

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000032298_01

Certified AMS: D-FL 100 for velocity

Manufacturer: DURAG GmbH
Kollastr. 105
22453 Hamburg
Germany

Test Institute: TÜV Rheinland Energie und Umwelt GmbH

**This is to certify that the AMS has been tested
and found to comply with:**

**EN 15267-1: 2009, EN 15267-2: 2009, EN 15267-3: 2007
and EN 14181: 2004**

Certification is awarded in respect of the conditions stated in this certificate
(see also the following pages).

The present certificate replaces Certificate No. 0000032298 of 22 March 2013



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000032298

Publication in the German Federal Gazette
(BAnz.) of 23 July 2013

German Federal Environment Agency
Dessau, 20 August 2013



i. A. Dr. Marcel Langner

This certificate will expire on:
04 March 2018

TÜV Rheinland Energie und Umwelt GmbH
Cologne, 19 August 2013



ppa. Dr. Peter Wilbring

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Accreditation according to EN ISO/IEC 17025 and certified according to ISO 9001:2008.

Test report:	936/21218492/B of 22 January 2013
Initial certification:	05 March 2013
Expiry date:	04 March 2018
Publication:	BAnz AT 23 July 2013 B4, chapter II, No. 2.2

Approved application

The tested AMS is suitable for use at combustion plants according to EC directive 2001/80/EC, at waste incineration plants according to EC directive 2000/76/EC and other plants requiring official approval. The tested ranges have been chosen with respect to the wide application range of the AMS.

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

The AMS is approved for an ambient temperature range of -20 °C to +50 °C.

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 936/21218492/B of 22 January 2013 of TÜV Rheinland Energie und Umwelt 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 23 July 2013 B4, chapter II, No. 2.2)

AMS designation:

D-FL 100 for velocity

Manufacturer:

DURAG GmbH, Hamburg

Field of application:

For measurements at plants requiring official approval (i.e. 2000/76/EC waste incineration directive and 2001/80/EC large combustion plants directive).

Measuring ranges during the performance test:

Component	Certification range	Unit
velocity	3 - 30	m/s

Software version:

D-FL 100-10: V. 2.0, Hardw. Rev. 3,
D-FL 100-20: V. 01.00R0000
D-ISC 100: V. 01.00R0100
D-ESI 100: V. 1.0.330

Restrictions:

1. The measuring system is only fit for use in waste gas which is not saturated with vapour.
2. The lower limit of velocity measurement is 3 m/s.

Notes:

1. The maintenance interval is three months.
2. The D-FL 100 measuring system may be used both with the D-FL 100-10 and the D-FL 100-20 evaluation unit.
3. The D-FL 100-20 evaluation unit does not have a display or a control panel. In order to adjust parameters and present measured values, a piece of software called D-ESI 100 is used. There is also an option to connect the system to the universal D-ISC 100 control unit to adjust parameters and present data.
4. The D-FL 100-20 evaluation unit has a digital Modbus interface (EIA-485, serial) in accordance with VDI 4201 part 1 and 3.
5. When used with the universal D-ISC 100 control unit, the D-FL 100-20 evaluation units' Modbus interface specified by VDI 4201 part 1 and 3 cannot be used.
6. Supplementary testing for notification of the German Federal Environment Agency (UBA) dated 12 February 2013 (BAnz AT 5 March 2013 B10, chapter II No. 2.5).

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report No.: 936/21218492/B of 22 January 2013

Certified product

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

The D-FL 100 measuring system uses differential pressure for the continuous measurement of velocity.

The measuring system basically consists of the following components:

- pitot tube
- automatic back purging device for the probe
- differential pressure transmitter 266MST (ABB)
- temperature and pressure sensor for calculating waste gas density (optional)
- evaluation unit for data evaluation and output
D-FL 100-10 or D-FL 100-20
- D-ESI 100 software for adjusting parameters, presenting data and conducting AST, QAL2 and QAL3 for the D-FL 100-20

Version	Description
D-FL 100 as D-FL 100-10	Display, mA output and option to adjust parameters
D-FL 100 as D-FL 100-20	without display, with mA- and digital Modbus output (EIA-485, serial) as specified in VDI 4201. For the adjustment of parameters and the presentation of measurement data, the D-ESI 100 software is part of the shipment.
D-FL 100 as D-FL 100-20 with a universal D-ISC 100 control unit	display, mA output and option to adjust parameters

Each **pitot tube**, type D-FL 100, is custom-made for a specific measurement site. To this end, depending on the intended length of the measurement path, three different measurement plane sizes are available:

1. 22 x 24 mm² for 0,4 up to 2 m length of probe
2. 50 x 53 mm² for 0,4 up to 4 m length of probe
3. 90 x 100 mm² for 0,4 up to 8 m length of probe

The **D-FL 100-10 evaluation unit** evaluates measured signals from the differential pressure transducer and presents them on a display. Signals are output via a 4 to 20 mA signal output.

The **D-FL 100-20 evaluation unit** does not have a display. In addition to the 4 to 20 mA signal output, it provides a Modbus interface for connecting an evaluation system with a digital interface in accordance with the VDI 4201 directive. The front plate has 5 LEDs and a USB interface (Mini-B 5-pins). The LEDs serve to signal the current status/operating mode of the system.

Different parameters, such as standard density, substitute values for pressure and temperature in the waste gas duct, k-factor and measured ranges is entered directly for the D-FL 100-10 and via a PC and accompanying software (D-ESI 100) using the USB interface for the D-FL 100-20.

Alternatively, the **D-ISC 100 control unit** may be used in conjunction with the D-FL 100-20. The display offers instant information on the status of connected instruments as well as values currently being measured. In addition, measured values can be presented as a bar diagram. The D-ISC 100 also allows retrieving information, to control and to adjust parameters for connected instruments.

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 Energie und Umwelt 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 can be applied to the product or used in publicity material for the certified product.

This document as well as the certification mark remains property of TÜV Rheinland Energie und Umwelt GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the certificate and on requests of the TÜV Rheinland Energie und Umwelt 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.

Certification of D-FL 100 for velocity 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. 0000032298: 22 March 2013
Expiry date of the certificate: 04 March 2018
Test report: 936/21218492/A of 11 October 2012
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Publication: BAnz AT 05 March 2013 B10, chapter II, No. 2.5
Announcement by UBA from 12 February 2013

Supplementary testing according to EN 15267:

Certificate No. 0000032298_01: 20 August 2013
Expiry date of the certificate: 04 March 2018
Test report: 936/21218492/B of 22 January 2013
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Publication: BAnz AT 23 July 2013 B4, chapter II, No. 2.2
Announcement by UBA from 03 July 2013

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

Measuring system

Manufacturer	Durag GmbH
Name of measuring system	D-FL 100
Serial number of the candidates	1226520 / 1227484
Measuring principle	dynamic / differential pressure

Test report

Test laboratory	936/21218492/B
Date of report	TÜV Rheinland 2013-01-22

Measured component

Certification range	Velocity 3 - 30 m/s
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Calculation of the combined standard uncertainty

Tested parameter

		u^2
Repeatability standard deviation at set point *	u_r 0.364 m/s	0.132 (m/s) ²
Lack of fit	u_{lof} 0.230 m/s	0.053 (m/s) ²
Zero drift from field test	$u_{d,z}$ 0.316 m/s	0.100 (m/s) ²
Span drift from field test	$u_{d,s}$ 0.222 m/s	0.049 (m/s) ²
Influence of ambient temperature at span	u_t 0.153 m/s	0.023 (m/s) ²
Influence of supply voltage	u_v 0.180 m/s	0.032 (m/s) ²
Uncertainty of reference material at 70% of certification range	u_{rm} 0.242 m/s	0.059 (m/s) ²

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

Combined standard uncertainty (u_c)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.67 m/s
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.31 m/s

Relative total expanded uncertainty

Requirement of 2000/76/EC and 2001/80/EC
Requirement of EN 15267-3

U in % of the range 30 m/s	4.4
U in % of the range 30 m/s	10.0 **
U in % of the range 30 m/s	7.5

** For this component no requirements in the EC-directives 2001/80/EG und 2000/76/EG are given.
The chosen value is recommended by the certification body.