Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000053816_01

AMS designation:	U3600-QAL1 for dust
Manufacturer:	Auburn Systems 800 Cummings Center Suite 355W MA 01915 Beverly 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 (2007) and EN 14181 (2014).

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 6 pages).
The present certificate replaces certificate 0000053816 of 8 September 2017.

TÜVRheinland® CERTIFIED

Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000053816

Publication in the German Federal Gazette (BAnz) of 26 March 2018

This certificate will expire on:
30 July 2022

German Federal Environment Agency
Dessau, 13 April 2018

Dr. Marcel Langner
Head of Section II 4.1

TÜV Rheinland Energy GmbH
Cologne, 12 April 2018

ppa. Dr. Peter Wilbring

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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/C dated 5 September 2017
Initial certification:	31 July 2017
Expiry date:	30 July 2022
Publication:	BAnz AT 26.03.2018 B8, chapter I number 1.1

Approved application
The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13th BImSchv), TA Luft and plants according to the 27th BImSchV. The measured ranges have been selected so as to ensure 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 six months field test 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 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/C dated 5 September 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 26.03.2018 B8, chapter I number 1.1, UBA announcement dated 21 February 2018:

AMS designation:
U3600-QAL1 for dust

Manufacturer:
Auburn Systems, Beverly, 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 measuring ranges		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-1.2

Restrictions:
1. The instrument can only be used at plants with a constant flow velocity. At a velocity of 10 m/s the permissible deviation is ±10 %. Any other 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 three months.
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.
5. Supplementary testing (extension of the maintenance interval and software update) as regards Federal Environment Agency (UBA) notice of 13 July 2013 (BAnz AT 31.07.2017 B12, chapter I number 1.1).

Test Report:
TÜV Rheinland Energy GmbH, Cologne
Report no. 936/21232911/C dated 5 September 2017

Certified product

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

The U3600-QAL1 measuring system manufactured by Auburn Systems 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-1.2 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 document no. 7518, Version 1.2 Sep 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

Supplementary testing according to EN 15267

Certificate no. 0000053816_01: 13 April 2018
Expiry date of the certificate: 30 July 2022

Test report: 936/21232911/C dated 5 September 2017
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 26.03.2018 B8, chapter I number 1.1
UBA announcement dated 21 February 2018

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

Measuring system					
Manufacturer			Auburn systems		
AMS designation			U3600-QAL1		
Serial number of units under test			160175-A / 160175-B		
Measuring principle			triboelectric		
Test report			936/21232911/C		
Test laboratory			TÜV Rheinland		
Date of report			2017-09-05		
Measured component			dust		
Certification range			0 - 15	mg/m³	

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.102	mg/m³	0.010	(mg/m³)²
Lack of fit	u_{lof}	0.009	mg/m³	0.000	(mg/m³)²
Zero drift from field test	$u_{d,z}$	0.017	mg/m³	0.000	(mg/m³)²
Span drift from field test	$u_{d,s}$	0.069	mg/m³	0.005	(mg/m³)²
Influence of ambient temperature at span	u_t	0.049	mg/m³	0.002	(mg/m³)²
Influence of supply voltage	u_v	0.007	mg/m³	0.000	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.121	mg/m³	0.015	(mg/m³)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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.18	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.35	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 10 mg/m³**	**3.5**
Requirement of 2010/75/EU	**U in % of the ELV 10 mg/m³**	**30.0**
Requirement of EN 15267-3	U in % of the ELV 10 mg/m³	22.5