

CERTIFICATE

Certificate of Product Conformity (QAL1)

Certificate number: 0000090026_00

Certified AMS: IR800CEMS for CO, NO_x, SO₂, CO₂ and O₂

Manufacturer: Yokogawa Electric Corporation
2-9-32 Nakacho, Musashino-shi,
180-8750 Tokyo
Japan

Testing body: 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 (2023), EN 15267-2 (2023) and EN 15267-3 (2023).

The certification applies to the conditions set out in this certificate and the accompanying document in the change history for the equipment certificate (0000090026)
(this certificate comprises 10 pages).

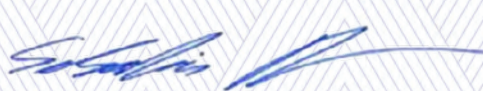


TÜV Rheinland Energy & Environment GmbH
Cologne, 19 October 2026

Certificate valid until:
18 October 2031



Dr Tobias Schäfer
Local Business Field Manager



Sebastian Decker M. Sc.
deputy Head of QAL1 Certification Body

QAL1 Certification Body
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TÜV Rheinland Energy & Environment GmbH
Am Grauen Stein
51105 Cologne

Certification body accredited by DAkkS in accordance with DIN EN ISO/IEC 17065.
The accreditation applies only to the scope of accreditation listed in Annex D-ZE-11120-02-00 to the certificate
scope of accreditation listed in the certificate annex D-ZE-11120-02-00.

Test reports:	EuL/21257317/Z dated 26. June 2026
Initial certification:	19. October 2026
Certificate valid until:	18. October 2031
Publication:	20. October 2026, offizielle Datenbank www.qal1.de

Approved application

The tested AMS is suitable for use at combustion plants covered by Chapter III of Directive 2010/75/EU on industrial emissions (IED), Chapter IV of Directive 2010/75/EU and Directive 2010/75/EU. The AMS is furthermore suitable for use at plants covered by Directive (EU) 2015/2193 and at installations within the scope of the German Technical Instructions on Air Quality Control (TA Luft). 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 four-month field test at an oil refinery.

The AMS is approved for an ambient temperature range of +5 °C to +40 °C.

The notification of the measuring equipment, the suitability test and the performance of the uncertainty calculations were carried out on the basis of the regulations valid at the time of the test. Due to possible changes in the legal framework, each user should ensure, prior to using the measuring equipment, that it is suitable for monitoring the limit values and oxygen concentrations relevant to the intended application.

Every potential user should consult with the manufacturer to ensure that this AMS is suitable for the intended application.

Basis of certification

This certification is based on:

- Test report EuL/21257317/Z dated 26 June 2026 issued by TÜV Rheinland Energy & Environment GmbH
- Audit report EuL/21275015/A dated 28 November 2025 and EuL/21279384/A dated 29 May 2026 issued by TÜV Rheinland Energy & Environment GmbH
- Certification decision by the QAL1 certification body TÜV Rheinland Energy & Environment GmbH, accredited in accordance with EN ISO/IEC 17065
- Surveillance of the product and the manufacturing process

AMS designation:

IR800CEMS for CO, NO_x, SO₂, CO₂ and O₂

Manufacturer:

Yokogawa Electric Corporation
2-9-32 Nakacho, Musashino-shi,
180-8750 Tokyo, Japan

Field of application:

For combustion plants covered by Chapter III of Directive 2010/75/EU on industrial emissions (IED), Chapter IV of Directive 2010/75/EU, Directive 2010/75/EU Directive (EU) 2015/2193, cremation plants, and installations within the scope of the German Technical Instructions on Air Quality Control (TA Luft).

Measuring ranges during performance testing:

Component	Certification range	Supplementary ranges	Unit
CO	0–75	0–3000	mg/m ³
NO _x	0–100 ¹⁾	0–1000 ²⁾	mg/m ³
SO ₂	0–275	0–2750	mg/m ³
CO ₂	0–20	0–25	Vol.-%
O ₂	0–25	0–10	Vol.-%

1) as NO; this corresponds to approx. 0–153 mg/m³ NO₂

2) as NO; this corresponds to approx. 0–1530 mg/m³ NO₂

Software version:

Firmware 1.04.01

Restrictions:

None

Notes:

1. The maintenance interval is four weeks.
2. The AMS performs an internal test cycle every two weeks. The cycle takes approximately 180 minutes. To ensure the validity of the daily mean value, the cycle shall be scheduled across midnight.

Test institute:

TÜV Rheinland Energy & Environment GmbH, Cologne
Report No.: EuL/21257317/Z dated 26 June 2026 issued by TÜV Rheinland Energy & Environment GmbH

Certified product

This certification applies to automatic measuring systems that comply with the following description:

The IR800CEMS is an extractive multi-component measuring system for the continuous determination of CO, NO_x, SO₂, CO₂ and O₂. The measuring system comprises a gas sampling system, a heated sample gas line and an analysis cabinet containing the IR800G analyser. CO, NO_x, SO₂ and CO₂ are determined by non-dispersive infrared absorption (NDIR). The oxygen concentration is determined using a paramagnetic sensor. An NO₂/NO converter is an integral part of the measuring system for the determination of NO_x.

The sample gas is extracted from the flue gas duct by means of a heated gas sampling probe and fed to the analysis cabinet through a heated sample gas line. The sample gas is transported by ejector pumps. For the infrared-active components, the absorption of infrared radiation by the respective measuring component is evaluated and the concentration is determined in accordance with the Lambert-Beer law. Pneumatic detectors are used for CO, NO and SO₂; CO₂ is detected by means of a pyroelectric detector.

The pneumatic detectors have a two-stage design and comprise, in addition to the detector for the respective measuring component, a detector for compensating interfering components with overlapping absorption ranges. The integrated paramagnetic sensor uses the paramagnetic properties of oxygen. The oxygen concentration is determined from the restoring force required to compensate the mechanical deflection caused by the magnetic field. Pressure and temperature influences on the sensor signal are compensated. During performance testing, the heated sample gas line was operated with a length of 10 m in the laboratory test and 50 m in the field test. The measured values are output dry and under standard conditions.

The certified measuring system consists of:

- Heated gas sampling probe JCT JES-301E1COS Ex, operated at 180 °C, with zero gas and back-purge connection
- Ceramic sample gas filter with a pore size of 2 µm
- Heated JCT sample gas line, internal diameter 6 mm, operated at 120 °C
 - Analysis cabinet with:
 - IR800G analyser with IR light source, sample gas cell and detectors
 - Paramagnetic sensor for oxygen measurement
 - HORIBA NO_x converter
 - Two-stage JCT cooler with injector pumps
 - Pressure reducer for setting the instrument air and display unit for displaying measured values and operating the analysis system

During the suitability test, the heated sample gas line was operated at a length of 10 m in the laboratory test and 50 m in the field test. The measured values are output in dry conditions under standard conditions.

General remarks

This certificate is based upon the equipment tested. The manufacturer is responsible for ensuring that ongoing production complies with the requirements of 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 system shall be subject to regular surveillance.

If a product from 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 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 remain the property of TÜV Rheinland Energy & Environment GmbH. Upon revocation of the publication, this certificate loses its validity. After expiry of the certificate and upon request by TÜV Rheinland Energy & Environment GmbH, this document shall be returned and the certification mark must no longer be used.

The current version of this certificate and its validity can also be viewed at qal1.de.

History of documents

The history of the certified IR800CEMS measuring system from Yokogawa Electric Corporation is based on the change history documents associated with the certificate number, as well as on the regular ongoing surveillance of the manufacturer's quality management system:

Initial certification in accordance with DIN EN 15267-1:2023

Certificate No. 0000090026_00
Certificate valid until: 18 October 2031
Test reports: EuL/21257317/Z issued by TÜV Rheinland Energy & Environment GmbH on 26 June 2026
Date of issue of the certificate: 19.10.2026
Official certificate database: www.qal1.de

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

Measuring system

Manufacturer	Yokogawa Electric Corporation
AMS designation	IR800CEMS
Serial number of units under test	KIIT7K401/KIIT7K402
Measuring principle	Infrarotabsorption

Test report

Test laboratory	EuL/21257317/Z TÜV Rheinland
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Measured component

Certification range	CO 0 - 75 mg/m ³
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Evaluation of the cross-sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0.43 mg/m ³
Sum of negative CS at zero point	0.00 mg/m ³
Sum of positive CS at span point	0.38 mg/m ³
Sum of negative CS at span point	-1.14 mg/m ³
Maximum sum of cross-sensitivities	-1.14 mg/m ³
Uncertainty of cross-sensitivity	u_i -0.658 mg/m ³

Calculation of the combined standard uncertainty

Tested parameter

		u^2
Lack of fit	u_D 0.443 mg/m ³	0.196 (mg/m ³) ²
Zero drift from field test	u_{inf} -0.173 mg/m ³	0.030 (mg/m ³) ²
Span drift from field test	$u_{d,z}$ 0.563 mg/m ³	0.317 (mg/m ³) ²
Influence of ambient temperature at span	$u_{d,s}$ 1.126 mg/m ³	1.268 (mg/m ³) ²
Influence of supply voltage	u_t 0.906 mg/m ³	0.821 (mg/m ³) ²
Cross-sensitivity (interference)	u_v 0.204 mg/m ³	0.042 (mg/m ³) ²
Influence of sample gas flow	u_i -0.658 mg/m ³	0.433 (mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u_b 0.346 mg/m ³	0.120 (mg/m ³) ²
	u_{rm} 0.606 mg/m ³	0.368 (mg/m ³) 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)

$$u_c = \sqrt{\sum (u_{max,j})^2} \quad 1.90 \text{ mg/m}^3$$

Total expanded uncertainty

$$U = u_c * k = u_c * 1.96 \quad 3.72 \text{ mg/m}^3$$

Relative total expanded uncertainty

Requirement of 2010/75/EU

Requirement of EN 15267-3

U in % of the ELV 50 mg/m³	7.4
U in % of the ELV 50 mg/m³	10.0
U in % of the ELV 50 mg/m ³	7.5

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

Measuring system

Manufacturer	Yokogawa Electric Corporation
AMS designation	IR800CEMS
Serial number of units under test	KIIT7K401/KIIT7K402
Measuring principle	Infrarotabsorption

Test report

Test laboratory	EuL/21257317/N TÜV Rheinland
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Measured component

Certification range	NOx (as NO) 0 - 100 mg/m³
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Evaluation of the cross-sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	1.83 mg/m³
Sum of negative CS at zero point	0.00 mg/m³
Sum of positive CS at span point	1.58 mg/m³
Sum of negative CS at span point	-2.42 mg/m³
Maximum sum of cross-sensitivities	-2.42 mg/m³
Uncertainty of cross-sensitivity	u_i -1.397 mg/m³

Calculation of the combined standard uncertainty

Tested parameter

			u^2
	u_D	1.185 mg/m³	1.404 (mg/m³)²
Lack of fit	u_{inf}	0.231 mg/m³	0.053 (mg/m³)²
Zero drift from field test	$u_{rl,7}$	1.039 mg/m³	1.080 (mg/m³)²
Span drift from field test	$u_{rl,s}$	1.559 mg/m³	2.430 (mg/m³)²
Influence of ambient temperature at span	u_t	0.613 mg/m³	0.376 (mg/m³)²
Influence of supply voltage	u_v	0.197 mg/m³	0.039 (mg/m³)²
Cross-sensitivity (interference)	u_i	-1.397 mg/m³	1.952 (mg/m³)²
Influence of sample gas flow	u_n	0.479 mg/m³	0.229 (mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.808 mg/m³	0.653 (mg/m³)²
Converter efficiency for AMS measuring NOx	u_{ce}	3.622 mg/m³	13.117 (mg/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)

$$u_c = \sqrt{\sum (u_{max,j})^2} \quad 4.62 \text{ mg/m}^3$$

Total expanded uncertainty

$$U = u_c * k = u_c * 1.96 \quad 9.05 \text{ mg/m}^3$$

Relative total expanded uncertainty

Requirement of 2010/75/EU

Requirement of EN 15267-3

U in % of the ELV 66 mg/m³	13.7
U in % of the ELV 66 mg/m³	20.0
U in % of the ELV 66 mg/m³	15.0

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

Measuring system

Manufacturer	Yokogawa Electric Corporation
AMS designation	IR800CEMS
Serial number of units under test	KIIT7K401/KIIT7K402
Measuring principle	Infrarotabsorption

Test report

Test laboratory	EuL/21257317/Z TÜV Rheinland
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Measured component

Certification range	SO ₂ 0 - 275 mg/m ³
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Evaluation of the cross-sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	3.96 mg/m ³
Sum of negative CS at zero point	-2.53 mg/m ³
Sum of positive CS at span point	1.65 mg/m ³
Sum of negative CS at span point	-9.98 mg/m ³
Maximum sum of cross-sensitivities	-9.98 mg/m ³
Uncertainty of cross-sensitivity	u_i -5.763 mg/m ³

Calculation of the combined standard uncertainty

Tested parameter

		u^2	
Lack of fit	u_D 1.806 mg/m ³	3.262 (mg/m ³) ²	
Zero drift from field test	u_{inf} 1.159 mg/m ³	1.343 (mg/m ³) ²	
Span drift from field test	$u_{r,z}$ 0.953 mg/m ³	0.908 (mg/m ³) ²	
Influence of ambient temperature at span	$u_{r,s}$ -3.334 mg/m ³	11.116 (mg/m ³) ²	
Influence of supply voltage	u_t 0.620 mg/m ³	0.384 (mg/m ³) ²	
Cross-sensitivity (interference)	u_v 1.080 mg/m ³	1.166 (mg/m ³) ²	
Influence of sample gas flow	u_i -5.763 mg/m ³	33.212 (mg/m ³) ²	
Uncertainty of reference material at 70% of certification range	u_n 0.762 mg/m ³	0.581 (mg/m ³) ²	
	u_m 2.223 mg/m ³	4.941 (mg/m ³) 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)

$$u_c = \sqrt{\sum (u_{max,j})^2} \quad 7.54 \text{ mg/m}^3$$

Total expanded uncertainty

$$U = u_c * k = u_c * 1.96 \quad 14.79 \text{ mg/m}^3$$

Relative total expanded uncertainty

Requirement of 2010/75/EU

Requirement of EN 15267-3

U in % of the ELV 110 mg/m ³	13,4
U in % of the ELV 110 mg/m ³	20,0
U in % of the ELV 110 mg/m ³	15,0

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

Measuring system

Manufacturer	Yokogawa Electric Corporation
AMS designation	IR800CEMS
Serial number of units under test	KIIT7K401/KIIT7K402
Measuring principle	Infrarotabsorption

Test report

Test laboratory	EuL/21257317/Z TÜV Rheinland
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Measured component

Certification range	CO ₂ 0 - 20 Vol.-%
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Evaluation of the cross-sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0.00	Vol.-%
Sum of negative CS at zero point	0.00	Vol.-%
Sum of positive CS at span point	0.00	Vol.-%
Sum of negative CS at span point	-0.38	Vol.-%
Maximum sum of cross-sensitivities	-0.38	Vol.-%
Uncertainty of cross-sensitivity	u_i	-0.219 Vol.-%

Calculation of the combined standard uncertainty

Tested parameter

			u^2	
	u_i	0.120	Vol.-%	0.014 (Vol.-%) ²
Lack of fit	u_{lof}	0.075	Vol.-%	0.006 (Vol.-%) ²
Zero drift from field test	$u_{d,z}$	-0.023	Vol.-%	0.001 (Vol.-%) ²
Span drift from field test	$u_{d,s}$	0.231	Vol.-%	0.053 (Vol.-%) ²
Influence of ambient temperature at span	u_t	0.119	Vol.-%	0.014 (Vol.-%) ²
Influence of supply voltage	u_v	0.127	Vol.-%	0.016 (Vol.-%) ²
Cross-sensitivity (interference)	u_i	-0.219	Vol.-%	0.048 (Vol.-%) ²
Influence of sample gas flow	u_D	-0.058	Vol.-%	0.003 (Vol.-%) ²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.162	Vol.-%	0.026 (Vol.-%) 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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.43	Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.84	Vol.-%

Relative total expanded uncertainty

Requirement of 2010/75/EU

Requirement of EN 15267-3

U in % of the range 20 Vol.-%	4,2
U in % of the range 20 Vol.-%	10,0 **
U in % of the range 20 Vol.-%	7,5

** The EU-directive 2010/75/EC on industrial emissions does not define requirements for this component.
A value of 10,0 % was used instead.

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

Measuring system

Manufacturer	Yokogawa Electric Corporation
AMS designation	IR800CEMS
Serial number of units under test	KIIT7K401/KIIT7K402
Measuring principle	Paramagnetisch

Test report

Test laboratory	EuL/21257317/Z TÜV Rheinland
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Measured component

Certification range	0 - 25 Vol.-%
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Evaluation of the cross-sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0.00	Vol.-%
Sum of negative CS at zero point	0.00	Vol.-%
Sum of positive CS at span point	0.00	Vol.-%
Sum of negative CS at span point	0.00	Vol.-%
Maximum sum of cross-sensitivities	0.00	Vol.-%
Uncertainty of cross-sensitivity	u_i 0.000	Vol.-%

Calculation of the combined standard uncertainty

Tested parameter

			u^2
Lack of fit	u_D 0.076	Vol.-%	0.006 (Vol.-%) ²
Zero drift from field test	u_{inf} 0.081	Vol.-%	0.007 (Vol.-%) ²
Span drift from field test	$u_{r,z}$ -0.098	Vol.-%	0.010 (Vol.-%) ²
Influence of ambient temperature at span	$u_{r,s}$ -0.104	Vol.-%	0.011 (Vol.-%) ²
Influence of supply voltage	u_t 0.053	Vol.-%	0.003 (Vol.-%) ²
Cross-sensitivity (interference)	u_v 0.023	Vol.-%	0.001 (Vol.-%) ²
Influence of sample gas flow	u_i 0.000	Vol.-%	0.000 (Vol.-%) ²
Uncertainty of reference material at 70% of certification range	u_n 0.003	Vol.-%	0.000 (Vol.-%) ²
	u_{rm} 0.202	Vol.-%	0.041 (Vol.-%) 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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.28	Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.54	Vol.-%

Relative total expanded uncertainty

Requirement of 2010/75/EU

Requirement of EN 15267-3

U in % of the range 25 Vol.-%	2,2
U in % of the range 25 Vol.-%	10,0 **
U in % of the range 25 Vol.-%	7,5

** The EU-directive 2010/75/EC on industrial emissions does not define requirements for this component.
A value of 10,0 % was used instead.