



# IECEX Certificate of Conformity

## INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification System for Explosive Atmospheres

for rules and details of the IECEx Scheme visit [www.iecex.com](http://www.iecex.com)

Certificate No.:	<b>IECEX ITS 14.0015X</b>	Page 1 of 4	<u>Certificate history:</u>
Status:	<b>Current</b>	Issue No: 3	Issue 2 (2020-04-21)
Date of Issue:	2022-03-15		Issue 1 (2015-03-17)
Applicant:	<b>Endress+Hauser Optical Analysis Inc</b> 371 Parkland Plaza Ann Arbor, MI 48103 <b>United States of America</b>		Issue 0 (2014-07-18)
Equipment:	<b>Raman Probes</b>		
Optional accessory:			
Type of Protection:	<b>Ex ia op is or op sh</b>		
Marking:	Ex ia op is IIA or IIB or IIB + H2 or IIC T3 or T4 or T6 Ga* IECEX ITS 14.0015X		

\* See equipment description for applicable Gas Groups and T Classes and annex for alternative markings.

Approved for issue on behalf of the IECEx  
Certification Body:

**Mark Newman**

Position:

**Certificate Officer**

Signature:  
(for printed version)

Date:  
(for printed version)

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ITS House, Cleeve Road  
Leatherhead  
Surrey, KT22 7SA  
United Kingdom

**intertek**



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Date of issue: 2022-03-15

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Manufacturer: **Endress+Hauser Optical Analysis Inc**  
371 Parkland Plaza  
Ann Arbor, MI 48103  
**United States of America**

Additional manufacturing locations:

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEX Quality system requirements. This certificate is granted subject to the conditions as set out in IECEX Scheme Rules, IECEX 02 and Operational Documents as amended

## STANDARDS :

The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

[IEC 60079-0:2017](#) Explosive atmospheres - Part 0: Equipment - General requirements  
Edition:7.0

[IEC 60079-11:2011](#) Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"  
Edition:6.0

[IEC 60079-28:2015](#) Explosive atmospheres - Part 28: Protection of equipment and transmission systems using optical radiation  
Edition:2

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

## TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Reports:

[GB/ITS/ExTR14.0015/00](#)

[GB/ITS/ExTR14.0015/01](#)

[GB/ITS/ExTR14.0015/02](#)

Quality Assessment Report:

[DE/TUR/QAR11.0001/04](#)



# IECEX Certificate of Conformity

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## **EQUIPMENT:**

Equipment and systems covered by this Certificate are as follows:

The Kaiser Optical Systems, Inc. Raman Probes comprise 4 probe types:

The Rxn-41 and Rxn-40 Raman Probes are for Process Control and allow direct installation into reaction vessels or process streams.

The Rxn-30 Probe has been designed to meet the needs of gas-phase chemistries. A sintered filter may be included to exclude dust particles greater than 20µm in diameter, permitting an increase in optical power.

The Rxn-20 Probe has been designed to meet sensing needs requiring a large spot size.

Refer to the annex for further details of permitted power levels, gas groups and marking codes.

## **SPECIFIC CONDITIONS OF USE: YES as shown below:**

1. The fibre optic cable linking the laser output to the pilot probe shall be installed so that the minimum bend radius specified by the cable manufacturer is not exceeded.
2. The fibre optic cable shall be installed in a manner such that the cable is not subjected to strain or pulling at the entry of the optical cable into the probe assembly.
3. Where it is necessary to monitor the process level to ensure that the optical beam is not exposed to a potentially explosive atmosphere, the devices used to monitor the level shall be intrinsically safe or classed as simple apparatus and be installed so as to provide (for EPL Ga) a fault tolerance of 2. Where the EPL required for the area of installation is lower than Ga, the reliability of the control mechanism may also be reduced. The functional safety of this arrangement has not been assessed as part of this certification and it is the responsibility of the installer / user to ensure that an appropriate mechanism is in place, commensurate with the required EPL.
4. When the probe is manufactured from Titanium, the probe shall be installed so that it cannot be subjected to impact or friction.
5. Rxn-20 probe focusing optics must not reduce the beam diameter below 3.4mm.
6. Laser power interlocks must be set for the Rxn-20 probe without focusing optics installed.



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## **DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)**

Issue 1:

Update to certification standards and QAR reference.

Issue 2:

Update to certification standards and QAR Reference.

Introduction of alternative connection method to the pilot probe.

Addition of specific condition for use concerning the prevention of strain on the fibre-optic cable entry to the probe.

Issue 3:

Updated the applicant and manufacturer's name from KAISER OPTICAL SYSTEM, INC. to Endress+Hauser Optical Analysis Inc.

Updated model names from Pilot to Rxn-41, from WetHead to Rxn-40, from AirHead to Rxn-30, and from PhAT to Rxn-20

**Annex:**

[SFT-IECEX-OP-19f - Annex for IECEx CoC\\_1.pdf](#)



# Annex to IECEx Certificate of Conformity

<b>Certificate No:</b>	IECEX ITS 14.0015X	<b>Issue No. 3</b>
<b>Annex No. 1</b>		

Technical Documents			
Title:	Drawing No.:	Rev. Level:	Date:
Probe GA	2009483	X3	19 Oct 2020
Jumper, Interlock	2007871-101	R2	25 Jan 2007
Assembly, Probe Type ER1082, ATEX	2010986	X2	15 Mar 2011
ATEX justification for Pilot probe type E temperature sensor	4000188	R3	11 Feb 2012
Schedule Drawing, WetHead-Mini-Max	2013340	X3	1 Oct 2020
Schedule Drawing, Gas Phase Probe (AirHead)	2013339	X1	3 Jun 2013
Schedule Drawing, ATEX PhAT Probe	2013259	X4	4 Sep 2013
Integrated Invictus Interlock System	2011965	X7	12 Apr 2012
Laser Power control and safety interlock	4002017	X1	18 Nov 2011
Safety statement, RXN Invictus Laser, IS Barrier, Interlock connector and probe system.	4002019	X1	18 Nov 2011
*HAZARDOUS LOCATION LABEL REQUIREMENTS FOR PROBES	4002252	R3	20 Jan 2022

*Note: An \* is included before the title of documents that are new or revised.*

General product information:

**The Endress+Hauser Optical Analysis Inc. Raman Probes** comprise 4 probe types:

The Rxn-41 and Rxn-40 Raman Probes are for Process Control and allow direct installation into reaction vessels or process streams.

The Rxn-30 Probe has been designed to meet the needs of gas-phase chemistries. A sintered filter may be included to exclude dust particles greater than 20µm in diameter, permitting an increase in optical power.

The Rxn-20 Probe has been designed to meet sensing needs requiring a large spot size.

The optical output of the laser within the analyser is connected by a fibre optical cable with fibre breakage detection mechanism to the Probe which is in contact with the process. The laser power is controlled by the analyzer which incorporates the Endress+Hauser Optical Analysis Inc. Integrated Invictus Interlock System. The laser power provided by the analyzer is adjusted and subsequently monitored to ensure that the laser power exiting the probe is within the following limits:

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## Annex to IECEx Certificate of Conformity

<b>Certificate No:</b>	IECEX ITS 14.0015X	<b>Issue No. 3</b>
<b>Annex No. 1</b>		

Apparatus Group	IIA		IIB Only		IIB + H <sub>2</sub>	IIC	
	T3	T4	T3	T4	T3	T4	T6
Temperature Class	<200	<135	<200	<135	<200	<135	<85
Temperature Class (°C)	<200	<135	<200	<135	<200	<135	<85
Power (mW) Rxn-41 Series Probe	150	35	35	35	35	35	15
Power (mW) Rxn-40 Series Probe	150	35	35	35	35	35	15
Power (mW) Rxn-30 Series without sintered filter.	150	35	35	35	35	35	15
Power (mW) Rxn-30 Series with sintered filter (20 µm).	150	35	125	35	100	35	15
Irradiance (mW/mm <sup>2</sup> )	5/20*	5	5/15*	5	5/12*	5	5
Power (mW) Rxn-20 Series Probe	152	38	38	38	38	38	15
Irradiance(mW/mm <sup>2</sup> ) Rxn-20 Series Probe	20	20	5	5	5	5	5

The tabulated power levels refer to surface areas not exceeding 400mm<sup>2</sup>.

\*For irradiated areas greater than 30mm<sup>2</sup> where combustible materials may intercept the beam, the 5mW/mm<sup>2</sup> limit applies.

Alternatively, when the probe window is submerged in liquid with safety interlock via level sensing or similar means, the probe may be marked:

Ex ia op sh IIA or IIB or IIC T6 Ga

Or, where the probe window is not in contact with a hazardous area:

Ex ia IIC T6 Gb

The probe may incorporate an RTD temperature sensor.

Intrinsic safety parameters are as follows:

The probe IS input parameters for the fibre breakage loop are as follows:

U<sub>i</sub> = 9.6 V

I<sub>i</sub> = 10 mA

P<sub>i</sub> = 24 mW

C<sub>i</sub> = 0

L<sub>i</sub> = 0

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## Annex to IECEx Certificate of Conformity

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<b>Annex No. 1</b>		

The probe IS input parameters for the temperature measurement circuit are as follows:

$U_i = 10.8 \text{ V}$

$I_i = 9 \text{ mA}$

$P_i = 24 \text{ mW}$

$C_i = 0$

$L_i = 0$

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