

# CERTIFICATE

## of Product Conformity (QAL1)

Certificate No: 0000038505\_04

**Certified AMS:** LasIR for HF

**Manufacturer:** Unisearch Associates  
96 Bradwick Drive  
Concord, Ontario / L4K 1K8  
Canada

**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 (2014).

Certification is awarded in respect of the conditions stated in this certificate  
(this certificate contains 9 pages).  
The present certificate replaces certificate 0000038505\_03 dated 05 March 2018.



Suitability Tested  
EN 15267  
QAL1 Certified  
Regular  
Surveillance

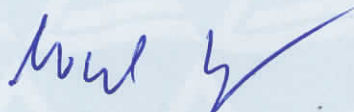
www.tuv.com  
ID 0000038505

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

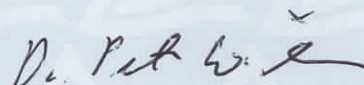
German Environment Agency  
Dessau, 02 March 2023

This certificate will expire on:  
04 March 2028

TÜV Rheinland Energy GmbH  
Cologne, 01 March 2023



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ppa. Dr. Peter Wilbring

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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>	936/21216746/C dated 20 September 2013
<b>Initial certification:</b>	05 March 2013
<b>Expiry date:</b>	04 March 2028
<b>Certificate:</b>	Renewal (of previous certificate 0000038505_03 of 05 March 2018 valid until 04 March 2023)
<b>Publication:</b>	BAnz AT 01.04.2014 B12, chapter I No. 2.1

### Approved application

The tested AMS is suitable for use at plants according to Directive 2010/75/EC, chapter III (13th BImSchV:2013), chapter IV (17th BImSchV:2013), 30th BImSchV:2009, TA-Luft:2002 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 12 month field test at a Aluminum smelter.

The AMS is approved for an ambient temperature range of -20° 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 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 936/21216746/C dated 20 September 2013 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 01.04.2014 B12, chapter I No. 2.1,  
Announcement by UBA 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/m <sup>3</sup>

\* referred 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, chap. V notification 20, Announcement by UBA 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, chap. II notification 28, Announcement by UBA 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 notification 20)**

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 Energy GmbH dated 23 January 2017

Publication in the German Federal Gazette: BAnz AT 31.07.2020 B10, chap. II notification 24, Announcement by UBA dated 27 May 2020:

**24 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 13 July 2017 (BAnz AT 31.07.2017 B12, chapter II, notification 28)**

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

4.95.

Statement issued by TÜV Rheinland Energy GmbH dated 27 February 2020

Publication in the German Federal Gazette: BAnz AT 05.08.2021 B5, chap. IV notification 51,  
Announcement by UBA dated 29 June 2021:

**51 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 27 May 2020 (BAnz AT 31.07.2020 B10, chapter II notification 24)**

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

4.96

The measuring system can also be operated with the FFTR option.

The Laser Controller Board can also be used in the updated version with the hardware identifier "LMH".

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 32,  
Announcement by UBA dated 28 June 2022:

**32 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 29 June 2021 (BAnz AT 05.08.2021 B5, chapter IV notification 51)**

A new motherboard with the designation PCA-MBH1000 is installed in the LasIR measuring device for HF from Unisearch Associates Inc.

Statement issued by TÜV Rheinland Energy GmbH dated 17 February 2022

**Certified product**

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

The LasIR measuring system for HF is a tuneable 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 for HF 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

### 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 as well as 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](http://qal1.de).

### History of documents

Certification of LasIR for HF 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. 0000038505\_00: 22 March 2013  
Expiry date of the certificate: 04 March 2018  
Test report 936/21216746/A dated 6 October 2012  
TÜV Rheinland Energie und Umwelt GmbH  
Publication BAnz AT 05.03.2013 B10, chapter I number 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  
Publication BAnz AT 23.07.2013 B4, chapter I number 2.1  
UBA announcement dated 3 July 2013

#### Supplementary testing according to EN 15267

Certificate No. 0000038505\_02: 29 April 2014  
Expiry date of the certificate: 04 March 2018  
Test report 936/21216746/C dated 26 September 2013  
TÜV Rheinland Energie und Umwelt GmbH  
Publication BAnz AT 01.04.2014 B12, chapter I number 2.1  
UBA announcement dated 27 February 2014

**Notifications**

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  
(Software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 23 January 2017  
Publication BAnz AT 31.07.2017 B12, chapter II notification 28  
UBA announcement dated 13 July 2017  
(Software changes)

**Renewal of certificate**

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

**Notifications**

Statement issued by TÜV Rheinland Energy GmbH dated 27 February 2020  
Publication BAnz AT 31.07.2020 B10, chapter II notification 24  
UBA announcement dated 27 May 2020  
(Software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 24 February 2021  
Publication BAnz AT 05.08.2021 B5, chapter IV notification 51  
UBA announcement dated 29 June 2021  
(Software change)

Statement issued by TÜV Rheinland Energy GmbH dated 17 February 2022  
Publication BAnz AT 28.07.2022 B4, chapter III notification 32  
UBA announcement dated 28 June 2022  
(Hardware changes)

**Renewal of certificate**

Certificate No. 0000038505\_04: 02 March 2023  
Expiry date of the certificate: 04 March 2028



**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**

Test laboratory	936/21216746/A	936/21216746/C
Date of report	TÜV Rheinland	TÜV Rheinland
	2012-10-06	2013-09-20

**Measured component**

Certification range	HF	
	0 -	5 mg/m <sup>3</sup>

**Evaluation of the cross sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.00	mg/m <sup>3</sup>
Sum of negative CS at zero point	0.00	mg/m <sup>3</sup>
Sum of positive CS at reference point	0.00	mg/m <sup>3</sup>
Sum of negative CS at reference point	0.00	mg/m <sup>3</sup>
Maximum sum of cross sensitivities	0.00	mg/m <sup>3</sup>
Uncertainty of cross sensitivity	0.000	mg/m <sup>3</sup>

**Calculation of the combined standard uncertainty**

**Tested parameter**

			$u^2$	
Standard deviation from paired measurements under field conditions *	$u_D$	0.024 mg/m <sup>3</sup>	0.001	(mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	$u_{lof}$	-0.035 mg/m <sup>3</sup>	0.001	(mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	$u_{d,z}$	0.023 mg/m <sup>3</sup>	0.001	(mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	$u_{d,s}$	0.046 mg/m <sup>3</sup>	0.002	(mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	$u_t$	0.017 mg/m <sup>3</sup>	0.000	(mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	$u_v$	0.006 mg/m <sup>3</sup>	0.000	(mg/m <sup>3</sup> ) <sup>2</sup>
Cross sensitivity (interference)	$u_i$	0.000 mg/m <sup>3</sup>	0.000	(mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample pressure	$u_p$	0.012 mg/m <sup>3</sup>	0.000	(mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$	0.040 mg/m <sup>3</sup>	0.002	(mg/m <sup>3</sup> ) <sup>2</sup>
Excursion of measurement beam	$u_{mb}$	0.022 mg/m <sup>3</sup>	0.000	(mg/m <sup>3</sup> ) <sup>2</sup>

\* The larger value is used :

"Repeatability standard deviation at span" or

"Standard deviation from paired measurements under field conditions"

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

Combined standard uncertainty ( $u_c$ )		0.08	mg/m <sup>3</sup>
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.16	mg/m <sup>3</sup>

**Relative total expanded uncertainty**

<b>Requirement of 2010/75/EU</b>	<b>U in % of the ELV 1 mg/m<sup>3</sup></b>	<b>16.4</b>
<b>Requirement of EN 15267-3</b>	<b>U in % of the ELV 1 mg/m<sup>3</sup></b>	<b>40.0</b>
	<b>U in % of the ELV 1 mg/m<sup>3</sup></b>	<b>30.0</b>