Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate No: 0000043525_03

Certified AMS:	AR 650/NHF for HF
Manufacturer:	Opsis AB Skytteskogsvägen 16 24402 Furulund Sweden
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 (2023), 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 6 pages).
The present certificate replaces certificate 0000043525_02 dated 2 April 2020.

TÜVRheinland® CERTIFIED
Suitability Tested
EN 15267
QAL1 Certified
Regular Surveillance
www.tuv.com
ID 0000043525

Publication in the German Federal Gazette (BAnz) of 14 March 2016

German Environment Agency

Dessau, 28 March 2025

This certificate will expire on:
1 April 2030

TÜV Rheinland Energy & Environment GmbH
Cologne, 26 March 2025

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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.

Test report:	936/21224575/B dated 13 October 2015
Initial certification:	2 April 2015
Expiry date:	1 April 2030
Certificate:	Renewal (of previous certificate 0000043525_02 of 2 April 2020 valid until 1 April 2025)
Publication:	BAnz AT 14.03.2016 B7, chapter I No. 2.1

Approved application

The tested AMS is suitable for use at plants according to Directive 2010/75/EC, chapter III (combustion plants / 13th BImSchV:2015), chapter IV (waste incineration plants / 17th BImSchV:2013), TA Luft:2002, 30th BImSchV:2009 and 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 and a twelve-month field test at a municipal waste incinerator plant.

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 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 936/21224575/B dated 13 October 2015 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 14.03.2016 B7, chapter I No. 2.1, Announcement by UBA dated 18 February 2016:

AMS designation:
AR650/NHF for HF

Manufacturer:
OPSIS AB, Furulund, Sweden

Field of application:
For measurements at plants requiring official approval and plants in accordance with the 27th BImSchV

Measuring ranges during the performance test:

Component	Certification range	Supplementary range	Unit
HF	0–3*	0–10*	mg/m³ x m

*at a measurement path length of 1.0 meter

Software version:
7.21

Restriction:
The requirement of EN 15267-3 with regard to the IP code of the enclosure is not fulfilled.

Notes:
1. The maintenance interval is six months.
2. During performance testing, the measurement path length for HF was 1 m in the laboratory test and 2 m in the field test.
3. For measurement paths longer than the tested 1 m, it must be verified on-site whether the requirements defined in standard EN 15267-3 regarding cross-sensitivities are still met when the measuring system is installed.
4. In order to monitor the limit value for HF in accordance with directive 2010/75/EU, the active measurement path length must be at least 2 m.
5. Supplementary testing (maintenance interval extension) as regards of the Federal Environment Agency (UBA) of 25 February 2015 (BAnz AT 02.04.2015 B5, chapter I number 2.1).

Test Report:
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report No.: 936/21224575/B dated 13 October 2015

Certified product

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

The AMS AR650/NHF for HF is an in-situ DOAS open path measuring system.
The tested system consists of a light source, a receiver, an opto-fibre cable, and an opto-analyser. The analyser consists of an interferometer, a detector, electronics for operating the scanner, and a computer for evaluation and signal processing.
The measurement section consists of the light path between light emitter and light receiver. The light source in the emitting unit is a high-pressure xenon lamp. The light beam generated by the emitter is directed towards the receiver. On its way through the medium, the intensity of the light beam is affected by scattering and absorption by molecules and particles.
The light collected by the receiver is led to the analyser via a fibre optic cable. This cable merely serves as a means to enable installing the analyser at a location where it is protected against dust, excessive moisture, variations in temperature etc.

The measuring system AR650/NHF consists of:

- Analyser (AR650/NHF)
- Emitter unit (EM062)
- Receiver unit (RE062)
- Fibre optic cable (OF 100B)
- Calibration unit

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 AR 650/NHF 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. 0000043525_00: 30 April 2015
Expiry date of the certificate: 1 April 2020
Test report: 936/21224575/A dated 22 September 2014
TÜV Rheinland Energie und Umwelt GmbH
Publication: BAnz AT 02.04.2015 B5, chapter I number 2.1
UBA announcement dated 25 February 2015

Supplementary testing according to EN 15267
Certificate No. 0000043525_01: 25 April 2016
Expiry date of the certificate: 1 April 2020
Test report: 936/21224575/B dated 13 October 2015
TÜV Rheinland Energie und Umwelt GmbH
Publication: BAnz AT 14.03.2016 B7, chapter I number 2.1
UBA announcement dated 18 February 2016

Renewal of certificates
Certificate No. 0000043525_02: 2 April 2020
Expiry date of the certificate: 1 April 2025

Renewal of certificates
Certificate No. 0000043525_03: 28 March 2025
Expiry date of the certificate: 1 April 2030

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

Measuring system					
Manufacturer			Opsis AB		
AMS designation			AR650/NHF		
Serial number of units under test			75 / 40		
Measuring principle			IR-DOAS		
Test report			936/21224575/B		
Test laboratory			TÜV Rheinland		
Date of report			2014-09-22		
Measured component			HF		
Certification range			0 - 3	mg/m³	
Evaluation of the cross-sensitivity (CS)					
(system with largest CS)					
Sum of positive CS at zero point			0.04	mg/m³	
Sum of negative CS at zero point			-0.02	mg/m³	
Sum of postive CS at span point			0.08	mg/m³	
Sum of negative CS at span point			-0.05	mg/m³	
Maximum sum of cross-sensitivities			0.08	mg/m³	
Uncertainty of cross-sensitivity			0.049	mg/m³	

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Repeatability standard deviation at set point *	u_r	0.040	mg/m³	0.002	(mg/m³)²
Lack of fit	u_{lof}	-0.029	mg/m³	0.001	(mg/m³)²
Zero drift from field test	$u_{d,z}$	0.033	mg/m³	0.001	(mg/m³)²
Span drift from field test	$u_{d,s}$	0.031	mg/m³	0.001	(mg/m³)²
Influence of ambient temperature at span	u_t	0.015	mg/m³	0.000	(mg/m³)²
Influence of supply voltage	u_v	0.017	mg/m³	0.000	(mg/m³)²
Cross-sensitivity (interference)	u_i	0.049	mg/m³	0.002	(mg/m³)²
Influence of sample gas pressure	u_p	0.020	mg/m³	0.000	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.024	mg/m³	0.001	(mg/m³)²
Excursion of measurement beam	u_{mb}	0.023	mg/m³	0.001	(mg/m³)²

* The larger value is used :
"Repeatability standard deviation at span" or
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.09	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.19	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 1 mg/m³**	**18.5**
Requirement of 2010/75/EU	**U in % of the ELV 1 mg/m³**	**40.0**
Requirement of EN 15267-3	U in % of the ELV 1 mg/m³	30.0