Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000038505_03

AMS designation:	LasIR for HF
Manufacturer:	Unisearch Associates Inc. 96 Bradwick Drive Concord On L4K 1K8 Canada
Test Laboratory:	TÜV Rheinland Energy GmbH

This is to certify that the AMS has been tested and certified according to 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 8 pages).

TÜVRheinland® CERTIFIED

Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000038505

Publication in the German Federal Gazette (BAnz) of 01 April 2014

German Federal Environment Agency
Dessau, 05 March 2018

Dr. Marcel Langner
Head of Section II 4.1

This certificate will expire on:
04 March 2023

TÜV Rheinland Energy GmbH
Cologne, 04 March 2018

ppa. Dr. Peter Wilbring

www.umwelt-tuv.eu tre@umwelt-tuv.eu Phone: + 49 221 806-5200	TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln

Test institute accredited to EN ISO/IEC 17025:2005 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.

10/221 2.08

Test Report:	936/21216746/C dated 20 September 2013
Initial certification:	05 March 2013
Expiry date:	04 March 2023
Certificate:	Renewal (of previous certificate 0000038505_02 dated 29 April 2014 valid until 04 March 2018)
Publication:	BAnz AT 01.04.2014 B12, chapter I no. 2.1

Approved application
The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13th BImSchV), at waste incineration plants according to Directive 2010/75/EU, chapter IV (17th BImSchV), the 27th BImSchV, the 30th BImSchV and TA Luft. The measured ranges have been selected so as to cater for 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 an aluminum smelter plant.

The AMS is approved for an ambient temperature range of -20 °C to +50 °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 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.

Basis of the certification
This certification is based on:

- test report 936/21216746/C dated 20 September 2013 issued 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 AT 01.04.2014 B12, chapter I no. 2.1, UBA announcement dated 27 February 2014:

AMS designation:
LasIR for HF

Manufacturer:
Unisearch Associates, Concord, Canada

Field of application:
For plants requiring official approval and for plants according to the 27th BImSchV

Measuring ranges during performance testing:

Component	Certification range	Supplementary measuring ranges		Unit
HF	0–5*	0–10*	0–50*	mg/m³

* refered to a measuring path of 1.0 m

Software version:
4.76

Restrictions:
None

Notes:

1. Testing of HF can be performed with dry test gases from compressed gas bottles and an unheated test gas cell.
2. The maintenance interval is six months.
3. The measuring system was performance tested with single-pass (LasIR Single-Pass) and dual-pass (LasIR Dual-Pass) optical units.
4. Supplementary testing (extension of the maintenance interval, additional measurement range, approval of dual-pass optics) as regards Federal Environment Agency (UBA) notice of 3 July 2013 (Federal Gazette (BAnz) AT 23.07.2013 B4, chapter I number 2.1).

Test Report:
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report no.: 936/21216746/C dated 20 September 2013

Publication in the German Federal Gazette: BAnz AT 01.08.2016 B11, chapter V notification 20,
UBA announcement dated 14 July 2016:

20 Notification as regards Federal Environment Agency (UBA) notices of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter I number 2.1)

The current software version of the LasIR measuring system for HF manufactured by Unisearch Associates Inc. is:

Version 4.85

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 26 January 2016

Publication in the German Federal Gazette: BAnz AT 31.07.2017 B12, chapter II notification 28,
UBA announcement dated 13 July 2017:

28 Notification as regards Federal Environment Agency (UBA) notices of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter I number 2.1) and of 14 July 2016 (BAnz AT 01.08.2016 B11, chapter V 20th notification)

The current software version of the LasIR measuring system for HF manufactured by Unisearch Associates Inc. is:

Version 4.90

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 23 January 2017

Certified product
This certification applies to automated measurement systems conforming to the following description:

The LasIR measuring system is a tunable infrared spectrometric diode laser system, which was designed for contactless in-situ measurement of stack emissions.

The system is approved with single-pass or dual-pass optics units. The LasIR measuring system consists of:

Single-pass-optics version

- LasIR control/analysis unit
- Transmitter unit with purge unit
- Receiver unit with purge unit
- Optical cable (between analysis unit and transmitter unit)
- Data cable (between the receiver unit and analysis unit)
- Unheated sample gas cell

Dual-pass-optics version

- LasIR control/analysis unit
- Combined transmitter/receiver unit with purge unit
- Reflector unit with purge unit
- Optical cable (between analysis unit and transmitter/receiver unit)
- Data cable (between the transmitter/receiver unit and analysis unit)
- Unheated sample gas cell

The current software version is: 4.90

The current manual version is: version dated 21 September 2012

General remarks

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 manufacturing process for 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 document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. Upon revocation of the publication the certificate loses its validity. After the expiration of the certificate and on request of TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must no longer be used.

The relevant version of this certificate and its expiration date are also accessible on the internet at **qal1.de**.

Certification of the LasIR measuring system is based on the documents listed below and the regular, continuous surveillance of the manufacturer's quality management system:

Initial certification according to EN 15267

Certificate no. 0000038505: 22 March 2013
Expiry date of the certificate: 04 March 2018

Test report: 936/21216746/A dated 06 October 2012
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Publication: BAnz AT 05.03.2013 B10, chapter I no. 3.2
UBA announcement dated 12 February 2013

Supplementary testing according to EN 15267

Certificate no. 0000038505_01: 20 August 2013
Expiry date of the certificate: 04 March 2018

Test report: 936/21216746/B dated 20 February 2013
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Publication: BAnz AT 23.07.2013 B4, chapter I no. 2.1
UBA announcement dated 03 July 2013

Certificate no. 0000038505_02: 29 April 2014
Expiry date of the certificate: 04 March 2018

Test report: 936/21216746/C dated 20 September 2013
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Publication: BAnz AT 01.04.2014 B12, chapter I no. 2.1
UBA announcement dated 27 February 2014

Notifications in accordance with EN 15267

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 26 January 2016
Publication: BAnz AT 01.08.2016 B11, chapter V notification 20
UBA announcement dated 14 July 2016
(new software version)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 23 January 2017
Publication: BAnz AT 31.07.2017 B12, chapter II notification 28
UBA announcement dated 13 July 2017
(new software version)

Renewal of the certificate

Certificate no. 0000038505_03: 05 March 2018
Expiry date of the certificate: 04 March 2023

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

Measuring system		
Manufacturer	Unisearch Associates	
Name of measuring system	LasIR	
Serial number of the candidates	LAS1002 / LAS1003	
Measuring principle	IR Laser	
Test report	936/21216746/A	936/21216746/C
Test laboratory	TÜV Rheinland	TÜV Rheinland
Date of report	2012-10-06	2013-09-20
Measured component	HF	
Certification range	0 - 5 mg/m³	

Evaluation of the cross sensitivity (CS)
(system with largest CS)

Sum of positive CS at zero point	0.00	mg/m³
Sum of negative CS at zero point	0.00	mg/m³
Sum of postive CS at reference point	0.00	mg/m³
Sum of negative CS at reference point	0.00	mg/m³
Maximum sum of cross sensitivities	0.00	mg/m³
Uncertainty of cross sensitivity	0.000	mg/m³

Calculation of the combined standard uncertainty

Tested parameter				u²	
Standard deviation from paired measurements under field conditions *	u_D	0.024	mg/m³	0.001	(mg/m³)²
Lack of fit	u_{lof}	-0.035	mg/m³	0.001	(mg/m³)²
Zero drift from field test	$u_{d,z}$	0.023	mg/m³	0.001	(mg/m³)²
Span drift from field test	$u_{d,s}$	0.046	mg/m³	0.002	(mg/m³)²
Influence of ambient temperature at span	u_t	0.017	mg/m³	0.000	(mg/m³)²
Influence of supply voltage	u_v	0.006	mg/m³	0.000	(mg/m³)²
Cross sensitivity (interference)	u_i	0.000	mg/m³	0.000	(mg/m³)²
Influence of sample pressure	u_p	0.012	mg/m³	0.000	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.040	mg/m³	0.002	(mg/m³)²
Excursion of measurement beam	u_{mb}	0.022	mg/m³	0.000	(mg/m³)²

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

$$u_c = \sqrt{\sum \left(u_{max\ j}\right)^2}$$

Combined standard uncertainty (u_C)		0.08	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.16	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 1 mg/m³**	**16.4**
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