TÜVRheinland®
Genau. Richtig.

CONFIRMATION

of Product Conformity (QAL1)

AMS designation:	Fidas® 200 S, Fidas® 200 and Fidas® 200 E for suspended particulate matter PM_{10} and $PM_{2,5}$
Manufacturer:	PALAS GmbH Greschbachstraße 3b 76229 Karlsruhe Germany
Test Laboratory:	TÜV Rheinland Energy GmbH

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

**VDI 4202-1 (2010), VDI 4203-3 (2010),
EN 12341 (1999), EN 14907 (2005), EN 16450 (2017)
Guide to the demonstration of equivalence of ambient air monitoring methods (2010), EN 15267-1 (2009) and EN 15267-2 (2009)**

The AMS underwent independent expert testing and was accepted.

This confirmation is valid up to the publication of the certificate, but no longer than 6 months from the date of issue (this document contains 7 pages).

Expiry date: 2 September 2018

TÜV Rheinland Energy GmbH
Cologne, 2 March 2018

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Test Report:	936/21227195/B dated 5 October 2015
Initial certification:	01 April 2014
Expiry date:	2 September 2018

Approved application

The certified AMS is suitable for continuous and simultaneous ambient air monitoring of suspended particulate matter, PM10 and PM2.5 (stationary operation).

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a sixteen-month field test.

The Fidas® 200 S version of the instrument is approved for an ambient temperature range of -20 °C to +50 °C. The Fidas® 200 and Fidas® 200 E versions of the instrument are 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 limit values relevant to the application.

Basis of the confirmation

This confirmation is based on:

- Test report 936/21227195/B dated 5 October 2015 issued by TÜV Rheinland Energy GmbH
- Suitability announced by the relevant body on 22 July 2015
- The ongoing surveillance of the product and the manufacturing process
- Expert testing and approval by an independent body

Publication in the German Federal Gazette: BAnz AT 26.08.2015 B4, chapter III number 2.1, UBA announcement dated 22 July 2015:

AMS designation:
Fidas® 200 S and Fidas® 200 for suspended particulate matter PM_{10} and $PM_{2.5}$

Manufacturer:
PALAS GmbH, Karlsruhe

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

Measuring ranges during performance testing:

Component	Certification range	Unit
PM_{10}	0–10 000	µg/m³
$PM_{2.5}$	0–10 000	µg/m³

Software version:
100380.0014.0001.0001.0011

Restrictions:
None

Notes:
1. The Fidas® 200 S measuring system is also available as an indoor-version for installation at temperature-controlled locations. It is then called Fidas® 200.
2. Both, the four comparison campaigns (initial testing) and the six comparison campaigns (supplementary testing) meet the requirements for PM_{10} and $PM_{2.5}$ stipulated by the Guide to “Demonstration of Equivalence of Ambient Air Monitoring Methods”.
3. One of the tested instrument tested at the site in Cologne in the summer failed to meet the requirements for the variation coefficient R^2.
4. The particle sensor’s sensitivity has to be checked on a monthly basis using CalDust 1100 or MonoDust 1500.
5. The measuring system must be calibrated on site at regular intervals by using the gravimetric PM_{10} reference method according to EN 12341 (2014 version).
6. The test report on performance testing is available on the internet at www.qal1.de.
7. Supplementary testing (extended equivalence testing, presentation of design changes, inclusion of the MonoDust1500 test standard) as regards Federal Environment Agency notices of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter IV number 5.1) and of 25 February 2015 (BAnz AT 02.04.2015 B5, chapter IV 14th notification).

Test Report:
TÜV Rheinland Energy GmbH, Cologne
Report no. 936/21227195/A dated 9 March 2015

Publication in the German Federal Gazette: BAnz AT 14.03.2016 B7, chapter V notification 6, UBA announcement dated 18 February 2016:

6 Notification as regards Federal Environment Agency (UBA) notice of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter III number 2.1)

A mistake regarding the description of the of the IADS-control functions was detected in the manual for the Fidas® 200 S or the Fidas® 200 measuring system for PM_{10} and $PM_{2.5}$ manufactured by PALAS GmbH. The description should correctly read as follows:

"*The temperature of the IADS is controlled as a function of the ambient temperature and humidity (as measured by the weather station). The minimum temperature is 23°C. Moisture compensation is ensured via a dynamic adjustment of the IADS temperature up to a maximum heat capacity of 90 Watt.*"

The manufacturer corrected this mistake as of manual version V0140815. Test report 936/21227195/A dated 9 March 2015 issued by TÜV Rheinland Energie und Umwelt GmbH was corrected accrodingly and replaced by test report 936/21227195/B dated 5 October 2015.

The measuring system can alternatively be operated with a WS300-UMB weather station. An extended IADS adaptable for lengths between 1.20m and 2.10m is available for the measuring system.

Furthermore, the Fidas® 200 E version of the measuring system may be used with an external sensor.

The current software version is: 100396.0014.0001.0001.0011

Statement issued by TÜV Rheinland Energie und Umwelt GmbH
dated 6 November 2015

Publication in the German Federal Gazette: BAnz AT 01.08.2016 B11, chapter V notification 35, UBA announcement dated 14 July 2016:

35 Notification as regards Federal Environment Agency (UBA) notices of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter IV number 5.1) and of 18 February 2016 (BAnz AT 14.03.2016 B7 chapter V 6th notification)

The sensitivity test of the particle sensor for the Fidas® 200, Fidas® 200 S or Fidas® 200 E PM_{10} and $PM_{2.5}$ particle monitor with MonoDust 1500 manufactured by PALAS GmbH can be performed at an IADS temperature between 35 °C and 50 °C.
The measuring system may provide two additional contacts for the control of an external pump/flow regulator (not relevant for the performance-tested instrument version).
The current software version of the measuring system is:
100408.0014.0001.0001.0011

Statement issued by TÜV Rheinland Energie und Umwelt GmbH
dated 24 February 2016.

Publication in the German Federal Gazette: BAnz AT 15.03.2017 B6, chapter V notification 10, UBA announcement dated 22 February 2017:

10 Notification as regards Federal Environment Agency notices of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter IV number 5.1) and of 14 July 2016 (BAnz AT 01.08.2016 B11 chapter V 35th notification)

The particle sensor's sensitivity of the Fidas® 200, Fidas® 200 S and Fidas® 200 E for PM_{10} and $PM_{2.5}$ manufactured by PALAS GmbH has to be checked using CalDust 1100 or MonoDust 1500.
These measuring systems may alternatively be used with the Siargo FS4008-10-O6-CV-A flow sensor instead of the Honeywell AWM5102VN model used so far.
The new temperature compensation factors for each instrument are as follows: 0.15 (Fidas® 200 S), 0.19 (Fidas® 200 E) and 0.17 (Fidas® 200).
To ensure effective heating for the outdoor enclosure of the Fidas® 200 S AMS variant the fan heater has been repositioned. The air flow produced by the fan heater now flows from the bottom to the top of the enclosure.
A mistake in the test report no. 936/21227195/B dated 5 October 2015 prepared by TÜV Rheinland Energie und Umwelt GmbH has been corrected. Instead of a 30-minute moving average as stated in two instances in the report, the Fidas® 200 S, Fidas® 200 E and Fidas® 200 ambient air quality monitors operate with a moving average over 900s (15 minutes). Report no. 936/21227195/C dated 12 October 2016 prepared by TÜV Rheinland Energy GmbH replaces the report referred to above.
The current software version of the measuring system is:
100417.0014.0001.0001.0011.

Statement issued by TÜV Rheinland Energy GmbH dated 12 October 2016

Publication in the German Federal Gazette: BAnz AT 31.07.2017 B12, chapter II notification 30, UBA announcement dated 13 July 2017:

30 Notification as regards Federal Environment Agency notices of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter IV number 5.1) and of 22 February 2017 (BAnz AT 15.03.2017 B6 chapter V 10th notification)

The current software version for the Fidas® 200, Fidas® 200 S and Fidas® 200 E monitoring PM_{10} and $PM_{2.5}$ manufactured by PALAS GmbH is:
100427.0014.0001.0001.0011

Statement issued by TÜV Rheinland Energy GmbH dated 7 March 2017

10 Notification as regards Federal Environment Agency notices of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter IV number 5.1) and of 13 July 2017 (BAnz AT 31.07.2017 B12 chapter II 30th notification)

The Fidas® 200, Fidas® 200 S and Fidas® 200 E measuring systems for PM_{10} and $PM_{2.5}$ manufactured by PALAS GmbH meet the requirements of standard EN 16450 (July 2017 version). An addendum no. 936/21239834/A as integral part of test report is available online at www.qal1.de.

The current software versions are:
100430.0014.0001.0001.0011
100431.0014.0001.0001.0011
100434.0014.0001.0001.0011

Statement issued by TÜV Rheinland Energy GmbH dated 8 September 2017

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

The Fidas® 200 S, Fidas® 200 and Fidas® 200 E measuring system is an optical aerospectrometer which determines particle size relying on scattered light analysis of an individual particle on the basis of Lorenz-Mie. Distributions of particle size and count are used in a size and weight-related algorithm to determine mass concentrations.

The measuring system is available as Fidas® 200 S (for use outdoors incl. weather-protection housing), Fidas® 200 (for installation in a temperature controlled environment such as an air-conditioned measurement station) and as Fidas® 200 E (as Fidas® 200 but with an external sensor unit).

The tested measuring system consists of a Sigma-2 sampling head, the sampling tube c/w IADS humidity compensation module (standard or long version), the Fidas® control unit with integrated aerosol sensor (Fidas® 200 S or Fidas® 200) or with external sensor unit (Fidas® 200 E), the compact WS600-UMB or WS300-UMBweather station, the optional UMTS receiver, a weather-proof housing (IP 65, only for the Fidas® 200 S), the required connecting lines and cables, a CalDust 1100 or MonoDust 1500 bottle and the relevant manuals in German.

The particle sample passes through the Sigma-2 sampling inlet at a flow rate of 4.8 l/min (at 25 °C and 1013 hPa) and reaches the sampling tube, which connects the sampling inlet to the Fidas control unit. The IADS humidity compensation module serves to prevent condensate effects especially in the event of high levels of humidity in ambient air. The IADS is controlled depending on ambient temperature and humidity (as detected by the compact weather station). The minimum temperature is 23°C. Humidity compensation is ensured via a dynamic adjustment of the IADS temperature up to a maximum heat capacity of 90 Watt. The Fidas firmware controls the IADS. After having passed the IADS module, the particle sample finally reaches the aerosol sensor which is where the measurement as such takes place. After having passed the aerosol sensor, the particle sample passes an absolute filter which may be used for further analyses including the collected aerosol. The Fidas® 200 S, Fidas® 200 and Fidas® 200 E measuring system also provide an integrated weather station (air WS600-UMB for collecting data on measurement parameters such as wind speed wind direction, precipitation (quantity and type), temperature, humidity and pressure; alternatively, the air WS300-UMB type may be used to determine parameters such as temperature, humidity and pressure. Besides the necessary electronics for operating the measuring system, the instruments control unit includes the 2 sampling pumps which are switched in parallel. In the case of pump failure, the remaining pump ensures operation.

The Fidas® 200 S, Fidas® 200 and Fidas® 200 E saves data in the raw format. In order to determine mass concentrations, the raw data have to be converted with the help of an algorithm. To this effect, a size and weight-related algorithm is applied to convert particle size and count into mass concentrations. In the context of performance testing, the PM_ENVIRO_0011 algorithm was used for conversion.

The instrument may be operated directly or indirectly via a touch display at the front of the instrument or remotely via an internet connection or functions using adequate software solutions (e.g. Teamviewer). The user is able to check measurement data and instrument information, change parameters and check correct functionality of the AMS.

The current software versions are:

100430.0014.0001.0001.0011
100431.0014.0001.0001.0011
100434.0014.0001.0001.0011

The current manual versions are:

- Fidas particle monitor V0221116
- Fidas firmware V0230816
- PDAnalyze-Fidas software V0010713.