Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

# CERTIFICATE

## of Product Conformity (QAL1)

**Certificate No.: 0000074620**

| | |
|---|---|
| **AMS designation:** | MP101M for suspended particulate matter $PM_{10}$ |
| **Manufacturer:** | ENVEA<br>111, Boulevard Robespierre<br>78304 Poissy Cedex<br>France |
| **Test Laboratory:** | TÜV Rheinland Energy GmbH |

**This is to certify that the AMS has been tested according to the standards VDI 4202-3 (2018), EN 12341 (2014), EN 16450 (2017), EN 15267-1 (2009) and EN 15267-2 (2009).**

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 9 pages).

TÜVRheinland® CERTIFIED

Suitability Tested
Equivalent to
2008/50/EC
EN 15267
Regular Surveillance

www.tuv.com
ID 0000074620

Publication in the German Federal Gazette (BAnz) of 07 May 2020

This certificate will expire on:
06 May 2025

German Federal Environment Agency
Dessau, 17 June 2020

Dr. Marcel Langner
Head of Section II 4.1

TÜV Rheinland Energy GmbH
Cologne, 16 June 2020

ppa. Dr. Peter Wilbring

| | |
|---|---|
| **www.umwelt-tuv.eu**<br>tre@umwelt-tuv.eu<br>Phone: + 49 221 806-5200 | TÜV Rheinland Energy GmbH<br>Am Grauen Stein<br>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 certificate D-PL-11120-02-00.

Umwelt Bundesamt

**Certificate:**
0000074620 / 17 June 2020

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| | |
|---|---|
| **Test Report:** | 936/21240384/A dated 15 August 2019 |
| **Initial certification:** | 07 May 2020 |
| **Expiry date:** | 06 May 2025 |
| **Publication:** | BAnz AT 07.05.2020 B8, chapter II number 2.1 |

**Approved application**
The certified AMS is suitable for continuous ambient air monitoring of suspended particulate matter, $PM_{10}$, (stationary operation).

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a field test performed at four different sites and/or different periods over several 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, in consultation with the manufacturer, that this AMS is suitable for monitoring the AMS readings relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for the intended purpose.

**Basis of the certification**
This certification is based on:

- Test report no. 936/21240384/A dated 15 August 2019 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

Publication in the German Federal Gazette: BAnz AT 07.05.2020 B8, chapter II number 2.1, UBA announcement dated 31 March 2020:

**AMS designation:**

MP101M for suspended particulate matter $PM_{10}$

**Manufacturer:**

ENVEA, Poissy, France

**Field of application:**

For continuous ambient air monitoring of suspended particulate matter, $PM_{10}$ (stationary operation)

**Measuring ranges during performance testing:**

| Component | Certification range | Unit |
|---|---|---|
| $PM_{10}$ | 0–10 000 | µg/m³ |

**Software version:**

MP101M 4.0.h

**Restrictions:**

None

**Notes:**

1. The maintenance interval is one month.
2. The test report on performance testing is available on the internet at www.qal1.de.

**Test Report:**

TÜV Rheinland Energy GmbH, Cologne
Report no. 936/21240384/A dated 15 August 2019

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

The MP101M measuring system is designed to measure suspended particulate matter in ambient air. The determination of the mass concentration relies on the principle of beta ray attenuation. The sample is first sucked through a $PM_{10}$ pre-separator and then through a glass fibre filter tape in the instrument. Suspended particulate matter is deposited on the filter tape. Every hour, a beta source ($^{14}C$ element) is swivelled in to determine the mass deposited on the filter tape. A Geiger Müller counter measuring beta radiation is situated below the filter tape. The $^{14}C$ radioelement emits beta rays as it decays. Particles deposited on the filter tape partially absorb the beta radiation. The filter spot is measured before and after loading. The difference in radiation intensity measured by the Geiger Müller counter serves as measure for the deposited amount of particulate matter.

The particulate sample passes the sampling head (USEPA) at a flow rate of 16.67 l/min and enters the sampling tube, which connects the sampling head to the actual measuring instrument. The sampling head separates all particles larger than $PM_{10}$. The sampling tube can be heated in order to avoid possible condensation effects, especially in situations with high outdoor air humidity. After entering the measuring instrument, the air stream contained in the sample is separated on the filter tape. After leaving the measuring system, the air flow reaches the pump and then exits into the environment via a particle filter.

Every hour (1 period), the sample volumetric flow is stopped and a beta radiation source is swivelled over the filter band. The Geiger Müller counter situated below the filter tape measures the intensity of radiation. Every filter tape is measured before and after filter loading. The absorbed radiation is proportional to the separated particle mass and thus the absorption difference is the measured quantity. One measurement takes 200 seconds. The measured values of 24 periods are the averaged 24 hour value (1 cycle). After 24 hours, the filter tape is transported forward and a new blank spot is sampled.

The volumetric flow is kept constant at 1 $m^3/h$ in the separator head. Since the velocity in the sampling head determines the separation characteristics, the volume flow is controlled by the weather sensors so that the volume flow in the sampling head is constant.

The sampling tube can be heated to avoid condensation effects. Since excessive temperatures in the sampling tube can lead to reduced results due to volatilization, the sampling tube is only heated as much as absolutely necessary. A sensor measuring relative moisture is situated near the Geiger Müller counter. If this sensor detects relative moisture above 50%, the heater will be activated.

The measuring system generally provides results simultaneously via the display and the data records. Measured values are updated hourly after each measurement (periodically, “Per.”) and every 24 hours (cyclically, “Cyc.”).

The tested AMS consists of

- the $PM_{10}$ USEPA sampling head,
- the sampling tube with heater, protective tube made of stainless steel and isolation (2 m long),
- the weather sensor (mounted at the sampling tube below the sample inlet) comprising a temperature sensor and a sensor which determines the relative moisture.
- the analyser,
- the pump unit,
- the required connecting tubes and cables,
- the operation manuals in German.

The measuring system may be operated either directly via the touch screen at the front of the instrument or remotely via an internet connection or a wireless modem.

**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**.

**Document history**

Certification of the MP101M 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.: 0000074620: 17 June 2020
Expiry date of the certificate: 06 May 2025
Test report: 936/21240384/A dated 15 August 2019
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 07.05.2020 B8, chapter II number 2.1
UBA announcement dated 31 March 2020

Equivalence calculation $PM_{10}$, cyc., after correction of the axis intercept

| Comparison candidate with reference according to Standard EN 16450:2017 | | | | | |
|---|---|---|---|---|---|
| Candidate | MP101M, PM10 (Cyc) | | SN | SN 6158 & SN 6159 | |
| | | | Limit value | 50 | µg/m³ |
| Status of measured values | Raw data | | Allowed uncertainty | 25 | % |
| | | | | | |
| **All comparisons** | | | | | |
| Uncertainty between Reference | 0.62 | µg/m³ | | | |
| Uncertainty between Candidates | 0.94 | µg/m³ | | | |
| | **SN 6158 & SN 6159** | | | | |
| Number of data pairs | 208 | | | | |
| Slope b | **1.027** | **not significant** | | | |
| Uncertainty of b | **0.019** | | | | |
| Ordinate intercept a | **0.000** | **not significant** | | | |
| Uncertainty of a | **0.468** | | | | |
| Expanded measured uncertainty WCM | **12.56** | **%** | | | |
| **All comparisons, ≥30 µg/m³** | | | | | |
| Uncertainty between Reference | 0.81 | µg/m³ | | | |
| Uncertainty between Candidates | 1.13 | µg/m³ | | | |
| | **SN 6158 & SN 6159** | | | | |
| Number of data pairs | 44 | | | | |
| Slope b | **1.043** | | | | |
| Uncertainty of b | **0.080** | | | | |
| Ordinate intercept a | **-1.534** | | | | |
| Uncertainty of a | **3.018** | | | | |
| Expanded measured uncertainty WCM | **15.18** | **%** | | | |

| Comparison candidate with reference according to Standard EN 16450:2017 | | | | |
| --- | --- | --- | --- | --- |
| Candidate | MP101M, PM10 (Cyc) | SN | SN 6158 & SN 6159 | |
| | | Limit value | 50 | µg/m³ |
| Status of measured values | Raw data | Allowed uncertainty | 25 | % |
| **Cologne, Winter** | | | | |
| Uncertainty between Reference | 0.40 | µg/m³ | | |
| Uncertainty between Candidates | 0.86 | µg/m³ | | |
| | SN 6158 | | SN 6159 | |
| Number of data pairs | 57 | | 57 | |
| Slope b | 0.967 | | 0.936 | |
| Uncertainty of b | 0.026 | | 0.024 | |
| Ordinate intercept a | -0.507 | | -0.003 | |
| Uncertainty of a | 0.572 | | 0.533 | |
| Expanded measured uncertainty $W_{CM}$ | 12.47 | % | 15.39 | % |
| **Bonn, Belderberg** | | | | |
| Uncertainty between Reference | 0.94 | µg/m³ | | |
| Uncertainty between Candidates | 0.77 | µg/m³ | | |
| | SN 6158 | | SN 6159 | |
| Number of data pairs | 40 | | 40 | |
| Slope b | 1.026 | | 1.028 | |
| Uncertainty of b | 0.027 | | 0.032 | |
| Ordinate intercept a | 1.385 | | 1.501 | |
| Uncertainty of a | 0.703 | | 0.808 | |
| Expanded measured uncertainty $W_{CM}$ | 12.13 | % | 13.38 | % |
| **Bulk good handling, Summer** | | | | |
| Uncertainty between Reference | 0.60 | µg/m³ | | |
| Uncertainty between Candidates | 1.21 | µg/m³ | | |
| | SN 6158 | | SN 6159 | |
| Number of data pairs | 66 | | 66 | |
| Slope b | 1.116 | | 1.109 | |
| Uncertainty of b | 0.045 | | 0.036 | |
| Ordinate intercept a | -0.888 | | -0.083 | |
| Uncertainty of a | 1.111 | | 0.888 | |
| Expanded measured uncertainty $W_{CM}$ | 23.09 | % | 23.57 | % |
| **Bulk good handling, Winter** | | | | |
| Uncertainty between Reference | 0.50 | µg/m³ | | |
| Uncertainty between Candidates | 0.65 | µg/m³ | | |
| | SN 6158 | | SN 6159 | |
| Number of data pairs | 45 | | 45 | |
| Slope b | 0.931 | | 0.919 | |
| Uncertainty of b | 0.033 | | 0.033 | |
| Ordinate intercept a | 1.033 | | 1.004 | |
| Uncertainty of a | 0.852 | | 0.834 | |
| Expanded measured uncertainty $W_{CM}$ | 13.92 | % | 15.61 | % |
| **All comparisons, ≥30 µg/m³** | | | | |
| Uncertainty between Reference | 0.81 | µg/m³ | | |
| Uncertainty between Candidates | 1.13 | µg/m³ | | |
| | SN 6158 | | SN 6159 | |
| Number of data pairs | 44 | | 44 | |
| Slope b | 1.046 | | 1.056 | |
| Uncertainty of b | 0.080 | | 0.083 | |
| Ordinate intercept a | -1.585 | | -2.067 | |
| Uncertainty of a | 3.019 | | 3.17 | |
| Expanded measured uncertainty $W_{CM}$ | 15.25 | % | 16.06 | % |
| **All comparisons** | | | | |
| Uncertainty between Reference | 0.62 | µg/m³ | | |
| Uncertainty between Candidates | 0.94 | µg/m³ | | |
| | SN 6158 | | SN 6159 | |
| Number of data pairs | 208 | | 208 | |
| Slope b | 1.032 | not significant | 1.027 | not significant |
| Uncertainty of b | 0.020 | | 0.020 | |
| Ordinate intercept a | -0.182 | not significant | 0.092 | not significant |
| Uncertainty of a | 0.478 | | 0.482 | |
| Expanded measured uncertainty $W_{CM}$ | 12.89 | % | 12.95 | % |

Equivalence calculation $PM_{10}$, per, after correction of the axis intercept

| Comparison candidate with reference according to Standard EN 16450:2017 | | | | | |
|---|---|---|---|---|---|
| Candidate | MP101M, PM10 (Per) | | SN | SN 6158 & SN 6159 | |
| | | | Limit value | 50 | µg/m³ |
| Status of measured values | Raw data | | Allowed uncertainty | 25 | % |
| | | | | | |
| All comparisons | | | | | |
| Uncertainty between Reference | 0.62 | µg/m³ | | | |
| Uncertainty between Candidates | 0.95 | µg/m³ | | | |
| | SN 6158 & SN 6159 | | | | |
| Number of data pairs | 208 | | | | |
| Slope b | 1.029 | not significant | | | |
| Uncertainty of b | 0.019 | | | | |
| Ordinate intercept a | 0.000 | not significant | | | |
| Uncertainty of a | 0.474 | | | | |
| Expanded measured uncertainty WCM | 12.82 | % | | | |
| All comparisons, ≥30 µg/m³ | | | | | |
| Uncertainty between Reference | 0.81 | µg/m³ | | | |
| Uncertainty between Candidates | 1.14 | µg/m³ | | | |
| | SN 6158 & SN 6159 | | | | |
| Number of data pairs | 44 | | | | |
| Slope b | 1.047 | | | | |
| Uncertainty of b | 0.081 | | | | |
| Ordinate intercept a | -1.649 | | | | |
| Uncertainty of a | 3.077 | | | | |
| Expanded measured uncertainty WCM | 15.56 | % | | | |

| Comparison candidate with reference according to Standard EN 16450:2017 | | | | |
|---|---|---|---|---|
| Candidate | MP101M, PM 10 (Per) | | SN | SN 6158 & SN 6159 |
| | | | Limit value | 50 | µg/m³ |
| Status of measured values | Raw data | | Allowed uncertainty | 25 | % |
| **Cologne, Winter** | | | | | |
| Uncertainty between Reference | 0.40 | µg/m³ | | | |
| Uncertainty between Candidates | 0.89 | µg/m³ | | | |
| | **SN 6158** | | | **SN 6159** | |
| Number of data pairs | 57 | | | 57 | |
| Slope b | 0.968 | | | 0.936 | |
| Uncertainty of b | 0.026 | | | 0.024 | |
| Ordinate intercept a | -0.495 | | | 0.013 | |
| Uncertainty of a | 0.577 | | | 0.538 | |
| Expanded measured uncertainty $W_{CM}$ | 12.47 | % | | 15.42 | % |
| **Bonn, Belderberg** | | | | | |
| Uncertainty between Reference | 0.94 | µg/m³ | | | |
| Uncertainty between Candidates | 0.78 | µg/m³ | | | |
| | **SN 6158** | | | **SN 6159** | |
| Number of data pairs | 40 | | | 40 | |
| Slope b | 1.033 | | | 1.039 | |
| Uncertainty of b | 0.029 | | | 0.034 | |
| Ordinate intercept a | 1.271 | | | 1.302 | |
| Uncertainty of a | 0.753 | | | 0.876 | |
| Expanded measured uncertainty $W_{CM}$ | 13.26 | % | | 14.87 | % |
| **Bulk good handling, Sommer** | | | | | |
| Uncertainty between Reference | 0.60 | µg/m³ | | | |
| Uncertainty between Candidates | 1.20 | µg/m³ | | | |
| | **SN 6158** | | | **SN 6159** | |
| Number of data pairs | 66 | | | 66 | |
| Slope b | 1.116 | | | 1.109 | |
| Uncertainty of b | 0.045 | | | 0.036 | |
| Ordinate intercept a | -0.839 | | | -0.052 | |
| Uncertainty of a | 1.116 | | | 0.894 | |
| Expanded measured uncertainty $W_{CM}$ | 23.21 | % | | 23.71 | % |
| **Bulk good handling, Winter** | | | | | |
| Uncertainty between Reference | 0.50 | µg/m³ | | | |
| Uncertainty between Candidates | 0.67 | µg/m³ | | | |
| | **SN 6158** | | | **SN 6159** | |
| Number of data pairs | 45 | | | 45 | |
| Slope b | 0.930 | | | 0.918 | |
| Uncertainty of b | 0.034 | | | 0.033 | |
| Ordinate intercept a | 1.090 | | | 1.046 | |
| Uncertainty of a | 0.858 | | | 0.841 | |
| Expanded measured uncertainty $W_{CM}$ | 13.96 | % | | 15.66 | % |
| **All comparisons, ≥30 µg/m³** | | | | | |
| Uncertainty between Reference | 0.81 | µg/m³ | | | |
| Uncertainty between Candidates | 1.14 | µg/m³ | | | |
| | **SN 6158** | | | **SN 6159** | |
| Number of data pairs | 44 | | | 44 | |
| Slope b | 1.048 | | | 1.062 | |
| Uncertainty of b | 0.081 | | | 0.085 | |
| Ordinate intercept a | -1.653 | | | -2.244 | |
| Uncertainty of a | 3.064 | | | 3.24 | |
| Expanded measured uncertainty $W_{CM}$ | 15.54 | % | | 16.53 | % |
| **All comparisons** | | | | | |
| Uncertainty between Reference | 0.62 | µg/m³ | | | |
| Uncertainty between Candidates | 0.95 | µg/m³ | | | |
| | **SN 6158** | | | **SN 6159** | |
| Number of data pairs | 208 | | | 208 | |
| Slope b | 1.034 | not significant | | 1.028 | not significant |
| Uncertainty of b | 0.020 | | | 0.020 | |
| Ordinate intercept a | -0.175 | not significant | | 0.082 | not significant |
| Uncertainty of a | 0.483 | | | 0.488 | |
| Expanded measured uncertainty $W_{CM}$ | 13.14 | % | | 13.23 | % |