

CERTIFICATE

of Product Conformity (QAL1)

Certificate No: 0000051693_05

Certified AMS: HM 1400 TRX for Hg

Manufacturer: DURAG GmbH
Kollastr. 105
22453 Hamburg
Germany

Test Institute: TÜV Rheinland Energy GmbH

**This is to certify that the AMS has been tested
and found to comply with the standards
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
(this certificate contains 11 pages).
The present certificate replaces certificate 0000051693_04 dated 28 July 2021.



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000051693

Publication in the German Federal Gazette
(BAnz) of 05 August 2014

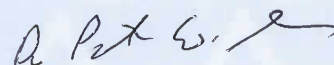
German Environment Agency
Dessau, 29 July 2022

This certificate will expire on:
28 July 2027

TÜV Rheinland Energy GmbH
Cologne, 28 July 2022



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Test institute accredited to EN ISO/IEC 17025 by DAkS (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:	212UMP003/8000641152 dated 07 April 2014
Initial certification:	31 August 2011
Expiry date:	28 July 2027
Certificate:	Renewal (of previous certificate 0000051693_04 of 28. Juli 2021 valid until 28 July 2022)
Publication:	BAnz AT 05.08.2014 B11, Chap. I No. 3.1

Approved application

The tested AMS is suitable for use at plants to Directive 2010/75/EU, chapter III (13th BImSchV:2013), chapter IV (17th BImSchV:2013), TA Luft:2002 and at plants according to the 27th BImSchV:2013. 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,
- an eleven-month field test at a waste incineration plant (17th BImSchV),
- a simplified field test at a power plant (13th BImSchV) with co-combustion and
- a simplified test at a rotating cement kiln with co-combustion (TA Luft)

The AMS is approved for an ambient temperature range of +5° 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 emission 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.

Note:

The legal regulations mentioned do not correspond to the current state of legislation in every case. Each user should, if necessary, in consultation with the competent authority, ensure that this AMS meets the legal requirements for the intended use. In addition, it cannot be ruled out that legal regulations governing the use of a measuring device for emission monitoring may change during the lifetime of the certificate.

Basis of the certification

This certification is based on:

- Test report 212UMP003/8000641152 dated 07 April 2014 of TÜV NORD Umweltschutz GmbH & Co. KG
- Suitability announced by the German 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 05.08.2014 B11, Chap. I No. 3.1,
Announcement by UBA dated 17 July 2014:

AMS designation:

HM 1400 TRX for Hg

Manufacturer:

DURAG GmbH, Hamburg

Field of application:

For plants requiring official approval and for plants according to the 27th BImSchV

Measuring ranges during the performance test:

Component	Certification range	Supplementary measurement ranges	Unit
Hg	0 – 45	0 - 75	µg/m ³

Software version: 2.01

(The display software [version: DIS TRX 008] only contains the language packages and has no influence on the function)

Restrictions: None

Notes:

1. The maintenance interval is three months, provided that continuous condensate drainage is guaranteed.
2. For the periodical span checks (at 3 month intervals) a suitable test gas generator must be available.
3. The zero point is automatically adjusted with purified ambient air every two hours.
4. With O₂ concentrations above 18 Vol.-%, it may be necessary to replace the filling of the Hg²⁺/Hg⁰ reactor more frequently than every six months.
5. The length of the heated measuring gas duct in the laboratory test was 5m and in the field test 10m.
6. The length of the heated sample gas line was 4m during the additional test at the power plant (13th BImSchV).
7. The length of the heated sample gas line was 24m during the additional test at the cement kiln installation (4th BImSchV).
8. The notification of suitability applies to systems of the type HM 1400 TRX with serial numbers higher than 1512175.
9. Supplementary testing (suitability for another type of plant) to the notification of the German Environment Agency (UBA) of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 2.4 and chapter V 1st notification) and of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter VI 6th notification).

Test report:

TÜV NORD Umweltschutz GmbH & Co. KG, Hamburg
Report No.: 212UMP003/8000641152 dated 07 April 2014

Publication in the German Federal Gazette: BAnz AT 05.08.2014 B11, chapter V notification 4, Announcement by UBA dated 17 July 2014:

4 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 2.4 and chapter V notification 1) and of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter VI notification 6) and this notice (chapter I number 3.1)

The current software version of the HM 1400 TRX measuring system for Hg from DURAG GmbH is: 2.02

The display software for language packages is: DIS_TRX_010.

Statement issued by TÜV NORD Umweltschutz GmbH & Co. KG of 08 April 2014

Publication in the German Federal Gazette: BAnz AT 26.08.2015 B4, chapter V notification 29, Announcement by UBA dated 22 July 2015:

29 Notification as regards Federal Environment Agency (UBA) notices of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter I number 3.1 and chapter V notification 4)

The HM-1400 TRX measuring system for mercury from the company DURAG GmbH can also be equipped with the new CJ2M control unit (SPS) manufactured by OMRON. In addition, the PT570024 relay in the control cabinet has been replaced by one of the type RIF-0-RPT-24DC/21, and the screw and plug-in terminals have been exchanged.

Statement issued by TÜV Rheinland Energie und Umwelt GmbH of 26 March 2015

Publication in the German Federal Gazette: BAnz AT 15.03.2017 B6, chapter V notification 21, Announcement by UBA dated 22 February 2017:

21 Notification as regards Federal Environment Agency (UBA) notices of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter I number 3.1) and of 22 July 2015 (BAnz AT 26.08.2015 B11, chapter V notification 29)

The current software version of the HM 1400 TRX measuring system for Hg from DURAG GmbH is: V02.02R0004

The AMS is equipped with a modified heating of the ball valve Y1.

Statement issued by TÜV Rheinland Energy GmbH dated 13 October 2016

Publication in the German Federal Gazette: BAnz AT 26.03.2018 B8, chapter V notification 26, Announcement by UBA dated 21 February 2018:

26 Notification as regards Federal Environment Agency (UBA) notices of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter I number 3.1) and of 22 February 2017 (BAnz AT 15.03.2017 B6, chapter V notification 21)

The HM-1400 TRX measuring system has been modified by DURAG. The following changes have been made:

- Adaptation of the reactor receptacle for better operability of maintenance activities
- Integration of the AKM test gas generator into the equipment cabinet
- Integration of the specification option (separate presentation of elemental and chemically bound gaseous mercury)
- Performance of an automatic leak test
- Omission of the COH dryer/adaptation of the condensate trap
- Positioning of the temperature measurement for standardisation of the gas volume flow
- Replacement of the air filter in front of the photometer.

The current software version of the HM-1400 TRX measuring system for Hg from DURAG GmbH is:

PLC: S03.00R0032
Display: D03.00R0048

The results of the testing of the amendments are presented in the test report 936/21238805/C of 29 September 2017 by TÜV Rheinland Energy GmbH.

Statement issued by TÜV Rheinland Energy GmbH dated 7 December 2017

Publication in the German Federal Gazette: BAnz AT 26.03.2019 B7, chapter IV notification 14, Announcement by UBA dated 27 February 2019:

14 Notification as regards Federal Environment Agency (UBA) notices of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter I number 3.1) and of 21 February 2018 (BAnz AT 26.03.2018 B8, chapter V notification 26)

The current software version of the HM-1400 TRX measuring system for Hg from DURAG GmbH is:

PLC: 03.04R0000
Display: TRX_03.04R0000

Furthermore, versions SPS: 03.02R0001, Display: TRX_03.02R0000 and SPS: 03.01R0000, Display: TRX_D03.01R0000 have also been approved.

The photometer of the HM-1400 TRX measuring system now has a proprietary inverter instead of the TDK CXA-P20L-L used so far.

Statement issued by TÜV Rheinland Energy GmbH dated 10 October 2018

Certified product

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

The HM 1400 TRX measuring system continuously measures the total mercury in the flue gas of a combustion plant. For this, sample gas is continuously extracted from the exhaust gas duct, and fed to the measuring system via a heated sample probe and heated sampling line. A selective catalytic converter reduces ionised mercury to elemental mercury. Detection is then performed in a 2-beam UV photometer on the basis of CVAAS (Cold Vapour Atomic Absorption Spectroscopy).

In the 2-beam photometer, measurement and reference cells are connected in series. Between the cells, mercury is absorbed in a selective filter. This design compensates for cross-sensitivities. The determined concentration is related to 1013 hPa and 273.15 K. The data output is performed in [$\mu\text{g}/\text{m}^3$] (dry).

The measuring system of the HM 1400 TRX system for total mercury measurement is accommodated in a Rittal cabinet. The catalytic converter acting as a heat source is located in the upper part, the UV detector, the gas cooler and the volumetric flow system are located in the lower part of the cabinet. The PLC for controlling and monitoring the measuring system is located in the centre part, together with the electrical components. The display and the control cabinet fan are incorporated in the front door.

Sample taking is performed with the probe SP 2000 H from the company M&C. The measurement gas is taken out through a 2 μm particle filter at 180°C and sucked at a gas flow of about 100 l/h into the HM 1400 TRX measuring system.

The UV photometer is a concentration measuring device, so that a volume flow does not have to be set exactly. The volume flow of 100 l/h corresponds approximately to a gas velocity of 2 m/s in the sample gas line. The volume flow can be adjusted with a pin valve.

The length of the heated sample gas line of both measuring devices was 10 m for the installation tested first. During the field test at a power plant, the length of the heated measuring gas line was 4 m. During the field test at a cement kiln, the length of the heated measuring gas line was 24m.

During the cyclical zero check, which is performed as standard for a period of 8 minutes every 2 hours, the 3/2-way valve upstream from the catalytic converter switches off from measurement gas to ambient air. A cartridge with iodised activated carbon is connected upstream of this valve in the ambient air flow, which filters out any mercury that may be present in the ambient air.

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 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 and the certification mark remains property of TÜV Rheinland Energy 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 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 HM 1400 TRX 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. TNU109GMT007: 31 August 2011
Expiry date of the certificate: 28 July 2016
Test report 109GMT007/8000632287 dated 30 June 2011
TÜV NORD Umweltschutz GmbH & Co. KG
Publication BAnz. 29 July 2011, No. 113, p. 2725, chapter I number 3.1
UBA announcement dated 15 July 2011

Supplementary testing according to EN 15267

Certificate No. TNU112UML0348: 25 September 2013
Expiry date of the certificate: 28 July 2016
Test report 112UML0348/8000638271 dated 14 January 2013
TÜV NORD Umweltschutz GmbH & Co. KG
Publication BAnz AT 05.03.2013 B10, chapter I number 2.4
UBA announcement dated 12 February 2013

Notifications

Statement issued by TÜV NORD Umweltschutz GmbH & Co. KG dated 19 October 2012
Publication BAnz AT 05.03.2013 B10, chapter V notification 1
UBA announcement dated 12 February 2013
(Changing at photometer group)

Statement issued by TÜV NORD Umweltschutz GmbH & Co. KG dated 30 May 2013
Publication BAnz AT 23.07.2013 B4, chapter IV notification 29
UBA announcement dated 3 July 2013
(Manufacturer formerly VEREWA Umwelt- und Prozessmesstechnik)

Statement issued by TÜV NORD Umweltschutz GmbH & Co. KG dated 7 October 2013
Publication BAnz AT 01.04.2014 B12, chapter VI notification 6
UBA announcement dated 27 February 2014
(Hardware changes)

Supplementary testing according to EN 15267

Certificate No. TNU212UMP003: 19 December 2014
Expiry date of the certificate: 28 July 2016
Test report 212UMP003/8000641152 dated 7 April 2014
TÜV NORD Umweltschutz GmbH & Co. KG
Publication BAnz AT 05.08.2014 B11, chapter I number 3.1
UBA announcement dated 17 July 2014
(Producer formerly VEREWA Umwelt- und Prozessmesstechnik GmbH)

Notifications

Statement issued by TÜV NORD Umweltschutz GmbH & Co. KG dated 8 April 2014
Publication BAnz AT 05.08.2014 B11, chapter V notification 4
UBA announcement dated 17 July 2014
(Hardware changes)

Statement issued by TÜV Rheinland Energie und UmweltGmbH dated 26 March 2015
Publication BAnz AT 26.08.2015 B4, chapter V notification 29
UBA announcement dated 22 July 2015
(Hardware changes)

Renewal of certificate

Certificate No. 0000051693_03: 22 July 2016
Expiry date of the certificate: 28 July 2021
(Producer formerly VEREWA Umwelt- und Prozessmesstechnik GmbH)

Notifications

Statement issued by TÜV Rheinland Energy GmbH dated 13 October 2016
Publication BAnz AT 15.03.2017 B6, chapter V notification 21
UBA announcement dated 22 February 2017
(Software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 7 December 2017
Publication BAnz AT 26.03.2018 B8, chapter V notification 26
UBA announcement dated 21 February 2018
(Soft- and hardware changes)

Statement issued by TÜV Rheinland Energy GmbH dated 10 October 2018
Publication BAnz AT 26.03.2019 B7, chapter IV notification 14
UBA announcement dated 27 February 2019
(Soft- and hardware changes)

Statement issued by TÜV Rheinland Energy GmbH 24 February 2021
Veröffentlichung: BAnz AT 05.08.2021 B5, chapter IV notification 30
UBA Bekanntmachung vom 29. Juni 2021
(Software changes)

Renewal of certificate

Certificate No. 0000051693_04: 28 July 2021
Expiry date of the certificate: 28 July 2022

Renewal of certificate

Certificate No. 0000051693_05: 29 July 2022
Expiry date of the certificate: 28 July 2027

AMS designation:

Manufacturer	DURAG GmbH
Name of the measuring system	HM 1400 TRX
Serial number of test units in the laboratory	1512081, 1512080
Serial number of test units in the field test	1512079, 1512078
Serial number of the test unit in the field test at the cement kiln. ...	1512078
Measuring principle	catalytic reduction to Hg ⁰ , 2-beam UV photometer

Test Report

	109GMT007 / 8000632287 of 30 June 2011
	112UML0348/8000638271 of 14 January 2013
	212UMP003/8000641152 of 07 April 2014
Test Laboratory:	TÜV NORD Umweltschutz GmbH & Co. KG

Measured components:

	Mercury Hg
Certification range (CR)	0 - 45 µg/m ³

Cross-sensitivities (CS)

(system with largest CS)

Sum of positive CS at zero point	0.36 µg/m ³	[µg/m ³]
Sum of negative CS at zero point	0.00	[µg/m ³]
Sum of positive CS at span point	1.64	[µg/m ³]
Sum of negative CS at span point	- 1.65	[µg/m ³]
Maximum sum of cross-sensitivities	- 1.65	[µg/m ³]
Measurement uncertainty of cross-sensitivity	0.961	[µg/m ³]

Combined standard uncertainty

Tested parameter	Standard-uncertainty	Standard uncertainty [$\mu\text{g}/\text{m}^3$]	Standard uncertainty ² [$\mu\text{g}/\text{m}^3$] ²
Lack-of-fit	U_{lof}	0.234	0.055
Zero drift from the field test	$U_{\text{d,z}}$	0.130	0.017
Span point drift from the field test	$U_{\text{d,s}}$	0.520	0.270
Influence of the ambient temperature at span	U_t	0.375	0.140
Influence of sample gas pressure	U_p	-	-
Influence of sample gas flow	U_f	0.140	0.020
Influence of voltage variations	U_v	0.012	0.000
Cross-sensitivity	U_l	0.961	0.924
Std.dev. from paired measurements in the field test *)	U_r	0.223	0.050
Uncertainty of the test gas	U_{tg}	0.439	0.193
Total	-	-	1.668

*) The greater of "Repeated standard deviation at span point" and "Standard deviations from double determinations in the field test"

Combined standard uncertainty U_c	[$\mu\text{g}/\text{m}^3$]	1.29
Total expanded uncertainty for a confidence level of 95%	[$\mu\text{g}/\text{m}^3$]	2.53
Relative expanded uncertainty in % of limit value $30 \mu\text{g}/\text{m}^3$	[%]	8.4
Requirement of 2010/75/EU	[%]	40.0
Requirement of EN 15267-3	[%]	30.0

The calculation of the total uncertainty was taken from the certificate TNU212UMP003 of TÜV NORD Umweltschutz GmbH & Co. KG.