



CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000043528 02

Certified AMS:

F-701-20 for suspended particulate matter PM₁₀

Manufacturer:

DURAG GmbH Kollaustr. 105 22453 Hamburg

Germany

Test Institute:

TÜV Rheinland Energy & Environment GmbH

This is to certify that the AMS has been tested and found to comply with the standards VDI 4202-1 (2002), VDI 4203-3 (2004), EN 12341 (1998) as well as EN 15267-1 (2009) and EN 15267-2 (2023).

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 13 pages).

The present certificate replaces certificate 0000043528 01 dated 26 August 2020.



Suitability Tested Complying with 2008/50/EC EN 15267 Regular Surveillance

www.tuv.com ID 0000043528

Publication in the German Federal Gazette (BAnz) of 14 October 2006

German Environment Agency

Dessau, 27 June 2025

This certificate will expire on: 25 August 2030

TÜV Rheinland Energy & Environment GmbH Cologne, 26 June 2025

Dr. Marcel Langner Head of Section II 4 Pメ んう
ppa. Dr. Peter Wilbring

www.umwelt-tuv.eu qal1-info@tuv.com Tel. + 49 221 806-5200 TÜV Rheinland Energy & Environment GmbH Am Grauen Stein 51105 Köln

Test institute accredited to EN ISO/IEC 17025 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:

720349 dated 6 July 2006

Initial certification:

26 August 2015

Expiry date:

25 August 2030

Certificate:

Renewal (of previous certificate 0000043528_01 of

26 August 2020 valid until 25 August 2025)

Publication:

BAnz. 14 October 2006, No. 194, p. 6715, chapter IV No. 1.1

Approved application

The tested AMS is suitable for continuous immission measurement of PM₁₀ in stationary use.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a field test at four different locations with different time periods.

The AMS is 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 that this AMS is suitable for monitoring the measured values relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for the intended use.

Basis of the certification

This certification is based on:

- Test report 720349 dated 6 July 2006 by TÜV Süd Industrie Service GmbH and notification 37 dated 18 March 2015 (BAnz AT 26.08.2015 B4, chap. V No. 37) about the QMS by 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. 14 October 2006, No. 194, p. 6715, chapter IV No. 1.1, Announcement by UBA dated 12 September 2006:

AMS designation:

F-701-20

Manufacturer:

VEREWA Umwelt- und Prozeßmesstechnik GmbH, Hamburg

Field of application:

For the continuous monitoring of the PM₁₀ fraction in ambient air (stationary operation)

Measuring ranges during the performance test:

0 to 200 µg/m³

Software version:

2.00b

Notes:

- 1. During performance testing, the cycle time was 3 h and the sample count rate was 1, which means that an automatic replacement of filters was carried out every 3 h with every filter spot being sampled only once.
- 2. The instrument must be calibrated on-site regularly using a gravimetric PM₁₀ reference method in accordance with EN 12341.

Test institute:

TÜV Süd Industrie Service GmbH, Munich Report No.: 720349 dated 6 July 2006

Publication in the German Federal Gazette: BAnz AT 23.07.2013 B4, Chap. V notification 28, Announcement by UBA dated 3 July 2013:

Notification as regards Federal Environment Agency (UBA) notices of 12 September 2006 (BAnz. p. 6715, chapter IV number 1.1)

As of 1 January 2013, Verewa Umwelt- und Prozessmesstechnik GmbH and DURAG GmbH merged. The new manufacturer of the F-701-20 ambient air monitor for dust is DURAG GmbH.

Statement issued by TÜV Nord Umweltschutz GmbH & Co. KG on 30 May 2013





Publication in the German Federal Gazette: BAnz AT 01.04.2014 B12, Chap. VI notification 25, Announcement by UBA dated 27 February 2014:

Notification as regards Federal Environment Agency (UBA) notices of 12 September 2006 (BAnz. p. 6715, chapter IV number 1.1) and of 3 July 2013 (BAnz AT 23.07.2013 B4, chapter IV notification 28)

The F701-20 measuring system for suspended particulate matter, PM_{10} , manufactured by DURAG GmbH was equipped with a new evaluation electronics (F701 No11), new circuit boards for the Geiger-Müller amplifier assembly (F701 No32 and No33) a new housing (manufactured by Schroff) as well as new electronics for the optional filter band printer.

The current software version of the measuring system is: 3.04

Statement by TÜV Rheinland Energie und Umwelt GmbH dated 4 October 2013

Publication in the German Federal Gazette: BAnz AT 05.08.2014 B11, Chap. V notification 16, Announcement by UBA dated 17 July 2014:

Notification as regards Federal Environment Agency (UBA) notices of 12 September 2006 (BAnz. p. 6715, chapter IV number 1.1) and of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter VI notification 25)

The latest software version of the F-701-20 measuring system for suspended particulate matter, PM_{10} , manufactured by DURAG GmbH is: 3.10

Statement by TÜV Rheinland Energie und Umwelt GmbH dated 27 March 2014

Publication in the German Federal Gazette: BAnz AT 26.08.2015 B4, Chap. V notification 37, Announcement by UBA dated 22 July 2015:

Notification as regards Federal Environment Agency (UBA) notices of 12 September 2006 (p. 6715, chapter IV number 1.1) and of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter IV notification 16)

The production process and quality management for the F701-20 measuring system for suspended particulate matter, PM₁₀, manufactured by DURAG GmbH meet the requirements of standard **EN 15267**.

The test report on performance testing, report no. 720349, is available on the internet at www.qal1.de.

Statement by TÜV Rheinland Energie und Umwelt GmbH dated 18 March 2015





Publication in the German Federal Gazette: BAnz AT 15.03.2017 B6, Chap. V notification 4, Announcement by UBA dated 22 February 2017:

4 Notification as regards Federal Environment Agency (UBA) notices of 12 September 2006 (BAnz. p. 6715, chapter IV number 1.1) and of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter V notification 37)

The latest software version of the F-701-20 measuring system for suspended particulate matter, PM_{10} , manufactured by DURAG GmbH is: 03.11R0005. Version V03.10R0001 is equally approved.

The measuring system may now also be used with SD chips of a newer type (spec. V4.10, 22 January 2013).

Statement by TÜV Rheinland Energy GmbH dated 13 October 2016

Publication in the German Federal Gazette: BAnz AT 26.03.2018 B8, Chap. V notification 5, Announcement by UBA dated 21 February 2018:

Notification as regards Federal Environment Agency (UBA) notices of 12 September 2006 (p. 6715, chapter IV number 1.1) and of 22 February 2017 (BAnz AT 15.03.2017 B6, chapter V notification 4)

The latest software version of the F-701-20 measuring system for suspended particulate matter, PM₁₀, manufactured by DURAG GmbH is: 03.11R0008. The measuring system may also be equipped with the Buschjost 8288200.9638.02400 control valve instead of the Buschjost 8288200.9624.02400 control valve.

Statement by TÜV Rheinland Energy GmbH dated 29 September 2017

Publication in the German Federal Gazette: BAnz AT 17.07.2018 B9, Chap. III notification 28, Announcement by UBA dated 3 July 2018:

Notification as regards Federal Environment Agency (UBA) notices of 12 September 2006 (p. 6715, chapter IV number 1.1) and of 21 February 2018 (BAnz AT 26.03.2018 B8, chapter V notification 5)

The latest software version of the F-701-20 measuring system for suspended particulate matter, PM₁₀, manufactured by DURAG GmbH is: 04.11R0009

The instrument housing was adapted to be fitted into a 19" rack.

The measuring system is also available as instrument version with external pump. This version is clearly marked by the letter "F" in the model code system F-701-20 PM xx2-xxxxxF and thus identifiable.

Statement by TÜV Rheinland Energy GmbH dated 2 May 2018





Publication in the German Federal Gazette: BAnz AT 26.03.2019 B7, Chap. IV notification 12, Announcement by UBA dated 27 February 2019:

12 Notification as regards Federal Environment Agency (UBA) notices of 12 September 2006 (BAnz. p. 6715, chapter IV number 1.1) and of 3 July 2018 (BAnz AT 17.07.2018 B9, chapter III notification 28)

The latest software version of the F-701-20 measuring system for suspended particulate matter, PM10, manufactured by DURAG GmbH is: 4.11R0010. Instead of the VT-A Drivecontrol manufactured by Ebmpapst used to control the clamping motor so far, the measuring system may also be equipped with the DSA-B60 drive control manufactured by miControl GmbH.

The measuring system can be equipped with the option "dust content analysis", consisting of a filter belt printer with corresponding control electronics as well as a roll with cover foil. The letter "E" in the model code system F-701-20 PM xx2-xxxxxE clearly marks and identifies this option.

Statement by TÜV Rheinland Energy GmbH dated 14 September 2018





Certified product

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

The F-701-20 ambient air quality measuring system consists of the PM_{10} sampling head, the meteorology sensor, the intake tube with active ventilation, the F-701-20 analyser itself incl. glass fibre filter tape, the required connecting tubes and cables as well as adapters, the roof flange as well as the manual in German.

The F-701-20 ambient air quality measuring system uses beta-attenuation as its measurement principle.

The particulate sample passes the PM_{10} sampling head at a flow rate of 1 m³/h (=16,67 l/min) and reaches the F-701-20 analyser through the intake pipe.

For the performance test the AMS was used with an activated auxiliary tube heating. The auxiliary tube heating keeps the temperature of the sample inlet tube +5°C above the ambient air temperature.

The instrument itself is of a compact design. Except for the sampling probe (intake tube, sampling head), the meteorological sensor to measure air pressure and ambient temperature and the installation for the active ventilation of the intake tube, all components are built in one unit.

The AMS is controlled with the help of a micro controller board.

A step motor transports the filter belt from the supply roll to the take-up roll. The Geiger-Müller tube determines the mass increase on the filter belt on the basis of the attenuation of radiance emitted by the C-14 source. A pump sucks in air. A flow meter measures the flow and a by-pass valve keeps it at a constant flow rate of 1000 l/h. Electronics save the data and control the measurement procedure, which enables a user-optimised handling via a touchscreen.

In a regular test sequence, an unloaded filter spot is inserted in between the C-14 source and the counter tube at the beginning of the sequence. Radiance intensity is measured over a period of 300s. This implies that impulses generated by the counter tube are used as a measure of beta attenuation.

Subsequently, the filter adapter is opened and the filter belt is transported until the assessed filter spot reaches the extraction position. The filter adapter is then closed and the extraction process starts. Once sampling is completed, the filter adapter is opened again and the filter paper is brought into its original position under the counter tube. The filter adapter is closed and the radiance intensity is measured for 300 s again.

Dust load is then determined from the count rates before and after the extraction and dust concentration is calculated from setting it of from extracted air.

The measured values determined are shown in the display and are available both as 4–20 mA analogue signals and via a serial RS232 interface (e.g. using the Bayern-Hessen protocol, Gesytec).





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 Energy & Environment 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 certification mark may be applied to the product or used in advertising materials for the certified product.

This document as well as the certification mark remains property of TÜV Rheinland Energy & Environment GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the certificate and on requests of the TÜV Rheinland Energy & Environment 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**.

History of documents

Certification of F-701-20 for suspended particulate matter PM₁₀ is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Basic test

Test report: 720349 dated 6 July 2006 TÜV Süd Industrie Service GmbH

Publication: BAnz. 14 October 2006, No. 194, p. 6715, chapter IV number 1.1

UBA announcement dated 12 September 2006

Notifications

Statement issued by TÜV NORD Umweltschutz GmbH & Co. KG dated 30 May 2013 Publication: BAnz AT 23.07.2013 B4, chapter V notification 28 UBA announcement dated 3 July 2013

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 4 October 2013 Publication: BAnz AT 01.04.2014 B12, chapter VI notification 25 UBA announcement dated 27 February 2014 (Soft- and hardware changes)



Certificate:

0000043528_02 / 27 June 2025



Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 27 March 2014 Publication: BAnz AT 05.08.2014 B11, chapter V notification 16 UBA announcement dated 17 July 2014 (Software changes)

Initial certification according to EN 15267 based on notification

Certificate No. 0000043528_00: 30 September 2015 Expiry date of the certificate: 25 August 2020

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 18 March 2015

Test report: 720349 dated 6 July 2006

Publication: BAnz AT 26.08.2015 B4, chapter V notification 37

UBA announcement dated 22 July 2015

Notifications

Statement issued by TÜV Rheinland Energy GmbH dated 13 October 2016 Publication: BAnz AT 15.03.2017 B6, chapter V notification 4 UBA announcement dated 22 February 2017 (Software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 29 September 2017 Publication: BAnz AT 26.03.2018 B8, chapter V notification 5 UBA announcement dated 21 February 2018 (Software changes, hardware addition)

Statement issued by TÜV Rheinland Energy GmbH dated 2 May 2018 Publication: BAnz AT 17.07.2018 B9, chapter III notification 28 UBA announcement dated 3 July 2018 (Soft- and hardware changes)

Statement issued by TÜV Rheinland Energy GmbH dated 14 September 2018 Publication: BAnz AT 26.03.2019 B7, chapter IV notification 12 UBA announcement dated 27 February 2019 (Soft- and hardware changes)

Renewal of certificates

Certificate No. 0000043528_01: 26 August 2020 Expiry date of the certificate: 25 August 2025

Renewal of certificates

Certificate No. 0000043528_02: 27 June 2025 Expiry date of the certificate: 25 August 2030

qal1.de qal1-info@tuv.com page 9 of 13





Expanded uncertainty U(c) of the individual results for system 1 (S/N 10759), excerpt from test report no. 720349 dated 6 July 2006 by TÜV Süd Industrie Service GmbH

Verfahrenskenngröße	Anforderung	Ergebnis	Unsicherheit in µg/m³	Quadrat der Unsicherheit in (µg/m³)²
Reproduzierbarkeit	≥ 10	10	2,00	4,00
Vertrauensbereich nach DIN EN 12341 (CI95)	≤ 5 µg/m³	3,95	2,28	5,20
Temperaturabhängigkeit am Nullpunkt	≤ 2 µg/m³	-0,30	-0,17	0,03
Temperaturabhängigkeit des Messwertes	≤ 2 µg/m³	-0,36	-0,21	0,04
Drift am Nullpunkt	< 2 µg/m³	0,0003	0,0002	0,00000003
Drift des Messwertes	< 2 µg/m³	-1,12	-0,65	0,42
Netzspannung	≤ 2 µg/m³	-1,44	-0,83	0,69
Querempfindlichkeit	≤ 6 µg/m³	-1,40	-0,81	0,65
Unsicherheit durch Filterwechselzeit	•	0,14	0,08	0,01
Unsicherheit des Prüfstandards	≤ 1 µg/m³	2,00	1,15	1,33
			$\sum_{k} u^2(c_k)$	12,38
			$U(\overline{c}) = 2u(\overline{c})$	7,04 µg/m³
			$rac{U(\overline{c})}{I_2}$	14,1%

Verfahrenskenngröße	Performance characteristic	Temperaturabhängigkeit des Messwertes	Temperature dependence of measuring value
Anforderung	Criterion	Drift am Nullpunkt	Drift at zero point
Ergebnis	Result	Drift des Messwertes	Drift of measuring value
Unsicherheit	Uncertainty	Netzspannung	Electrical voltage
Quadrat der Unsicherheit	Square of uncertainty	Querempfindlichkeit	Interference
Reproduzierbarkeit	Reproducibility	Unsicherheit durch Filter- wechselzeit	Uncertainty of filter change time
Vertrauensbereich nach DIN EN 12341 (Cl95)	Confidence level according to EN 12341 (CI95)	Unsicherheit des Prüfstan- dards	Uncertainty of test standard
Temperaturabhängigkeit am Nullpunkt	Temperature dependence zero point		

Serät 1 (Seriennr. 10759)





Expanded uncertainty U(c) of the averages for system 1 (S/N 10759), excerpt from test report no. 720349 dated 6 July 2006 by TÜV Süd Industrie Service GmbH

Unsicherheit (Einzelwert) in µg/m³

Verfahrenskenngröße	Performance characteristic	Temperaturabhängigkeit des Messwertes	Temperature dependence of measuring value
Anforderung	Criterion	Drift am Nullpunkt	Drift at zero point
Ergebnis	Result	Drift des Messwertes	Drift of measuring value
Unsicherheit	Uncertainty	Netzspannung	Electrical voltage
Quadrat der Unsicherheit	Square of uncertainty	Querempfindlichkeit	Interference
Reproduzierbarkeit	Reproducibility	Unsicherheit durch Filter- wechselzeit	Uncertainty of filter change time
Vertrauensbereich nach DIN EN 12341 (CI95)	Confidence level according to EN 12341 (CI95)	Unsicherheit des Prüfstan- dards	Uncertainty of test standard
Temperaturabhängigkeit am Nullpunkt	Temperature dependence zero point		

Gerät 1 (Seriennr. 10759)





Expanded uncertainty U(c) of the individual results for system 2 (S/N 10760), excerpt from test report no. 720349 dated 6 July 2006 by TÜV Süd Industrie Service GmbH

V-4-1	A. F. C.	L. C.	i de la constante de la consta	
Verialienskeinigrobe	Amorderung Ergebnis	Ergebilis	in µg/m³	Quadrat der Orisichement in (µg/m²)²
Reproduzierbarkeit	≥ 10	10	2,00	4,00
Vertrauensbereich nach DIN EN 12341 (CI95)	≤ 5 µg/m³	3,95	2,28	5,20
Temperaturabhängigkeit am Nullpunkt	≤ 2 µg/m³	08'0	0,46	0,21
Temperaturabhängigkeit des Messwertes	≤ 2 µg/m³	-1,68	76'0-	0,94
Drift am Nullpunkt	≤ 2 µg/m³	0,0010	9000'0	0,00000033
Drift des Messwertes	≤ 2 µg/m³	-1,04	-0,60	0,36
Netzspannung	≤ 2 µg/m³	-1,64	-0,95	06'0
Querempfindlichkeit	≤ 6 µg/m³	-0,50	-0,29	0,08
Unsicherheit durch Filterwechselzeit	-	0,14	0,08	0,01
Unsicherheit des Prüfstandards	≤ 1 µg/m³	2,00	1,15	1,33
			$\sum_{k} u^2(c_k)$	13,04
			$U(\overline{c}) = 2u(\overline{c})$	7,22 µg/m³
			$\frac{U(\overline{c})}{I_{\gamma}}$	14,4%

Verfahrenskenngröße	Performance characteristic	Temperaturabhängigkeit des Messwertes	Temperature dependence of measuring value
Anforderung	Criterion	Drift am Nullpunkt	Drift at zero point
Ergebnis	Result	Drift des Messwertes	Drift of measuring value
Unsicherheit	Uncertainty	Netzspannung	Electrical voltage
Quadrat der Unsicherheit	Square of uncertainty	Querempfindlichkeit	Interference
Reproduzierbarkeit	Reproducibility	Unsicherheit durch Filter- wechselzeit	Uncertainty of filter change time
Vertrauensbereich nach DIN EN 12341 (CI95)	Confidence level according to EN 12341 (CI95)	Unsicherheit des Prüfstan- dards	Uncertainty of test standard
Temperaturabhängigkeit am Nullpunkt	Temperature dependence zero point		V

Serät 2 (Seriennr. 10760)

Bezugswert (I₂):





Expanded uncertainty U(c) of the averages for system 2 (S/N 10760), excerpt from test report no. 720349 dated 6 July 2006 issued by TÜV Süd Industrie Service GmbH

Verfahrenskenngröße	Unsicherheit (Einzelwert) in µg/m³	Zeitbasis	Anzahl n _K	Quadrat der Unsicherheit in (µg/m³)²
Reproduzierbarkeit	2,00	24 h	365	0,01
Vertrauensbereich nach DIN EN 12341 (CI95)	2,28	1 a	1	5,20
Temperaturabhängigkeit am Nullpunkt	0,46	1 a	1	0,21
Temperaturabhängigkeit des Messwertes	76,0-	1 a	1	0,94
Drift am Nullpunkt	9000'0	3 Wochen	21	0,000000016
Drift des Messwertes	-0,60	3 Wochen	21	0,02
Netzspannung	-0,95	1 a	1	0,90
Querempfindlichkeit	-0,29	1 a	1	0,08
Unsicherheit durch Filterwechselzeit	0,08	24 h	365	0,000018
Unsicherheit des Prüfstandards	1,15	1 a	1	1,33
			$\sum_{k} u^2(c_k)$	8,70
			$U(\overline{c}) = 2u(\overline{c})$	5,90 µg/m³
			$\frac{U\left(\overline{c}^{-} ight)}{I_{1}}$	14,7%

Verfahrenskenngröße	Performance characteristic	Temperaturabhängigkeit des Messwertes	Temperature dependence of measuring value
Anforderung	Criterion	Drift am Nullpunkt	Drift at zero point
Ergebnis	Result	Drift des Messwertes	Drift of measuring value
Unsicherheit	Uncertainty	Netzspannung	Electrical voltage
Quadrat der Unsicherheit	Square of uncertainty	Querempfindlichkeit	Interference
Reproduzierbarkeit	Reproducibility	Unsicherheit durch Filter- wechselzeit	Uncertainty of filter change time
Vertrauensbereich nach DIN EN 12341 (Cl95)	Confidence level according to EN 12341 (CI95)	Unsicherheit des Prüfstan- dards	Uncertainty of test standard
Temperaturabhängigkeit am Nullpunkt	Temperature dependence zero point		

Gerät 2 (Seriennr. 10760)