

# CERTIFICATE

## of Product Conformity (QAL1)

Certificate No: 0000059869\_02

**Certified AMS:** HM-1400 TRX 2 for Hg

**Manufacturer:** DURAG GmbH  
Kollastr. 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  
EN 15267-1 (2009), EN 15267-2 (2009), EN 15267-3 (2007)  
as well as EN 14181 (2014).**

Certification is awarded in respect of the conditions stated in this certificate  
(this certificate contains 9 pages).

The present certificate replaces certificate 0000059869\_01 dated 5 November 2019.



Suitability Tested  
EN 15267  
QAL1 Certified  
Regular  
Surveillance

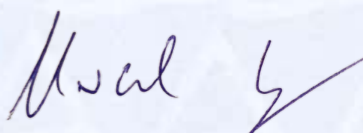
www.tuv.com  
ID 0000059869

Publication in the German Federal Gazette  
(BAnz) of 22 July 2019

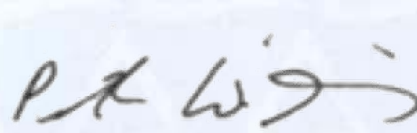
This certificate will expire on:  
21 July 2029

German Environment Agency  
Dessau, 3 July 2024

TÜV Rheinland Energy & Environment GmbH  
Cologne, 2 July 2024



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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.

<b>Test report:</b>	936/21245908/A dated 6 May 2019
<b>Initial certification:</b>	17 July 2018
<b>Expiry date:</b>	21 July 2029
<b>Certificate:</b>	Renewal (of previous certificate 0000059869_01 of 5 November 2019 valid until 21 July 2024)
<b>Publication:</b>	BAnz AT 22.07.2019 B8, chapter I No. 1.3

### Approved application

The tested AMS is suitable for use at plants according to Directive 2010/75/EC chapter III (combustion plants / 13<sup>th</sup> BImSchV:2017) and IV (WID / 17<sup>th</sup> 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 and a field test lasting more than eight months at a large combustion plant (hard coal firing) and a field test lasting more than three months at a waste incineration plant.

Depending on the instrument version, the AMS has been approved for different temperature ranges:

- model code HM-1400 TRX 2EC-230-A1LF) +5 °C to +40 °C.  
(with housing fan without cabinet heating and cooling unit),
- model code HM-1400 TRX 2EC-230-A1LH, 0 °C to +50 °C.  
(with built-in cooling unit and cabinet heating),
- model code HM-1400 TRX 2EC-230-A1LD, +5 °C to +50 °C.  
(with built-in cooling unit and without cabinet heating).

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 correspond to the current state of legislation during certification. 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 936/21245908/A dated 6 May 2019 of 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 22.07.2019 B8, chapter I No. 1.3,  
Announcement by UBA dated 28 June 2019:

**AMS designation:**

HM-1400 TRX 2 for mercury

**Manufacturer:**

DURAG GmbH, Hamburg

**Field of application:**

Measurements at plants according the 13<sup>th</sup> and 17<sup>th</sup> BImSchV

**Measuring ranges during the performance test:**

Component	Certification range	supplementary measuring ranges		Unit
Hg	0 – 15	0 – 45	0 – 75	µg/m <sup>3</sup>

**Software versions:**

PLC: 3.04R0000  
Display: TRX\_3.04R0000

**Restrictions:**

None

**Notes:**

1. The maintenance interval is three months.
2. Wet test gases should be used for testing mercury.
3. An external test gas generator is needed for regular span checks during the maintenance interval.
4. The length of the sampling line during the performance test (laboratory test and field test at the large combustion plant) was 40 m. The length of the sampling line was 10 m during the field test at the waste incinerator.
5. The zero point was automatically adjusted every two hours using purged ambient air.
6. Manual QAL3 tests and automatic span point checks should not be performed the same day.
7. The permissible ambient temperature range for the standard version of the HM-1400 TRX 2 measuring system (with housing fan without cabinet heating and cooling unit, model code HM-1400 TRX 2EC-230-A1LF) is +5 °C to +40 °C. In the version with built-in cooling unit and cabinet heating, model code HM-1400 TRX 2EC-230-A1LH, the permissible ambient temperature range is 0 °C to +50 °C. In the version with built-in cooling unit and without cabinet heating, model code HM-1400 TRX 2EC-230-A1LD, the permissible ambient temperature range is +5 °C to +50 °C.
8. Supplementary testing (extension of the maintenance interval to three months and approval of an additional housing version) regarding Federal Environment Agency notices of 3 July 2018 (BAnz AT 17.07.2018 B9, chapter I number 2.1) and of 27 February 2019 (BAnz AT 26.03.2019 B7, chapter IV notification 77).

**Test Institute:**

TÜV Rheinland Energy GmbH, Cologne  
Report No.: 936/21245908/A dated 6 May 2019

Publication in the German Federal Gazette: BAnz AT 24.03.2020 B7, Chap. IV notification 18, Announcement by UBA dated 24 February 2020:

**18 Notification as regards Federal Environment Agency (UBA) notice of 28 June 2019 (BAnz AT 22.07.2019 B8, chapter I number 1.3)**

In future, a JEAC1C photodiode may be used for the HM-1400 TRX 2 measuring system for mercury manufactured by Durag GmbH. A type JEC1C photodiode was used previously.

The software version of the measuring system remains unchanged:

PLC: 3.04R0000  
Display: TRX\_3.04R0000

Statement issued by TÜV Rheinland Energy GmbH dated 2 October 2019

Publication in the German Federal Gazette: BAnz AT 05.08.2021 B5, Chap. IV notification 30, Announcement by UBA dated 29 June 2021:

**30 Notification as regards Federal Environment Agency (UBA) notices of 28 June 2019 (BAnz AT 22.07.2019 B8, chapter I number 1.3) and of 24 February 2020 (BAnz AT 24.03.2020 B7, chapter IV notification 18)**

The latest software versions of the HM-1400 TRX 2 mercury measuring system manufactured by Durag GmbH are:

PLC: 3.05R0000, Display: TRX\_3.05R0000

Statement issued by TÜV Rheinland Energy GmbH dated 24 February 2021



Publication in the German Federal Gazette: BAnz AT 28.07.2022 B4, Chap. III notification 8, Announcement by UBA dated 28 June 2022:

**8 Notification as regards Federal Environment Agency (UBA) notices of 28 June 2019 (BAnz AT 22.07.2019 B8, chapter I number 1.3) and of 29 June 2021 (BAnz AT 05.08.2021 B5, chapter IV notification 30)**

The current software versions of the measuring device HM-1400 TRX 2 for mercury of the company DURAG GmbH are:

PLC: 3.06R0000

Display: TRX\_3.06R0000

The current type of measuring cabinet of the measuring device HM-1400 TRX 2 for mercury of the company DURAG GmbH reads:

Sheet steel cabinet type VX25

The current measuring cabinet paint of the measuring device HM-1400 TRX 2 for mercury of the company DURAG GmbH is:

Color RAL7035 and RAL7032

Statement issued by TÜV Rheinland Energy GmbH dated 19 May 2022

Publication in the German Federal Gazette: BAnz AT 20.03.2023 B6, Chap. IV notification 14, Announcement by UBA dated 21 February 2023:

**14 Notification as regards Federal Environment Agency (UBA) notices of 28 June 2019 (BAnz AT 22.07.2019 B8, chapter I number 1.3) and of 28 June 2022 (BAnz AT 28.07.2022 B5, chapter III notification 8)**

The HM-1400 TRX 2 measuring system for mercury from DURAG GmbH can now also be equipped with a sampling probe that has an improved connection option for an external test gas generator.

The HM-1400 TRX 2 measuring system for mercury from the company DURAG GmbH in the variants with type code "D" and "H" can now also be equipped with an air baffle for improved cooling air flow in the interior.

Statement issued by TÜV Rheinland Energy GmbH dated 15 September 2022

## Certified product

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

The extractive HM-1400 TRX 2 measuring system is an AMS for the continuous analysis of all gaseous mercury compounds emitted by plants subject to monitoring (currently under the 13<sup>th</sup> and 17<sup>th</sup> BImSchV) or present in process gases. A dual beam photometer detects the concentration of atomic mercury Hg<sup>0</sup>. In order to determine total mercury Hg (total) in the sample gas, mercury present in the sample gas is first reduced to Hg<sup>0</sup>. This takes place in a thermocatalytic reactor.

The AMS provides the following control functions:

- Leak test: The AMS tests the leak tightness of the system.
- Zero point checks: The AMS automatically performs zero point checks for an internal re-adjustment of the photometer.
- Span point measurement: With its internal calibration gas generator (AKM), the instrument performs an automatic span point measurement. This feature has not yet been QAL3-approved for regular checks. Thus, the use of the internal AKM does not conform to the certified version of the measuring system.
- Connecting external gas generators: This facilitates to connect external gas generators for checking the photometer and the entire system. In the context of QAL3-compliant performance, this is typically done via an appropriate stub at the sampling probe for dosing test gas upstream of the filter.

The measuring system provides options for sample gas dilution and separate determination of the proportions of Hg species Hg<sup>0</sup> and Hg<sup>n+</sup> (specification). As soon as this option is activated, the measuring system does no longer conform to the certified version. Measured values obtained in this operation mode must not be used for continuous emission monitoring.

The essential components of the HM-1400 TRX 2 measuring system include:

- Measuring cabinet c/w photometer (UV dual beam photometer), thermocatalytic reactor (with two reactor vessels which can be switched automatically), pressure and flow regulator, temperature control and test gas generator
- M&C sample probe SP2000-H with second stub upstream of the filter
- Heated sampling line (185 °C) with two internal lines (6 mm PTFE, one for sucking the sample gas downstream of the filter and one for dosing in zero and test gases upstream of the filter). The sampling line used for the laboratory and field test was 40 m long, for the supplementary test at the waste incinerator, it was 10 m long.



### **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](http://qal1.de)**.

### **History of documents**

Certification of HM-1400 TRX 2 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. 0000059869\_00: 4 September 2018  
Expiry date of the certificate: 16 July 2023  
Test report: 936/21238805/C dated 10 May 2018  
TÜV Rheinland Energy GmbH, Cologne  
Publication: BAnz AT 17.07.2018 B9, chapter I number 2.1  
UBA announcement dated 3 July 2018

#### **Notifications**

Statement issued by TÜV Rheinland Energy GmbH dated 10 January 2019  
Publication: BAnz AT 26.03.2019 B7, chapter IV notification 77  
UBA announcement dated 27 February 2019  
(Soft- and hardware changes)

#### **Supplementary testing according to EN 15267**

Certificate No. 0000059869\_01: 5 November 2019  
Expiry date of the certificate: 21 July 2024  
Test report: 936/21245908/A dated 6 May 2019  
TÜV Rheinland Energy GmbH  
Publication: BAnz AT 22.07.2019 B8, chapter I number 1.3  
UBA announcement dated 28 June 2019

#### **Notifications**

Statement issued by TÜV Rheinland Energy GmbH dated 2 October 2019  
Publication: BAnz AT 24.03.2020 B7, chapter IV notification 18  
UBA announcement dated 24 February 2020  
(Soft- and hardware changes)

Statement issued by TÜV Rheinland Energy GmbH dated 24 February 2021  
Publication: BAnz AT 05.08.2021 B5, chapter IV notification 30  
UBA announcement dated 29 June 2021  
(Software change)

Statement issued by TÜV Rheinland Energy GmbH dated 19 May 2022  
Publication: BAnz AT 28.07.2022 B4, chapter III notification 8  
UBA announcement dated 28 June 2022  
(Soft- and hardware changes)

Statement issued by TÜV Rheinland Energy GmbH dated 15 September 2022  
Publication: BAnz AT 20.03.2023 B6, chapter IV notification 14  
UBA announcement dated 21 February 2023  
(Hardware changes)

#### **Renewal of certificates**

Certificate No. 0000059869\_02: 3 July 2024  
Expiry date of the certificate: 21 July 2029



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

**Measuring system**

Manufacturer	DURAG GmbH
AMS designation	HM-1400 TRX 2
Serial number of units under test	755 / 756 / 519 / 520
Measuring principle	Thermocatalytic reaction and cold vapour AAS

**Test report**

Test laboratory	TÜV Rheinland
Date of report	2019-03-06

**Measured component**

Certification range	Hg	0 - 15 µg/m³
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**Evaluation of the cross-sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.11 µg/m³
Sum of negative CS at zero point	-0.19 µg/m³
Sum of positive CS at span point	0.22 µg/m³
Sum of negative CS at span point	-0.53 µg/m³
Maximum sum of cross-sensitivities	-0.53 µg/m³
Uncertainty of cross-sensitivity	$u_i$ -0.306 µg/m³

**Calculation of the combined standard uncertainty**

**Tested parameter**

		$u^2$
Standard deviation from paired measurements under field conditions *	$u_D$ 0.160 µg/m³	0.026 (µg/m³)²
Lack of fit	$u_{lof}$ -0.081 µg/m³	0.007 (µg/m³)²
Zero drift from field test	$u_{d,z}$ 0.191 µg/m³	0.036 (µg/m³)²
Span drift from field test	$u_{d,s}$ 0.251 µg/m³	0.063 (µg/m³)²
Influence of ambient temperature at span	$u_t$ 0.190 µg/m³	0.036 (µg/m³)²
Influence of supply voltage	$u_v$ 0.078 µg/m³	0.006 (µg/m³)²
Cross-sensitivity (interference)	$u_i$ -0.306 µg/m³	0.094 (µg/m³)²
Influence of sample gas flow	$u_p$ 0.090 µg/m³	0.008 (µg/m³)²
Uncertainty of reference material at 70% of certification range	$u_{rm}$ 0.121 µg/m³	0.015 (µg/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 ( $u_c$ )	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.54 µg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.06 µg/m³

**Relative total expanded uncertainty**

Requirement of 2010/75/EU	<b>U in % of the ELV 6 µg/m³</b>	<b>17.6</b>
Requirement of EN 15267-3	<b>U in % of the ELV 6 µg/m³</b>	<b>40.0</b>
	<b>U in % of the ELV 6 µg/m³</b>	<b>30.0</b>