

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000053816

AMS designation: U3600-QAL1 for dust

Manufacturer: Auburn Systems LLC
8 Electronics Avenue
MA 01923 Danvers
USA

Test Laboratory: TÜV Rheinland Energy GmbH

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

**EN 15267-1 (2009), EN 15267-2 (2009), EN 15267-3 (2008)
and EN 14181 (2015).**

Certification is awarded in respect of the conditions stated in this certificate
(this certificate contains 6 pages).



Performance tested
EN 15267
QAL1 certified
Continuous
surveillance

www.tuv.com
ID 0000053816

Publication in Federal Gazette
(BAnz) dated 31 July 2017

This certificate will expire on:
30 July 2022

German Federal Environment Agency
Dessau, 08 September 2017

TÜV Rheinland Energy GmbH
Cologne, 07 September 2017



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Test institute accredited to EN ISO/IEC 17025:2005 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: | 936/21232911/A dated 6 March 2017 |
| Initial certification: | 31 July 2017 |
| Expiry date: | 30 July 2022 |
| Publication: | BAnz AT 31.07.2017 B12, chapter I number 1.1 |

Tested application

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13th BImSchV), TA Luft and 27th BImSchV. 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 field test of more than three-months duration at a drying plant for the production of mineral floor covering.

The AMS is approved for an ambient temperature range of -20 °C to +50 °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 performance testing. As changes in legal provisions are possible, any potential user should ensure that this AMS is suitable for monitoring the limit values 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.

Basis of the certification

This certification is based on:

- Test report 936/21232911/A dated 6 March 2017 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 31.07.2017 B12, chapter I number 1.1
UBA announcement dated 13 July 2017:

AMS designation:

U3600-QAL1 for dust

Manufacturer:

Auburn Systems LLC, Danvers, USA

Field of application:

For plants requiring official approval according to TA Luft, 13th BImSchV and 27th BImSchV

Measuring ranges during performance testing:

| Component | Certification range | Supplementary range | | Unit |
|-----------|---------------------|---------------------|-------------|------|
| dust | 0 – 1,000 | 0 – 10,000 | 0 – 100,000 | pA |

The 0–1,000 pA measuring range roughly corresponds to 0–15 mg/m³ in the field test.

Software version:

u-1.1

Restrictions:

1. The instrument can only be used at plants with a constant flow velocity. At a flow velocity of 10 m/s the permissible deviation is $\pm 10\%$. Any other flow velocities require an initial estimation of the uncertainty contribution to the total uncertainty.
2. The measuring system may not be used downstream of an electronic precipitator.
3. The instrument is only fit for purpose in waste gas which is not saturated with water vapour.

Notes:

1. The maintenance interval is four weeks.
2. The dust concentration is determined in wet flue gas under operational conditions.
3. The requirement for the determination coefficient R^2 of the calibration function in accordance with EN 15267-3 was not satisfied.
4. When determining the total uncertainty as part of performance testing, the uncertainty contributions of the interference sources velocity and waste gas moisture were not taken into account. These must be determined on installation of the instrument.

Test Report:

TÜV Rheinland Energy GmbH, Cologne
Report no.: 936/21232911/A dated 6 March 2017

Certified product

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

The U3600-QAL1 measuring system manufactured by Auburn Systems LLC uses what is called the TRIBO.dsp technology. The TRIBO.dsp measurement technology processes not only the DC signal which is generated by a particle in contact with and transferring a charge to a probe, but also the AC signal generated by a particle closely passing by the probe. By combining both technologies for signal processing (AC/DC) and using high-quality electronics, this measuring system also meets the tough requirements on quantitative dust emission monitoring technology. The measurement principle combines the two measurement principles DC (direct charge transfer, triboelectric) and AC (induction of electrostatic signals, electrodynamic) for improved accuracy, reliability and repeatability. It is characterised by a high degree of sensitivity and flexibility.

The certified U3600-QAL1 measuring system comprises the following components:

- an electronic control unit using u-1.1 software;
- a probe rod;
- a cable connecting the probe with the electronics;

Moreover, the following equipment is required for performing annual surveillance tests (AST):

- a model 2902 "field test unit" including a zero pipe for testing the measuring system;

During performance testing, two different measuring probes were used. One version had an active probe length of approximately 18.5 cm, the second version for the field test was ~45 cm long.

By means of different types of flanges, the probes can be installed at different measurement ports in the field.

The U3600-QAL1 measuring system performs automated zero and span point checks once a day. If the average of values over the period of testing exceeds the permissible limits, the system produces a status signal.

The current version of the manual is 7518, Version 1.1 Feb 2017.

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.

Certification of the U3600-QAL1 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. 0000053816: 31 July 2017
Expiry date of the certificate: 30 July 2022

Test report: 936/21232911/A dated 6 March 2017
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 31.07.2017 B12, chapter I number 1.1
UBA announcement dated 13 July 2017

Calculation of overall uncertainty according to EN 14181 and EN 15267-3

Measuring system

| | |
|-----------------------------------|---------------------|
| Manufacturer | Auburn Systems LLC |
| AMS designation | U3600-QAL1 |
| Serial number of units under test | 160175-A / 160175-B |
| Measuring principle | triboelectric |

Test report

| | |
|-----------------|----------------|
| Test laboratory | 936/21232911/A |
| Date of report | TÜV Rheinland |
| | 2016-03-06 |

Measured component

| | | |
|---------------------|------|--------------------------|
| Certification range | Dust | 0 - 15 mg/m ³ |
|---------------------|------|--------------------------|

Calculation of the combined standard uncertainty

Tested parameter

| | | | u^2 |
|--|-----------|-------------------------|---|
| Standard deviation from paired measurements under field conditions * | u_D | 0.102 mg/m ³ | 0.010 (mg/m ³) ² |
| Lack of fit | u_{lof} | 0.009 mg/m ³ | 0.000 (mg/m ³) ² |
| Zero drift from field test | $u_{d,z}$ | 0.017 mg/m ³ | 0.000 (mg/m ³) ² |
| Span drift from field test | $u_{d,s}$ | 0.069 mg/m ³ | 0.005 (mg/m ³) ² |
| Influence of ambient temperature at span | u_t | 0.049 mg/m ³ | 0.002 (mg/m ³) ² |
| Influence of supply voltage | u_v | 0.007 mg/m ³ | 0.000 (mg/m ³) ² |
| Uncertainty of reference material at 70% of certification range | u_{rm} | 0.121 mg/m ³ | 0.015 (mg/m ³) ² |

* The larger value is used :
"Repeatability standard deviation at set point" or
"Standard deviation from paired measurements under field conditions"

| | | |
|---|------------------------------------|------------------------|
| Combined standard uncertainty (u_c) | $u_c = \sqrt{\sum (u_{max, i})^2}$ | 0.18 mg/m ³ |
| Total expanded uncertainty | $U = u_c * k = u_c * 1.96$ | 0.35 mg/m ³ |

Relative total expanded uncertainty

| | | |
|----------------------------------|--|------------|
| Requirement of 2010/75/EU | U in % of the ELV 10 mg/m³ | 3.5 |
| Requirement of EN 15267-3 | U in % of the ELV 10 mg/m ³ | 30.0 |
| | U in % of the ELV 10 mg/m ³ | 22.5 |