CERTIFICATE OF CONFORMITY

1. **HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**
2. **Certificate No:** **FM22US0052X**
3. **Equipment:** **VEGADIF 85**
   (Type Reference and Name) **Differential Pressure Measuring Device**
4. **Name of Listing Company:** **Vega Grieshaber KG**
5. **Address of Listing Company:** **Am Hohenstein 113**
   Schiltach D-77761
   Germany
6. The examination and test results are recorded in confidential report number:

   PR463285 dated 24th April 2023

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

   FM Class 3600:2022, FM Class 3610:2021, FM Class 3611:2021, FM Class 3615:2022, FM Class 3616:2022, FM Class 3810:2021, ANSI/UL 60079-0:2020, ANSI/UL 60079-1:2015, ANSI/UL 60079-11:2018, ANSI/UL 60079-26:2017, ANSI/UL 60079-31:2015, ANSI/UL 121201:2019 ANSI/UL 61010-1:2018, ANSI/IEC 60529:R2011, ANSI/UL 50E:2015, ANSI/ISA 12.27.01:2011

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.

Certificate issued by:

J.E. Marquedant
VP, Manager - Electrical Systems

4 June 2023
Date

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

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

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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:

    See Annex

11. The marking of the equipment shall include:

    See Annex

12. **Description of Equipment:**

    General - The differential pressure measuring device type VEGADIF 85 is used for differential pressure measurement of liquids and gases. It consists of an electronics housing, a differential pressure measuring element and the process connections. Optionally, an indication and operation module may be installed.

    Construction - All housings have a threaded cover with optional plastic or glass viewing window, two NPT or metric entries for wiring connections, a cylindrical or threaded joint on the bottom for instrument/mounting/probe connections, and an optional venting element that serves as the annunciation means required for the DUAL SEAL rating of the double compartment housings. O-ring seals are provided for environmental protection. The optional glass viewing window is suitable for explosionproof/flameproof as well as dust-ignitionproof protection and the plastic viewing window is for dust-ignitionproof protection only. The double compartment housings have an additional threaded cover. The double compartment housings also have a two or four wire cable feedthrough separating the compartments. Either compartment of the double chamber enclosure may be used separately as an explosionproof compartment, for example when an Intrinsically Safe barrier and sensor electronics are present in the equipment configuration. The double chamber housings may also be employed and considered as one large electronics compartment for explosionproof construction.

    The double chamber housings may contain a feedthrough that meets the requirements for the secondary seal for the DUAL SEAL rating. The feedthroughs may also be used to separate the compartments of the double chamber housings when only the wiring compartment with the conduit entries qualifies as explosionproof/flameproof.

    Optionally the compartments of the housings can be closed with a high cover (63mm) instead of the standard cover (35.5mm). The thread and sealing concept used for the high cover is identical with the standard cover. The high cover can be used for ordinary (non-hazardous) locations and the DIP protection type. The high cover cannot be used for the XP protection type.

    See Annex for model codes and ratings.

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13. **Specific Conditions of Use:**

See Annex

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
24th April 2023	Original Issue.
4 June 2023	Supplement 1: Report Reference: – RR237254 dated 4 June 2023 Changes listed below: Specific Conditions of Use updated to include all temperature tables for XP and Nonincendive models and model code update for DIP model

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ANNEX

VEGADIF DF85(*).ab**hijk*m* Differential Pressure Measuring Device***

Equipment Ratings

Intrinsically Safe for use in Class I, Division 1, Groups A, B, C, and D, T6…T1; hazardous (classified) locations in accordance with installation drawing 1013794 Type 4X/6P; IP66/67/68
Intrinsically Safe for use in Class I, Zone 0, AEx ia IIC T6…T1 Ga hazardous (classified) locations, in accordance with installation drawing 1013794 Type 4X/6P; IP66/67/68

See document no. 1013794 for electrical and thermal ratings
IP68 Ratings are 2 meters for 30 minutes

Equipment Markings

IS Class I Division 1, Groups A, B, C and D; T6…T1; Type 4X/6P; IP66/67/68

Class I, Zone 0, AEx ia IIC T6…T1 Ga; Type 4X/6P; IP66/67/68

Model Code

VEGADIF DF85(*).ab**hijk*m***
a = Scope = F
b = Approval = C or O
h = Electronics = Z, H, A, P, F
i = Supplementary electronics = X or Z
j = Housing = A, D, V, 8, W
k = Housing version/Protection = I, D, M, A, S, K or L
m = Display and adjustment module PLICSCOM = X, A, F, B, K or L

Specific Conditions of Use:

1. The following temperature table applies:

Temperature class	Product temperature (Tp) on the sensor	Ambient temperature (Ta)
T6 (+85 °C)	-40°C to +46 °C	-40°C to +46 °C
T5 (+100 °C)	-40°C to +55 °C (only valid with remote sensor component)	
T4 (+135 °C)	-40°C to +85 °C	-40°C to +80 °C
T3 (+200 °C)		
T2 (+300 °C)		
T1 (+450 °C)		

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2. At the plastic parts there is a danger of ignition by electrostatic discharge. Observe manual of the manufacturer and warning label.

3. At the metallic parts made of light metal there is a danger of ignition by impact or friction. Observe manual of the manufacturer.

4. For the execution with separate housing, potential equalization has to exist in the complete course of the erection of the connecting cable between the electronics housing and the measuring sensor housing.

5. FOR INFORMATION ONLY: The permissible ambient with respect to medium temperature range depends on the variant of the apparatus and on the temperature class, for which the apparatus shall be used (see thermal data). The limits of the permissible ambient temperature range may be restricted by the used O-ring material. The used O-ring material is included in the marking. The permissible temperature ranges in dependence of the material have to be taken from the manufacturer's instructions.

Name: Seal ring	Temperature range: Measuring cell	Temperature range: Seal ring
FKM	-40 to +85 °C	-40 to +220 °C
NBR	-20 to +85 °C	-20 to +120 °C
EPDM	-40 to +85 °C	-50 to +140 °C
PTFE	-40 to +85 °C	-200 to +260 °C
FFKM	-40 to +85 °C	-46 to +240 °C
Copper	-40 to +85 °C	-200 to +300 °C

VEGADIF DF85(*).ab**hijklm****

Equipment Ratings

Explosionproof and Intrinsically Safe apparatus for use in in Class I, Division 1, Groups A, B, C and D, T6…T1; hazardous (classified) locations, indoor and outdoor in accordance with installation drawing 1013798 Type 4X/6P; IP66/67/68
Intrinsically Safe and Flameproof Apparatus for use in Class I, Zone 0/1, AEx ia/db IIC T6…T1 Ga/Gb hazardous (classified) locations, indoors and outdoors in accordance with installation drawing 1013798. Type 4X/6P; IP66/67/68
Intrinsically Safe and Flameproof Apparatus for use in Class I, Zone 1, AEx db ia IIC T6…T1 Gb hazardous (classified) locations, indoors and outdoors in accordance with installation drawing 1013798. Type 4X/6P; IP66/67/68

See document no. 1013798 for electrical and thermal ratings
IP68 Ratings are 2 meters for 30 minutes

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Equipment Markings

XP-IS Class I Division 1, Groups A, B, C and D; T6…T1; Type 4X/6P; IP66/67/68

Class I, Zone 0/1, AEx ia/db IIC T6…T1 Ga/Gb; Type 4X/6P; IP66/67/68

Class I, Zone 1, AEx db ia IIC T6…T1 Gb; Type 4X/6P; IP66/67/68

Model Code

VEGADIF DF85(*).ab**hijklm****

a = Scope = F
b = Approval = E or Q
h = Electronics = Z, H, U, A, P or F
i = Supplementary electronics = X or Z
j = Housing = A, V, D or W
k = Housing version/Protection = D, A, S, K or L
l = Cable entry = D, 1, N, Q, O or 6
m = Display and adjustment module PLICSCOM = X, A, K, F, B or L

Specific Conditions of Use:

1. The following temperature table applies for VEGADIF 85(*).**********D*** (Compact Version):

Temperature class	Ambient temperature (Ta) or medium temperature (Tp) on the sensor housing and the sensor
T6 (+85 °C)	-40°C to +55 °C
T5 (+100 °C)	
T4 (+135 °C)	-40°C to +60 °C
T3 (+200 °C)	
T2 (+300 °C)	
T1 (+450 °C)	

The following temperature table applies for VEGADIF 85(*).*******U**A/S/K/L*A/K/F/B/L/S* (version with external housing, with MODBUS barrier and/or without PLICSCOM):

Temperature class	Ambient temperature (Ta) on the sensor housing	Ambient temperature (Ta) or medium temperature (Tp) on the sensor
T6 (+85 °C)	-40°C to +60°C	-40°C to +55°C
T5 (+100 °C)		
T4 (+135 °C)		-40°C to +85°C
T3 (+200 °C)		
T2 (+300 °C)		
T1 (+450 °C)		

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The following temperature table applies for VEGADIF 85(*).*******Z/H/A/P/F**/A/S/K/L*X* (version with external housing, without MODBUS barrier and/or without PLICSCOM):

Temperature class	Ambient temperature (Ta) on the sensor housing	Ambient temperature (Ta) or medium temperature (Tp) on the sensor
T6 (+85 °C)	-50°C to +60°C	-40°C to +55°C
T5 (+100 °C)		
T4 (+135 °C)		-40°C to +85°C
T3 (+200 °C)		
T2 (+300 °C)		
T1 (+450 °C)		

2. For use as Ga/Gb-apparatus:
For functional reasons, the partition wall (membrane) to the wetted area has a wall thickness < 1 mm. In the application, it has to be ensured, that an impairment of the separation wall e.g. by aggressive media or mechanical hazards is excluded.

For variants with standard process connections:
The installation of the meter bodies shall provide as a minimum degree of protection IP67 according to ANSI/IEC 60529 for the process connections and vents.

For variants with capillary connections:
The capillary connections are designed to be connected to a capillary with diaphragm seal. The filling holes are intended to bring in a fill fluid. To prevent a zone entrainment from Zone 0, the diaphragm seal resp. the diaphragm seal and capillary have to be suitably designed. The pressure transfer system has to be technically tight. The filling hole has to be tightly sealed.

3 At the plastic parts there is a danger of ignition by electrostatic discharge. Observe manual of the manufacturer and warning label.

4. At the metallic parts made of light metal there is a danger of ignition by impact or friction. Observe manual of the manufacturer.

5. For the execution with separate housing, potential equalization has to exist in the complete course of the erection of the connecting cable between the electronics housing and the measuring sensor housing.

6. For use as Flameproof equipment, it is not allowed to repair the flamepath joints.

7. FOR INFORMATION ONLY: The permissible ambient with respect to medium temperature range depends on the variant of the apparatus and on the temperature class, for which the apparatus shall be used (see thermal data). The limits of the permissible ambient temperature range may be restricted by the used O-ring material. The used O-ring material is included in the marking. The permissible temperature ranges in dependence of the material have to be taken from the manufacturer's instructions.

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Name: Seal ring	Temperature range: Measuring cell	Temperature range: Seal ring
FKM	-40 to +85 °C	-40 to +220 °C
NBR	-20 to +85 °C	-20 to +120 °C
EPDM	-40 to +85 °C	-50 to +140 °C
PTFE	-40 to +85 °C	-200 to +260 °C
FFKM	-40 to +85 °C	-46 to +240 °C
Copper	-40 to +85 °C	-200 to +300 °C

VEGADIF DF85(*).ab**hijk*m* Differential Pressure Measuring Device***

Equipment Ratings

Nonincendive for use in Class I, II, Division 2 Groups A, B, C, D, F and G hazardous (classified) locations, indoors and outdoors;
Type 4X/6P; IP66/67/68
DUAL SEAL

See document no. 1013797 for electrical and thermal ratings
IP68 Ratings are 2 meters for 30 minutes

Equipment Markings

Class I, II, Division 2 Groups A, B, C, D, F and G; Type 4X/6P; IP66/67/68

Model Code

VEGADIF DF85(*).ab**hijk*m* Differential Pressure Measuring Device***

a = Scope = F
b = Approval = N
h = Electronics = Z, H, U, A, P or F
i = Supplementary electronics = X or Z
j = Housing = A, D, V, W or 8
k = Housing version/Protection = D, A, S, K, L or I
m = Display and adjustment module PLICSCOM = X, A, K, F, B or L

SCHEDULE

US Certificate Of Conformity No: FM22US0052X

Specific Conditions of Use:

1. The following temperature table applies for VEGADIF 85(*).**********D*** (Compact Version):

Temperatur Class	Ambient temperature (Ta) or medium temperature (Tp) on the sensor housing and the sensor
T6 (+85 °C)	-40°C to +55°C
T5 (+100 °C)	
T4 (+135 °C)	-40°C to +60°C
T3 (+200 °C)	
T2 (+300 °C)	
T1 (+450 °C)	

The following temperature table applies for VEGADIF 85(*).*******Z/H/A/P/F**A/S/K/L*X*(version with external housing, without MODBUS barrier and/or without PLICSCOM):

Temperature class	Ambient temperature (Ta) on the sensor housing	Ambient temperature (Ta) or medium temperature (Tp) on the sensor
T6 (+85 °C)	-50°C to +60°C	-40°C to +55°C
T5 (+100 °C)		
T4 (+135 °C)		-40°C to +85°C
T3 (+200 °C)		
T2 (+300 °C)		
T1 (+450 °C)		

The following temperature table applies for VEGADIF 85(*).*******U**A/S/K/L*A/K/F/B/L/S* (version with external housing, with MODBUS barrier and/or PLICSCOM):

Temperature class	Ambient temperature (Ta) on the sensor housing	Ambient temperature (Ta) or medium temperature (Tp) on the sensor
T6 (+85 °C)	-40°C to +60°C	-40°C to +55°C
T5 (+100 °C)		
T4 (+135 °C)		-40°C to +85°C
T3 (+200 °C)		
T2 (+300 °C)		
T1 (+450 °C)		

2. At the plastic parts there is a danger of ignition by electrostatic discharge. Observe manual of the manufacturer and warning label.

3. At the metallic parts made of light metal there is a danger of ignition by impact or friction. Observe manual of the manufacturer.

4. For the execution with separate housing, potential equalization has to exist in the complete course of the erection of the connecting cable between the electronics housing and the measuring sensor

housing.

5. FOR INFORMATION ONLY: The permissible ambient with respect to medium temperature range depends on the variant of the apparatus and on the temperature class, for which the apparatus shall be used (see thermal data). The limits of the permissible ambient temperature range may be restricted by the used O-ring material. The used O-ring material is included in the marking. The permissible temperature ranges in dependence of the material have to be taken from the manufacturer's instructions.

Name: Seal ring	Temperature range: Measuring cell	Temperature range: Seal ring
FKM	-40 to +85 °C	-40 to +220 °C
NBR	-20 to +85 °C	-20 to +120 °C
EPDM	-40 to +85 °C	-50 to +140 °C
PTFE	-40 to +85 °C	-200 to +260 °C
FFKM	-40 to +85 °C	-46 to +240 °C
Copper	-40 to +85 °C	-200 to +300 °C

VEGADIF DF85(*).ab**hijklm* Differential Pressure Measuring Device**

Equipment Ratings

Dust-ignitionproof for use in Class II, Division 1, Groups E, F and G; Class III, Division 1 hazardous (classified) locations, indoors and outdoors; Type 4X/6P; IP66/67/68 DUAL SEAL
Intrinsically Safe and Protection by Enclosure for use in Zone 20, AEx ia ta IIIC T135°C Da hazardous (classified) locations, indoors and outdoors in accordance with installation drawing 1013796 Type 4X/6P; IP66/67/68 DUAL SEAL

See document no. 1013796 for electrical and thermal ratings
IP68 Ratings are 2 meters for 30 minutes

Equipment Markings

Class II, Division 1, Groups E, F and G; Class III, Division 1; T135°C; Type 4X/6P; IP66/67/68
Zone 20, AEx ia ta IIIC T135°C Da; T*; Type 4X/6P; IP66/67/68

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US Certificate Of Conformity No: FM22US0052X

Model Code

VEGADIF DF85(*).ab**hijklm* Differential Pressure Measuring Device***

a = Scope = F
b = Approval = R
h = Electronics = Z, H, U, A, P or F
i = Supplementary electronics = X or Z
j = Housing = A, D, V or W
k = Housing version/Protection = D, A, S, K or L
l = Cable entry/connection = 1, 2, D, N or Q
m = Display and adjustment module PLICSCOM = X, A, F, B, K or L

Specific Conditions of Use:

1. The following temperature table applies for Divisions and Zones:

Device protection level (EPL)	Product temperature (Tp) on the sensor	Ambient temperature (Ta)
Da	-40°C to +70 °C	-40°C to +70 °C
Da/Db	-40°C to +85 °C	-40°C to +70 °C
Da/Dc	-40°C to +85 °C	-40°C to +70 °C
Db	-40°C to +70 °C	-40°C to +70 °C

2. The permissible ambient with respect to medium temperature range depends on the variant of the apparatus and on the temperature class, for which the apparatus shall be used (see thermal data). The limits of the permissible ambient temperature range may be restricted by the used O-ring material. The used O-ring material is included in the marking. The permissible temperature ranges in dependence of the material have to be taken from the manufacturer's instructions.

Name: Seal ring	Temperature range: Measuring cell	Temperature range: Seal ring
FKM	-40 to +85 °C	-40 to +220 °C
NBR	-20 to +85 °C	-20 to +120 °C
EPDM	-40 to +85 °C	-50 to +140 °C
PTFE	-40 to +85 °C	-200 to +260 °C
FFKM	-40 to +85 °C	-46 to +240 °C
Copper	-40 to +85 °C	-200 to +300 °C

3 At the plastic parts there is a danger of ignition by electrostatic discharge. Observe manual of the manufacturer and warning label.

4. At the metallic parts made of light metal there is a danger of ignition by impact or friction. Observe manual of the manufacturer.

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5. For the execution with separate housing, potential equalization has to exist in the complete course of the erection of the connecting cable between the electronics housing and the measuring sensor housing.