

EU TYPE-EXAMINATION CERTIFICATE

1. EU type-examination Certificate (Module B)
2. Equipment or Protective System intended for use in potentially explosive atmospheres (Directive 2014/34/EU)
3. EU type examination certificate Nr **ITS10ATEX17085X R.0**
4. **Product:** Raman Probes
5. **Manufacturer:** Endress+Hauser Optical Analysis, Inc. **Applicant:** Endress+Hauser Optical Analysis, Inc.
6. **Address:** 371 Parkland Plaza
Ann Arbor MI 48103
USA **Address:** 371 Parkland Plaza
Ann Arbor MI 48103
USA
7. This product and any acceptable variation thereto are specified in the schedule to this certificate and therein referred to.
8. INTERTEK ITALIA S.p.A., Notified Body n° 2575 in accordance with article 17 of the Directive 2014/34/EU of the European Parliament and Council of the 26 February 2014, certifies that the equipment or protective system has been found to comply with the essential Health and Safety Requirements relating to the design and construction of equipment and protective system intended for use in potentially explosive atmosphere, given in Annex II of the Directive.



The examination and tests results are recorded in confidential technical evaluation Intertek Report Nr. 104938426CRT-005 Issue 0 dated 30th 10 February 2022

1. Compliance with the Essential Health and Safety Requirements has been assured by compliance with standards EN IEC 60079-0:2018, EN 60079-11:2012 and EN 60079-28:2015 except in respect of those requirements referred to at item 16 of the Schedule.
2. If the sign X is placed after the certificate number, it indicates that the product is subject to Special Conditions for Safe Use specified in the schedule to this certificate.
3. This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.
4. The marking of the product shall include the following:



II 2/1 G Ex ia op is IIA or IIB or IIB+H2 or IIC T4 or T3 or T6 Ga
Tamb: -20°C to +60°C

* for alternative markings, refer to schedule

25 March 2022

Certificate issue date



Todd L. Relyea
Certification Officer
Intertek Italia S.p.A. (NB 2575)



PDR N° 277B

Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC

Signatory of EA, IAF and ILAC Mutual Recognition Agreements

This certificate has been issued by Intertek Italia S.p.A. NB 2575 on transfer from Intertek Testing & Certification Ltd. (NB 0359) using the same issued original certificate number.



This Certificate is for the exclusive use of Intertek's client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this Certificate. Only the Client is authorized to permit copying or distribution of this Certificate and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek.

Intertek Italia S.p.A. Via Miglioli, 2/A - 20063 Cernusco sul Naviglio, Milano - Italy

LFT-EMEA-IT-ATEX-OP-23a (29 August 2019)



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13. DESCRIPTION OF THE EQUIPMENT OR PROTECTIVE SYSTEM

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:

Apparatus Group	IIA		IIB Only		IIB + H ₂	IIC	
	T3	T4	T3	T4		T4	T6
Temperature Class	T3	T4	T3	T4	T3	T4	T6
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 ²)	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 ²) Rxn-20 Series Probe	20	20	5	5	5	5	5

The tabulated power levels refer to surface areas not exceeding 400mm².

*For irradiated areas greater than 30mm² where combustible materials may intercept the beam, the 5mW/mm² 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:



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

$U_i = 9.6 \text{ V}$

$I_i = 10 \text{ mA}$

$P_i = 24 \text{ mW}$

$C_i = 0$

$L_i = 0$

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

$U_i = 10.8 \text{ V}$

$I_i = 9 \text{ mA}$

$P_i = 24 \text{ mW}$

$C_i = 0$

$L_i = 0$

CE Marking shall be accompanied by the identification number of the Notified Body responsible for surveillance of production.

14. DRAWINGS AND DOCUMENTS

TITLE	DOCUMENT Nr	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
*ATEX Label, Probes Schematic	4002252	R3	20 Jan 2022
*Operating Instructions Rxn-41 Raman spectroscopic probe	70194074	01.21	2021-12-31
*Operating Instructions Rxn-40 Raman spectroscopic probe	70193562	01.21	2021-12-31



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TITLE	DOCUMENT Nr	LEVEL	DATE
*Operating Instructions Rxn-30 Raman spectroscopic probe	70193522	01.21	2021-12-31
*Operating Instructions Rxn-20 Raman spectroscopic probe	70193519	01.21	2021-12-31

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

Copies of the above listed documents are kept at Intertek Italia S.p.A. archive.

15. SPECIAL CONDITIONS FOR SAFE USE

- The fibre optic cable linking the laser output to the Rxn-41 probe shall be installed so that the minimum bend radius specified by the cable manufacturer is not exceeded.
- 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 to the probe assembly.
- 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 / Category 1G) a fault tolerance of 2. Where the EPL required for the area of installation is lower than Ga / Category 1G, 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 / Equipment Category.
- When the probe is manufactured from Titanium, the probe shall be installed so that it cannot be subjected to impact or friction.
- Rxn-20 probe focusing optics must not reduce the beam diameter below 3.4mm.
- Laser power interlocks must be set for the Rxn-20 probe without focusing optics installed.

16. ESSENTIAL HEALTH AND SAFETY REQUIREMENTS

The relevant essential Health and Safety Requirements have been identified and assessed in Intertek Report Nr. 104938426CRT-005 Issue 0 dated 30th 10 February 2022.

17. ROUTINE (FACTORY) TESTS

None

18. DETAIL OF CERTIFICATE CHANGES

September 2010

Issue 1 Original certificate issue (10044753)

July 2013

Issue 2 Introduction of the PhAT probe (G101150319) Update to interlock system

February 2015

Issue 3 Update to standards & drawings (G101814019) New report number

April 2020

Issue 4 Update to standards (G103806740)

February 2022



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R.0 Update applicant and manufacturer's name from KAISER OPTICAL SYSTEM, INC. to Endress+Hauser Optical Analysis Inc. and updated drawings, copy of marking plate, and general product information to reflect name change.

Updated model names:

Old Brand Name	New Brand Name
PhAT	Rxn-20
AirHead	Rxn-30
WetHead	Rxn-40
Pilot	Rxn-41