

# CERTIFICATE

## of Product Conformity (QAL1)

Certificate No.: 0000032298\_03

**Certified AMS:** D-FL 100 for velocity

**Manufacturer:** DURAG GmbH  
Kollaustraße 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,  
EN ISO 16911-2: 2013 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\_02 of 29 April 2014



Suitability Tested  
EN 15267  
QAL1 Certified  
Regular  
Surveillance

www.tuv.com  
ID 0000032298

Publication in the German Federal Gazette  
(BAnz.) of 1 April 2014

This certificate will expire on:  
4 March 2018

German Federal Environment Agency  
Dessau, 30 April 2015

TÜV Rheinland Energie und Umwelt GmbH  
Cologne, 29 April 2015



i. A. Dr. Marcel Langner



ppa. Dr. Peter Wilbring

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

<b>Test report:</b>	936/21218492/C of 30 September 2013
<b>Initial certification:</b>	5 March 2013
<b>Expiry date:</b>	4 March 2018
<b>Publication:</b>	BAnz AT 01 April 2014 B12, chapter II number 2.4

### **Approved application**

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III, at waste incineration plants according to Directive 2010/75/EU, chapter IV 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 twelve-month field test at a waste incinerator.

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 valid at the time of performance testing. As changes in legal regulations are possible, any potential user should ensure that this AMS is suitable for monitoring the flow 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 936/21218492/C of 30 September 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 1 April 2014 B12, chapter II number 2.4, Announcement by UBA from 27 February 2014)
- publication in the German Federal Gazette (BAnz AT 2 April 2015 B5, chapter IV notification 27, Announcement by UBA from 25 February 2015)

**AMS designation:**

D-FL 100 for velocity

**Manufacturer:**

DURAG GmbH, Hamburg

**Field of application:**

For measurements at plants requiring official approval (Directive 2010/75/EU on industrial emissions, chapter III and IV)

**Measuring ranges during the performance test:**

Component	Certification range	Supplementary range	Unit
Velocity	3 - 30	3 - 50	m/s

**Software version:**

D-FL 100-10: V. 2.0, Hardw. Rev. 3,  
D-FL 100-20: V. 01.00R0003  
D-ISC 100: V. 01.01R0000  
D-ESI 100: V. 1.1.006

**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 type approval applies to D-FL 100 measuring systems from serial number 1230000 onwards.
2. The maintenance interval is 6 months.
3. The D-FL 100 AMS can be used with either the D-FL 100-10 evaluation unit or the D-FL 100-20 evaluation unit.
4. The D-FL 100-20 evaluation unit does not have a display and no control options. The ESI 100 software is used for the parameterisation and visualization of measurement values. There is also the option to connect the universal control unit D-ISC 100 for parameterisation of the evaluation unit and visualization of data.
5. The D-FL 100-20 evaluation unit is fitted with the Modbus (EIA-485, series) digital interface in accordance with VDI 4201 Sheet 1 and 3.
6. The D-ISC 100 universal control unit is fitted with the Modbus digital interface in accordance with VDI 4201 Sheet 1 and 3 (EIA-485, series and TCP/IP, Ethernet).
7. Supplementary testing (maintenance interval extension and measuring range expansion) for announcement by the Federal Environmental Agency (UBA) dated 12th February 2013 (Federal Gazette (BAnz) of 05 March 2013 B10, chapter II number 2.5).

**Test report:**

TÜV Rheinland Energie und Umwelt GmbH, Cologne  
Report No.: 936/21218492/C of 30 September 2013

**27 Notification as regards Federal Environmental Agency notices of 27 February 2014  
(Federal Gazette (BAnz) AT 1 April 2014 B12 chapter II number 2.4)**

The software for measuring system D-FL 100 for the flow gas velocity manufactured by DURAG GmbH is now designated as:

D-FL 100-10: V. 2.0 Hardw. rev. 3

D-FL 100-20: V. 01.00R0003

D-ISC 100: V. 01.03R0001

D-ESI 100: V. 1.1.015

Statement of TÜV Rheinland Energie und Umwelt GmbH of 29 September 2014

**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
- switch device for manual function test of zero and span point and for back purge of the pitot tube
- 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 with D-FL 100-10	Display, mA output and option to adjust parameters
D-FL 100 with 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 with D-FL 100-20 and 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 mm<sup>2</sup> for 0,4 up to 2 m length of probe
2. 50 x 53 mm<sup>2</sup> for 0,4 up to 4 m length of probe
3. 90 x 100 mm<sup>2</sup> 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 Sheet 1 and 3. 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. The D-ISC 100 universal control unit is fitted with the Modbus digital interface in accordance with VDI 4201 Sheet 1 and 3 (EIA-485, series and TCP/IP, Ethernet).

#### 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: 4 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 number 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: 4 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 number 2.2  
Announcement by UBA from 3 July 2013

**Supplementary testing according to EN 15267:**

Certificate No. 0000032298\_02: 29 April 2014  
Expiry date of the certificate: 4 March 2018  
Test report: 936/21218492/C of 30 September 2013  
TÜV Rheinland Energie und Umwelt GmbH, Cologne  
Publication: BAnz AT 1 April 2014 B12, chapter II number 2.4  
Announcement by UBA from 27 February 2014

**Notification:**

Publication: BAnz AT 2 April 2015 B5, chapter IV notification 27  
Announcement by UBA from 25 February 2015

**Correction of certificate 0000032298\_02 dated 29 April 2014  
(product description)**

Certificate No. 0000032298\_03: 30 April 2015  
Expiry date of the certificate: 4 March 2018

**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/C
Date of report	TÜV Rheinland
	2013-09-30

**Measured component**

Certification range	Velocity
	3 - 30 m/s

**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) <sup>2</sup>
Lack of fit	$u_{lof}$	0.230 m/s	0.053 (m/s) <sup>2</sup>
Zero drift from field test	$u_{d,z}$	0.316 m/s	0.100 (m/s) <sup>2</sup>
Span drift from field test	$u_{d,s}$	0.318 m/s	0.101 (m/s) <sup>2</sup>
Influence of ambient temperature at span	$u_t$	0.153 m/s	0.023 (m/s) <sup>2</sup>
Influence of supply voltage	$u_v$	0.180 m/s	0.032 (m/s) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$	0.242 m/s	0.059 (m/s) <sup>2</sup>

\* The larger value is used :

"Repeatability standard deviation at span" or  
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty ( $u_c$ )	$u_c = \sqrt{\sum (u_{max,i})^2}$	0.71 m/s
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.39 m/s

**Relative total expanded uncertainty**

	<b>U in % of the range 30 m/s</b>	<b>4.6</b>
<b>Requirement of 2010/75/EU</b>	<b>U in % of the range 30 m/s</b>	<b>10.0 **</b>
Requirement of EN 15267-3	U in % of the range 30 m/s	7.5

\*\* For this component no requirements in the EC-directives 2010/75/EU are given.

A value of 10 % was used for this.