Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

# CERTIFICATE

## of Product Conformity (QAL1)

**Certificate No.: 0000040336_02**

| | |
|---|---|
| **Certified AMS:** | Air Pollution Monitor 2 (APM-2) for $PM_{10}$ and $PM_{2,5}$ |
| **Manufacturer:** | Comde-Derenda GmbH<br>Kieler Straße 9<br>14532 Stahnsdorf<br>Germany |
| **Test Institute:** | TÜV Rheinland Energy GmbH |

**This is to certify that the AMS has been tested and found to comply with the standards VDI 4202-1 (2010), VDI 4203-3 (2010), EN 12341 (2014), EN 16450 (2017), EN 14907 (2005), Guide for Demonstration of Equivalence of Ambient Air Monitoring Methods (2010), EN 15267-1 (2009) and EN 15267-2 (2009).**

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 12 pages).
The present certificate replaces certificate 0000040336_01 dated 05 August 2019.

TÜVRheinland® CERTIFIED

Suitability Tested
Complying with 2008/50/EC
EN 15267
Regular Surveillance

www.tuv.com
ID 0000040336

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

This certificate will expire on: 11 April 2027

German Environment Agency
Dessau, 31 May 2022

TÜV Rheinland Energy GmbH
Cologne, 30 May 2022

Dr. Marcel Langner
Head of Section II 4.1

ppa. Dr. Peter Wilbring


| | |
|---|---|
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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.

| | |
|---|---|
| **Test report:** | 936/21219977/A dated 26 March 2014<br>and addendum 936/21253723/A dated 09 September 2021 |
| **Initial certification:** | 09 September 2014 |
| **Expiry date:** | 11 April 2027 |
| **Publication:** | BAnz AT 11.04.2022 B10, Chap. VI Notification 7 |

**Approved application**
The tested AMS is suitable for continuous ambient air monitoring of $PM_{10}$ and $PM_{2,5}$ (stationary operation).

The suitability of the AMS for these applications was assessed based on a laboratory test and a field test at four different locations and over different time periods.

The AMS is approved for the temperature range from -20°C to +50°C (or -15°C to +40°C when used as a measuring system in accordance with EN 16450).

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 measured values relevant to the application.

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

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

- Test report 936/21219977/A dated 26 March 2014
  issued by TÜV Rheinland Energie und Umwelt GmbH and
- Addendum 936/21253723/A dated 09 September 2021 by 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 05.08.2014 B11, chapter III No. 2.1, UBA announcement dated 17 July 2014:

**AMS designation:**
Air Pollution Monitor 2 (APM-2) for suspended particulate matter $PM_{10}$ and $PM_{2.5}$

**Manufacturer:**
Comde-Derenda GmbH, Stahnsdorf

**Field of application:**
For continuous and simultaneous ambient air monitoring of suspended particulate matter, $PM_{10}$ and $PM_{2.5}$ fractions (stationary sources)

**Measuring ranges during performance testing:**

| Component | Certification range | Unit |
|---|---|---|
| $PM_{10}$ | 0 – 1 000 | µg/m³ |
| $PM_{2,5}$ | 0 – 1 000 | µg/m³ |

**Software version:** 3.0.1

**Restrictions:** None

**Notes:**

1. After applying the determined correction factors, the measuring system complies with the requirements of the Guide for Demonstration of Equivalence of Ambient Air Monitoring Methods for the component $PM_{10}$ and $PM_{2.5}$.
2. The candidates did not comply with the requirements for the equivalence test specified in standard EN 12341: 1998 for $PM_{10}$.
3. The long-term drift of the particle sensor's sensitivity could not be determined during the field test.
4. It is possible to monitor the measuring system telemetrically but it cannot be controlled that way.
5. The measuring system alternately determines the $PM_{10}$ and $PM_{2.5}$ fractions in suspended particulate matter. During performance testing the system switched between the two fractions every two minutes.
6. After maintenance of the photometer, the instrument must be calibrated on-site regularly using a gravimetric $PM_{10}$ reference method in accordance with EN 12341. If possible, a seasonal calibration cycle should be set.
7. After maintenance of the photometer, the instrument must be calibrated on-site regularly using a gravimetric $PM_{2.5}$ reference method in accordance with EN 14907. If possible, a seasonal calibration cycle should be set.
8. The test report on performance testing is available on the internet at www.qal1.de.

**Test report:**
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report no.: 936/21219977/A dated 26 March 2014

Publication in the German Federal Gazette: BAnz AT 02.04.2015 B5, chapter IV notification 1, UBA announcement dated 25 February 2015:

**1 Notification as regards Federal Environment Agency (UBA) notice of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter III number 2.1)**

An outlet filter of the Air Pollution Monitor 2 (APM-2) measuring system for $PM_{10}$ and $PM_{2.5}$ manufactured by Comde-Derenda GmbH has been repositioned from its former position downstream of the pump to between the mass flow sensor and the pump.

Statement issued by TÜV Rheinland Energie und Umwelt GmbH
dated 27 September 2014

Publication in the German Federal Gazette: BAnz AT 14.03.2016 B7, chapter V notification 4, UBA announcement dated 14 March 2016:

**4 Notification as regards Federal Environment Agency (UBA) notices of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter II number 2.1) and of 25 February 2015 (BAnz AT 02.04.2015 B5, chapter IV notification 1)**

The new software version of the APM-2 measuring system for suspended particulate matter $PM_{10}$ and $PM_{2.5}$ manufactured by Comde-Derenda GmbH is:

Software version: 3.05.002

Statement issued by TÜV Rheinland Energie und Umwelt GmbH
dated 21 October 2015

Publication in the German Federal Gazette: BAnz AT 31.07.2017 B12, chapter II notification 34, UBA announcement dated 13 July 2017:

**34 Notification as regards Federal Environment Agency (UBA) notices of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter II number 2.1) and of 18 February 2016 (BAnz AT 14.03.2016 B7, chapter V notification 4)**

The current software version of the Air Pollution Monitor 2 (APM-2) ambient air quality measuring system for suspended particulate matter $PM_{10}$ and $PM_{2.5}$ manufactured by Comde-Derenda GmbH is:

3.07.002

The measuring system has been equipped with a 500 ml buffer bottle for compensating pressure fluctuations caused by the sampling pump.

The optional test method for checking the photometer's sensitivity externally by feeding propane gas is no longer available.

Statement issued by TÜV Rheinland Energy GmbH dated 10 March 2017

Publication in the German Federal Gazette: BAnz AT 31.07.2020 B10, chapter II notification 1, UBA announcement dated 27 May 2020:

**1 Notification as regards Federal Environment Agency (UBA) notices of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter II number 2.1) and of 13 July 2017 (BAnz AT 31.03.2017 B12, chapter II notification 34)**

The current software version of the Air Pollution Monitor 2 (APM-2) ambient air quality measuring system for suspended particulate matter $PM_{2.5}$ and $PM_{10}$ manufactured by Comde-Derenda GmbH is:

3.08.001

In the future, hardware version 5.4 will be used for the input circuit.

Statement issued by TÜV Rheinland Energy GmbH dated 04 May 2020

Publication in the German Federal Gazette: BAnz AT 11.04.2022 B10, chapter VI notification 7, Announcement by UBA dated 09 March 2022:

**7 Notification as regards Federal Environment Agency (UBA) notices of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter III number 2.1) and of 27 May 2020 (BAnz AT 31.07.2020 B10, chapter II notification 1)**

The measuring device Air Pollution Monitor 2 (APM-2) for suspended particulate matter PM2,5 and PM10 of the company Comde-Derenda GmbH fulfills the requirements of EN 16450 (July 2017 edition) for an ambient temperature range from -15 °C to +40 °C. An addendum to the test report with report number 936/21253723/A can be viewed on the Internet at www.qal1.de.
The current software version is:
3.11.007
Furthermore, the following software version is approved for the measuring device:
3.09.021

Statement issued by TÜV Rheinland Energy GmbH dated 09 September 2021

## Certified product

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

The APM-2 measuring system for monitoring suspended particulate matter in ambient air consists of a $PM_{10}$ sampling head, a sampling pipe, a virtual impactor, the instrument with a control unit and a scattered light photometer unit, an outdoor sensor and a user manual in German.

The APM-2 measuring system uses scattered light to measure suspended particulate matter. The applied measurement method uses the physical characteristics of light scattering by microparticles. The scattered light photometer unit used consists of an intensity-stabilised laser diode and a semiconductor photodetector. Both components are arranged at an angle of 90° to each other, so it is a single-angle scattered light sensor. The light reflected from the particles located in a precisely defined measuring volume is detected by a detector. The photodetector generates a corresponding voltage signal (0-5 V), which is then amplified with low noise and represents a direct measure of the mass concentration of the aerosol in the measurement volume. For zero adjustment, filtered air is fed to the scattered light sensor at periodic intervals via a switching device.

The particulate sample passes through the $PM_{10}$ sampling head at a flow rate of 3.3 l/min and enters the sampling tube connecting the sampling head to the virtual impactor.

The virtual impactor is located on the top of the housing and is connected to the impactor head via the intake pipe. The virtual impactor splits the outside air (Q1) drawn in via an integrated pump at 3.3 l/min into two partial flows. The division takes place in the area of two opposing nozzles. The lateral flow Q2 (3.1 l/min) is drawn off between the two nozzles at right angles to the incoming air flow. Particles that cannot follow the lateral flow due to their inertia maintain their direction of movement and thus enter the lower axial flow Q3 (0.2 l/min). As a result, the flow is divided into the lateral flow, which only carries the smaller and lighter particles of the $PM_{2,5}$ fraction, and the axial flow, which carries particles with a particle size of $PM_{10}$. Via low-loss switching devices (pinch valves with straight passage), the aerosol now enters the scattered light sensor either from the axial flow (enrichment mode) or from the lateral flow (normal mode). In the enrichment mode, the APM-2 thus detects the $PM_{10}$ concentration, in the normal mode the $PM_{2,5}$ concentration. For zero adjustment, filtered air is supplied to the scattered light sensor at periodic intervals via the switching device.

Within the scope of the performance test, the measuring system was operated in alternating mode between $PM_{10}$ and $PM_{2,5}$ with a respective interval time of 2 min. Once per hour, a zero air flush was also carried out for approx. two minutes for zero point adjustment - this is indicated in the display with "Flush". The measured data is stored in the unit's memory and - if available - on an SD card.

## 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: **qal1.de**.

## History of documents

Certification of Air Pollution Monitor 2 (APM-2) 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. 0000040336_00: 09 September 2014
Expiry date of the certificate: 04 August 2019
Test report 936/21219977/A dated 26 March 2014
TÜV Rheinland Energie und Umwelt GmbH
Publication BAnz AT 05.08.2014 B11, chapter III number 2.1
UBA announcement dated 17 July 2014

### Notifications

Statement issued by TÜV Rheinland Energy GmbH dated 27 September 2014
Publication BAnz AT 02.04.2015 B5, chapter IV notification 1
UBA announcement dated 25 February 2015
(Hardware changes)

Statement issued by TÜV Rheinland Energy GmbH dated 21 October 2015
Publication BAnz AT 14.03.2016 B7, chapter V notification 4
UBA announcement dated 18 February 2016
(Software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 10 March 2017
Publication BAnz AT 31.07.2017 B12, chapter II notification 34
UBA announcement dated 13 July 2017
(Software changes)

**Renewal of certificate**
Certificate No. 0000040336_01: 05 August 2019
Expiry date of the certificate: 04 August 2024

**Notifications**
Statement issued by TÜV Rheinland Energy GmbH dated 4 May 2020
Publication BAnz AT 31.07.2020 B10, chapter II notification 1
UBA announcement dated 27 May 2020
(Software changes)

**Certificate based on a notification**
Certificate No. 0000040336_02: 31 May 2022
Expiry date of the certificate: 11 April 2027
Statement issued by TÜV Rheinland Energy GmbH dated 9 September 2021
Test report 936/21253723/A dated 9 September 2021
Publication BAnz AT 11.04.2022 B10, chapter VI notification 7
UBA announcement dated 9 March 2022
(Comply with EN 16450 (2017), an addendum is added to the test report.)

## Combination of equivalence test results for PM2.5 after slope correction

| Comparison candidate with reference according to Standard EN 16450:2017 | | | | | |
|---|---|---|---|---|---|
| Candidate | APM-2 | | SN | SN 3 & SN 4 | |
| | | | Limit value | 30 | µg/m³ |
| Status of measured values | Raw data | | Allowed uncertainty | 25 | % |
| | | | | | |
| **All comparisons** | | | | | |
| Uncertainty between Reference | **0,55** | **µg/m³** | | | |
| Uncertainty between Candidates | **0,71** | **µg/m³** | | | |
| | **SN 3 & SN 4** | | | | |
| Number of data pairs | **192** | | | | |
| Slope b | **1,001** | **not significant** | | | |
| Uncertainty of b | **0,013** | | | | |
| Ordinate intercept a | **0,335** | **not significant** | | | |
| Uncertainty of a | **0,235** | | | | |
| Expanded meas. uncertainty $W_{CM}$ | **12,64** | **%** | | | |
| **All comparisons, ≥18 µg/m³** | | | | | |
| Uncertainty between Reference | **0,63** | **µg/m³** | | | |
| Uncertainty between Candidates | **1,13** | **µg/m³** | | | |
| | **SN 3 & SN 4** | | | | |
| Number of data pairs | **49** | | | | |
| Slope b | **0,967** | | | | |
| Uncertainty of b | **0,033** | | | | |
| Ordinate intercept a | **1,292** | | | | |
| Uncertainty of a | **1,019** | | | | |
| Expanded meas. uncertainty $W_{CM}$ | **18,70** | **%** | | | |

| Comparison candidate with reference according to Standard EN 16450:2017 | | | | | |
|---|---|---|---|---|---|
| Candidate | APM-2 | | SN | SN 3 & SN 4 | |
| | | | Limit value | 30 | µg/m³ |
| Status of measured values | Raw data | | Allowed uncertainty | 25 | % |
| | | | | | |
| **Cologne, Winter** | | | | | |
| Uncertainty between Reference | **0,54** | **µg/m³** | | | |
| Uncertainty between Candidates | **0,71** | **µg/m³** | | | |
| | **SN 3** | | **SN 4** | | |
| Number of data pairs | **52** | | **52** | | |
| Slope b | **0,931** | | **0,962** | | |
| Uncertainty of b | **0,019** | | **0,019** | | |
| Ordinate intercept a | **1,148** | | **1,495** | | |
| Uncertainty of a | **0,424** | | **0,435** | | |
| Expanded meas. uncertainty $W_{CM}$ | **14,07** | **%** | **13,17** | **%** | |
| **Bonn, Winter** | | | | | |
| Uncertainty between Reference | **0,62** | **µg/m³** | | | |
| Uncertainty between Candidates | **0,96** | **µg/m³** | | | |
| | **SN 3** | | **SN 4** | | |
| Number of data pairs | **51** | | **51** | | |
| Slope b | **1,037** | | **1,097** | | |
| Uncertainty of b | **0,031** | | **0,032** | | |
| Ordinate intercept a | **-0,948** | | **-0,964** | | |
| Uncertainty of a | **0,706** | | **0,725** | | |
| Expanded meas. uncertainty $W_{CM}$ | **15,61** | **%** | **20,61** | **%** | |
| **Cologne, Summer** | | | | | |
| Uncertainty between Reference | **0,53** | **µg/m³** | | | |
| Uncertainty between Candidates | **0,62** | **µg/m³** | | | |
| | **SN 3** | | **SN 4** | | |
| Number of data pairs | **46** | | **44** | | |
| Slope b | **1,054** | | **1,113** | | |
| Uncertainty of b | **0,044** | | **0,049** | | |
| Ordinate intercept a | **-0,279** | | **-0,232** | | |
| Uncertainty of a | **0,493** | | **0,553** | | |
| Expanded meas. uncertainty $W_{CM}$ | **12,03** | **%** | **22,86** | **%** | |
| **Rodenkirchen, Summer** | | | | | |
| Uncertainty between Reference | **0,52** | **µg/m³** | | | |
| Uncertainty between Candidates | **0,36** | **µg/m³** | | | |
| | **SN 3** | | **SN 4** | | |
| Number of data pairs | **45** | | **45** | | |
| Slope b | **1,150** | | **1,133** | | |
| Uncertainty of b | **0,050** | | **0,051** | | |
| Ordinate intercept a | **-1,383** | | **-1,482** | | |
| Uncertainty of a | **0,565** | | **0,567** | | |
| Expanded meas. uncertainty $W_{CM}$ | **22,59** | **%** | **18,94** | **%** | |
| **All comparisons, ≥18 µg/m³** | | | | | |
| Uncertainty between Reference | **0,63** | **µg/m³** | | | |
| Uncertainty between Candidates | **1,13** | **µg/m³** | | | |
| | **SN 3** | | **SN 4** | | |
| Number of data pairs | **49** | | **49** | | |
| Slope b | **0,949** | | **0,986** | | |
| Uncertainty of b | **0,032** | | **0,034** | | |
| Ordinate intercept a | **1,074** | | **1,497** | | |
| Uncertainty of a | **1,002** | | **1,05** | | |
| Expanded meas. uncertainty $W_{CM}$ | **18,50** | **%** | **20,36** | **%** | |
| **All comparisons** | | | | | |
| Uncertainty between Reference | **0,55** | **µg/m³** | | | |
| Uncertainty between Candidates | **0,71** | **µg/m³** | | | |
| | **SN 3** | | **SN 4** | | |
| Number of data pairs | **194** | | **192** | | |
| Slope b | **0,976** | **not significant** | **1,027** | **significant** | |
| Uncertainty of b | **0,013** | | **0,013** | | |
| Ordinate intercept a | **0,396** | **not significant** | **0,269** | **not significant** | |
| Uncertainty of a | **0,228** | | **0,245** | | |
| Expanded meas. uncertainty $W_{CM}$ | **12,25** | **%** | **14,81** | **%** | |

## Combination of equivalence test results for PM10 after correction slope and intercept.

| Comparison candidate with reference according to Standard EN 16450:2017 | | | | | |
|---|---|---|---|---|---|
| Candidate | APM-2 | | SN | SN 3 & SN 4 | |
| | | | Limit value | 50 | µg/m³ |
| Status of measured values | Raw data | | Allowed uncertainty | 25 | % |
| | | | | | |
| **All comparisons** | | | | | |
| Uncertainty between Reference | **0,58** | **µg/m³** | | | |
| Uncertainty between Candidates | **1,30** | **µg/m³** | | | |
| | **SN 3 & SN 4** | | | | |
| Number of data pairs | **193** | | | | |
| Slope b | **1,001** | **not significant** | | | |
| Uncertainty of b | **0,021** | | | | |
| Ordinate intercept a | **-0,023** | **not significant** | | | |
| Uncertainty of a | **0,514** | | | | |
| Expanded measured uncertainty WCM | **13,62** | **%** | | | |
| **All comparisons, ≥30 µg/m³** | | | | | |
| Uncertainty between Reference | **0,72** | **µg/m³** | | | |
| Uncertainty between Candidates | **2,33** | **µg/m³** | | | |
| | **SN 3 & SN 4** | | | | |
| Number of data pairs | **33** | | | | |
| Slope b | **1,061** | | | | |
| Uncertainty of b | **0,065** | | | | |
| Ordinate intercept a | **-2,800** | | | | |
| Uncertainty of a | **2,744** | | | | |
| Expanded measured uncertainty WCM | **18,93** | **%** | | | |

| Comparison candidate with reference according to Standard EN 16450:2017 | | | | | |
|---|---|---|---|---|---|
| Candidate | APM-2 | | SN | SN 3 & SN 4 | |
| | | | Limit value | 50 | µg/m³ |
| Status of measured values | Raw data | | Allowed uncertainty | 25 | % |
| | | | | | |
| **Cologne, Winter** | | | | | |
| Uncertainty between Reference | **0,54** | **µg/m³** | | | |
| Uncertainty between Candidates | **1,41** | **µg/m³** | | | |
| | **SN 3** | | | **SN 4** | |
| Number of data pairs | **52** | | | **52** | |
| Slope b | **0,953** | | | **1,006** | |
| Uncertainty of b | **0,023** | | | **0,022** | |
| Ordinate intercept a | **1,785** | | | **2,520** | |
| Uncertainty of a | **0,625** | | | **0,596** | |
| Expanded measured uncertainty $W_{CM}$ | **10,72** | **%** | | **15,06** | **%** |
| **Bonn, Winter** | | | | | |
| Uncertainty between Reference | **0,38** | **µg/m³** | | | |
| Uncertainty between Candidates | **1,76** | **µg/m³** | | | |
| | **SN 3** | | | **SN 4** | |
| Number of data pairs | **51** | | | **51** | |
| Slope b | **0,967** | | | **1,069** | |
| Uncertainty of b | **0,051** | | | **0,055** | |
| Ordinate intercept a | **-0,523** | | | **-1,146** | |
| Uncertainty of a | **1,511** | | | **1,641** | |
| Expanded measured uncertainty $W_{CM}$ | **19,26** | **%** | | **20,77** | **%** |
| **Cologne, Summer** | | | | | |
| Uncertainty between Reference | **0,60** | **µg/m³** | | | |
| Uncertainty between Candidates | **1,09** | **µg/m³** | | | |
| | **SN 3** | | | **SN 4** | |
| Number of data pairs | **47** | | | **45** | |
| Slope b | **0,873** | | | **0,978** | |
| Uncertainty of b | **0,040** | | | **0,044** | |
| Ordinate intercept a | **2,123** | | | **1,622** | |
| Uncertainty of a | **0,750** | | | **0,828** | |
| Expanded measured uncertainty $W_{CM}$ | **18,99** | **%** | | **9,70** | **%** |
| **Rodenkirchen, Summer** | | | | | |
| Uncertainty between Reference | **0,76** | **µg/m³** | | | |
| Uncertainty between Candidates | **0,44** | **µg/m³** | | | |
| | **SN 3** | | | **SN 4** | |
| Number of data pairs | **45** | | | **45** | |
| Slope b | **0,969** | | | **1,008** | |
| Uncertainty of b | **0,065** | | | **0,065** | |
| Ordinate intercept a | **-1,719** | | | **-2,154** | |
| Uncertainty of a | **1,281** | | | **1,287** | |
| Expanded measured uncertainty $W_{CM}$ | **16,54** | **%** | | **12,32** | **%** |
| **All comparisons, ≥30 µg/m³** | | | | | |
| Uncertainty between Reference | **0,72** | **µg/m³** | | | |
| Uncertainty between Candidates | **2,33** | **µg/m³** | | | |
| | **SN 3** | | | **SN 4** | |
| Number of data pairs | **33** | | | **33** | |
| Slope b | **1,028** | | | **1,095** | |
| Uncertainty of b | **0,064** | | | **0,066** | |
| Ordinate intercept a | **-3,024** | | | **-2,618** | |
| Uncertainty of a | **2,701** | | | **2,81** | |
| Expanded measured uncertainty $W_{CM}$ | **19,73** | **%** | | **21,11** | **%** |
| **All comparisons** | | | | | |
| Uncertainty between Reference | **0,58** | **µg/m³** | | | |
| Uncertainty between Candidates | **1,30** | **µg/m³** | | | |
| | **SN 3** | | | **SN 4** | |
| Number of data pairs | **195** | | | **193** | |
| Slope b | **0,958** | **significant** | | **1,045** | **significant** |
| Uncertainty of b | **0,020** | | | **0,022** | |
| Ordinate intercept a | **0,190** | **not significant** | | **-0,253** | **not significant** |
| Uncertainty of a | **0,485** | | | **0,543** | |
| Expanded measured uncertainty $W_{CM}$ | **15,10** | **%** | | **16,44** | **%** |