



# 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.: **IECEx SIR 18.0054X** Page 1 of 3 [Certificate history:](#)

Status: **Current** Issue No: 0

Date of Issue: 2019-08-05

Applicant: **Guided Wave Inc. An Advanced Company**  
3033 Gold Canal Drive  
Rancho Cordova  
California 95670  
United States of America

Equipment: **NIR-O Analyzer (see annexe for the model types)**

Optional accessory:

Type of Protection: **Flameproof, Purged, Increased Safety, Intrinsically Safe, Type nA and Optical Isolation**

Marking: **Model no: 405V5-1PWCH** Ex db ib [ib] op pr pxb IIB+H<sub>2</sub> T4 Gb  
**Model no: 405V4-1PWCH** Ex ic nA op pr pzc IIB+H<sub>2</sub> T4 Gc  
Ta = 0°C to +45°C

Approved for issue on behalf of the IECEx  
Certification Body:

**N Jones**

Position:

**Certification Manager**

Signature:  
(for printed version)

Date:

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\_\_\_\_\_

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**United Kingdom**





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Manufacturer: **Guided Wave Inc. An Advanced Company**  
3033 Gold Canal Drive  
Rancho Cordova  
California 95670  
**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 60079-0:2011** Explosive atmospheres - Part 0: General requirements  
Edition:6.0

**IEC 60079-1:2014-06** Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"  
Edition:7.0

**IEC 60079-11:2011** Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"  
Edition:6.0

**IEC 60079-15:2010** Explosive atmospheres - Part 15: Equipment protection by type of protection "n"  
Edition:4

**IEC 60079-2:2014-07** Explosive atmospheres - Part 2: Equipment protection by pressurized enclosure "p"  
Edition:6

**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 Report:

[GB/SIR/ExTR19.0210/00](#)

Quality Assessment Report:

[CA/CSA/QAR16.0007/00](#)



# IECEx Certificate of Conformity

Certificate No.: **IECEx SIR 18.0054X**

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Date of issue: 2019-08-05

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**EQUIPMENT:**

Equipment and systems covered by this Certificate are as follows:

The NIR-O is a spectrographic analyser designed to analyse a spectrum of light after it passes through optics at a given sample point.

Refer to the Annexe for the full descriptions of both the pxb model and pzc model

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

Refer to the Annexe

**Annex:**

[IECEx SIR 18.0054X Issue 0 Annexe.pdf](#)

**Annexe to:** IECEx SIR 18.0054X Issue 0

**Applicant:** Guided Wave Inc.

**Apparatus:** NIR-O Analyzer Model 405V4-1PWCH  
(Type pzc)  
NIR-O Analyzer Model 405V5-1PWCH  
(Type pxb)

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#### **Type pxb: (Model no: 405V5-1PWCH)**

The NIR-O is a spectrographic analyser designed to analyse a spectrum of light after it passes through optics at a given sample point.

NIR-O has a pressurized main enclosure, which consists of the following modules inside:

- Light Source and Filter Wheel
- Multiplexer and Spectrometer (includes the detector)
- Computer
- Cabinet Heat Exchanger
- Communications Converters (Ethernet to Fibre Optic)
- Power Supplies

A small enclosure is mounted on the exterior of the enclosure to provide impact protection for the fibre cables and used as a junction box for service loops. This enclosure is not purged or pressurised.

The Fibre Optic output assembly receives the source light energy and directs it into a manifold of fibre optic cables for distribution to the field mounted probe(s) or flow cells. The fibre optic cables are mechanically protected against damage that would allow the light to escape from the cable.

Returning fibre optic cables from the probes are connected to the Multiplexor (Mux), which selects the light energy from one of the fibre optic cables and directs it into the spectrograph. The spectrograph receives the light energy through the Mux and gives a spectrum on a detector.

The thermal electric A/C is a nominal 1200 BTU/hr (680 BTU/hr actual) instrument air conditioning unit that is designed to be installed external to the pressurized main enclosure.

The enclosure is made of powder-coated steel and zinc plated hardware for the clamps and hinges. It has a control unit that automatically purges and pressurizes the inside of the enclosure once the enclosure is no longer pressurized. This contactor is housed in an Ex d certified enclosure (IECEx and ATEX certified Model XIHLFCX). The power connections at the contactor are provided by the customer and is routed to the Type pxb control unit. Once the purge process is completed and safe pressure is maintained inside the enclosure, the control unit energizes the contactor, which sends power to the analyser. The type pxb system includes a control unit, purge vent, I.S. cable between vent and control unit, contactor enclosure, cable sealing glands, and flexible conduit. The location and the certification information of these components can be found in the table listed below.

Customer connect incoming power on the contactor in the small flameproof enclosure located externally under the main enclosure. The purge control unit energizes the contactor if safe pressure and proper purge operation is completed. Once the contactor is energized, the breakers for the main enclosure are also energized which powers the A/C and internal modules. If pressurization falls below the safe setting, the purge control unit cuts put to the contactor subsequently removing power to the main enclosure. Power to the main enclosure will not be restored until the pressurization and purge operations are completed.

The following IECEx/ATEX certified components and equipment's as applicable have been utilized in Type pxb model based on the listed standards

**Annexe to:** IECEx SIR 18.0054X Issue 0

**Applicant:** Guided Wave Inc.

**Apparatus:** NIR-O Analyzer Model 405V4-1PWCH  
(Type pzc)  
NIR-O Analyzer Model 405V5-1PWCH  
(Type pxb)



Item #	Manufacturer Document#	Balloon no per manufacturer document#	Component	Manufacturer /model	ATEX Certification	IECEX Certification	Application
40677-00002	40669-1V3PCH	445	ENCLOSURE, FLAMEPROOF	ADALET/SCOTT FETZER CO. / Model XIHLFCX	DEMKO 07 ATEX 0622294U Rev 3	IECEX UL 08.0005U Issue 6	Housing of the contactor
					Protection method : Ex II 2 G Ex d IIC Gb Ex II 2 G Ex d IIB + H2 Gb		
11113-UFF92	40669-1V3PCH	442	UNION, STRAIGHT, F-F, ¾ NPT, AL GUF-2-EX	Killark, Div of Hubbell Inc / GUF-2-EX	ITS09ATEX164 17U/02	IECEX ITS 09.0024U	Connection between the purge control unit (balloon # 447) and the contactor enclosure (balloon # 445)
					Protection method : Ex d IIC		
11521-90M16	40669-1V3PCH	398	CABLE GLAND	U.I.Lapp GmbH / 54115215	IBExU08ATEX1 063X	IECEX IBE 13.0027X issue 0	It is used to seal around the fiber-optic cables that run in and out of the analyser on the right side of the equipment.
					Protection method : Ex eb IIC, Ex ta III		
23287-00002 23287-00003	40669-1V3PCH	443 458	GLAND, MC CABLE, A, ¾ NPT, Ni 711-A-3/4-Ni BRASS	Hawke International / 711-A-3/4-Ni BRASS	SIRA 07ATEX4330X Issue: 6	IECEX SIR 06.0082X Issue 9	It is used to seal the contactor enclosure entries and also seal the entry on the bottom of the main enclosure that connects to the contactor enclosure
					Protection method: Ex d IIC Gb and Ex e II Gb Ex tb IIIC Db IP 66		
10665-00001 11060-00001	40669-1V3PCH	447 455	CONTROL UNIT + VENT	Pepperl + Fuchs Inc. / Model 6000 Pressurization Control System	-	IECEX UL 08.0003X Issue 8	The control unit provides automatic monitoring and control of purging, temperature, leakage, alarm and system power of the main enclosure. This control unit comes with a pressure relief vent that allows gas to exit the enclosure when the breaking pressure of the vent is reached
						Ex d [ib px] IIC T4 tD A21 IP6X T60°C	
11663-00105 11663-00106 11663-00201	14064-J000V	222 267 268	Shaft coupling	ROTEX GS	IBExU03ATEXB 002_05_X	-	The coupler is housed inside the large fan shaft sleeve to protect from misalignment of motor shaft.

**Annexe to:** IECEx SIR 18.0054X Issue 0

**Applicant:** Guided Wave Inc.

**Apparatus:** NIR-O Analyzer Model 405V4-1PWCH  
(Type pzc)  
NIR-O Analyzer Model 405V5-1PWCH  
(Type pxb)



#### Type pzc: (Model no: 405V4-1PWCH)

The NIR-O is a spectrographic analyser designed to analyse a spectrum of light after it passes through optics at given sample point.

NIR-O has a pressurized main enclosure which consists of the following modules inside:

- Light Source and Filter Wheel
- Multiplexer and Spectrometer (includes the detector)
- Computer
- Cabinet Heat Exchanger
- Communications Converters (Ethernet to Fibre Optic)
- Power Supplies

A small enclosure is mounted on the exterior of the enclosure to provide impact protection for the fibre cables and used as a junction box for service loops. This enclosure is not purged or pressurised.

The Fiber Optic output assembly receives the source light energy and directs it into a manifold of fiber optic cables for distribution to the field mounted probe(s) or flow cells. The fiber optic cables are mechanically protected against damage that would allow the light to escape from the cable.

Returning fiber optic cables from the probes are connected to the Multiplexor (Mux), which selects the light energy from one of the fiber optic cables and directs it into the spectrograph. The spectrograph receives the light energy through the Mux and gives a spectrum on a detector.

The thermal electric A/C is a nominal 1200 BTU/hr (680 BTU/hr actual) instrument air conditioning unit that is designed to be installed external to the pressurized main enclosure.

The enclosure is made of powder-coated steel and zinc plated hardware for the clamps and hinges. It has a manual control unit to purge and pressurization the inside of the enclosure before electrical is applied. The Type pzc system includes an indicator, inlet kit, and over pressure vent. Certification information of these components can be found in the table listed below.

The following IECEx/ATEX certified components have been utilized for Type pzc model based on listed standards in section 1.7

Item #	Manufacturer Document#	Balloon no per manufacturer document#	Component	Manufacturer/ model	IECEx Certification	Application
11521-90M16	40669-1V2PCH	398	CABLE GLAND	U.I.Lapp GmbH / 54115215	IECEx IBE 13.0027X issue 0 Protection method : Ex eb IIC, Ex ta III	It is used to seal around the fiber-optic cables that run in and out of the analyser on the right side of the equipment.

**Annexe to:** IECEx SIR 18.0054X Issue 0

**Applicant:** Guided Wave Inc.

**Apparatus:** NIR-O Analyzer Model 405V4-1PWCH  
(Type pzc)  
NIR-O Analyzer Model 405V5-1PWCH  
(Type pxb)



Item #	Manufacturer Document#	Balloon no per manufacturer document#	Component	Manufacturer/ model	IECEx Certification	Application
11093-00001	40669-1V2PCH	408	INDICATOR [INLET KIT & VENT]	Purge Solutions, Inc. / CYCLOPS Z-Purge Indicators	IECEx DNV 09.0001X issue 1 Protection method : Ex nA ic [pz] IIC T6 Gc Ex tc IIIC T79°C Dc IP66	The indicator monitors the internal pressure to ensure proper purging. An alarm will be triggered in the event of out-of-range pressure. The inlet kit and vent help regulate the inflow and outflow of purge gas respectively.
11663-00105 11663-00106 11663-00201	14064-J000V	222 267 268	Shaft coupling	ROTEX GS	IBExU03ATEXB002_05_X	The coupler is housed inside the large fan shaft sleeve to protect from misalignment of motor shaft.

## Specific Conditions of Use

### Type pxb, NIR-O Analyzer Model 405V5-1PWCH only:

- When marked with the code "Ex db h ib op pr pxb IIB+H2 T4 Gb", any fibre optic cable shall be protected in accordance with the relevant code of practice.
- Ensure that the purge gas supply does not exceed 40°C
- Inspect the air conditioning unit for dust build-up in accordance with the manufacturer's instructions.
- The equipment when used in the outdoor locations shall be installed in a protective shelter as indicated in the user manual.
- All unused device openings of the ADALET/SCOTT FETZER CO. / Model XIHLFCX flameproof enclosure must be fitted with a suitably certified close-up plug with protection types 'd', 'tb', and have an IP66 rating

### Type pzc, NIR-O Analyzer Model 405V4-1PWCH only:

- When marked with the code "Ex h ic nA op pr pzc IIB+H2 T4 Gc", any fibre optic cable must be protected in accordance with the relevant code of practice.
- Ensure that the purge gas supply does not exceed 40°C
- Inspect the air conditioning unit for dust build-up in accordance with the manufacturer's instructions.
- The equipment when used in the outdoor locations shall be installed in a protective shelter as indicated in the user manual.

**Annexe to:** IECEx SIR 18.0054X Issue 0

**Applicant:** Guided Wave Inc.

**Apparatus:** NIR-O Analyzer Model 405V4-1PWCH  
(Type pzc)  
NIR-O Analyzer Model 405V5-1PWCH  
(Type pxb)



## Conditions of Manufacture

### Type pxb and Type pzc:

- i. Each and every NIR-O Analyser shall be subjected to a routine overpressure test of 9 (6\*1.5) mbar for Type pxb and 107.5 (71.6\*1.5) mbar for Type pzc for a period of 2 min  $\pm$  10 s, in accordance with Clause 16.2 of IEC/EN 60079-2:2014.  
There shall be no permanent deformation.
- ii. Each and every NIR-O Analyser shall be subjected to a routine leakage test, in accordance with Clause 16.3 of IEC/EN 60079-2:2014. The leakage flow rate shall not exceed 17 L/min for Type pxb and 125L/min for Type pzc.
- iii. The NIR-O Analyser incorporates previously certified devices as listed below

Applicable model	Item #	Component	Manufacturer/ model	IECEX Certification
Type pxb	40677-00002	ENCLOSURE, FLAMEPROOF,	ADALET/SCOTT FETZER CO. / Model XIHLFCX	IECEX UL 08.0005U Issue 6
Type pxb	11113-UFF92	UNION, STRAIGHT, F-F, 3/4 NPT, AL GUF-2-EX	Killark, Div of Hubbell Inc / GUF-2-EX	IECEX ITS 09.0024U
Type pxb & pzc	11521-90M16	CABLE GLAND	U.I.Lapp GmbH / 54115215	IECEX IBE 13.0027X issue 0
Type pxb	23287-00002	GLAND, MC CABLE, A, 3/4 NPT, Ni 711-A-3/4-Ni BRASS	Hawke International / 711-A-3/4-Ni BRASS	IECEX SIR 06.0082X Issue 8
Type pzc	11093-00001	INDICATOR [INLET KIT & VENT]	Purge Solutions, Inc. / CYCLOPS Z-Purge Indicators	IECEX DNV 09.0001X issue 1
Type pxb	10665-00001 11060-00001	CONTROL UNIT + VENT	Pepperl + Fuchs Inc. / Model 6000 Pressurization Control System	IECEX UL 08.0003X Issue 8
Type pxb & pzc	11663-00105 11663-00106 11663-00201	14064-J000V	Shaft coupling	IBExU03ATEXB002_05_X