CERTIFICATE OF CONFORMITY

1. **HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**
2. **Certificate No:** **FM16US0215X**
3. **Equipment: (Type Reference and Name)** **PROTRAC (FIBERTRAC, MINITRAC, SOLITRAC, POINTRAC, WEIGHTRAC) Series, Radiation-Based Sensor**
4. **Name of Listing Company:** **VEGA Grieshaber KG**
5. **Address of Listing Company:** **Am Hohenstein 113**
   D-77761 Schiltach, Baden-Wuerttemberg
   Germany
6. The examination and test results are recorded in confidential report number:

   3031547 dated 11th December 2009
7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:

   FM Class 3600:2018, FM Class 3610:2018, FM Class 3611:2018, FM Class 3615:2018, FM Class 3616:2011, FM Class 3810:2018, ANSI/IEC 60529:2004, ANSI/ISA-60079-0:2020, ANSI/ISA-60079-11:2014, ANSI/ISA-61010-1:2012, ANSI/UL 50E:2015, ANSI/UL 121201:2019
8. If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
9. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.
10. Equipment Ratings:

    Explosionproof Equipment for use in Class I, Division 1, Groups A, B, C and D; Dust-Ignitionproof Equipment for use in Class II, Division 1, Groups E, F and G, Class III, Division 1; providing intrinsically safe connections to Class I, II, III, Division 1, Groups A, B, C, D, E, F and G in accordance with installation drawing 1001360 with an ambient temperature rating of -50 ºC to +60 ºC, indoor and outdoor (Type 4X; IP66, IP67) environments. The FIBERTRAC has an ambient temperature rating of -40 ºC to +60 ºC.

Certificate issued by:

J. E. Marquedant
VP, Manager - Electrical Systems

29 July 2021
Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

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Nonincendive Equipment for use in Class I, Division 2, Groups A, B, C and D, Class II, Division 2, Groups F and G, Class III, Division 2; providing intrinsically safe connections to Class I, II, III, Division 1, Groups A, B, C, D, E, F and G in accordance with installation drawing 1001360 with an ambient temperature rating of -50 ºC to +60 ºC, indoor and outdoor (Type 4X; IP66, IP67) environments. The FIBERTRAC has an ambient temperature rating of -40 ºC to +60 ºC.

11. The marking of the equipment shall include:

In types of protection explosionproof/dust-ignitionproof enclosure with intrinsically safe connections, the equipment is labelled with the following marking(s):

Class I, II, III, Division 1, Groups ABCDEFG, T6
IS Outputs Class I, II, III, Division 1, Groups ABCDEFG Entity
Ta = -50 ºC to +60 ºC
Ta = -40 ºC to +60 ºC (FIBERTRAC only)
Installation per Dwg. 1001360; Type 4X; IP66/IP67

In type of protection nonincendive equipment with intrinsically safe connections, the equipment is labelled with the following marking(s).

Class I, II, III, Division 2, Groups A, B, C, D, F, G T6
IS Outputs Class I, II, III, Division 1, Groups ABCDEFG Entity
Ta = -50 ºC to +60 ºC
Ta = -40 ºC to +60 ºC (FIBERTRAC Only)
Installation per Dwg. 1001360; Type 4X; IP66/IP67

12. **Description of Equipment:**

General – The PROTRAC devices are part of the radiometric measuring principle.
In a radiometric measurement, a weak radioactive source on the tank emits focused gamma rays. A special detector mounted on the opposite side of the tank receives the PROTRAC devices which is converted into flashes of light. The number of these flashes is detected and evaluated.
The FIBERTRAC 31, 32 and SOLITRAC 31 are suitable for non-contact level and interface measurement.
The MINITRAC 31, 32 are suitable for the non-contact, continuous density measurement and level detection of liquids and bulk solids in pipelines and vessels.
The POINTRAC 31 are suitable for non-contact level detection of liquids and bulk solids.
The WEIGHTRAC 31, 32 are suitable for non-contact, continuous mass flow measurement of bulk solids on conveyor belts and screw conveyors.

Construction - The compact version of the radiation-based sensor is constructed from one of three different double chamber enclosure versions, with or without an additional PLICSCOM display, permanently attached directly to the detector rod or tube.

The remote version of the radiation-based sensor is constructed from one of three different double chamber enclosure versions, with or without an additional remote VEGADIS 61/81, permanently attached directly to the detector rod or tube.

The double chamber enclosure versions, with explosionproof type of protection feedthrough between chambers,

is comprised of aluminum with metric or NPT threaded hubs and two threaded mating covers with or without an inspection display window; or stainless steel casting with metric or NPT threaded hubs and two threaded mating covers with or without an inspection display window.

The base chassis of the aluminum and stainless steel casting enclosures includes a lid lock for the single chamber enclosure version and two lid locks for the double chamber enclosure version.

The VEGADIS 61/81 is identically constructed from one of the two different single chamber enclosure versions of the radiation-based sensor enclosure and installed to a socket and base plate.

For the various enclosure designs by unscrewing the enclosure cover, the connection terminals to the signal and supply circuit are accessible. Visible is the PLICSCOM display indicator, situated within the top or side chamber of the enclosure, to display different pressure and level measurements. Furthermore, there are holes to contact the parameterization bushing of the electronics inserts mounted on digital part behind the cover. There are four M20 x 1.5 metric or 1/2 inch NPT cable entries in the explosionproof connection compartment of the enclosure; two of which are sealed with a certified cable gland, where applicable, or rigid conduit, and the other two are sealed with a certified blanking plug. There are two M20 x 1.5 metric or 1/2 inch NPT cable entries in the intrinsically safe connection compartment of the enclosure; one of which is sealed with a certified cable gland, where applicable, or rigid conduit, and the other is sealed with a certified blanking plug. Each of the double chamber enclosures is equipped with an internal and external earthing terminal. The signal and supply circuits are electrically isolated from elements that may be earthed, while the metal elements of the radiation-based sensor are electrically connected to earth terminals.

The electronics assemblies of the radiation-based sensor is constructed from one of four designs. The TRAC-A indicates the electronics version for the 4 wire (4-20 mA) design transmitters with superposed HART™ non-intrinsically safe current loop output signal. The TRAC-B indicates the electronics version for the 4 wire (4-20 mA) design transmitters with superposed HART™ intrinsically safe current loop output signal. The TRAC-I indicates the electronics version for the 4 wire (4-20 mA) design (and additional SIL qualification, not FM verified) transmitters with superposed HART™ non-intrinsically safe current loop output signal. The TRAC-L indicates the electronics version for the 4 wire (4-20 mA) design (and additional SIL qualification, not FM verified) transmitters with superposed HART™ intrinsically safe current loop output signal.

For more specifics concerning construction and description details of the radiation-based sensor, reference the manufacturer's sales literature and specification sheets.

Ratings - The equipment is certified to the following ratings.

The ambient operating temperature range is -50 ºC to +60 ºC or -40 ºC to +60 ºC (FIBERTRAC only). The process temperature range of the media is -40 ºC to +60 ºC or -50 ºC to +60 ºC, depending upon model configuration, with an unpressurized process pressure.

In types of protection explosionproof/dust-ignitionproof enclosure and nonincendive with intrinsically safe connections, and associated apparatus with intrinsically safe output connections, the radiation-based sensor (FIBERTRAC, MINITRAC, POINTRAC, SOLITRAC, and WEIGHTRAC, each with built-in electronics insert TRAC-A/B/I/L) equipment is connected to limited output Class 2 circuits and power source with the following nominal external supply values.

The following electrical parameters apply to the explosionproof connection compartment of the enclosure.

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Power Supply and Signal Circuit Terminals (1, 2) are:
Vmax (Ui) = 20-72 VDC; or 20-253 VAC, 50/60 Hz
Pmax (Pi) = 4 W (DC); or 6 VA (AC)
Um = 253 V maximum

Relay Circuit Terminals (4, 5, 6) are, maximum values:
Max = 253 VAC, 3 A, 500 VA
Max = 253 VDC, 1 A, 41 W

Current Input Terminals (12, 13) are:
Imax (Ii) = 4-20 mA

Digital Input Terminals (14, 15, 16) are:
Imax (Ii) = 100 mA (open collector inputs between terminals 14 and 16)
Imax (Ii) = 10 mA (open collector inputs between terminals 15 and 16)

The following electrical parameters apply to the explosionproof connection compartment of the enclosure.

Current Output Terminals (9, 10, 11) are, optional:
Isc (Io) = 4-20 mA

Digital Output Terminals (17, 18) are, optional:
Voc (Vo) = 55 VDC (potential free)
Isc (Io) = 400 mA

Communication Output Terminals (19, 20) are, PROTRAC gauges:
Voc (Vo) = 3.3 VDC

The following electrical parameters apply to the intrinsically safe connection compartment of the enclosure.

Display and Adjustment Output Terminals (5, 6, 7, 8) are, external indicating instrument (VEGADIS 61/81):
Voc (Vo) = 6.0 VDC
Isc (Io) = 209.7 mA
Po = 314.6 mW

Connection values are as follows:

	Group A/B (IIC)	Group C/D (IIB)	Group E/F/G (IIA)
C_a (C_o)	1.4 µF	1.4 µF	1.4 µF
L_a (L_o)	1.0 mH	1.0 mH	1.0 mH

Operation and Indication Circuit (Terminals 5, 6, 7, 8), double chamber enclosure with explosionproof type of protection feedthrough between chambers versions are:
Only for connection to the intrinsically safe signal circuit of the applicable external indicating instrument, VEGADIS 61/81.

Current Loop Output Terminals (1, 2) are, optional (4-20 mA):
Voc (Vo) = 22.2 VDC

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Isc (Io) = 112 mA
Po = 620 mW

Connection values are as follows:

	Group A/B (IIC)	Group C/D (IIB)	Group E/F/G (IIA)
C_a (C_o)	0.16 µF	1.11 µF	4.08 µF
L_a (L_o)	2.8 mH	12 mH	23 mH

Model Codes – The equipment is identified with the following model code structure.

In types of protection explosionproof/dust-ignitionproof enclosure with intrinsically safe output connections the equipment has the following model codes:

FT3a.Ubcdefghi PROTRAC: FIBERTRAC 3a Radiation-Based Sensor
a = Configuration: 1 or 2
b = Agency Approval: G
c = Version: 1
d = Electronics: A, B, I or L
e = Housing Type: A, D, R, S, V or W
f = Cable Entry: M or N or separately certified cable glands, blind plugs, cable bushings, plug connector, conduit (1/2NPT or M20x1.5)
g = Indicator Control Module (PLICSCOM): B, F, L, or X
h = Supplementary Electronics: X
i = Length: Options not affecting safety, three digit alphanumeric variable referring to Detector length

MT3a.Ubcdefgh PROTRAC: MINITRAC 3a Radiation-Based Sensor
a = Configuration: 1 or 2
b = Agency Approval: G
c = Version: 1 or 2
d = Electronics: A, B, I or L
e = Housing Type: D, S or W
f = Cable Entry: M or N or separately certified cable glands, blind plugs, cable bushings, plug connector, conduit (1/2NPT or M20x1.5)
g = Indicator Control Module (PLICSCOM): B, F, L or X
h = Supplementary Electronics: S or X

PT3a.Ubcdefghi PROTRAC: POINTRAC 3a Radiation-Based Sensor
a = Configuration: 1
b = Agency Approval: G
c = Version: 1 or 2
d = Electronics: A, B, I or L
e = Housing Type: D, S or W
f = Cable Entry: M or N or separately certified cable glands, blind plugs, cable bushings, plug connector, conduit (1/2NPT or M20x1.5)
g = Indicator Control Module (PLICSCOM): B, F, L or X
h = Supplementary Electronics: S or X
i = Length: Options not affecting safety, three digit alphanumeric variable referring to Detector length

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US Certificate Of Conformity No: FM16US0215X

ST3a.Ubcdefghi PROTRAC: SOLITRAC 3a Radiation-Based Sensor

a = Configuration: 1
b = Agency Approval: G
c = Version: 1 or 2
d = Electronics: A, B, I or L
e = Housing Type: D, S or W
f = Cable Entry: M or N or separately certified cable glands, blind plugs, cable bushings, plug connector, conduit (1/2NPT or M20x1.5)
g = Indicator Control Module (PLICSCOM): B, F, L or X
h = Supplementary Electronics: X
i = Length: Options not affecting safety, three digit alphanumeric variable referring to Detector length

WT3a.Ubcdefghijk PROTRAC: WEIGHTRAC 3a Radiation-Based Sensor

a = Configuration: 1 or 2
b = Agency Approval: G
c = Version: 1 or 2
d = Electronics: A, B, I or L
e = Housing Type: D, S or W
f = Cable Entry: M or N or separately certified cable glands, blind plugs, cable bushings, plug connector, conduit (1/2NPT or M20x1.5)
g = Indicator Control Module (PLICSCOM): B, F, L or X
h = Supplementary Electronics: X
i = Frame Construction: Options not affecting safety, one digit alphanumeric variable referring to frame material
j = Conveyor Width/Frame Upright Height: Options not affecting safety, two digit alphanumeric variable referring to frame size
k = Source Holder Configuration: B, D, V, X or one digit alphanumeric variable referring to source holder configuration; Options not affecting safety

In type of protection nonincendive equipment with intrinsically safe output connections, the equipment has the following model code(s).

FT3a.Ubcdefghi PROTRAC: FIBERTRAC 3a Radiation-Based Sensor

a = Configuration: 1 or 2
b = Agency Approval: X
c = Version: 1
d = Electronics: A, B, I or L
e = Housing Type: A, D, R, S, V or W
f = Cable Entry: M or N or separately certified cable glands, blind plugs, cable bushings, plug connector, conduit (1/2NPT or M20x1.5)
g = Indicator Control Module (PLICSCOM): B, F, L or X
h = Supplementary Electronics: X
i = Length: Options not affecting safety, three digit alphanumeric variable referring to Detector length

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MT3a.Ubcdefgh PROTRAC: MINITRAC 3a Radiation-Based Sensor

a = Configuration: 1 or 2
b = Agency Approval: X
c = Version: 1 or 2
d = Electronics: A, B, I or L
e = Housing Type: D, S or W
f = Cable Entry: M or N or separately certified cable glands, blind plugs, cable bushings, plug connector, conduit (1/2NPT or M20x1.5)
g = Indicator Control Module (PLICSCOM): B, F, L or X
h = Supplementary Electronics: S or X

PT3a.Ubcdefghi PROTRAC: POINTRAC 3a Radiation-Based Sensor

a = Configuration: 1
b = Agency Approval: X
c = Version: 1 or 2
d = Electronics: A, B, I or L
e = Housing Type: D, S or W
f = Cable Entry: M or N or separately certified cable glands, blind plugs, cable bushings, plug connector, conduit (1/2NPT or M20x1.5)
g = Indicator Control Module (PLICSCOM): B, F, L or X
h = Supplementary Electronics: S or X
i = Length: Options not affecting safety, three digit alphanumeric variable referring to Detector length

ST3a.Ubcdefghi PROTRAC: SOLITRAC 3a Radiation-Based Sensor

a = Configuration: 1
b = Agency Approval: X
c = Version: 1 or 2
d = Electronics: A, B, I or L
e = Housing Type: D, S or W
f = Cable Entry: M or N or separately certified cable glands, blind plugs, cable bushings, plug connector, conduit (1/2NPT or M20x1.5)
g = Indicator Control Module (PLICSCOM): B, F, L or X
h = Supplementary Electronics: X
i = Length: Options not affecting safety, three digit alphanumeric variable referring to Detector length

WT3a.Ubcdefghijk PROTRAC: WEIGHTRAC 3a Radiation-Based Sensor

a = Configuration: 1 or 2
b = Agency Approval: X
c = Version: 1 or 2
d = Electronics: A, B, I or L
e = Housing Type: D, S or W
f = Cable Entry: M or N or separately certified cable glands, blind plugs, cable bushings, plug connector, conduit (1/2NPT or M20x1.5)
g = Indicator Control Module (PLICSCOM): B,F, L or X
h = Supplementary Electronics: X
i = Frame Construction: Options not affecting safety, one digit alphanumeric variable referring to frame material

j = Conveyor Width/Frame Upright Height: Options not affecting safety, two digit alphanumeric variable referring to frame size

k = Source Holder Configuration: B, D, V, X or one digit alphanumeric variable referring to source holder configuration; Options not affecting safety

13. **Specific Conditions of Use:**

The radiation detectors (FIBERTRAC, MINITRAC, POINTRAC, SOLITRAC, and WEIGHTRAC) are designated with the following specific conditions of use.

1. Potential Electrostatic Charging Hazard – To prevent the risk of electrostatic sparking, the non-metallic surface should only be cleaned with a damp cloth.
2. Enclosures containing aluminum constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.
3. Process temperature no greater than +60 ºC.

14. **Test and Assessment Procedure and Conditions:**

This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

15. **Schedule Drawings**

A copy of the technical documentation has been kept by FM Approvals.

16. **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
11th December 2009	Original Issue.
13th July 2016	Supplement 10: Report Reference: RR205399, dated 13th July 2016. Description of the Change: Addition of process connection for the PROTRAC series. Assembly document and model code updates – the actual change is made to the entire certificate and the full document is issued to the holder. Certificate updated to the new format.
29th July 2021	Supplement 11: Report Reference: PR458537 dated 29th July 2021. Description of the Change: 1) FM3600, FM3610, FM3611, FM3615 and FM3810 updated to latest edition (2018) 2) ANSI/UL 60079-0 updated to latest edition (Edition 7:2020)

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	3) ANSI/ISA 60079-11 updated to latest edition (Edition 6:2014) 4) ANSI/ISA 61010-1 updated to Edition 3 (2012) 5) ANSI/UL 121201:2019 added to standards assessment list 6) NEMA 250 updated to current applicable standard ANSI/UL 50E (2015) 7) Expanded Temperature Ratings for the FIBERTRAC Series 8) Explosionproof construction updates to feedthrough and gauge glass 9) Model Code updates for Indicating/Adjustment Module (PLICSCOM) 10) Electronics updates 11) Updates to Certificate Sections 10, 11, 12 and 13

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