBA dated 09 March 2022:

AMS designation

MIR 9000P for CO, NO_x als NO, N₂O, CO₂ and O₂

Manufacturer:

ENVEA, Poissy, Frankreich

Field of application:

Portable measuring device for periodic measurements of emissions from stationary sources and as a standard reference measurement method or as an alternative method to the standard reference measurement method for the calibration and validation of stationary AMS within the scope of QAL2 and AST according to EN 14181 at plants requiring approval and at plants according to the 27th BImSchV.

Measuring ranges during the performance test:

Component	Certification range	Supplementary measuring range	Unit	Method
CO	0 – 70	0 – 3000	mg/m ³	SRM
NO _x	0 – 70 ¹⁾	0 – 2000 ²⁾	mg/m ³	AM
N ₂ O	0 – 150	0 – 450	mg/m ³	SRM
CO ₂	0 – 20	0 – 30	vol.-%	SRM
O ₂	0 – 25	0 – 10	vol.-%	SRM

SRM = Standard Reference Method / AM = Alternative Measurement Method

¹⁾ as NO, this corresponds to approx. 107 mg/m³ NO₂

²⁾ as NO, this corresponds to approx. 3067 mg/m³ NO₂

Software version: 1.0.e

Restrictions:

None

Notes:

1. If the outside temperatures fluctuate by more than 6 °C during measurement, it must be checked on site whether the measurement uncertainties are still met.
2. The measuring device can optionally be equipped with the portable ESTEL Box to provide analog measurement signals.
3. Certified NO_x test gases must be used for NO_x testing.

Test institute: TÜV Rheinland Energy GmbH, Cologne

Test report No.: 936/21248796/B dated 10 January 2022

Certified product

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

The MIR 9000P measuring system is a portable measuring instrument used for periodic measurements of emissions from stationary sources and as a standard reference measurement method or as an alternative method to the standard reference measurement method for the calibration and validation of stationary AMS within the framework of QAL2 and AST according to EN 14181 at industrial plants.

The portable measuring system comprises the following components:

- Heated sampling probe; manufacturer: M&C TechGroup; Type: PSP4000-H/C, heated to 180°C, length of sampling tube 1 m, ceramic filter element, 2 µm filter fineness
- Sampling line, heated to 190 °C, length 2 m
- Mobile gas conditioning / test gas cooler; Manufacturer: M&C TechGroup; Type: PSS5E, dew point 5°C
- MIR 9000P Portable Analyser
- Notebook/tablet/smartphone for controlling the measuring system via internet browser with closed housing cover
During performance testing: Smartphone Type Ulefone Armor 9E
- Optional: portable ESTEL box for analogue inputs and outputs
- Manual in German

The measuring system works extractively.

The test gas (approx. 2.5 l/min) is taken from the waste gas flow with a heated sampling probe. The probe is heated to 180°C and equipped with a ceramic filter with a filter fineness of 2 µm. The gas is passed on via a heated sample gas line (heated to 190°C) to the mobile gas conditioning / test gas cooler.

The test gas cooler of the type PSS5E from M&C Techgroup is installed in a plastic case and is used for controlled gas conditioning to a dew point temperature of 5°C. The preparation takes place via a Peltier gas cooler. The separated condensate is discharged via a peristaltic pump. The test gas cooler also contains the test gas pump, which enables a throughput of approx. 2.5 l/min. Then, after the test gas cooler, a partial flow (approx. 18 to 30 l/h) of the dried sample gas is directed to the MIR 9000P portable analyser. The remaining dried test gas is discharged via a bypass.

In the analyser, the components CO, NO_x (as NO), N₂O and CO₂ are measured by means of NDIR spectroscopy. A paramagnetic sensor is used to measure the O₂ component.

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 and 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: gal1.de.

History of documents

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

Initial certification according to EN 15267

Certificate No. 0000074636_00: 31 May 2022
Expiry date of the certificate: 11 April 2027
Test report 936/21248796/A dated 6 September 2021
TÜV Rheinland Energy GmbH
Publication BAnz AT 11.04.2022 B10, chapter II number 1.1
UBA announcement dated 9 March 2022

Calculation of overall uncertainty according to EN 14181 and EN 15267-4 for both systems during field test 1

Measuring system

Manufacturer	ENVEA
AMS designation	MIR 9000P
Serial number of units under test	#15 / #16
Measuring principle	NDIR

Test report

Test laboratory	936/21249796/B TÜV Rheinland
Date of report	1/10/2022

Measured component

Certification range	CO 0 - 70 mg/m ³
---------------------	--------------------------------

Evaluation of the cross-sensitivity (CS)

(system with largest CS)

The cross-sensitivities were calculated site-specifically as a function of the exhaust gas matrix at the respective field test facility, taking into account the cross-sensitivity influences determined in the laboratory.

Maximum sum of cross-sensitivities	1.02 mg/m ³
Uncertainty of cross-sensitivity	u_i 0.586 mg/m ³

Calculation of the combined standard uncertainty

Test parameter

			u^2
Standard deviation from paired measurements under field conditions	u_D	0.279 mg/m ³	0.078 (mg/m ³) ²
Lack of fit	u_{lof}	0.218 mg/m ³	0.048 (mg/m ³) ²
Zero drift from field test	$u_{d,z}$	-0.556 mg/m ³	0.309 (mg/m ³) ²
Span drift from field test	$u_{d,s}$	-0.884 mg/m ³	0.781 (mg/m ³) ²
Influence of ambient temperature from field	u_t	0.402 mg/m ³	0.161 (mg/m ³) ²
Influence of supply voltage field test specific	u_v	0,000 mg/m ³	0.000 (mg/m ³) ²
Cross-sensitivity field test specific	u_i	0.586 mg/m ³	0.343 (mg/m ³) ²
Influence of sample gas flow field test specific	u_b	0,000 mg/m ³	0.000 (mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.566 mg/m ³	0.320 (mg/m ³) ²

Combined standard uncertainty (u_c)	$u_c = \sqrt{\sum (u_{max,j})^2}$	1.43 mg/m ³
Total expanded uncertainty	$U = u_c * k = u_c * 1,96$	2.80 mg/m ³

Relative total expanded uncertainty

Requirement of 2010/75/EU	U in % of the limit value of 46.67 mg/m³	6.0
Requirement of EN 15267-3	U in % of the limit value of 46.67 mg/m ³	7.5
Requirement for standard reference methods	U in % of the limit value of 46.67 mg/m ³	6.0

Calculation of overall uncertainty according to EN 14181 and EN 15267-4 for both systems during field test 5

Measuring system

Manufacturer	ENVEA
AMS designation	MIR 9000P
Serial number of units under test	#15 / #16
Measuring principle	NDIR

Test report

Test laboratory	936/21248796/B TÜV Rheinland
Date of report	10/1/2022

Measured component

Certification range	NOx as NO 0 - 70 mg/m ³
---------------------	---------------------------------------

Evaluation of the cross-sensitivity (CS)

(system with largest CS)

The cross-sensitivities were calculated site-specifically as a function of the exhaust gas matrix at the respective field test facility, taking into account the cross-sensitivity influences determined in the laboratory.

Maximum sum of cross-sensitivities	1.08 mg/m ³
Uncertainty of cross-sensitivity	u_i 0.623 mg/m ³

Calculation of the combined standard uncertainty

Test parameter

			u^2	
Standard deviation from paired measurements under field conditions	u_D	0.664 mg/m ³	0.441	(mg/m ³) ²
Lack of fit	u_{of}	0.271 mg/m ³	0.073	(mg/m ³) ²
Zero drift from field test	$u_{d,z}$	-1.187 mg/m ³	1.409	(mg/m ³) ²
Span drift from field test	$u_{d,s}$	0.930 mg/m ³	0.865	(mg/m ³) ²
Influence of ambient temperature from field	u_t	0.371 mg/m ³	0.138	(mg/m ³) ²
Influence of supply voltage field test specific	u_v	0,000 mg/m ³	0.000	(mg/m ³) ²
Cross-sensitivity field test specific	u_i	0.623 mg/m ³	0.388	(mg/m ³) ²
Influence of sample gas flow field test specific	u_p	0,000 mg/m ³	0.000	(mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.566 mg/m ³	0.320	(mg/m ³) ²
Converter efficiency for AMS measuring NOx	u_{ce}	1.091 mg/m ³	1.191	(mg/m ³) ²

Combined standard uncertainty (u_c)

$$u_c = \sqrt{\sum (u_{max,j})^2} \quad 2.20 \text{ mg/m}^3$$

Total expanded uncertainty

$$U = u_c \cdot k = u_c \cdot 1,96 \quad 4.31 \text{ mg/m}^3$$

Relative total expanded uncertainty

U in % of the limit value of 46.67 mg/m³ 9.2

Requirement of 2010/75/EU

U in % of the limit value of 46.67 mg/m³ 20.0

Requirement of EN 15267-3

U in % of the limit value of 46.67 mg/m³ 15.0

Requirement for standard reference methods

U in % of the limit value of 46.67 mg/m³ 10.0

Calculation of overall uncertainty according to EN 14181 and EN 15267-4 for both systems during field test 4

Measuring system

Manufacturer	ENVEA
AMS designation	MIR 9000P
Serial number of units under test	#15 / #16
Measuring principle	NDIR

Test report

Test laboratory	936/21248796/B
Date of report	TÜV Rheinland
	1/10/2022

Measured component

Certification range	N2O	0 - 150 mg/m ³
---------------------	-----	---------------------------

Evaluation of the cross-sensitivity (CS)

(system with largest CS)

The cross-sensitivities were calculated site-specifically as a function of the exhaust gas matrix at the respective field test facility, taking into account the cross-sensitivity influences determined in the laboratory.

Maximum sum of cross-sensitivities	2.70 mg/m ³
Uncertainty of cross-sensitivity	u_i 1.558 mg/m ³

Calculation of the combined standard uncertainty

Test parameter

			u^2
Standard deviation from paired measurements under field conditions	u_D	1.096 mg/m ³	1.201 (mg/m ³) ²
Lack of fit	u_{lof}	-0.303 mg/m ³	0.092 (mg/m ³) ²
Zero drift from field test	$u_{d,z}$	0.173 mg/m ³	0.030 (mg/m ³) ²
Span drift from field test	$u_{d,s}$	1.126 mg/m ³	1.268 (mg/m ³) ²
Influence of ambient temperature from field	u_t	0.220 mg/m ³	0.048 (mg/m ³) ²
Influence of supply voltage field test specific	u_v	0,000 mg/m ³	0.000 (mg/m ³) ²
Cross-sensitivity field test specific	u_i	1.558 mg/m ³	2.427 (mg/m ³) ²
Influence of sample gas flow field test specific	u_p	0,000 mg/m ³	0.000 (mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u_{rm}	1.212 mg/m ³	1.470 (mg/m ³) ²

Combined standard uncertainty (u_c)	$u_c = \sqrt{\sum (u_{max,j})^2}$	2.56 mg/m ³
Total expanded uncertainty	$U = u_c * k = u_c * 1,96$	5.01 mg/m ³

Relative total expanded uncertainty

Requirement of 2010/75/EU	U in % of the range 0-150 mg/m³	3.3
Requirement of EN 15267-3	U in % of the range 0-150 mg/m ³	20.0 **
Requirement for standard reference methods	U in % of the range 0-150 mg/m ³	15.0
	U in % of the range 0-150 mg/m ³	10.0

** For this component no requirements in the EC Directive 2010/75/EU are given.
A value of 20,0 % was chosen.

Calculation of overall uncertainty according to EN 14181 and EN 15267-4 for both systems during field test 3

Measuring system

Manufacturer	ENVEA
AMS designation	MIR 9000P
Serial number of units under test	#15 / #16
Measuring principle	NDIR

Test report

Test laboratory	936/21248796/B TÜV Rheinland
Date of report	1/10/2022

Measured component

Certification range	CO2 0 - 20 Vol.-%
---------------------	----------------------

Evaluation of the cross-sensitivity (CS)

(system with largest CS)

The cross-sensitivities were calculated site-specifically as a function of the exhaust gas matrix at the respective field test facility, taking into account the cross-sensitivity influences determined in the laboratory.

Maximum sum of cross-sensitivities	0.17 Vol.-%
Uncertainty of cross-sensitivity	u_i 0.096 Vol.-%

Calculation of the combined standard uncertainty

Test parameter

				u^2	
Standard deviation from paired measurements under field conditions	u_D	0.050	Vol.-%	0.003	(Vol.-%) ²
Lack of fit	u_{lof}	0.058	Vol.-%	0.003	(Vol.-%) ²
Zero drift from field test	$u_{d,z}$	0.012	Vol.-%	0.000	(Vol.-%) ²
Span drift from field test	$u_{d,s}$	-0.046	Vol.-%	0.002	(Vol.-%) ²
Influence of ambient temperature from field	u_t	0.156	Vol.-%	0.024	(Vol.-%) ²
Influence of supply voltage field test specific	u_v	0,000	Vol.-%	0.000	(Vol.-%) ²
Cross-sensitivity field test specific	u_i	0.096	Vol.-%	0.009	(Vol.-%) ²
Influence of sample gas flow field test specific	u_p	0,000	Vol.-%	0.000	(Vol.-%) ²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.162	Vol.-%	0.026	(Vol.-%) ²

Combined standard uncertainty (u_c)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.26	Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1,96$	0.51	Vol.-%

Relative total expanded uncertainty

Requirement of 2010/75/EU	U in % of the range 0-20 vol.-%	2.6
Requirement of EN 15267-3	U in % of the range 0-20 vol.-%	7.5
Requirement for standard reference methods	U in % of the range 0-20 vol.-%	6.0
	U in % of the range 0-20 vol.-%	10.0 **

** For this component no requirements in the EC Directive 2010/75/EU are given.
A value of 10.0 % was chosen.

Calculation of overall uncertainty according to EN 14181 and EN 15267-4 for both systems during field test 3

Measuring system

Manufacturer	ENVEA
AMS designation	MIR 9000P
Serial number of units under test	#15 / #16
Measuring principle	Paramagnetism

Test report

Test laboratory	936/21248796/B TÜV Rheinland
Date of report	1/10/2022

Measured component

Certification range	O2 0 - 25 Vol.-%
---------------------	---------------------

Evaluation of the cross-sensitivity (CS)

(system with largest CS)

The cross-sensitivities were calculated site-specifically as a function of the exhaust gas matrix at the respective field test facility, taking into account the cross-sensitivity influences determined in the laboratory.

Maximum sum of cross-sensitivities	0.02 Vol.-%
Uncertainty of cross-sensitivity	u_i 0.013 Vol.-%

Calculation of the combined standard uncertainty

Test parameter

				u^2	
Standard deviation from paired measurements under field conditions	u_D	0.036	Vol.-%	0.001	(Vol.-%) ²
Lack of fit	u_{lof}	0.014	Vol.-%	0.000	(Vol.-%) ²
Zero drift from field test	$u_{d,z}$	0.004	Vol.-%	0.000	(Vol.-%) ²
Span drift from field test	$u_{d,s}$	0.004	Vol.-%	0.000	(Vol.-%) ²
Influence of ambient temperature from field	u_t	0.221	Vol.-%	0.049	(Vol.-%) ²
Influence of supply voltage field test specific	u_v	0,000	Vol.-%	0.000	(Vol.-%) ²
Cross-sensitivity field test specific	u_i	0.013	Vol.-%	0.000	(Vol.-%) ²
Influence of sample gas flow field test specific	u_p	0,000	Vol.-%	0.000	(Vol.-%) ²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.202	Vol.-%	0.041	(Vol.-%) ²

Combined standard uncertainty (u_c)

$$u_c = \sqrt{\sum (u_{max,j})^2} \quad 0.30 \text{ Vol.-%}$$

Total expanded uncertainty

$$U = u_c * k = u_c * 1,96 \quad 0.59 \text{ Vol.-%}$$

Relative total expanded uncertainty

U in % of the range 0-25 vol.-% **2.4**

Requirement of 2010/75/EU

U in % of the range 0-25 vol.-% **10.0 ****

Requirement of EN 15267-3

U in % of the range 0-25 vol.-% **7.5**

Requirement for standard reference methods

U in % of the range 0-25 vol.-% **6.0**

** For this component no requirements in the EC Directive 2010/75/EU are given.
The chosen value is recommended by the certification body.