

## Safety instructions

### CCOE approval

### VEGAFLEX 81, 82, 83, 86

Intrinsic safety "i"

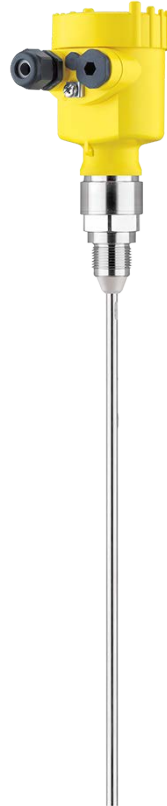
Two-wire 4 ... 20 mA/HART

Two-wire 4 ... 20 mA/HART with SIL qualification

Profibus PA

Foundation Fieldbus

Additional current output 4 ... 20 mA



Document ID: 63692



# VEGA

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Supplementary documentation:

- Operating instructions VEGAFLEX 81, 82, 83, 86
- Quick setup guide VEGAFLEX 81, 82, 83, 86
- Letter P506071/1, 506310/1, 535808/1, 535808/2 By Government of India (Document ID: 1012774)

Editing status: 2022-05-16

## 1 Area of applicability

These safety instructions apply to the VEGAFLEX 81, 82, 83, 86 of type series:

- VEGAFLEX FX8<sup>(\*)</sup>.DC\*\*\*\*A/H/P/FX\*\*\*\*, VEGAFLEX FX8<sup>(\*)</sup>.DC\*\*\*\*A/HZ\*\*\*\*
- VEGAFLEX FX8<sup>(\*)</sup>.DO\*\*\*\*A/H/P/FX\*\*\*\*, VEGAFLEX FX8<sup>(\*)</sup>.DO\*\*\*\*A/HZ\*\*\*\*

With the electronics versions:

- H - Two-wire 4 ... 20 mA/HART
- A - Two-wire 4 ... 20 mA/HART with SIL qualification
- P - Two-wire Profibus PA
- F - Two-wire Foundation Fieldbus
- Z - Additional current output 4 ... 20 mA

According to Letter P506071/1, 506310/1, 535808/1, 535808/2 By Government of India (certificate number on the type label) and for all instruments with safety instruction 63692.

Type of protection marking:

- Ex ia IIC T6 ... T1 Ga/Gb

## 2 Important specification in the type code

VEGAFLEX FX81(a).bcdefghijklm

Position	Feature	Description
a		One or two-digit alphanumeric variable, for production control. Optional, not safety-relevant.
b	Scope	D India
c	Approval	C Ex ia IIC T6 ... T1 Ga/Gb
		O Ex ia IIC T6 ... T1 Ga/Gb + Ship approval

Position		Feature	Description
d	Version / Material	2	exchangeable cable (ø 2 mm) with centering weight / Duplex (1.4462)
		3	exchangeable coated cable (ø 4 mm) with uncoated centering weight / PFA and 316
		6	exchangeable rod (ø 8 mm) / Duplex (1.4462)
		7	exchangeable cable (ø 2 mm) with gravity weight / Alloy C276 (2.4819)
		A	exchangeable cable (ø 4 mm) with gravity weight / 316
		B	exchangeable cable (ø 2 mm) with gravity weight / 316
		D	exchangeable cable (ø 2 mm) with centering weight / 316
		E	exchangeable rod (ø 8 mm) / 316L
		F	exchangeable rod (ø 12 mm) / 316L
		G	exchangeable rod (ø 8 mm) / 304L
		H	Coax (ø 21.3 mm) with single hole / 304L
		I	exchangeable cable (ø 4 mm) with gravity weight / Alloy C22 (2.4602)
		J	exchangeable cable (ø 4 mm) with centering weight / Alloy C22 (2.4602)
		K	Coax (ø 21.3 mm) with single hole / 316L
		L	Coax (ø 21.3 mm) with multiple hole / 316L
		N	Coax (ø 21.3 mm) with multiple hole / 304L
		O	exchangeable rod (ø 12 mm) / Alloy C22 (2.4602)
		P	Coax (ø 42.2 mm) with multiple hole / 316L
		Q	Coax (ø 21.3 mm) with multiple hole / Alloy C22 (2.4602)
		R	Coax (ø 42.2 mm) with multiple hole / Alloy C22 (2.4602)
S	exchangeable rod (ø 8 mm) / Alloy C22 (2.4602)		
U	exchangeable cable (ø 4 mm) without weight / 316		
V	exchangeable rod (ø 12 mm) / Alloy 400 (2.4360)		
W	exchangeable rod (ø 8 mm) / Alloy C276 (2.4819)		
		*	further approved Versions / Materials
ef	Process fitting / Material	**	Two-digit alphanumeric variables for process fittings according to industry standard

Position		Feature	Description
g	Seal / Second line of defense / Process temperature	A	FKM (SHS EPM 70C3 GLT) / without / -40 ... +80 °C
		B	EPDM (A+P 70.10-02) / without / -40 ... +80 °C
		D	FFKM (Kalrez 6375) / without / -10 ... +150 °C
		D	FFKM (Kalrez 6375) / without / -20 ... +150 °C
		F	FKM (SHS FPM 70C3 GLT) / without / -40 ... +150 °C
		G	FKM (SHS FPM 70C3 GLT) / with / -40 ... +150 °C
		H	EPDM (A+P 70.10-02) / without / -40 ... +150 °C
		I	Silicone FEP coated (A+P FEP-O-SEAL) / without / -40 ... +150 °C
		J	Borosilicate glass for slightly volatile substances, e.g. ammonia / with / -60 ... +150 °C
		K	FFKM (Kalrez 6375) / without / -10 ... +200 °C
		K	FFKM (Kalrez 6375) / without / -20 ... +200 °C
		L	FFKM (Kalrez 6375) / with / -10 ... +200 °C
		L	FFKM (Kalrez 6375) / with / -20 ... +200 °C
		M	EPDM (A+P 70.10-02) / with / -40 ... +150 °C
		N	Silicone FEP coated (A+P FEP-O-SEAL) / with / -40 ... +150 °C
		O	Silicone FEP coated (A+P FEP-O-SEAL) / without / -40 ... +80 °C
		P	FFKM (Kalrez 6375) / with / -10 ... +150 °C
		P	FFKM (Kalrez 6375) / with / -20 ... +150 °C
		Q	FKM (SHS EPM 70C3 GLT) / with / -40 ... +80 °C
		R	EPDM (A+P 70.10-02) / with / -40 ... +80 °C
S	Silicone FEP coated (A+P FEP-O-SEAL) / with / -40 ... +80 °C		
*	Other seals suitable for process temperature, IP protection and environmental conditions, see operating instructions.		
h	Electronics	A	Two-wire 4 ... 20 mA/HART with SIL qualification
		F	Two-wire Foundation Fieldbus
		H	Two-wire 4 ... 20 mA/HART
		P	Two-wire Profibus PA
i	Supplementary electronics	X	without
		Z	Additional current output 4 ... 20 mA

Position		Feature	Description
j	Housing / Protection	3	Aluminium single chamber / IP66/IP68 (1 bar)
		4	Aluminium double chamber / IP66/IP68 (1 bar)
		5	Stainless steel single chamber (precision casting) / IP66/IP68 (1 bar)
		8	Stainless steel single chamber (electropolished) / IP66/IP68 (0.2 bar)
		A	Aluminium single chamber / IP66/IP68 (0.2 bar)
		B	Cable outlet IP68 with external plastic single chamber / IP66/IP67
		C	Cable outlet IP68 with external stainless steel single chamber (electropolished) / IP66/IP67
		D	Aluminium double chamber / IP66/IP68
		D	Aluminium double chamber / IP66/IP68 (0.2 bar)
		E	Cable outlet IP68 with external plastic double chamber / IP66/IP67
		F	Cable outlet IP68 with external Aluminium single chamber / IP66/IP67
		G	Cable outlet IP68 with external stainless steel single chamber (precision casting) / IP66/IP67
		H	Special colour Aluminium single chamber / IP66/IP68 (0.2 bar)
		J	Cable outlet IP68 with external special colour Aluminium single chamber / IP66/IP67
		K	Plastic single chamber / IP66/IP67
		L	Cable outlet IP68 with external Aluminium double chamber / IP66/IP67
		M	Cable outlet IP68 with external stainless steel double chamber / IP66/IP67
		R	Plastic double chamber / IP66/IP67
		S	Special colour Aluminium double chamber / IP66/IP67
		S	Special colour Aluminium double chamber / IP66/IP68 (0.2 bar)
		T	Cable outlet IP68 with external special colour Aluminium double chamber / IP66/IP67
		V	Stainless steel single chamber (precision casting) / IP66/IP68 (0.2 bar)
		W	Stainless steel double chamber / IP66/IP67
W	Stainless steel double chamber / IP66/IP68 (0.2 bar)		
k	Cable entry / Connection	1	M20 x 1.5 / without
		D	M20 x 1.5 / Blind plug
		N	½ NPT / Blind plug
		Q	½ NPT / without
		*	Respectively approved cable glands and blind plugs correspond to the ignition protection type

Position		Feature	Description
l	Display and adjustment module PLICSCOM	X	without
		A	mounted
		F	without; lid with inspection window
		B	Laterally mounted
		K	mounted; with Bluetooth, magnetic pen operation
		L	laterally mounted; with Bluetooth, magnetic pen operation
m	Certificates	M	Yes
		X	No

## VEGAFLEX FX82(a).bcdefghijklm

Position		Feature	Description
a			One or two-digit alphanumeric variable, for production control. Optional, not safety-relevant.
b	Scope	D	India
c	Approval	C	Ex ia IIC T6 ... T1 Ga/Gb
		O	Ex ia IIC T6 ... T1 Ga/Gb + Ship approval
d	Version / Material	A	exchangeable cable (ø 4 mm) / 316
		F	exchangeable rod (ø 6 mm) / 316
		E	exchangeable steel cable (ø 6 mm with gravity weight / PA coated
		G	exchangeable steel cable (ø 11 mm with gravity weight / PA coated
		H	exchangeable rod (ø 16 mm) / 316L
		T	exchangeable rod (ø 16 mm) / Alloy C22 (2.4602)
		*	further approved Versions / Materials
ef	Process fitting / Material	**	Two-digit alphanumeric variables for process fittings according to industry standard
g	Seal / Process temperature	A	FKM (SHS EPM 70C3 GLT) / -40 ... +80 °C
		B	EPDM (A+P 70.10-02) / -40 ... +80 °C
		F	FKM (SHS FPM 70C3 GLT) / -40 ... +150 °C
		H	EPDM (A+P 70.10-02) / -40 ... +150 °C
		K	FFKM (Kalrez 6375) / -20 ... +200 °C
		*	Other seals suitable for process temperature, IP protection and environmental conditions, see operating instructions.
h	Electronics	A	Two-wire 4 ... 20 mA/HART with SIL qualification
		F	Two-wire Foundation Fieldbus
		H	Two-wire 4 ... 20 mA/HART
		P	Two-wire Profibus PA
i	Supplementary electronics	X	without
		Z	Additional current output 4 ... 20 mA

Position		Feature	Description
j	Housing / Protection	3	Aluminium single chamber / IP66/IP68 (1 bar)
		4	Aluminium double chamber / IP66/IP68 (1 bar)
		5	Stainless steel single chamber (precision casting) / IP66/IP68 (1 bar)
		8	Stainless steel single chamber (electropolished) / IP66/IP68 (0.2 bar)
		A	Aluminium single chamber / IP66/IP68 (0.2 bar)
		B	Cable outlet IP68 with external plastic single chamber / IP66/IP67
		C	Cable outlet IP68 with external stainless steel single chamber (electropolished) / IP66/IP67
		D	Aluminium double chamber / IP66/IP68
		D	Aluminium double chamber / IP66/IP68 (0.2 bar)
		E	Cable outlet IP68 with external plastic double chamber / IP66/IP67
		F	Cable outlet IP68 with external Aluminium single chamber / IP66/IP67
		G	Cable outlet IP68 with external stainless steel single chamber (precision casting) / IP66/IP67
		H	Special colour Aluminium single chamber / IP66/IP68 (0.2 bar)
		J	Cable outlet IP68 with external special colour Aluminium single chamber / IP66/IP67
		K	Plastic single chamber / IP66/IP67
		L	Cable outlet IP68 with external Aluminium double chamber / IP66/IP67
		M	Cable outlet IP68 with external stainless steel double chamber / IP66/IP67
		R	Plastic double chamber / IP66/IP67
		S	Special colour Aluminium double chamber / IP66/IP67
		S	Special colour Aluminium double chamber / IP66/IP68 (0.2 bar)
		T	Cable outlet IP68 with external special colour Aluminium double chamber / IP66/IP67
		V	Stainless steel single chamber (precision casting) / IP66/IP68 (0.2 bar)
		W	Stainless steel double chamber / IP66/IP67
W	Stainless steel double chamber / IP66/IP68 (0.2 bar)		
k	Cable entry / Connection	1	M20 x 1.5 / without
		D	M20 x 1.5 / Blind plug
		N	½ NPT / Blind plug
		Q	½ NPT / without
		*	Respectively approved cable glands and blind plugs correspond to the ignition protection type



Position		Feature	Description
l	Display and adjustment module PLICSCOM	X	without
		A	mounted
		F	without; lid with inspection window
		B	Laterally mounted
		K	mounted; with Bluetooth, magnetic pen operation
		L	laterally mounted; with Bluetooth, magnetic pen operation
m	Certificates	M	Yes
		X	No

## VEGAFLEX FX83(a).bcdefghijklm

Position		Feature	Description
a			One or two-digit alphanumeric variable, for production control. Optional, not safety-relevant.
b	Scope	D	India
c	Approval	C	Ex ia IIC T6 ... T1 Ga/Gb
		O	Ex ia IIC T6 ... T1 Ga/Gb + Ship approval
d	Version / Material	B	exchangeable cable (ø 4 mm) with gravity weight / PFA
		F	exchangeable rod (ø 8 mm) / 1.4435 (BN2), (Ra<0,76µm)
		G	exchangeable rod (ø 8 mm) / 1.4435 (BN2), can be autoclaved (Ra<0,76µm)
		E	Rod (ø 10 mm) / PFA
		H	exchangeable rod (ø 8 mm) / 1.4435 (BN2), electropolished (Ra<0,38µm)
		I	exchangeable rod (ø 8 mm) / 1.4435 (BN2), electropolished, can be autoclaved (Ra<0,38µm)
		*	further approved Versions / Materials
ef	Process fitting / Material	**	Two-digit alphanumeric variables for process fittings according to industry standard
g	Seal / Process temperature	X	without / -40 ... +150 °C
		E	FFKM (Kalrez 6221) / -20 ... +150 °C
		C	EPDM (Freudenberg 70, EPDM 291) / -20 ... +130 °C
		T	FEPM (Vi 602 Extreme-ETP, COG) / -10 ... +150 °C
		*	Other seals suitable for process temperature, IP protection and environmental conditions, see operating instructions.
h	Electronics	A	Two-wire 4 ... 20 mA/HART with SIL qualification
		F	Two-wire Foundation Fieldbus
		H	Two-wire 4 ... 20 mA/HART
		P	Two-wire Profibus PA
i	Supplementary electronics	X	without
		Z	Additional current output 4 ... 20 mA

Position		Feature	Description
j	Housing / Protection	3	Aluminium single chamber / IP66/IP68 (1 bar)
		4	Aluminium double chamber / IP66/IP68 (1 bar)
		5	Stainless steel single chamber (precision casting) / IP66/IP68 (1 bar)
		8	Stainless steel single chamber (electropolished) / IP66/IP68 (0.2 bar)
		A	Aluminium single chamber / IP66/IP68 (0.2 bar)
		B	Cable outlet IP68 with external plastic single chamber / IP66/IP67
		C	Cable outlet IP68 with external stainless steel single chamber (electropolished) / IP66/IP67
		D	Aluminium double chamber / IP66/IP68
		D	Aluminium double chamber / IP66/IP68 (0.2 bar)
		E	Cable outlet IP68 with external plastic double chamber / IP66/IP67
		F	Cable outlet IP68 with external Aluminium single chamber / IP66/IP67
		G	Cable outlet IP68 with external stainless steel single chamber (precision casting) / IP66/IP67
		H	Special colour Aluminium single chamber / IP66/IP68 (0.2 bar)
		J	Cable outlet IP68 with external special colour Aluminium single chamber / IP66/IP67
		K	Plastic single chamber / IP66/IP67
		L	Cable outlet IP68 with external Aluminium double chamber / IP66/IP67
		M	Cable outlet IP68 with external stainless steel double chamber / IP66/IP67
		R	Plastic double chamber / IP66/IP67
		S	Special colour Aluminium double chamber / IP66/IP67
		S	Special colour Aluminium double chamber / IP66/IP68 (0.2 bar)
		T	Cable outlet IP68 with external special colour Aluminium double chamber / IP66/IP67
V	Stainless steel single chamber (precision casting) / IP66/IP68 (0.2 bar)		
W	Stainless steel double chamber / IP66/IP67		
W	Stainless steel double chamber / IP66/IP68 (0.2 bar)		
k	Cable entry / Connection	1	M20 x 1.5 / without
		D	M20 x 1.5 / Blind plug
		N	½ NPT / Blind plug
		Q	½ NPT / without
		*	Respectively approved cable glands and blind plugs correspond to the ignition protection type

Position		Feature	Description
i	Display and adjustment module PLICSCOM	X	without
		A	mounted
		F	without; lid with inspection window
		B	Laterally mounted
		K	mounted; with Bluetooth, magnetic pen operation
		L	laterally mounted; with Bluetooth, magnetic pen operation
m	Certificates	M	Yes
		X	No

## VEGAFLEX FX86(a).bcdefghijklm

Position		Feature	Description
a			One or two-digit alphanumeric variable, for production control. Optional, not safety-relevant.
b	Scope	D	India
c	Approval	C	Ex ia IIC T6 ... T1 Ga/Gb
		O	Ex ia IIC T6 ... T1 Ga/Gb + Ship approval
d	Version / Material	2	exchangeable cable (ø 2 mm) with centering weight / Duplex (1.4462)
		4	Coax (ø 42.2 mm) with multiple hole and reference distance / 316L
		5	Coax (ø 42.2 mm) with multiple hole and reference distance / Alloy C22 (2.4602)
		6	exchangeable rod (ø 8 mm) / Duplex (1.4462)
		A	exchangeable cable (ø 4 mm) with gravity weight / 316
		B	exchangeable cable (ø 2 mm) with gravity weight / 316
		C	exchangeable cable (ø 4 mm) with centering weight / 316
		D	exchangeable cable (ø 2 mm) with centering weight / 316
		E	exchangeable rod (ø 8 mm) / 316L
		H	exchangeable rod (ø 16 mm) / 316L
		I	exchangeable cable (ø 4 mm) with gravity weight / Alloy C22 (2.4602)
		J	exchangeable cable (ø 4 mm) with centering weight / Alloy C22 (2.4602)
		L	Coax (ø 21.3 mm) with multiple hole / 316L
		P	Coax (ø 42.2 mm) with multiple hole / 316L
		R	Coax (ø 42.2 mm) with multiple hole / Alloy C22 (2.4602)
		T	exchangeable rod (ø 16 mm) / Alloy C22 (2.4602)
W	exchangeable rod (ø 8 mm) / Alloy C276 (2.4819)		
*	further approved Versions / Materials		
ef	Process fitting / Material	**	Two-digit alphanumeric variables for process fittings according to industry standard

Position		Feature	Description
g	Seal / Second line of defense / Process temperature	1	Ceramic-graphite / with / -196 ... +280 °C
		2	Ceramic-graphite / with / -196 ... +400 °C
		2	Ceramic-graphite / with / -196 ... +450 °C
		3	PEEK-FFKM (Kalrez 6375) / with / -20 ... +250 °C
		*	Other seals suitable for process temperature, IP protection and environmental conditions, see operating instructions.
h	Electronics	A	Two-wire 4 ... 20 mA/HART with SIL qualification
		F	Two-wire Foundation Fieldbus
		H	Two-wire 4 ... 20 mA/HART
		P	Two-wire Profibus PA
i	Supplementary electronics	X	without
		Z	Additional current output 4 ... 20 mA

Position		Feature	Description
j	Housing / Protection	3	Aluminium single chamber / IP66/IP68 (1 bar)
		4	Aluminium double chamber / IP66/IP68 (1 bar)
		5	Stainless steel single chamber (precision casting) / IP66/IP68 (1 bar)
		8	Stainless steel single chamber (electropolished) / IP66/IP68 (0.2 bar)
		A	Aluminium single chamber / IP66/IP68 (0.2 bar)
		B	Cable outlet IP68 with external plastic single chamber / IP66/IP67
		C	Cable outlet IP68 with external stainless steel single chamber (electropolished) / IP66/IP67
		D	Aluminium double chamber / IP66/IP68
		D	Aluminium double chamber / IP66/IP68 (0.2 bar)
		E	Cable outlet IP68 with external plastic double chamber / IP66/IP67
		F	Cable outlet IP68 with external Aluminium single chamber / IP66/IP67
		G	Cable outlet IP68 with external stainless steel single chamber (precision casting) / IP66/IP67
		H	Special colour Aluminium single chamber / IP66/IP68 (0.2 bar)
		J	Cable outlet IP68 with external special colour Aluminium single chamber / IP66/IP67
		K	Plastic single chamber / IP66/IP67
		L	Cable outlet IP68 with external Aluminium double chamber / IP66/IP67
		M	Cable outlet IP68 with external stainless steel double chamber / IP66/IP67
		R	Plastic double chamber / IP66/IP67
		S	Special colour Aluminium double chamber / IP66/IP67
		S	Special colour Aluminium double chamber / IP66/IP68 (0.2 bar)
		T	Cable outlet IP68 with external special colour Aluminium double chamber / IP66/IP67
		V	Stainless steel single chamber (precision casting) / IP66/IP68 (0.2 bar)
		W	Stainless steel double chamber / IP66/IP67
W	Stainless steel double chamber / IP66/IP68 (0.2 bar)		
k	Cable entry / Connection	1	M20 x 1.5 / without
		D	M20 x 1.5 / Blind plug
		N	½ NPT / Blind plug
		Q	½ NPT / without
		*	Respectively approved cable glands and blind plugs correspond to the ignition protection type

Position		Feature	Description
l	Display and adjustment module PLICSCOM	X	without
		A	mounted
		F	without; lid with inspection window
		B	Laterally mounted
		K	mounted; with Bluetooth, magnetic pen operation
		L	laterally mounted; with Bluetooth, magnetic pen operation
m	Certificates	M	Yes
		X	No

Multiple listed characteristics according to the dependencies of the device configuration.

In the following, all above mentioned versions are called VEGAFLEX 81, 82, 83, 86. If parts of these safety instructions refer only to certain versions, then these will be mentioned explicitly with their type code.

### 3 General information

The level measuring instruments VEGAFLEX 81, 82, 83, 86 as guided radar sensors are used to detect the distance between medium surface and sensor by means of high frequency electromagnetic waves in the GHz range. The electronics uses the running time of the signals reflected by the medium surface to calculate the distance to the medium surface.

The VEGAFLEX 81, 82, 83, 86 consist of an electronics housing, a process connection element and a sensor, i.e. a measuring cable or a measuring rod. As an option, the display and adjustment module can also be installed in the instrument.

The VEGAFLEX 81, 82, 83, 86 are suitable for applications in hazardous atmospheres of all combustible materials of explosion groups IIA, IIB and IIC.

The VEGAFLEX 81, 82, 83, 86 are suitable for applications requiring EPL Ga, EPL Ga/Gb or EPL Gb instruments.

### 4 Application area

#### EPL Ga instrument







The VEGAFLEX 81, 82, 83, 86 with the mechanical fixing element are installed in hazardous areas of zone 0 requiring EPL Ga instruments.

#### EPL Ga/Gb or EPL Ga/Gc instrument

The VEGAFLEX 81, 82, 83, 86 with mechanical fixing element are installed in hazardous areas of zone 1 or zone 2 requiring EPL Gb or EPL Gc instruments. The mechanical fixing element, process connection element is installed in the separating wall, which separates areas requiring EPL Gb or EPL Gc instruments. The sensor measuring system is installed in hazardous areas of zone 0 requiring EPL Ga instruments.

#### EPL Gb instrument

The VEGAFLEX 81, 82, 83, 86 with the mechanical fixing element are installed in hazardous areas of zone 1 requiring EPL Gb instruments.

VEGA Instrument	EPL Gc	EPL Gb	EPL Ga/Gb	EPL Ga
Ex Zone 2 				
Ex Zone 1 				
Ex Zone 0 				

## 5 Specific conditions of use ("X" identification)

The following overview is listing all special properties of VEGAFLEX 81, 82, 83, 86, which make a labelling with the symbol "X" behind the certificate number necessary.

### Electrostatic charging (ESD)

You can find the details in chapter " *Electrostatic charging (ESD)*" of these safety instructions.

### Ambient temperature

You can find the details in chapter " *Thermal data*" of these safety instructions.

### Impact and friction sparks

The VEGAFLEX 81, 82, 83, 86 in light metal versions (e.g. aluminium, titanium, zircon) must be mounted in such a way that sparks from impact and friction between light metals and steel (except stainless steel, if the presence of rust particles can be excluded) cannot occur.

### Non-grounded, metallic parts

The resistance between aluminium housing to metal measuring point identification plate is  $> 10^9$  Ohm.

The capacitance of the metal measuring point identification plate was measured with 15 pF.

### For versions with external housing

For the version with external housing, the potential equalization must be provided in the complete range of the connection cable between electronics housing and transmitter housing.

Make sure that the coaxial connection cable between electronics housing and sensor housing cannot get damaged.

## 6 Important information for mounting and maintenance

### General instructions

The following requirements must be fulfilled for mounting, electrical installation, setup and maintenance of the instrument:

- The staff must be qualified according the respective tasks
- The staff must be trained in explosion protection

- The staff must be familiar with the respectively valid regulations, e.g. planning and installation acc. to IEC/EN 60079-14
- Make sure when working on the instrument (mounting, installation, maintenance) that there is no explosive atmosphere present, the supply circuits should be voltage-free, if possible.
- The instrument has to be mounted according to the manufacturer specifications, the Letter By Government of India and the valid regulations and standards
- Modifications on the instrument can influence the explosion protection and hence the safety, therefore repairs are not permitted to be conducted by the end user
- Modifications must only be carried out by employees authorized by VEGA company
- Use only approved spare parts
- Components for installation and connection not included in the approval documents are only permitted if these correspond technically to the latest standard mentioned on the cover sheet. They must be suitable for the application conditions and have a separate certificate. The special conditions of the components must be noted and if necessary, the components must be integrated in the type test. This applies also to the components already mentioned in the technical description.
- Vessel installations and probable flow must be taken into account

### Cable and wire entries

- The VEGAFLEX 81, 82, 83, 86 must be connected via suitable cable gland or conduit systems that are in conformity with the requirements of the type of protection and the IP protection and provided with a separate type approval certificate. When connecting VEGAFLEX 81, 82, 83, 86 to conduit systems, the corresponding sealing facility must be connected directly to the housing.
- The red thread or/dust covers screwed in when the instruments are shipped (depending on the version) must be removed before setup and replaced by cable entries or closing screws suitable for the respective ignition protection type and IP protection.
- Note type and size of the thread: A label with the respective thread name is in the area of the respective thread
- Threads must have no damages
- Cable entries and closing screws should be mounted correctly and according to the safety instructions of the manufacturer to ensure the specified ignition protection type and IP protection rating. When using certified or suitable cable glands, closing screws or plug connections, it is absolutely necessary to note the corresponding certificates/documents. Supplied cable entries or closing screws meet these requirements.
- Unused openings must be closed with plugs suitable for the ignition protection type and IP protection. Supplied plugs meet these requirements.
- Cable or wire entries resp. the closing screws must be tightly screwed into the housing
- The connection cables resp. pipeline sealing facilities must be suitable for the application conditions (e.g. temperature range) of the application
- With surface temperatures > 70 °C, the cables must be suitable for the higher application conditions
- The connection cable of VEGAFLEX 81, 82, 83, 86 has to be wired fix and in such a way that damages can be excluded.

### Mounting

Keep in mind for instrument mounting

- Mechanical damage on the instrument must be avoided
- Mechanical friction must be avoided
- Process connections separating two areas of different Ex-zones must comply to valid regulations and standards and the protection rating must be in conformity to IEC 60529.
- Close the housing lid (s) up to the stop before starting operating, to ensure the IP protection rating specified on the type label



## Maintenance

To ensure the functionality of the device, periodic visual inspection is recommended for:

- Secure mounting
- No mechanical damages or corrosion
- Worn or otherwise damaged cables
- No loose connections of the line connections, equipotential bonding connections
- Correct and clearly marked cable connections

The parts of the VEGAFLEX 81, 82, 83, 86 being in contact with flammable media during operation must be included in the periodic overpressure test of the plant.

## Intrinsic safety "i"

- Valid regulations for connection of intrinsically safe circuits, e.g. proof of intrinsic safety according to IEC/EN 60079-14 must be observed
- The instrument is only suitable for connection to certified, intrinsically safe instruments
- When connecting a circuit with protection level Ex ib, the device, the sensor meas. system of the device must no more be used in hazardous areas of zone 0.
- When connecting an intrinsically safe instruments with classification mark Ex ia to a circuit with protection level Ex ib, then the classification mark of the instrument changes to Ex ib. After the use as instrument with Ex ib power supply, the instrument must no more be used in circuits with protection level Ex ia
- When connecting an intrinsically safe instrument to an non-intrinsically safe circuit, the instrument must be no longer used in intrinsically safe circuits
- With surface temperatures > 70 °C, the cables must be suitable for the higher application conditions

## Version with exchangeable cable or rod probe

Only original VEGA cable or rod probes must be mounted to VEGAFLEX 81, 82, 83, 86. When mounting cable or rod probes, the torques specified in the respective operating instruction manuals must be maintained. The mechanical connection must be ensured.

## 7 Safe operating mode

### General operating conditions

- Do not operate the instrument outside the electrical, thermal and mechanical specifications of the manufacturer
- Use the instrument only in media against which the wetted parts are sufficiently resistant
- Note the relation between process temperature on the sensor/antenna and the permissible ambient temperature on the electronics housing. For permissible temperatures, see the respective temperature tables. See chapter " *Thermal data*".
- If necessary, a suitable overvoltage arrester can be connected in front of the VEGAFLEX 81, 82, 83, 86
- For assessment and reduction of the explosion risk, valid standards such as for example ISO/ EN 1127-1 must be taken into account

## 8 Potential equalization/Grounding

- Integrate the instruments into the local potential equalisation, e.g. via the internal or external earth terminal
- The potential equalization terminal must be secured against loosening and twisting
- If grounding of the cable screening is necessary, this must be carried out acc. to the valid standards and regulations, e.g. acc. to IEC/EN 60079-14

- The intrinsically safe input and the intrinsically safe output circuits are ground-free. The voltage resistance against ground is min. 500 Veff.

## 9 Electrostatic charging (ESD)

In case of instrument versions with electrostatically chargeable plastic parts, the danger of electrostatic charging and discharging must be taken into account!

The following parts can charge and discharge:

- Lacquered housing version or alternative special lacquering
- Plastic housing, plastic housing parts
- Metal housing with inspection window
- Plastic process fittings
- Plastic-coated process fittings and/or plastic-coated sensors
- Connection cable for separate versions
- Type label
- Isolated metallic labels (measuring point identification plate)

Take note in case of danger of electrostatic charges:

- Avoid friction on the surfaces
- Do not dry clean the surfaces

The instruments must be mounted/installed in such a way that the following can be ruled out:

- electrostatic charges during operation, maintenance and cleaning.
- process-related electrostatic charges, e.g. by measuring media flowing past

The warning label indicates danger:

**WARNING - POTENTIAL ELECTROSTATIC  
CHARGING HAZARD - SEE INSTRUCTIONS**

## 10 Instructions for zone 0, zone 0/1 applications

In hazardous areas, the instrument, sensor measuring system in zone 0 should only be operated under atmospheric conditions:

- Temperature: -20 ... +60 °C.
- Pressure: 80 ... 110 kPa (0.8 ... 1.1 bar)
- Air with normal oxygen content, normally 21 %

The operator must ensure that the medium temperature in zone 0 is not higher than 80 % of the self-ignition temperature of the concerned medium (in °C) and does not exceed the max. permissible flange temperature depending on the temperature class. The parts of the sensor which during operation are in contact with flammable products, must be integrated in the periodic overpressure test of the plant.

If no explosive mixtures or additional application conditions are certified resp. supplementary measures such as e.g. according to ISO/EN 1127-1 taken, then the instruments can be also operated according to the manufacturer specification outside atmospheric conditions.

If there is a risk of dangerous potential differences inside zone 0, then suitable measures for circuits in zone 0 must be taken, e.g. according to the requirements of IEC/EN 60079-14.

Process fittings between two explosion protection areas require category 1G (EPL Ga) and less endangered areas must show a tightness in accordance with protection rating IP67 acc. to IEC/EN 60529.

## 11 Electrical data

### VEGAFLEX FX8<sup>(\*)</sup>.DC/O\*\*\*\*A/HX\*\*\*\*, single chamber housing, Ex i electronics and connection compartment

Intrinsically safe voltage supply, signal circuit:	
Terminals 1[+], 2[-]	In type of protection intrinsic safety Ex ia IIC
	For connection to a certified, intrinsically safe circuit. $U_i = 30 \text{ V}$ $I_i = 131 \text{ mA}$ $P_i = 983 \text{ mW}$
	The effective internal capacitance $C_i$ is negligibly small. The effective internal inductance is $L_i \leq 5 \mu\text{H}$ .
	In the version with fix mounted connection cable $C_{i \text{ wire/wire}} = 58 \text{ pF/m}$ , $C_{i \text{ wire/screen}} = 270 \text{ pF/m}$ and additionally $L_i = 0.55 \mu\text{H/m}$ has to be taken into account.

### VEGAFLEX FX8<sup>(\*)</sup>.DC/O\*\*\*\*A/HX\*\*\*\*, double chamber housing, Ex i connection compartment

Intrinsically safe voltage supply, signal circuit:	
Terminals 1[+], 2[-]	In type of protection intrinsic safety Ex ia IIC
	For connection to a certified, intrinsically safe circuit. $U_i = 30 \text{ V}$ $I_i = 131 \text{ mA}$ $P_i = 983 \text{ mW}$
	The effective internal capacitance $C_i$ is negligibly small. The effective internal inductance is $L_i \leq 10 \mu\text{H}$ .
	In the version with fix mounted connection cable $C_{i \text{ wire/wire}} = 58 \text{ pF/m}$ , $C_{i \text{ wire/screen}} = 270 \text{ pF/m}$ and additionally $L_i = 0.55 \mu\text{H/m}$ has to be taken into account.

**VEGAFLEX FX8\*(\*).DC/O\*\*\*\*P/FX\*\*\*\*, single chamber housing, Ex i electronics and connection compartment**

Intrinsically safe voltage supply, signal circuit:	
Terminals 1[+], 2[-]	In type of protection intrinsic safety Ex ia IIC
	For connection to a certified, intrinsically safe circuit. $U_i = 17,5 \text{ V}$ $I_i = 500 \text{ mA}$ $P_i = 5,5 \text{ W}$
	The instrument is suitable for connection to a Fieldbus system according to the FISCO model (IEC 60079-11), e.g. Profibus PA.
	or $U_i = 24 \text{ V}$ $I_i = 250 \text{ mA}$ $P_i = 1,2 \text{ W}$
	The effective inner capacitances $C_i$ , inductances $L_i$ are negligible.
	In the version with fix mounted connection cable $C_{i \text{ wire/wire}} = 58 \text{ pF/m}$ , $C_{i \text{ wire/screen}} = 270 \text{ pF/m}$ and additionally $L_i = 0.55 \text{ } \mu\text{H/m}$ has to be taken into account.

**VEGAFLEX FX8\*(\*).DC/O\*\*\*\*P/FX\*\*\*\*, double chamber housing, Ex i connection compartment**

Intrinsically safe voltage supply, signal circuit:	
Terminals 1[+], 2[-]	In type of protection intrinsic safety Ex ia IIC
	For connection to a certified, intrinsically safe circuit. $U_i = 17,5 \text{ V}$ $I_i = 500 \text{ mA}$ $P_i = 5,5 \text{ W}$
	The instrument is suitable for connection to a Fieldbus system according to the FISCO model (IEC 60079-11), e.g. Profibus PA.
	or $U_i = 24 \text{ V}$ $I_i = 250 \text{ mA}$ $P_i = 1,2 \text{ W}$
	The effective internal capacitance $C_i$ is negligibly small. The effective internal inductance is $L_i \leq 5 \text{ } \mu\text{H}$ .
	In the version with fix mounted connection cable $C_{i \text{ wire/wire}} = 58 \text{ pF/m}$ , $C_{i \text{ wire/screen}} = 270 \text{ pF/m}$ and additionally $L_i = 0.55 \text{ } \mu\text{H/m}$ has to be taken into account.

## VEGAFLEX FX8\*(\*).DC/O\*\*\*\*A/HZ\*\*\*\*, double chamber housing, Ex i connection compartment

Intrinsically safe voltage supply, signal circuit I:	
Terminals 1[+], 2[-]	In type of protection intrinsic safety Ex ia IIC
	For connection to a certified, intrinsically safe circuit.
	$U_i = 30 \text{ V}$ $I_i = 131 \text{ mA}$ $P_i = 983 \text{ mW}$
	The effective internal capacitance $C_i$ is negligibly small. The effective internal inductance is $L_i \leq 5 \mu\text{H}$ .

Intrinsically safe voltage supply, signal circuit II:	
Terminals 7[-], 8[-]	In type of protection intrinsic safety Ex ia IIC
	For connection to a certified, intrinsically safe circuit.
	$U_i = 30 \text{ V}$ $I_i = 131 \text{ mA}$ $P_i = 983 \text{ mW}$
	The effective internal capacitance $C_i$ is negligibly small. The effective internal inductance is $L_i \leq 5 \mu\text{H}$ .

## VEGAFLEX FX8\*(\*).DC/O\*\*\*\*A/H/P/FX\*\*\*\*, single chamber housing, Ex i electronics and connection compartment

Intrinsically safe circuit for the external display and adjustment unit:	
Terminals 5, 6, 7, 8	In type of protection intrinsic safety Ex ia IIC
	For connection to the intrinsically safe circuit of the corresponding external indicating unit VEGADIS 81 in ignition protection type Intrinsic safety "i" with corresponding CCOE approval.
	The proof for intrinsic safety of the interconnection rendered if the total inductance and total capacitance of the connection cable $L_{\text{cable}} = 212 \mu\text{H}$ and $C_{\text{cable}} = 1.98 \mu\text{F}$ is not exceeded
	When using the supplied VEGA connection cable, then the permissible cable length is $L_{\text{zul}} = 341 \text{ m}$ .

**VEGAFLEX FX8\*(\*).DC/O\*\*\*\*A/H/P/FX\*\*\*\*, double chamber housing, Ex i connection compartment**

<b>Intrinsically safe circuit for the external display and adjustment unit:</b>	
Terminals 5, 6, 7, 8	In type of protection intrinsic safety Ex ia IIC
	For connection to the intrinsically safe circuit of the corresponding external indicating unit VEGADIS 81 in ignition protection type Intrinsic safety "i" with corresponding CCOE approval.
	The proof for intrinsic safety of the interconnection rendered if the total inductance and total capacitance of the connection cable $L_{\text{cable}} = 212 \mu\text{H}$ and $C_{\text{cable}} = 1.98 \mu\text{F}$ is not exceeded
	When using the supplied VEGA connection cable, then the permissible cable length is $L_{\text{zul}} = 341 \text{ m}$ .

**VEGAFLEX FX8\*(\*).DC/O\*\*\*\*A/H/P/FX\*\*\*\* and VEGAFLEX FX8\*(\*).DC/O\*\*\*\*A/HZ\*\*\*\*, double chamber housing, Ex i electronics compartment**

<b>Intrinsically safe adapter circuit:</b>	
Internal plug connection	In type of protection intrinsic safety Ex ia IIC
	For connection to the intrinsically safe circuit of the corresponding external indicating unit VEGADIS 81 in ignition protection type Intrinsic safety "i" with corresponding CCOE approval.
	The proof for intrinsic safety of the interconnection rendered if the total inductance and total capacitance of the connection cable $L_{\text{cable}} = 212 \mu\text{H}$ and $C_{\text{cable}} = 1.98 \mu\text{F}$ is not exceeded
	When using the supplied VEGA connection cable, then the permissible cable length is $L_{\text{zul}} = 341 \text{ m}$ .

**VEGAFLEX FX8\*(\*).DC/O\*\*\*\*A/H/P/FX\*\*\*\* and VEGAFLEX FX8\*(\*).DC/O\*\*\*\*A/HZ\*\*\*\*, single and double chamber housing, Ex i electronics and connection compartment**

<b>Intrinsically safe circuit for the display and adjustment module or the interface adapter</b>	
Spring contacts	In type of protection intrinsic safety Ex ia IIC.
	Only for connection to the display and adjustment module PLICSCOM.

**VEGAFLEX FX8\*(\*).DC/O\*\*\*\*A/H/P/FX\*\*\*\* and VEGAFLEX FX8\*(\*).DC/O\*\*\*\*A/HZ\*\*\*\***

<b>Intrinsically safe HF circuit:</b>	
	In type of protection intrinsic safety Ex ia IIC
	The length of the coax connection cable between the electronics housing and the sensor housing may not exceed $L_{\text{cable}} = 50 \text{ m}$ for all versions of VEGAFLEX 81, 82, 83, 86 with separate sensor.

## 12 Mechanical data

The following mechanical data are valid for all housing and electronics versions.

<b>Mechanical data</b>	
Ground terminal (connection cross-section)	$\geq 4 \text{ mm}^2$

<b>Mechanical data</b>	
Overvoltage category	See operating instructions VEGAFLEX 81, 82, 83, 86, chapter " <i>Technical data</i> "
Pollution degree	2
<ul style="list-style-type: none"> <li>● Materials</li> <li>● Max. tensile load on the cable or rod probe</li> <li>● Potential connections and electrical separating measures in the instrument</li> <li>● Electromechanical data</li> <li>● Electrical protective measures</li> </ul>	Are described in the operating instructions VEGAFLEX 81, 82, 83, 86 in chapter " <i>Technical data</i> ".

## 13 Thermal data

The following temperature tables are valid for all housing and electronics versions.

If the VEGAFLEX FX8\*(\*).DC/O\*\*\*\*A/H/P/FX\*\*\*\* and VEGAFLEX FX8\*(\*).DC/O\*\*\*\*A/HZ\*\*\*\* level transmitters are operated in hazardous areas for EPL Ga, EPL Ga/Gb and EPL Gb applications, the permissible temperature range on the electronics/housings as well as on the sensor (measuring cable, rod) depending on the temperature class can be found in the following table:

Temperature class	Ambient temperature range (Electronics/housing)	Product temperature range on the sensor (measuring cable, rod)
T6	-50 ... +46 °C	-60 ... +80 °C
T5	-50 ... +61 °C	-60 ... +95 °C
T4	-50 ... +70 °C	-60 ... +130 °C
T3	-50 ... +70 °C	-60 ... +195 °C
T2	-50 ... +70 °C	-60 ... +290 °C
T1	-50 ... +70 °C	-60 ... +440 °C

### Low temperature version up to -196 °C

Temperature class	Ambient temperature range (Electronics/housing)	Product temperature range on the sensor (measuring cable, rod)
T6	-50 ... +46 °C	-196 ... +80 °C
T5	-50 ... +61 °C	-196 ... +95 °C
T4	-50 ... +70 °C	-196 ... +130 °C
T3	-50 ... +70 °C	-196 ... +195 °C
T2	-50 ... +70 °C	-196 ... +290 °C
T1	-50 ... +70 °C	-196 ... +440 °C

The sensors (measuring cable, rod) may only be operated in areas for EPL Ga, EPL Ga/Gb and EPL Gb applications if atmospheric conditions are present (pressure of 0.8 ... 1.1 bar).

If there is no explosive atmosphere, the permissible operating temperatures and pressures must be taken from the manufacturer specifications (operating instructions).

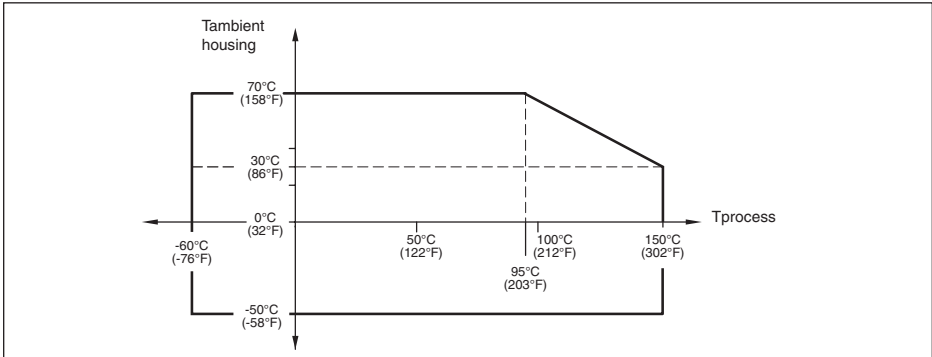
If the sensors (measuring cable, measuring rod) are operated at temperatures higher than those listed in the table above, measures must be taken to prevent the risk of ignition from hot surfaces.

The maximum permissible temperature at the electronics/housing must not exceed the values in the

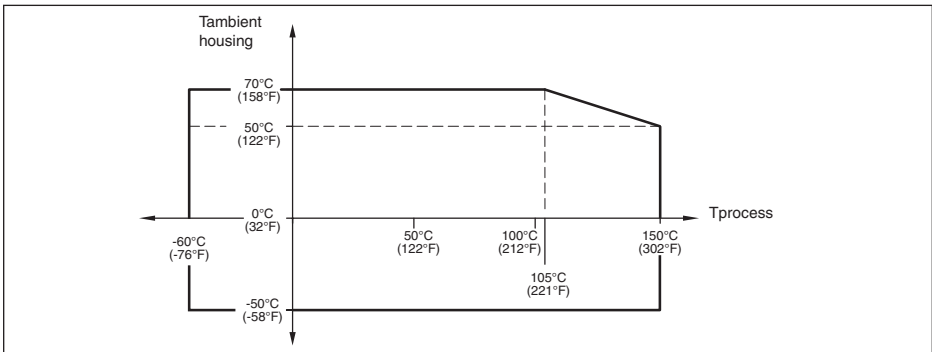
above table.

**Temperature derating for process temperatures up to +150 °C, +200 °C, +250 °C, +280 °C and +450 °C**

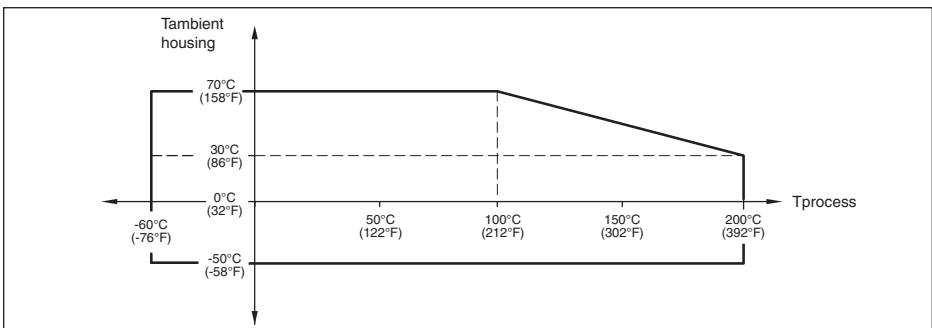
**Versions for process temperatures up to +150 °C with plastic housing**



**Versions for process temperatures up to +150 °C with metal housing**

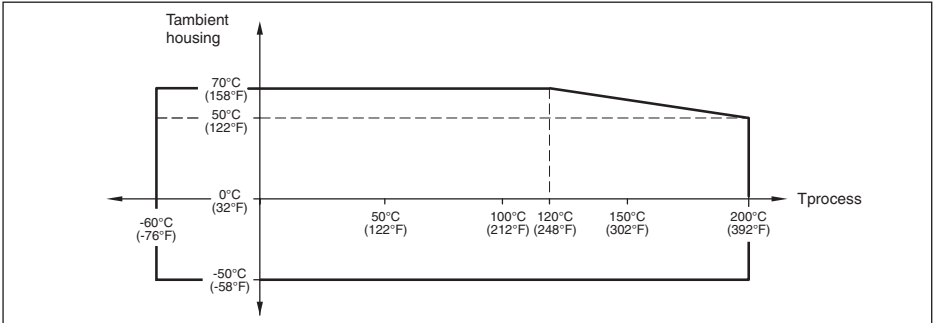


**Versions for process temperatures up to +200 °C with plastic housing**

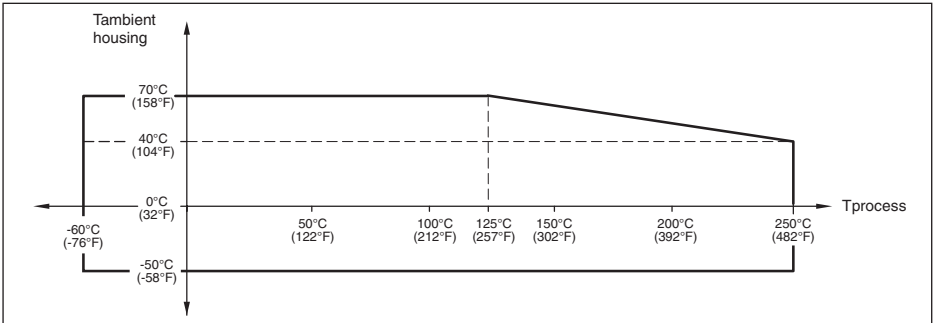




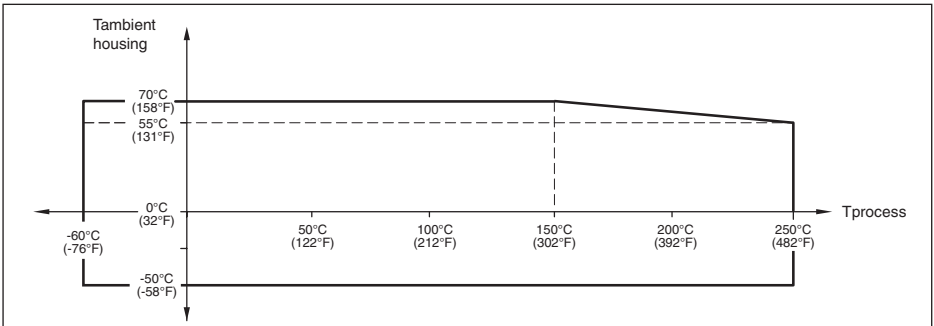
## Versions for process temperatures up to +200 °C with metal housing



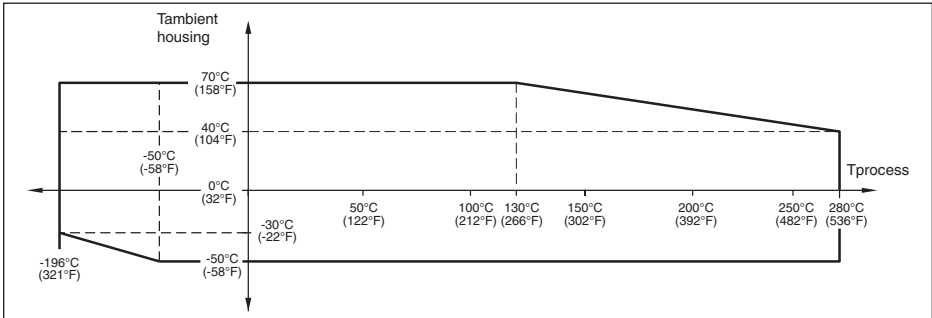
## Versions for process temperatures up to +250 °C with plastic housing



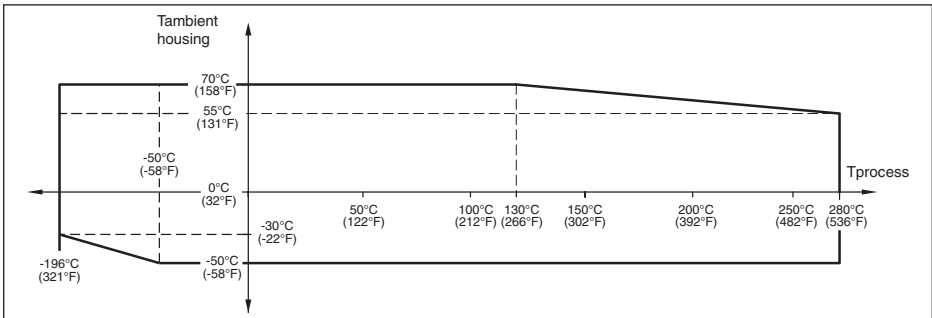
## Versions for process temperatures up to +250 °C with metal housing



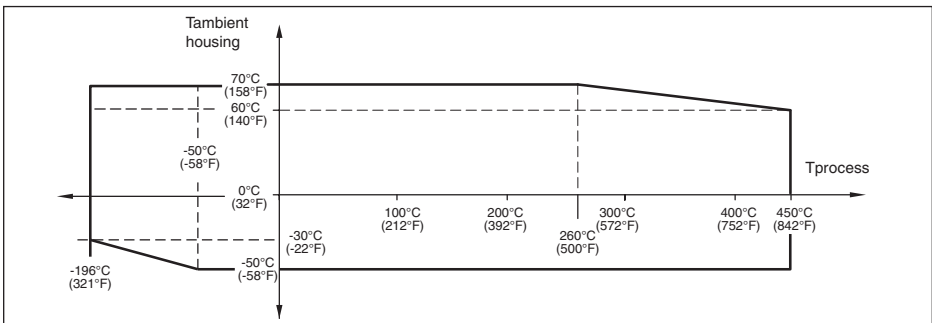
**Versions for process temperatures up to +280 °C with plastic housing**



**Versions for process temperatures up to +280 °C with metal housing**



**Versions for process temperatures up to +450 °C with plastic and metal housing**



**Confirmation**

Hereby the company VEGA Grieshaber KG declares that the approved CCOE devices have been manufactured in accordance with the IECEx approval mentioned in the attached CCOE certificate.

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Printing date:

**VEGA**

All statements concerning scope of delivery, application, practical use and operating conditions of the sensors and processing systems correspond to the information available at the time of printing.

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63692-EN-230316

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