



OPTIWAVE 7300 C Technical Datasheet

Non-contact Radar (FMCW) Level Meter for liquids

- For liquid applications
- The only guarantee for measuring accurately in difficult conditions
- Antenna options (Drop, Hygienic, ...) designed for specific purposes



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1.1 The radar solution for liquids

This device is a non-contact Radar (FMCW) Level Meter for distance, level, volume and mass measurement of liquids, pastes and slurries. It gives a stabler measurement than pulse radar and is well suited to agitated process conditions. The device can operate at very low and very high process temperatures as long as the process connection temperature limits are observed.



- ① Optional touch screen with 4-button operation
- ② 2-wire level meter
- ③ One converter for all applications
- ④ Stainless steel horn, PTFE/PP Drop or PEEK Hygienic antenna
- ⑤ Antenna extension (for long nozzles)
- ⑥ Optional Metaglas® barrier
- ⑦ Rotatable housing
- ⑧ Same housing for Ex d and non-Ex

Highlights

- ± 3 mm / ± 0.12 " standard accuracy
- Optionally equipped with a 4-button touch screen display and an easy-to-use setup wizard
- Reliable measurement in difficult process conditions
- Operates up to a process connection temperature of 200°C / 390°F and 100 barg / 1450 psig
- Measuring range up to 80 m / 260 ft
- Horn and Drop antenna versions can be extended to suit any nozzle length
- Drop antenna for corrosive liquids (with optional PTFE/PP flange plate) or where product build-up is likely to occur
- Sealed Drop antenna extension option for pressurized tanks
- Hygienic antenna for processes where stringent hygiene standards must be obeyed
- PACTware and DTMs included as standard
- Optional second current output
- Directly-accessible graphic touchscreen/wizard (option)
- Converter rotates 360°
- Triple barrier gas-tight protection available for working with dangerous gases (using pre-stressed fused glass)

Industries

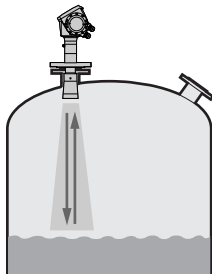
- Chemicals
- Food & Beverage
- Oil & Gas
- Petrochemicals
- Pulp & Paper
- Water & Wastewater

Applications

- Tanks with agitators
- Process tanks
- Storage tanks

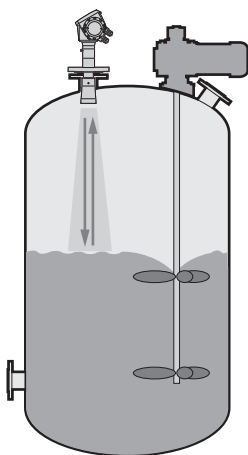
1.2 Applications

1. Level measurement of liquids in storage tanks



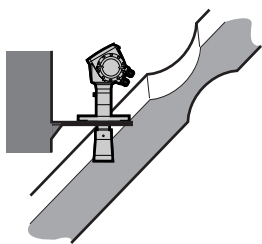
The level transmitter can measure the level of a wide range of liquid products on a large variety of installations, including LPG and LNG tanks. It does not require calibration or commissioning when installed. It can measure any liquid within the stated pressure and temperature range, and distances up to 80 m / 260 ft.

2. Level measurement of liquids in process tanks



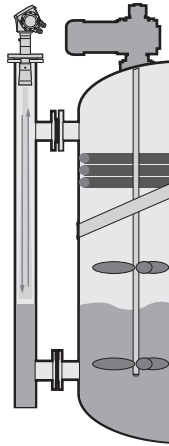
The level transmitter can measure level accurately in agitated conditions, such as near to vortexes caused by agitators, and also where foam is present.

3. Open channel metering or flow



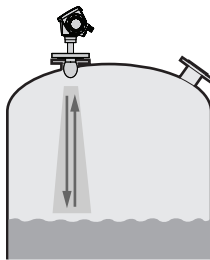
The level transmitter can measure level in an open channel and convert this measurement into flow values if the characteristics of the channel are known. This solution is the high end alternative to ultrasonic and hydrostatic pressure transmitters.

4. Measurement of liquids in a bypass chamber



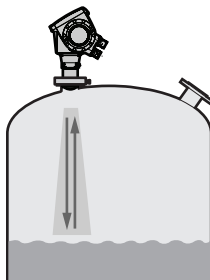
If the tank is full of obstructions such as agitators and reinforcements, we recommend installing the radar level transmitter in a bypass chamber or a stilling well. This solution is also available from us under the name BM 26 W. The BM 26 W combines the BM 26 A with the radar level transmitter. The device includes a permanent, local indication without a power supply. Please refer to the BM 26 W documentation for further information.

5. Measurement of corrosive liquids with a Drop antenna



The Drop antenna option combines a relatively small radar beam for more precise measurement and a shape that avoids product build-up. If the tank contains corrosive liquids such as acids and alkaline solutions, we recommend the DN80 / 3" Drop antenna with the PTFE or PP flange plate protection option.

6. Measurement of liquids with a Hygienic antenna



The Hygienic antenna option is made of materials that agree with FDA regulations. It is suitable for level measurement in processes that require hygienic equipment (such as the food, beverage and pharmaceutical industries).

1.3 Measuring principle

A radar signal is emitted via an antenna, reflected from the product surface and received after a time t . The radar principle used is FMCW (Frequency Modulated Continuous Wave).

The FMCW-radar transmits a high frequency signal whose frequency increases linearly during the measurement phase (called the frequency sweep). The signal is emitted, reflected on the measuring surface and received with a time delay, t . Delay time, $t=2d/c$, where d is the distance to the product surface and c is the speed of light in the gas above the product.

For further signal processing the difference Δf is calculated from the actual transmit frequency and the receive frequency. The difference is directly proportional to the distance. A large frequency difference corresponds to a large distance and vice versa. The frequency difference Δf is transformed via a Fourier transformation (FFT) into a frequency spectrum and then the distance is calculated from the spectrum. The level results from the difference between tank height and measuring distance.

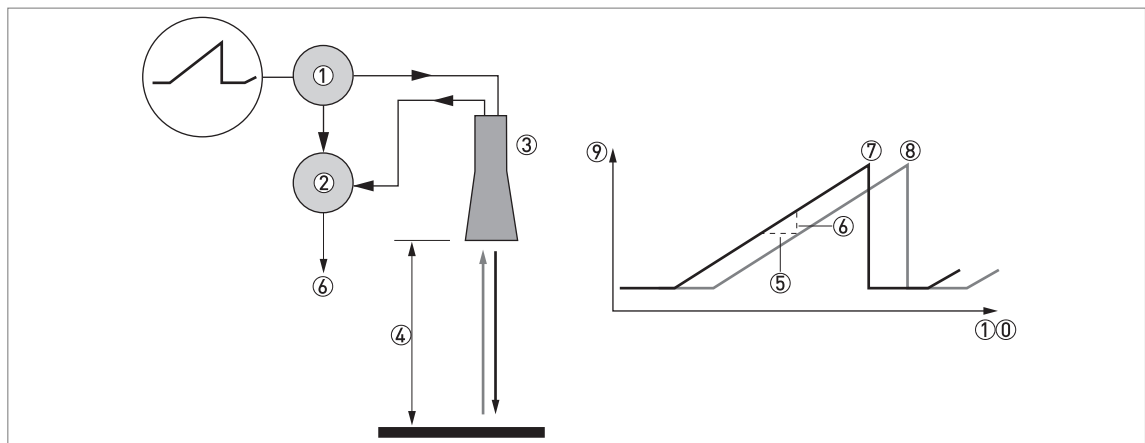


Figure 1-1: Measuring principle of FMCW radar

- ① Transmitter
- ② Mixer
- ③ Antenna
- ④ Distance to product surface, where change in frequency is proportional to distance
- ⑤ Differential time delay, Δt
- ⑥ Differential frequency, Δf
- ⑦ Frequency transmitted
- ⑧ Frequency received
- ⑨ Frequency
- ⑩ Time

2.1 Technical data

- *The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local representative.*
- *Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website (Download Center).*

Measuring system

Measuring principle	2-wire loop-powered level transmitter; K-band (24...26 GHz) FMCW radar
Application range	Level measurement of liquids, pastes and slurries
Primary measured value	Δf (change in frequency) between the emitted and received signal
Secondary measured value	Distance, level, volume, mass and reflectivity

Design

Construction	The measurement system consists of a measuring sensor (antenna) and a signal converter which is only available in a compact version
Options	Integrated LCD display with sun cover (-20...+60°C / -4...+140°F); if the ambient temperature is not in these limits, the display switches off
	2nd current output
	FOUNDATION Fieldbus output (4-wire device with local HART communication)
	PROFIBUS PA output (4-wire device with local HART communication)
	PTFE/PP flange plate protection (for Drop antennas without antenna extensions only)
	Distance piece (for process temperature: +150...+200°C / +300...+390°F) ①
Accessories	Antenna purging system (supplied with a ¼ NPTF connection)
	Weather protection
Max. measuring range	Antenna extensions of 105 mm / 4.1" length (Max length for Drop antenna versions: 525 mm / 20.7"; not available for the Hygienic antenna)
	80 m / 260 ft
Min. tank height	Depends on the antenna option, dielectric constant of the product and installation type. Refer also to "Antenna selection".
Dead zone	0.2 m / 8" (1 m / 40" for hygienic antenna)
Beam angle of antenna	Antenna extension length + antenna length + 0.1 m / 4" (500 mm / 20" for hygienic antenna)
	Horn DN40 / 1.5": 20°
	Horn DN50 / 2": 15°
	Horn / Sheet metal horn DN80 / 3": 10°
	Horn / Sheet metal horn DN100 / 4": 8°
Display and user interface	Drop DN80 / 3": 8°
	Hygienic DN50 / 2": 15°
Display	English, German, French, Italian, Spanish, Portuguese, Japanese, Chinese (Mandarin) and Russian
	LCD display
Interface languages	9 lines, 160 × 160 pixels in 8-step grayscale with 4-button keypad

Measuring accuracy

Resolution	1 mm / 0.04"
Repeatability	±1 mm / ±0.04"
Accuracy	±3 mm / ±0.12", when distance < 10 m / 33 ft; ±0.03% of measured distance, when distance > 10 m / 33 ft
Reference conditions acc. to EN 60770	
Temperature	+20°C ±5°C / +70°F ±10°F
Pressure	1013 mbara ±20 mbar / 14.69 psia ±0.29 psi
Relative air humidity	60% ±15%
Target	Metal plate in an anechoic chamber

Operating conditions

Temperature	
Ambient temperature	-40...+80°C / -40...+175°F (according to the temperature limits of the gasket material. Refer to "Materials" in this table.) Ex: see supplementary operating instructions or approval certificates
Storage temperature	-40...+85°C / -40...+185°F
Process connection temperature	Horn / Sheet metal horn antenna: Standard: -50...+150°C / -58...+300°F Option: -50...+200°C / -58...+390°F (the process connection temperature must agree with the temperature limits of the gasket material. Refer to "Materials" in this table.) Ex: see supplementary operating instructions or approval certificates Drop antenna (PTFE): -50...+150°C / -58...+300°F (the process connection temperature must agree with the temperature limits of the gasket material. Refer to "Materials" in this table.) Ex: see supplementary operating instructions or approval certificates Drop antenna (PP): -40...+100°C / -40...+210°F (the process connection temperature must agree with the temperature limits of the gasket material. Refer to "Materials" in this table.) Ex: see supplementary operating instructions or approval certificates Hygienic antenna (PEEK): -20...+150°C / -4...+300°F (the process connection temperature must agree with the temperature limits of the gasket material. Refer to "Materials" in this table.) Ex: see supplementary operating instructions or approval certificates
Pressure	
Operating pressure	Drop antenna (PP): -1...16 barg / -14.5...232 psig; subject to process connection used and flange temperature Drop antenna (PTFE): -1...40 barg / -14.5...580 psig; subject to process connection used and flange temperature Hygienic antenna (PEEK): -1...10 barg / -14.5...145 psig; subject to process connection used and flange temperature Horn / Sheet metal horn antenna: Standard: -1...40 barg / -14.5...580 psig; Option: -1...100 barg / -14.5...1450 psig; subject to process connection used and flange temperature

Other conditions	
Dielectric constant (ϵ_r)	≥ 1.5
Vibration resistance	IEC 60068-2-6 and EN 50178 (10...57 Hz: 0.075 mm / 57...150 Hz:1g)
Ingress protection	IP 66/67 equivalent to NEMA type 4X (housing) and type 6P (antenna)

Installation conditions

Process connection size	The nominal diameter (DN) should be equal to or larger than the antenna diameter. If the nominal diameter (DN) is smaller than the antenna, either: - provide the means to adapt the device to a larger process connection on the tank (for example, a plate with a slot), or - use the same process connection, but remove the antenna from the device before installation and fit it from inside the tank.
Process connection position	Make sure that there are not any obstructions directly below the process connection for the device.
Dimensions and weights	Refer to "Technical data: Dimensions and weights".

Materials

Housing	Standard: Aluminium with a polyester topcoat
	Option: Stainless steel (1.4404 / 316L) ②
Wetted parts, including antenna	Standard for Horn / Sheet metal horn antenna: Stainless steel (1.4404 / 316L)
	Option for Horn antenna: Hastelloy® C-22 (2.4602) ③
	Standard for Drop antenna: PTFE; PP
	Option for Drop antenna: PP or PTFE flange plate protection
Process connection	Hygienic antenna: PEEK - this material agrees with FDA regulations
	Standard for Horn, Sheet metal horn and Drop antennas: Stainless steel (1.4404 / 316L) - a PP or PTFE flange plate protection option is also available for the Drop antenna Standard for Hygienic antenna: PEEK Option: Hastelloy® C-22 (2.4602) - for Horn antennas only
Gaskets (and o-rings for the sealed antenna extension option)	Hygienic antenna: BioControl®: FKM/FPM (-20...+150°C / -4...+300°F); EPDM (-20°C...+150°C / -4...+300°F) SMS, Tri-Clamp®, DIN 11851: without ④
	PTFE Drop antenna: FKM/FPM (-40...+150°C / -40...+300°F); Kalrez® 6375 (-20...+150°C / -4...+300°F); EPDM (-50°C...+150°C / -58...+300°F) ⑤
	PP Drop antenna: FKM/FPM (-40...+100°C / -40...+210°F); Kalrez® 6375 (-20...+100°C / -4...+210°F); EPDM (-40°C...+100°C / -40...+210°F) ⑤
	Horn / Sheet metal horn antenna: FKM/FPM (-40...+200°C / -40...+390°F); Kalrez® 6375 (-20...+200°C / -4...+390°F); EPDM (-50°C...+150°C / -58...+300°F) ⑤
Feedthrough	Standard: PEI (-50...+200°C / -58...+390°F - max. range. The feedthrough temperature limits must agree with the temperature limits of the gasket material and antenna type. If the distance piece option is not attached, the maximum temperature is 150°C / 300°F.)
	Option: Metaglas® (-30...+200°C / -22...+390°F - max. range. The feedthrough temperature limits must agree with the temperature limits of the gasket material and antenna type. If the distance piece option is not attached, the maximum temperature is 150°C / 300°F.) ⑥
Weather protection (Option)	Stainless steel (1.4301 / 304)

Process connections

Thread	G 1½; 1½ NPT
Flange version	
EN	DN40...150 in PN16, PN40, PN63 or PN100; others on request
ASME	1½"...8" in 150 lb, 1½"...6" in 300 lb, 1½"...4" in 600 lb or 900 lb; others on request
JIS	40...100A in 10K; others on request
Hygienic	BioControl® DN50; Tri-Clamp® 2"; DIN 11851 DN50; SMS 51; others on request
Other	Others on request

Electrical connections

Power supply	Terminals output 1 - Non-Ex / Ex i: 14...30 VDC; min./max. value for an output of 22 mA at the terminal
	Terminals output 1 - Ex d: 20...36 VDC; min./max. value for an output of 22 mA at the terminal
	Terminals output 2 - Non-Ex / Ex i / Ex d 10...30 VDC; min./max. value for an output of 22 mA at the terminal (additional power supply needed - output only)
Cable entry	M20×1.5; ½ NPT
	G ½ (not for FM- and CSA-approved devices. Not for stainless steel housings.)
	M25×1.5 (for stainless steel housings only)
Cable gland	Standard: none
	Options: M20×1.5 (for non-Ex and Ex -approved devices with M20×1.5 and M25×1.5 cable entries); others are available on request
Cable entry capacity (terminal)	0.5...1.5 mm²

Input and output

Current output	
Output signal (Output 1)	4...20 mA HART® or 3.8...20.5 mA acc. to NAMUR NE 43 ⑦
Output signal (Output 2 - optional)	4...20 mA (no HART® signal) or 3.8...20.5 mA acc. to NAMUR NE 43
Resolution	±3 µA
Temperature drift	Typically 50 ppm/K
Error signal	High: 22 mA; Low: 3.6 mA acc. to NAMUR NE 43
PROFIBUS PA	
Type	4-wire (+ local HART) level transmitter; K-band FMCW radar
Function blocks	7 (level, distance, level conversion, level mass, reflection, ullage conversion and distance mass)
Protocol / Communication standard	PROFIBUS PA protocol that agrees with IEC 61158-2, galvanically isolated
Physical layer types	Standard power signaling, bus powered, non I.S.
Other features	Bus interface with integrated reverse polarity protection
Device power supply (24 V input)	18...30 VDC
Current consumption on PROFIBUS network	20 mA
Output data	Level, distance, level conversion, level mass, reflection, ullage conversion or distance mass
Input data	None

Error current FDE	Typically 0 mA (FDE =Fault Disconnection Electronic)
Address range	0...125. Default address: 126.
FOUNDATION Fieldbus	
Type	4-wire (+ local HART) level transmitter; K-band FMCW radar
Function blocks	1 × Resource Block (RB), 4 × Analog Input Blocks (RB), 1 × Transducer Block (TB) Analog Input Block: 50 ms
Protocol / Communication standard	Foundation Fieldbus protocol that agrees with IEC 61158-2, galvanically isolated
ITK version	5.1
Physical layer types	Standard power signaling, bus powered, non I.S.
Other features	Bus interface with integrated reverse polarity protection
Device power supply (24 V input)	18...30 VDC
Bus power supply	9...32 VDC (non-Ex); 9...17.5 VDC (intrinsically-safe)
Basic current	20 mA
Maximum error current	20 mA
Start current after 10 ms	20 mA
Polarity sensitivity	Yes
Minimum cycle time	100 ms
Output data	Level, distance, level conversion, level mass, reflection, ullage conversion or distance mass
Input data	None
Error current FDE	Typically 0 mA (FDE =Fault Disconnection Electronic)
Link Master function	Not supported

Approvals and certification

CE	This device fulfils the statutory requirements of the EC directives. The manufacturer certifies successful testing of the product by applying the CE mark.
Explosion protection	
ATEX KEMA 04ATEX1218 X	II 1 G, 1/2 G, 2 G Ex ia IIC T6...T3;
	II 1 D, 1/2 D, 2 D Ex iaD 20 or Ex iaD 20/21 IP6X T70°C...T95°C;
	II 1/2 G, 2 G Ex d[ia] IIC T6...T3;
	II 1/2 D, 2 D Ex tD[iaD] A21/20 IP6X T70°C...T95°C;
	II 3 G Ex nA II T6...T3 X
IECEX IECEX KEM 06.0025 X	Ga Ex ia IIC T6...T3; Ex iaD 20 IP6X T70°C...T 95°C;
	Ga/Gb Ex d[ia] IIC T6...T3; Ex tD[iaD] A21/20 IP6X T70°C...T 95°C
FM - Dual Seal-approved	NEC 500
	XP-IS / Cl. I / Div. 1 / Gr. ABCD / T6;
	DIP / Cl. II/III / Div. 1 / Gr. EFG / T6;
	IS / Cl. I/II/III / Div. 1 / Gr. ABCDEFG / T6;
	NI / Cl. I / Div. 2 / Gr. ABCD / T6
	NEC 505
	XP-IS / Cl. I / Zone 0 / AEx d[ia] IIC T6;
	IS / Cl. I / Zone 0 / AEx ia IIC T6;
	NI / Cl. I / Zone 2 / AEx nA[ia] IIC T6
	Hazardous (Classified) Locations, indoor/outdoor Type 4X and 6P, IP66, Dual Seal

CSA - Dual Seal-approved	CEC Section 18 (Zone ratings)
	Cl. I, Zone 1, Ex d, IIC (Antenna: Zone 0) T6;
	Cl. I, Zone 0, Ex ia, IIC T6;
	Cl. I, Zone 2, Ex nA, IIC T6
	CEC Section 18 and Annex J (Division ratings)
	XP-IS, Cl. I, Div. 2, Gr. ABCD; Cl. II, Div. 2, Gr. FG; Cl. III, Div. 2 T6; IS, Cl. I, Div. 1, Gr. ABCD; Cl. II, Gr. FG; Cl. III T6
NEPSI GYJ111193/94	Ex dia IIC T3~T6 DIP A21/A20 T _A T70°C~T95°C IP6X;
	Ex ia IIC T3~T6 DIP A21/A20 T _A T70°C~T95°C IP6X
CEPEL / INMETRO CEPEL-EX-1996/11X	BR-Ex ia IIC T6...T3 Ga
	Ex ia IIIC T95°C Da IP67
	BR-Ex d[ia] IIC T6...T3 Gb
	Ex t[ia Da] IIIC T95°C Db IP67
Other standards and approvals	
EMC	Electromagnetic Compatibility Directive 2004/108/EC in conjunction with EN 61326-1 (2006)
R & TTE	Radio Equipment and Telecommunications Terminal Equipment Directive 1999/5/EC in conjunction with ESTI EN 302 372 (2006)
FCC Rules	Part 15
Industry Canada	RSS-210
LVD	Low-Voltage Directive 2006/95/EC in conjunction with EN 61010-1 (2001)
NAMUR	NAMUR NE 21 Electromagnetic Compatibility (EMC) of Industrial Process and Laboratory Control Equipment
	NAMUR NE 43 Standardization of the Signal Level for the Failure Information of Digital Transmitters
WHG (pending)	In conformity with the German Federal Water Act, §9
CRN	This certification is for all Canadian provinces and territories. For more data, refer to the website.
Construction code	On request: NACE MR0175 / ISO 15156; NACE MR0103

① The device has a distance piece if it has the flange options that follow: 6" in 300 lb, 3"...4" in 600 lb and 1½"...4" in 900 lb

② This option is not available for FM- or CSA-approved devices

③ Hastelloy® is a registered trademark of Haynes International, Inc.

④ Tri-Clamp® is a registered trademark of Ladish Co., Inc. BioControl® is a registered trademark of Neumo-Ehrenberg-Group.

⑤ Kalrez® is a registered trademark of DuPont Performance Elastomers L.L.C.

⑥ Metaglas® is a registered trademark of Herberts Industrieglas, GMBH & Co., KG

⑦ HART® is a registered trademark of the HART Communication Foundation

2.2 Antenna selection

The graphs below show which antenna to select for the application based on:

- D , the measuring range,
- ϵ_r , is the dielectric constant of the product being measured

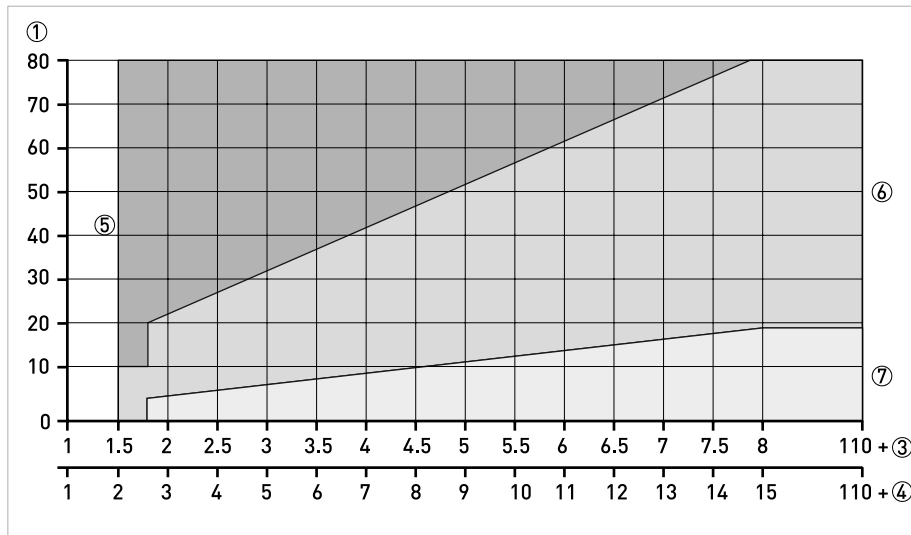


Figure 2-1: Selection of antenna for liquid applications (graph of distance in m against ϵ_r)

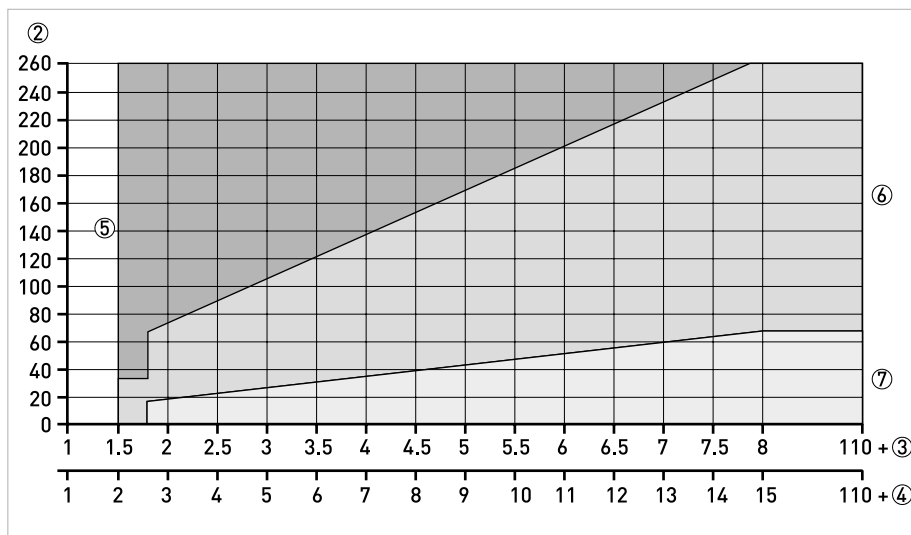


Figure 2-2: Selection of antenna for liquid applications (graph of distance in ft against ϵ_r)

- ① Distance, D [m]
- ② Distance, D [ft]
- ③ Dielectric constant (ϵ_r) range for storage/stillwell applications
- ④ Dielectric constant (ϵ_r) range for process/agitator applications
- ⑤ DN80 or DN100 Horn antenna in a still well
- ⑥ DN80 or DN100 Horn antenna with or without a still well, or DN80 Drop antenna without a still well
- ⑦ DN40, DN50, DN80 or DN100 Horn antenna with or without a still well, DN80 Drop antenna without a still well or Hygienic antenna

2.3 Guidelines for maximum operating pressure

Make sure that the devices are used within their operating limits.

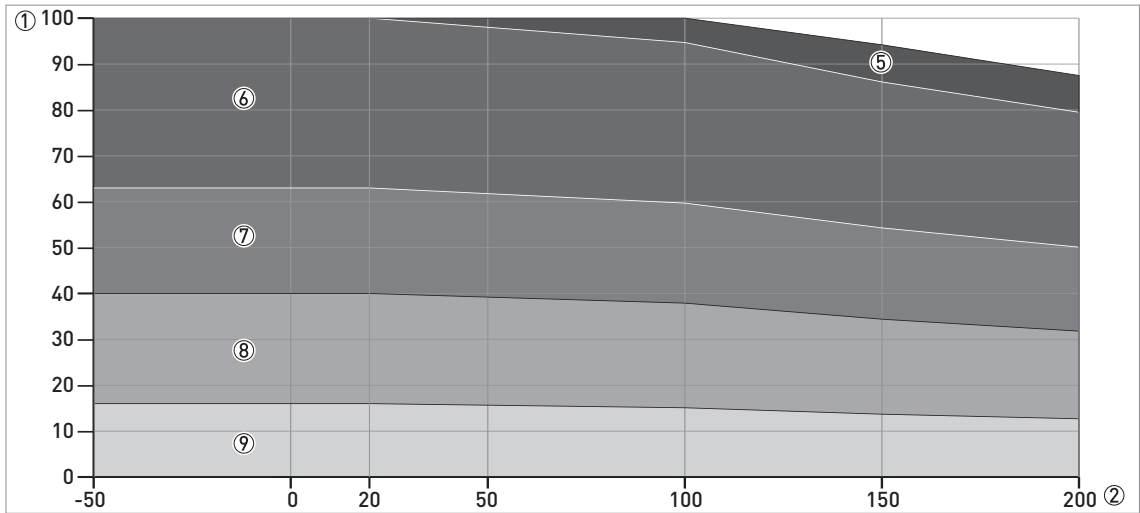


Figure 2-3: Pressure / temperature de-rating (EN 1092-1), flange and threaded connection, in °C and barg

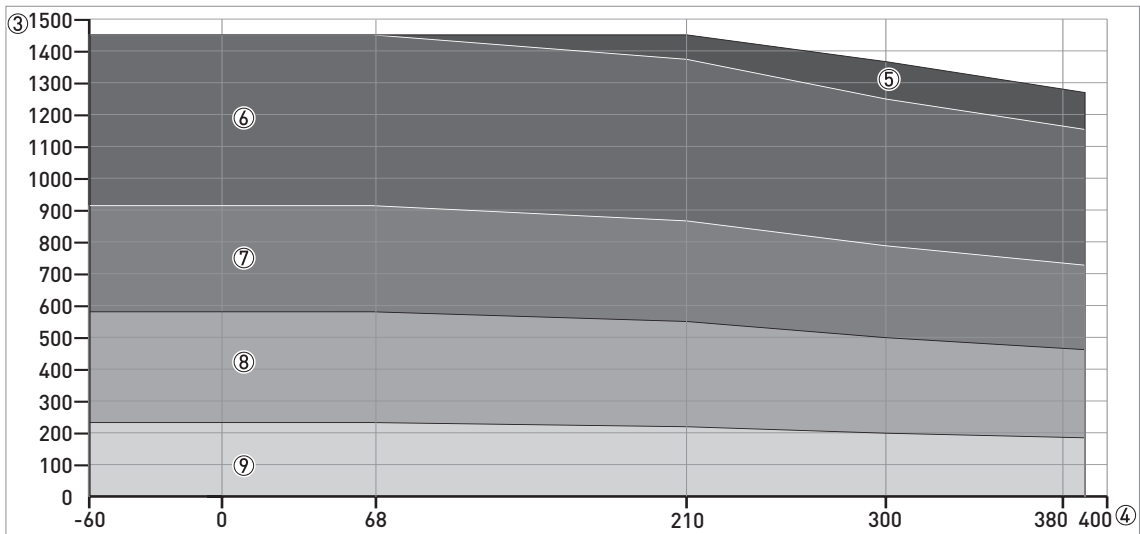


Figure 2-4: Pressure / temperature de-rating (EN 1092-1), flange and threaded connections, in °F and psig

- ① p [barg]
- ② T [°C]
- ③ p [psig]
- ④ T [°F]
- ⑤ Threaded connection, G (ISO 228-1)
- ⑥ Flange connection, PN100
- ⑦ Flange connection, PN63
- ⑧ Flange connection, PN40
- ⑨ Flange connection, PN16

CRN certification

There is a CRN certification option for devices with process connections that agree with ASME standards. This certification is necessary for all devices that are installed on a pressure vessel and used in Canada.

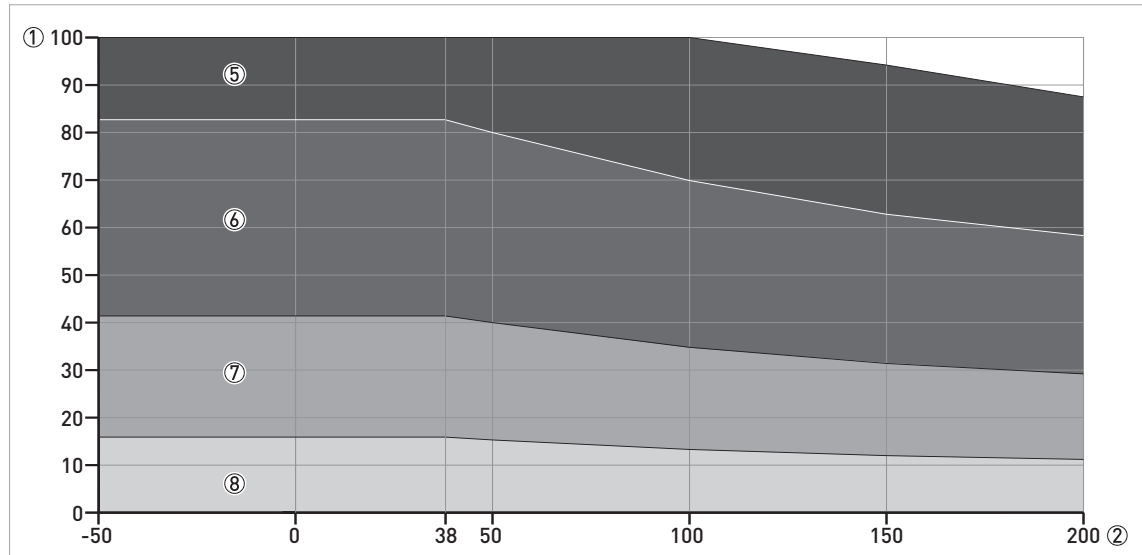


Figure 2-5: Pressure / temperature de-rating (ASME B16.5), flange and threaded connections, in °C and barg

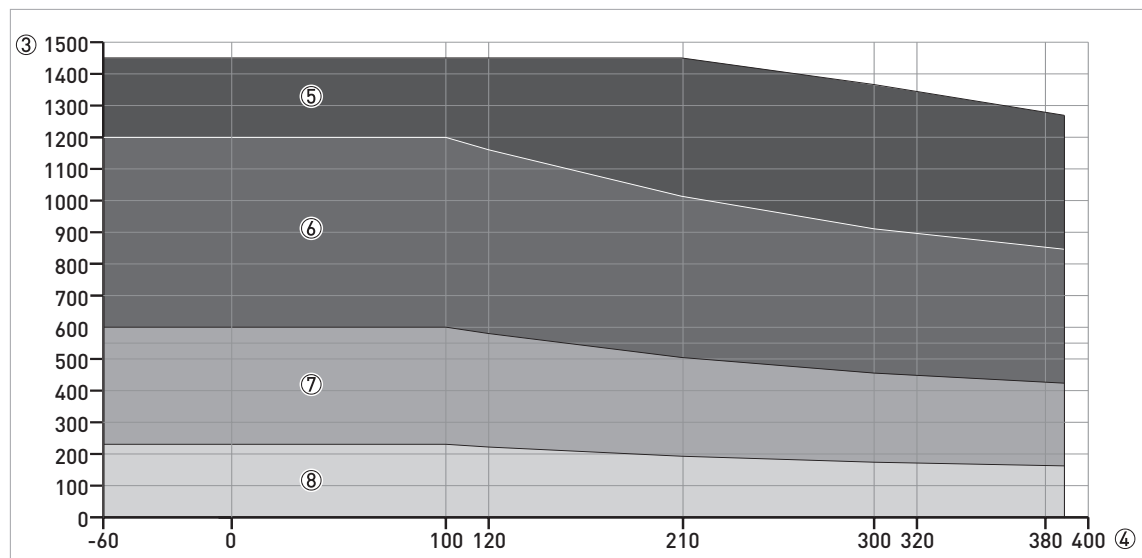


Figure 2-6: Pressure / temperature de-rating (ASME B16.5), flange and threaded connections, in °F and psig

① p [barg]

② T [°C]

③ p [psig]

④ T [°F]

⑤ Flange connection, Class 900 and Class 1500. Threaded connection, NPT (ASME B1.20.1).

⑥ Flange connection, Class 600

⑦ Flange connection, Class 300

⑧ Flange connection, Class 150

2.4 Dimensions and weights

Housing

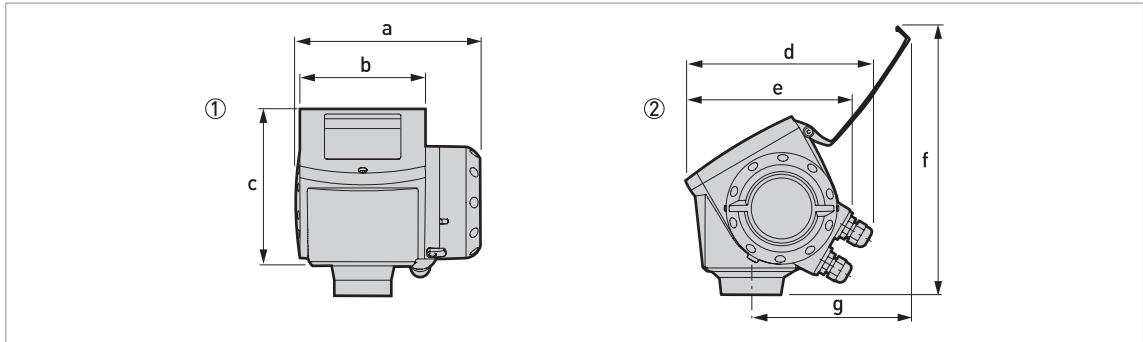


Figure 2-7: Housing dimensions

- ① Housing front view
- ② Housing side view

Dimensions and weights in mm and kg

	Dimensions [mm]							Weights [kg]
	a	b	c	d	e	f	g	
Housing	180	122	158.5	182 ①	167	277	155	3.3

① If fitted with standard cable glands

Dimensions and weights in inches and lb

	Dimensions [inches]							Weights [lb]
	a	b	c	d	e	f	g	
Housing	7.1	4.8	6.2	7.2 ①	6.5	10.9	6.1	7.3

① If fitted with standard cable glands

- Cable glands are delivered on demand with non-Ex, Ex i- and Ex d-approved devices.
- The diameter of the outer sheath of the cable must be 6...12 mm or 0.2...0.5".
- Cable glands for FM- or CSA-approved devices must be supplied by the customer.
- A weather protection cover is available on request with all devices.

Weather protection

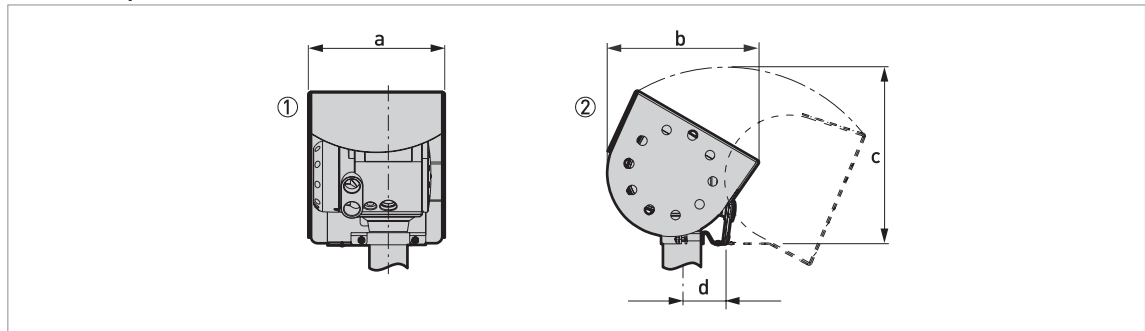


Figure 2-8: Dimensions of the weather protection option

- ① Weather protection, back view
- ② Weather protection, left side view

Dimensions and weights in mm and kg

	Dimensions [mm]				Weights [kg]
	a	b	c	d	
Weather protection	208	231.5	268 ①	66	2.9

① Radius

Dimensions and weights in inches and lb

	Dimensions [inches]				Weights [lb]
	a	b	c	d	
Weather protection	8.2	9.1	10.6 ①	2.6	6.4

① Radius

DN40/1.5" horn antenna versions

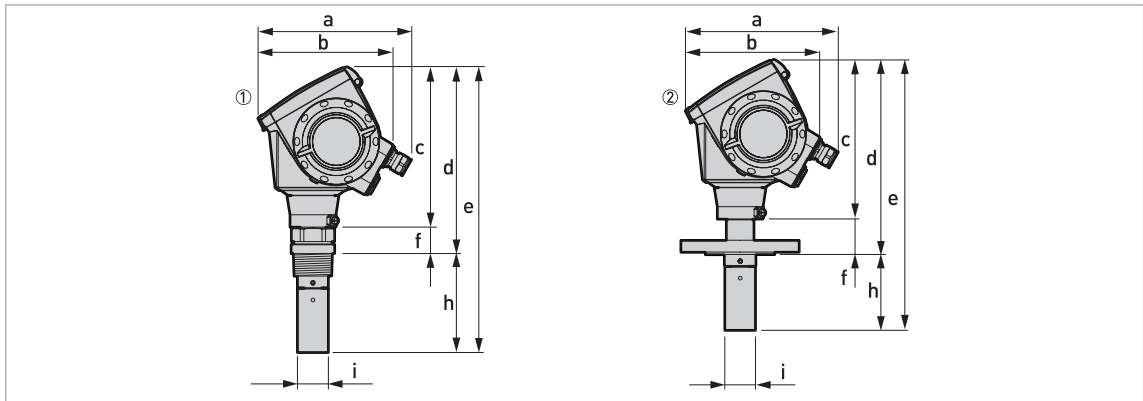


Figure 2-9: DN40 or 1.5" horn antenna versions

- ① DN40/1.5" horn antenna with G 1 1/2 or 1 1/2 NPT thread connection
- ② DN40/1.5" horn antenna with flange connection

Dimensions and weights in mm and kg

	Dimensions [mm]								Weights [kg]
	a	b	c	d	e	f	h	Øi	
Thread connection	194 ①	170	201	233	359	32	126 ②	39	5.1
Flange connection	194 ①	170	201	246 ③	342 ③	45 ③	96 ②	39	6.6...14.1

- ① If fitted with standard cable glands
- ② Additional antenna extensions of Ø39 × length 105 mm are available
- ③ With 1/4 NPTF purge connection option: add 17 mm to this dimension. With distance piece option: add 71 mm to this dimension.

Dimensions and weights in inches and lb

	Dimensions [inches]								Weights [lb]
	a	b	c	d	e	f	h	Øi	
Thread connection	7.6 ①	6.7	7.9	9.2	14.1	1.3	4.9 ②	1.5	11.2
Flange connection	7.6 ①	6.7	7.9	9.7 ③	13.5 ③	1.8 ③	3.8 ②	1.5	14.4...31.1

- ① If fitted with standard cable glands
- ② Additional antenna extensions of Ø1.5 × length 4.1" are available
- ③ With 1/4 NPTF purge connection option: add 0.7" to this dimension. With distance piece option: add 2.8" to this dimension.

DN50/2" horn antenna versions

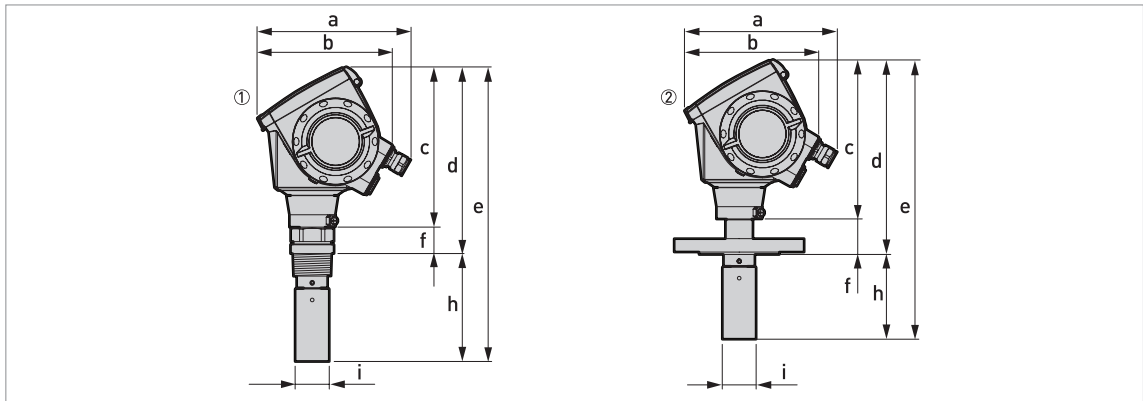


Figure 2-10: DN50/2" horn antenna versions

- ① DN50/2" horn antenna with G 1½ or 1½ NPT thread connection
 ② DN50/2" horn antenna with flange connection

Dimensions and weights in mm and kg

	Dimensions [mm]								Weight [kg]
	a	b	c	d	e	f	h	Øi	
Thread connection	182 ①	167	201	234	370	32	136 ②	43	5.3
Flange connection	182 ①	167	201	246 ③	353 ③	45 ③	107 ②	43	6.8...14.3

① If fitted with standard cable glands

② Additional antenna extensions of Ø39 × length 105 mm are available

③ With ¼ NPTF purge connection option: add 17 mm to this dimension. With distance piece option: add 71 mm to this dimension.

Dimensions and weights in inches and lb

	Dimensions [inches]								Weights [lb]
	a	b	c	d	e	f	h	Øi	
Thread connection	7.2 ①	6.5	7.9	9.2	14.5	1.3	5.3 ②	1.7	11.6
Flange connection	7.2 ①	6.5	7.9	9.7 ③	13.9 ③	1.8 ③	4.2 ②	1.7	14.8...31.5

① If fitted with standard cable glands

② Additional antenna extensions of Ø1.5 × length 4.1" are available

③ With ¼ NPTF purge connection option: add 0.7" to this dimension. With distance piece option: add 2.8" to this dimension.

DN80/3" horn antenna versions

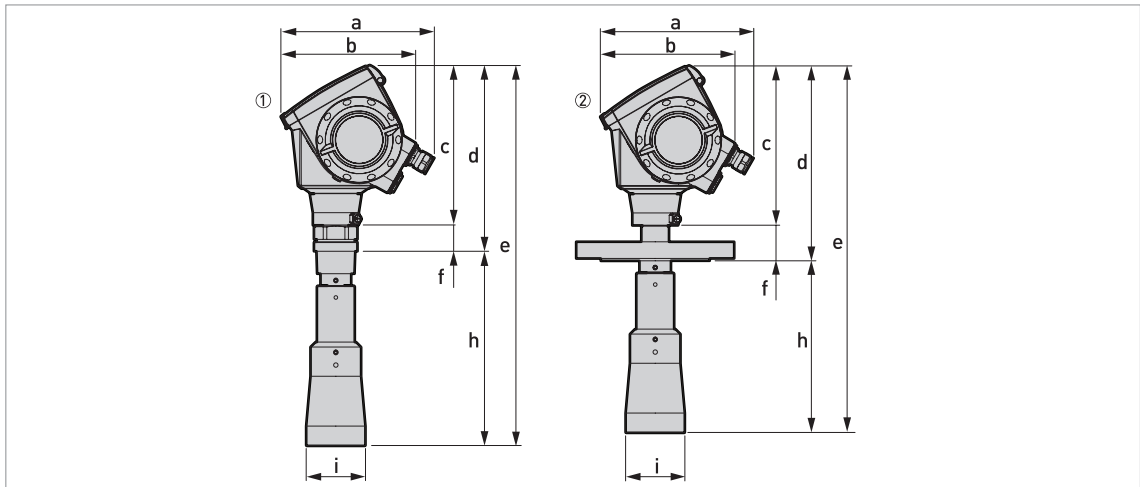


Figure 2-11: DN80/3" horn antenna versions

- ① DN80/3" horn antenna with G 1½ or 1½ NPT thread connection
- ② DN80/3" horn antenna with flange connection

Dimensions and weights in mm and kg

	Dimensions [mm]								Weights [kg]
	a	b	c	d	e	f	h	Øi	
Thread connection	182 ①	167	201	233	479	32	246 ②	75	6.8
Flange connection	182 ①	167	201	246 ③	463 ③	45 ③	217 ②	75	11.1...18.9

- ① If fitted with standard cable glands
- ② Additional antenna extensions of Ø39 × length 105 mm are available
- ③ With ¼ NPTF purge connection option: add 17 mm to this dimension. With distance piece option: add 71 mm to this dimension.

Dimensions and weights in inches and lb

	Dimensions [inches]								Weights [lb]
	a	b	c	d	e	f	h	Øi	
Thread connection	7.2 ①	6.5	7.9	9.2	18.9	1.3	9.7 ②	3	15
Flange connection	7.2 ①	6.5	7.9	9.7 ③	18.2 ③	1.8 ③	8.5 ②	3	24.4...41.5

- ① If fitted with standard cable glands
- ② Additional antenna extensions of Ø1.5 × length 4.1" are available
- ③ With ¼ NPTF purge connection option: add 0.7" to this dimension. With distance piece option: add 2.8" to this dimension.

DN100/4" horn antenna versions

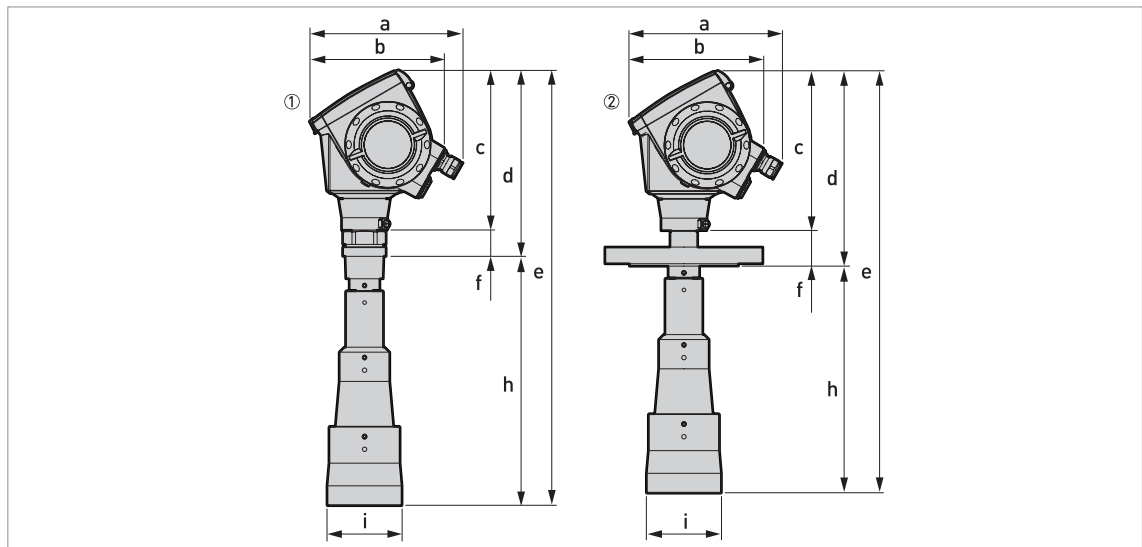


Figure 2-12: DN100/4" horn antenna versions

- ① DN100/4" horn antenna with G 1½ or 1½ NPT thread connection
 ② DN100/4" horn antenna with flange connection

Dimensions and weights in mm and kg

	Dimensions [mm]								Weights [kg]
	a	b	c	d	e	f	h	Øi	
Thread connection	182 ①	167	201	233	548	32	315 ②	95	7.2
Flange connection	182 ①	167	201	246 ③	532 ③	45 ③	286 ②	95	11.6...28.2

① If fitted with standard cable glands

② Additional antenna extensions of Ø39 × length 105 mm are available

③ With ¼ NPTF purge connection option: add 17 mm to this dimension. With distance piece option: add 71 mm to this dimension.

Dimensions and weights in inches and lb

	Dimensions [inches]								Weights [lb]
	a	b	c	d	e	f	h	Øi	
Thread connection	7.2 ①	6.5	7.9	9.2	21.6	1.3	12.4 ②	3.7	15.8
Flange connection	7.2 ①	6.5	7.9	9.7 ③	20.9 ③	1.8 ③	11.3 ②	3.7	25.6...62.2

① If fitted with standard cable glands

② Additional antenna extensions of Ø1.5 × length 4.1" are available

③ With ¼ NPTF purge connection option: add 0.7" to this dimension. With distance piece option: add 2.8" to this dimension.

Sheet metal horn antenna versions

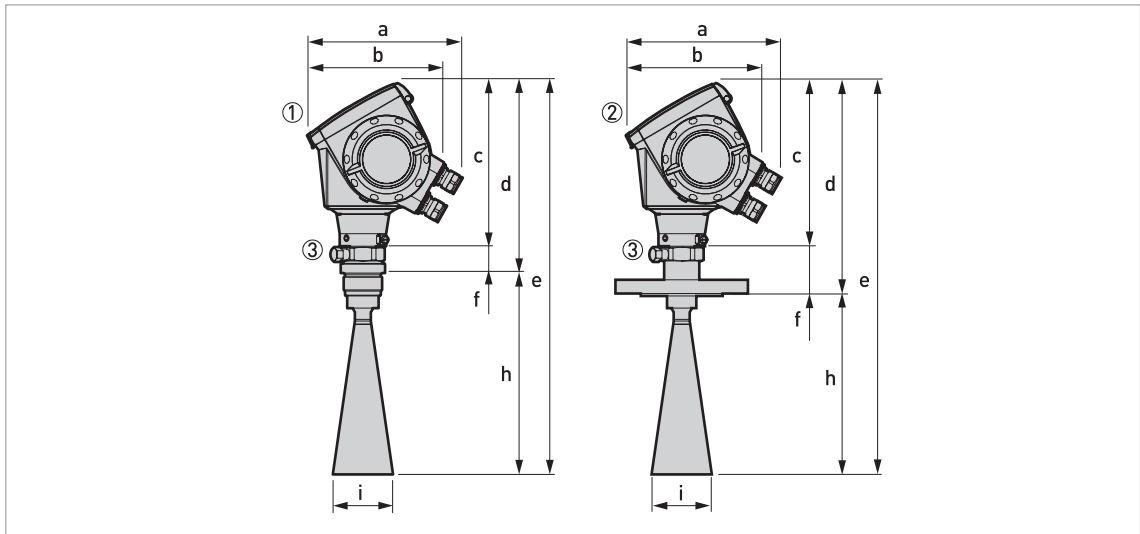


Figure 2-13: DN80/3" and DN100/4" sheet metal horn antenna versions

- ① Sheet metal horn antenna (DN80/3" or DN100/4") with G 1 1/2 or 1 1/2 NPT thread connection
- ② Sheet metal horn antenna (DN80/3" or DN100/4") with flange connection
- ③ Antenna purging system (supplied with 1/4 NPTF connection)

Dimensions and weights in mm and kg

		Dimensions [mm]							Weights [kg]	
		a	b	c	d	e	f	h		Øi
Thread connection	DN80/3"	182 ①	167	201	234	483	33	249 ②	75	4.9
	DN100/4"	182 ①	167	201	234	552	33	318 ②	95	5.1
Flange connection	DN80/3"	182 ①	167	201	262	483	62	221 ②	75	9.2
	DN100/4"	182 ①	167	201	262	552	62	290 ②	95	9.5

- ① If fitted with standard cable glands
- ② Additional antenna extensions of Ø39 × length 105 mm are available

Dimensions and weights in inches and lb

		Dimensions [inches]							Weights [lb]	
		a	b	c	d	e	f	h		Øi
Thread connection	DN80/3"	7.2 ①	6.5	7.9	9.2	19.0	1.3	9.8 ②	3.0	10.8
	DN100/4"	7.2 ①	6.5	7.9	9.2	21.7	1.3	12.5 ②	3.7	11.1
Flange connection	DN80/3"	7.2 ①	6.5	7.9	10.3	19.0	2.4	8.7 ②	3.0	20.2
	DN100/4"	7.2 ①	6.5	7.9	10.3	21.7	2.4	11.4 ②	3.7	20.8

- ① If fitted with standard cable glands
- ② Additional antenna extensions of Ø1.5 × length 4.1" are available

DN80/3" Drop antenna versions

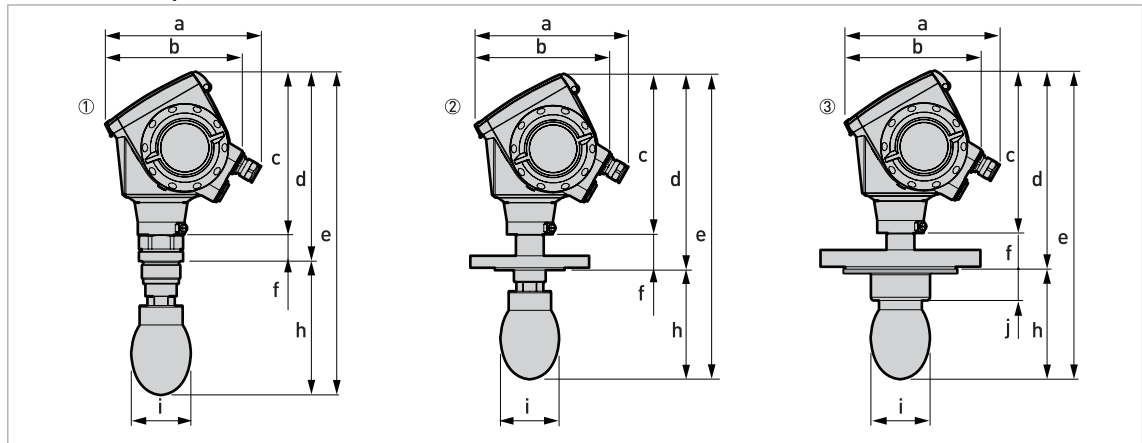


Figure 2-14: DN80/3" Drop antenna versions

- ① DN80/3" Drop antenna with G 1½ or 1½ NPT thread connection
- ② DN80/3" Drop antenna with flange connection
- ③ DN80/3" Drop antenna, with PP or PTFE flange plate protection option

Dimensions and weights in mm and kg

	Dimensions [mm]									Weights [kg]
	a	b	c	d	e	f	h	Øi	j	
Thread connection	182 ①	167	201	234	399	33	165 ②	74	-	5.7...6.1
Flange connection	182 ①	167	201	246	383	45	137 ②	74	-	6.3...26
Flange connection with flange plate protection option	182 ①	167	201	246	383	45	137	74	39	6.6...26.8

① If fitted with standard cable glands

② Additional antenna extensions of Ø39 × length 105 mm are available. Do not attach more than 5 antenna extensions.

Dimensions and weights in inches and lb

	Dimensions [inches]									Weights [lb]
	a	b	c	d	e	f	h	Øi	j	
Thread connection	7.2 ①	6.5	7.9	9.2	15.7	1.3	6.5 ②	2.9	-	12.6...13.4
Flange connection	7.2 ①	6.5	7.9	9.7	15.1	1.8	5.4 ②	2.9	-	13.9...57.3
Flange connection with flange plate protection option	7.2 ①	6.5	7.9	9.7	15.1	1.8	5.4	2.9	1.5	13.9...59.1

① If fitted with standard cable glands

② Additional antenna extensions of Ø1.5 × length 4.1" available. Do not attach more than 5 antenna extensions.

DN50/2" Hygienic antenna versions

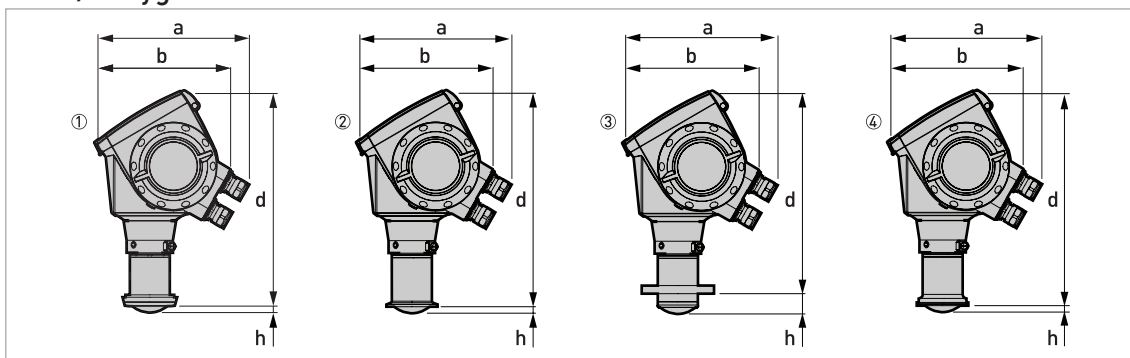


Figure 2-15: DN50/2" Hygienic antenna versions

- ① DN50/2" Hygienic antenna with DIN 11851 connection
- ② DN50/2" Hygienic antenna with Tri-Clamp® connection
- ③ DN50/2" Hygienic antenna with Neumo BioControl® connection
- ④ DN50/2" Hygienic antenna with SMS connection

Dimensions and weights in mm and kg

	Dimensions [mm]				Weights [kg]
	a	b	d	h	
DIN 11851 connection	182 ①	167	264	8	3.8
Tri-Clamp® connection	182 ①	167	264	8	3.7
Neumo BioControl® connection	182 ①	167	247	25	4.0
SMS connection	182 ①	167	264	8	3.8

① If fitted with standard cable glands

Dimensions and weights in inches and lb

	Dimensions [inches]				Weights [lb]
	a	b	d	h	
DIN 11851 connection	7.2 ①	6.5	10.4	0.3	8.4
Tri-Clamp® connection	7.2 ①	6.5	10.4	0.3	8.2
Neumo BioControl® connection	7.2 ①	6.5	9.7	1.0	8.8
SMS connection	7.2 ①	6.5	10.4	0.3	8.4

① If fitted with standard cable glands

3.1 Intended use

This radar level transmitter measures distance, level, mass, volume and reflectivity of liquids, pastes and slurries.

It can be installed on tanks, reactors and open channels.

3.2 Pre-installation requirements

Obey the precautions that follow to make sure that the device is correctly installed.

- Make sure that there is sufficient space on all sides.
- Protect the signal converter from direct sunlight. If necessary, install the weather protection accessory.
- Do not subject the signal converter to heavy vibrations. The devices are tested for vibration and agree with EN 50178 and IEC 60068-2-6.

3.3 How to prepare the tank before you install the device

To avoid measuring errors and device malfunction, obey these precautions.

3.3.1 Theoretical data for nozzle position

Follow these recommendations to make sure that the device measures correctly.

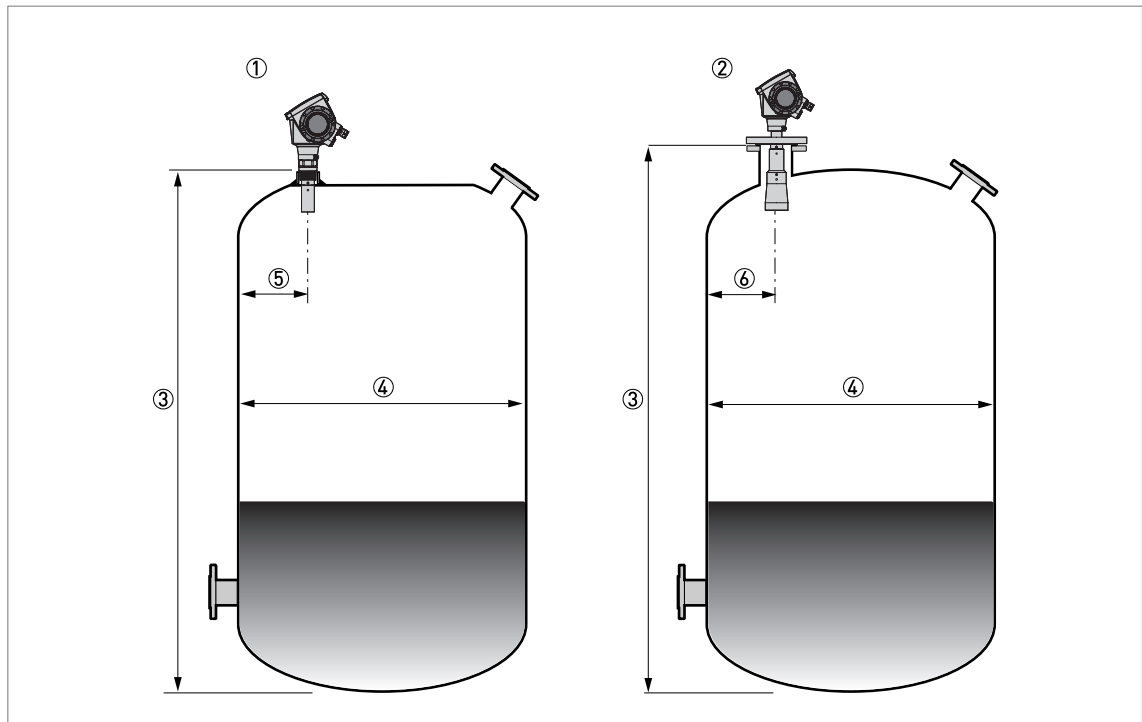


Figure 3-1: Recommended nozzle position for liquids, pastes and slurries

- ① Nozzles for DN40 or DN50 Horn antennas, or DN50 Hygienic antenna
- ② Nozzles for DN80 or DN100 Horn antennas, or DN80 Drop antenna
- ③ Tank height
- ④ Tank diameter
- ⑤ Minimum distance of nozzle from the tank wall : $1/7 \times$ tank height
Maximum distance of nozzle from the tank wall : $1/3 \times$ tank diameter
- ⑥ Minimum distance of nozzle from the tank wall : $1/10 \times$ tank height
Maximum distance of nozzle from the tank wall : $1/3 \times$ tank diameter

If possible, do not install a nozzle on the tank centerline.

Do not put the device near to the product inlet. If the product that enters the tank touches the antenna, the device will measure incorrectly. If the product fills the tank directly below the antenna, the device will also measure incorrectly.

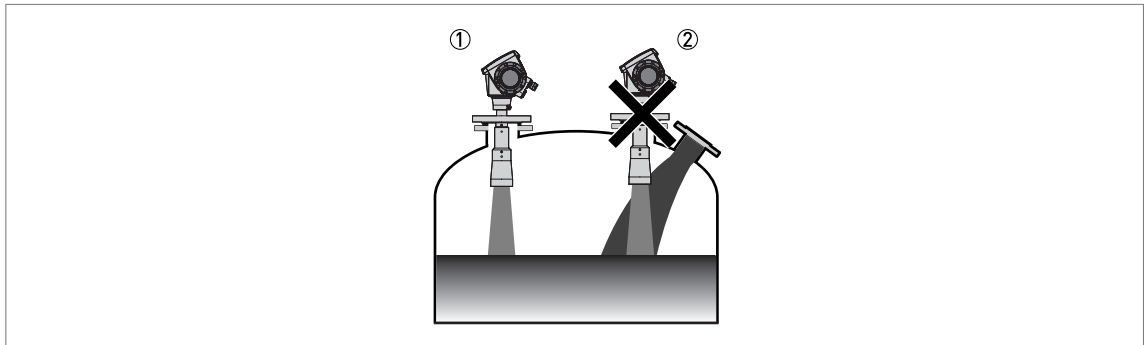


Figure 3-2: Product inlets

- ① The device is in the correct position.
- ② The device is too near to the product inlet.

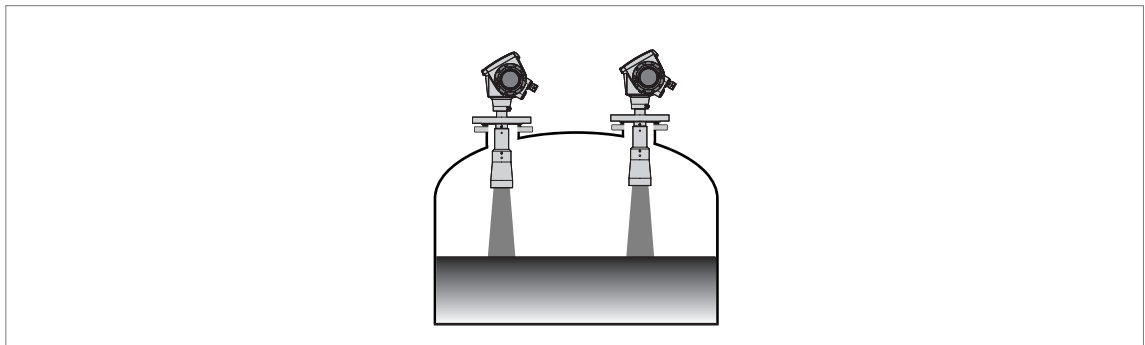


Figure 3-3: More than 1 FMCW radar level meter can be operated in a tank

More than 1 FMCW radar level meter can be operated in a tank.

3.3.2 Theoretical data for hygienic applications

To make the cleaning of the antenna easier, attach the device to a short socket.

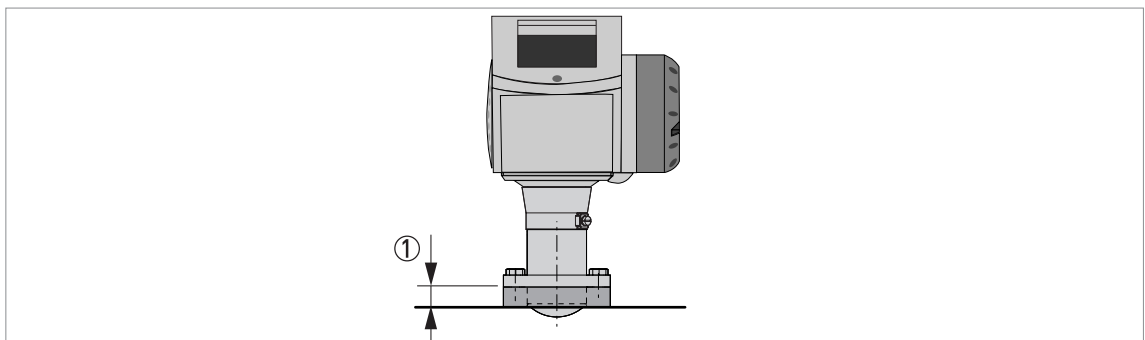


Figure 3-4: Requirements for hygienic applications

- ① Maximum height of process connection: 50 mm / 2"

3.4 Installation recommendations for liquids

3.4.1 General requirements

We recommend that you configure the device when the tank is empty.

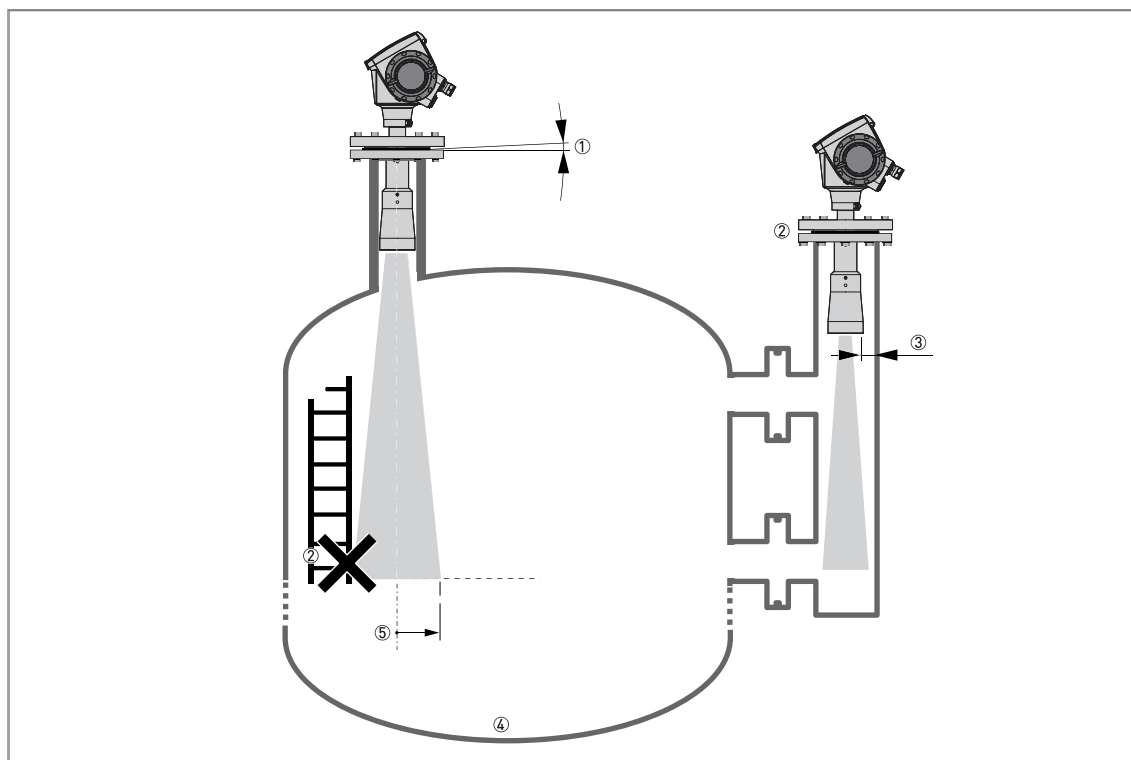


Figure 3-5: General Installation recommendations

- ① Do not tilt the device more than 2°
- ② If there are too many obstacles in the radar beam, do an empty spectrum scan (refer to the handbook) or install a bypass chamber or stilling well
- ③ 2.5 mm / 0.1" max. for high-dielectric constant liquids
- ④ Curved and conical tank bottoms. Refer to the handbook for fine adjustment of the device.
- ⑤ Radius of radar footprint (DN40 Horn antenna): increments of 180 mm/m or 2.15"/ft (10°)
 Radius of radar footprint (DN50 Horn antenna or DN50 Hygienic antenna): increments of 130 mm/m or 1.55"/ft (7.5°)
 Radius of radar footprint (DN80 Horn antenna): increments of 90 mm/m or 1.1"/ft (5°)
 Radius of radar footprint (DN100 Horn antenna and DN80 Drop antenna): increments of 70 mm/m or 0.83"/ft (4°)

3.4.2 Standpipes

Use a standpipe if:

- There is highly conductive foam in the tank.
- The liquid is very turbulent or agitated.
- There are too many other objects in the tank.
- The device is measuring a liquid (petro-chemicals) in a tank with a floating roof.

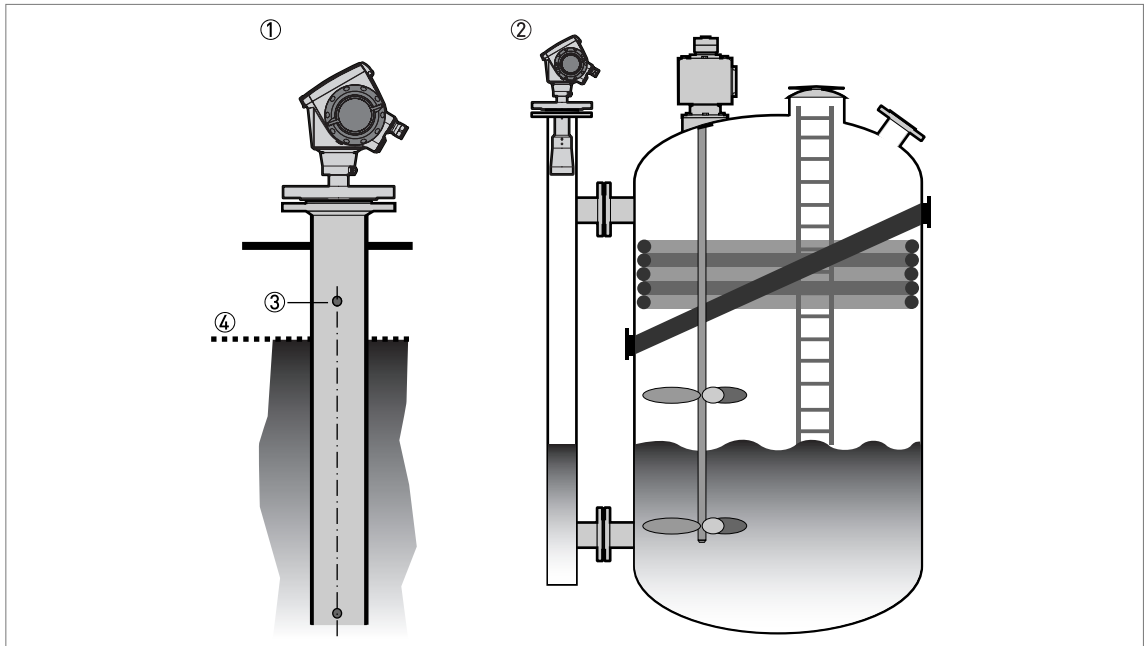


Figure 3-6: Installation recommendations for standpipes (stilling wells and bypass chambers)

- ① Stilling well
- ② Bypass chamber
- ③ Air circulation hole
- ④ Level of the liquid

Installation requirements

- *The standpipe must be electrically conductive.*
- *The inside diameter of the standpipe must not be more than 5 mm / 0.2" over the diameter of the antenna (for a high-dielectric constant liquid).*
- *The standpipe must be straight. There must be no sudden changes in internal diameter greater than 1 mm / 0.04".*
- *The standpipe must be vertical.*
- *Recommended surface roughness: $\leq \pm 0.1 \text{ mm} / 0.004"$.*
- *Stilling well only: The bottom of the stilling well must be open.*
- *Make sure that there are no deposits at the bottom of the standpipe.*
- *Make sure that there is liquid in the standpipe.*

Stilling wells - general notes

Installation in tanks containing one liquid and foam

- Drill a pressure equalization hole in the stilling well above the maximum level.
- Deburr the hole.

Installation in tanks containing one liquid or more without foam

- Drill a pressure equalization hole in the stilling well above the maximum level of the top liquid.
- Drill 1 or more liquid circulation holes in the stilling well (if there is more than 1 liquid in the tank).
- ➡ These holes help the liquid to move freely between the stilling well and the tank.
- Deburr the holes.

Stilling wells: floating roofs

If the device must be installed on a tank with a floating roof, install it in a stilling well.

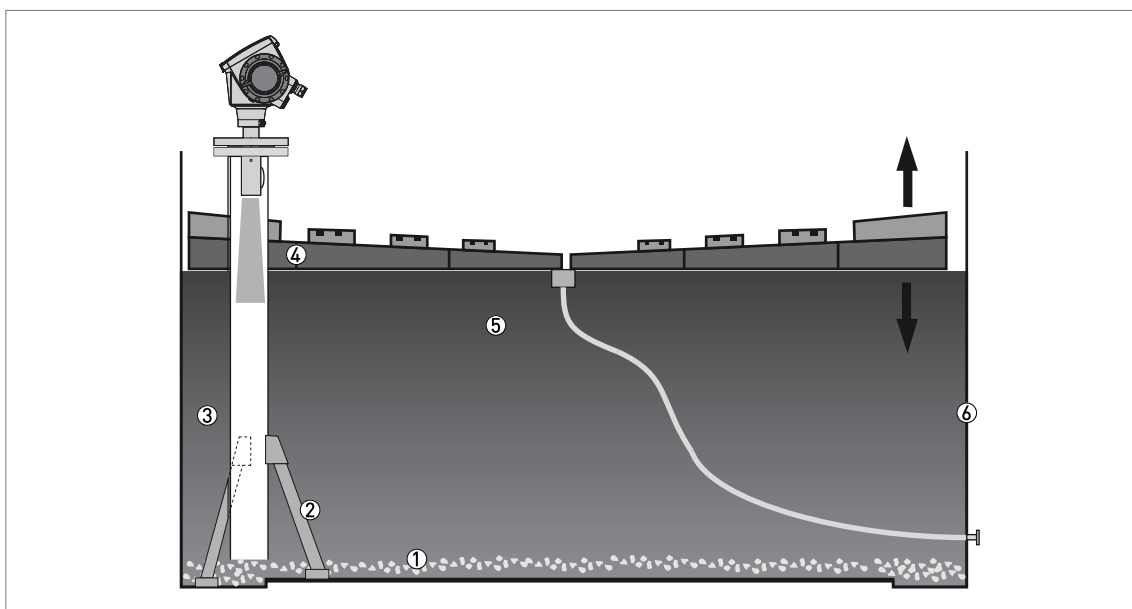


Figure 3-7: Floating roofs

- ① Sediment
- ② Support fixtures
- ③ Stilling well
- ④ Floating roof
- ⑤ Product
- ⑥ Tank

Stilling wells: horizontal cylindrical tanks

If the device:

- is for a horizontal cylindrical tank,
- is in a metallic tank,
- measures a product with a high dielectric constant and
- is on the centerline of the tank,

we recommend that you install it in a stilling well.

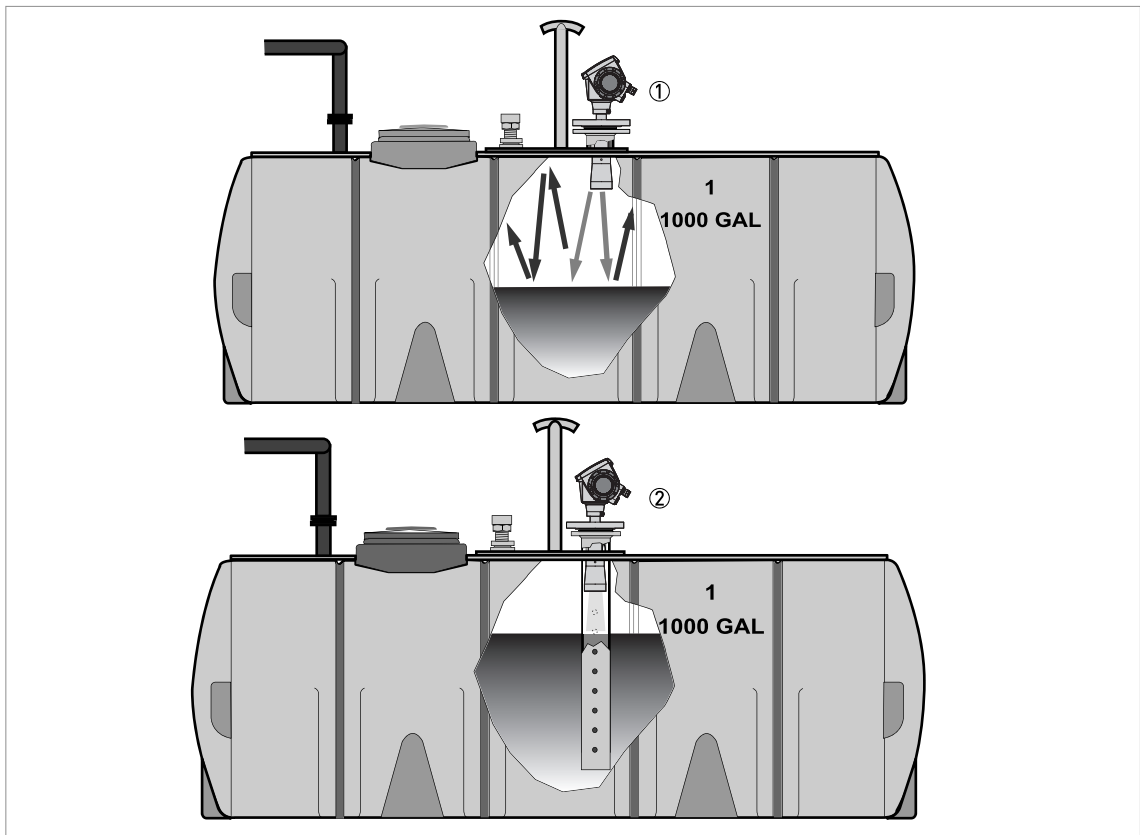


Figure 3-8: Horizontal cylindrical tanks

- ① The device is installed without a stilling well. There are multiple reflections. Refer to the CAUTION! that follows.
- ② The device is installed in a stilling well and measures correctly.

*If the device is installed in horizontal cylindrical tank that contains a high dielectric constant liquid without a stilling well, do not put it on the tank centerline. This will cause multiple reflections and the device will not measure accurately. Use the **Multiple Reflections** function in **Supervisor > Advanced Setup > Installation Setup** to keep the effects of multiple reflections to a minimum. For more data, refer to "Function description" in the handbook.*

Bypass chambers

Installation next to tanks containing one liquid and foam

- The top process connection of the bypass chamber must be above the maximum level of liquid.
- The bottom process connection of the bypass chamber must be below the lowest measured level of liquid.

Installation next to tanks containing more than one liquid

- The top process connection of the bypass chamber must be above the maximum level of liquid.
- The bottom process connection of the bypass chamber must be below the lowest measured level of liquid.
- Additional process connections are necessary for the liquids to circulate freely along the length of the bypass chamber.

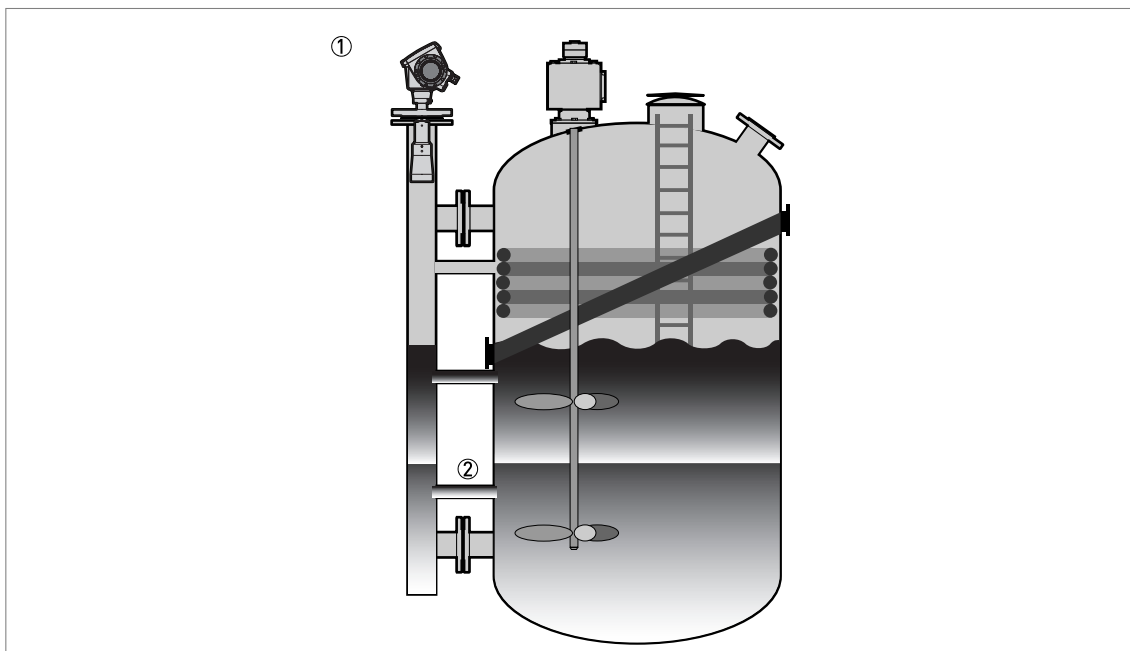


Figure 3-9: Installation recommendations for bypass chambers that contain more than one liquid

- ① Bypass chamber
- ② Additional process connection

3.5 How to install the device on the tank

3.5.1 How to install a device with a flange connection

Equipment needed:

- Device
- Gasket (not supplied)
- Nuts and bolts (not supplied)
- Wrench (not supplied)

Requirements for flange connections

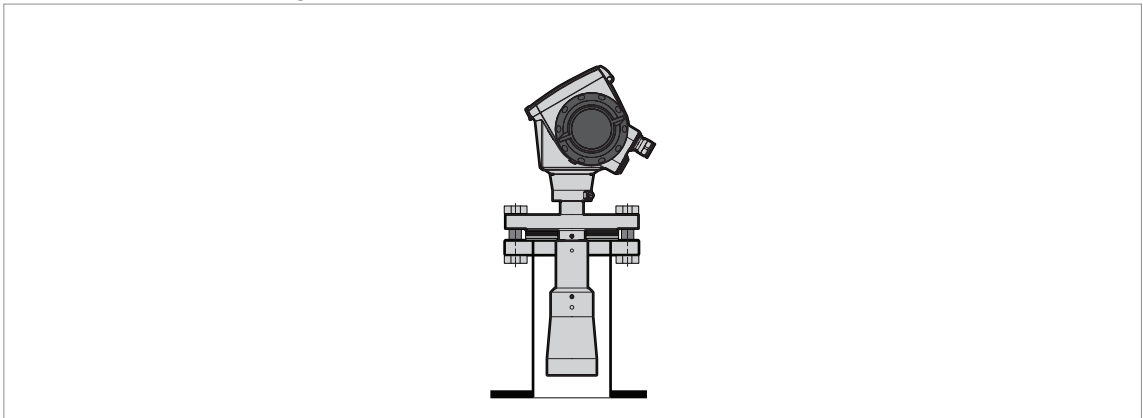


Figure 3-10: Flange connection

For more data, refer to the handbook.

3.5.2 How to install a device with a threaded connection

Equipment needed:

- Device
- Gasket for G 1½ connection (not supplied)
- 50 mm / 2" wrench (not supplied)

Requirements for threaded connections

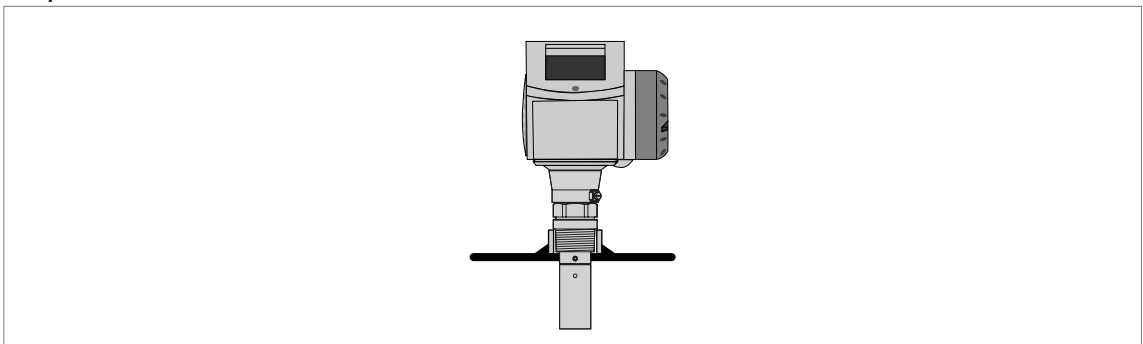


Figure 3-11: Threaded connection

For more data, refer to the handbook.

3.5.3 How to install a device with a hygienic connection

To make the cleaning of the antenna easier, attach the device to a short socket.

BioControl[®]

Equipment needed:

- Device
- Gasket
- Flange bolts (not supplied)
- Wrench (not supplied)

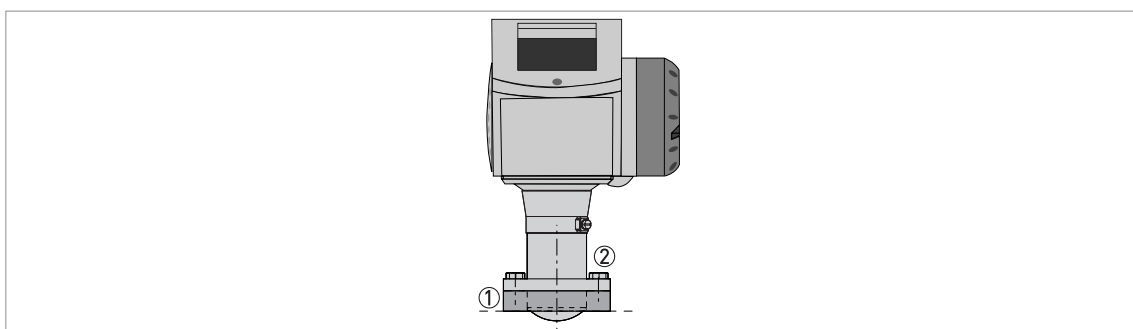


Figure 3-12: BioControl[®] connection

- ① BioControl[®] connection on the tank
- ② Flange bolts

Tri-Clamp[®]

Equipment needed:

- Device
- Gasket (not supplied)
- Band clamp (not supplied)

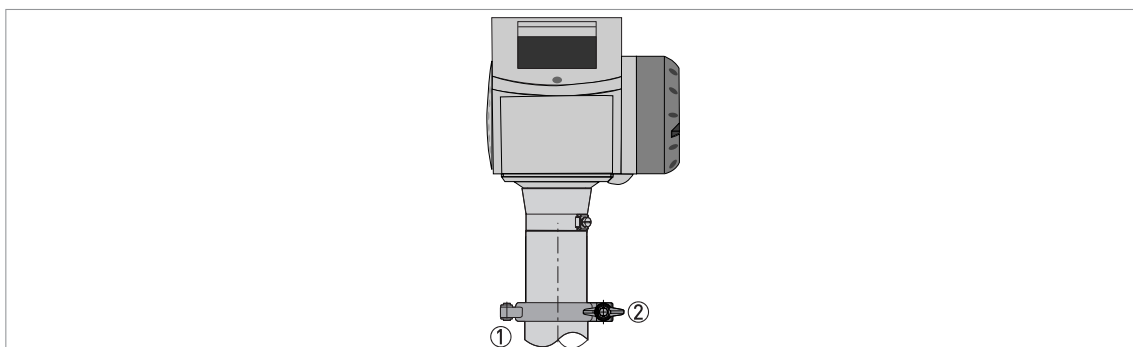


Figure 3-13: Tri-Clamp[®] connection

- ① Tank socket
- ② Band clamp

DIN 11851

Equipment needed:

- Device
- Gasket (not supplied)
- DIN 11851 nut

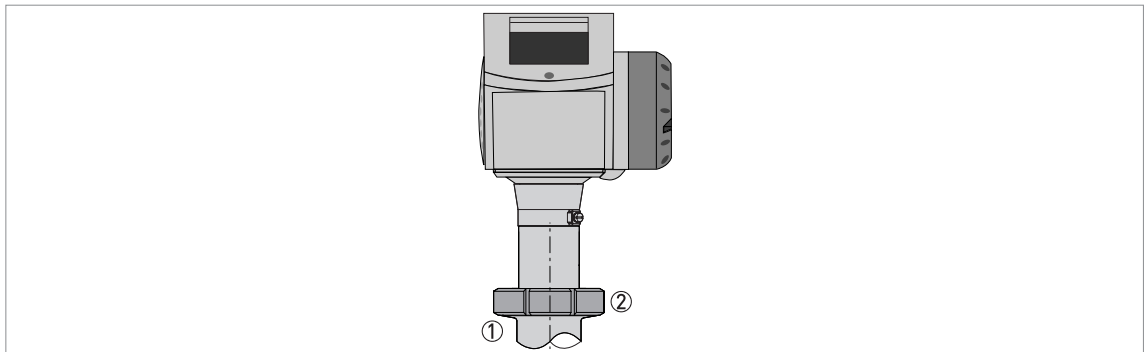


Figure 3-14: DIN 11851 connection

- ① Tank socket
- ② Nut for DIN 11851 connection

SMS

Equipment needed:

- Device
- Gasket (not supplied)
- SMS nut

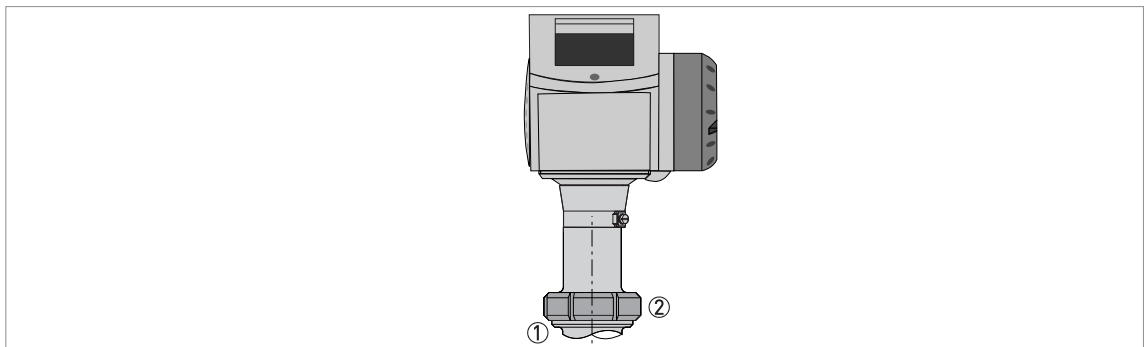


Figure 3-15: SMS connection

- ① Tank socket
- ② Nut for SMS connection

4.1 Safety instructions

All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!

Observe the national regulations for electrical installations!

For devices used in hazardous areas, additional safety notes apply; please refer to the Ex documentation.

Observe without fail the local occupational health and safety regulations. Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

4.2 Electrical installation: outputs 1 and 2

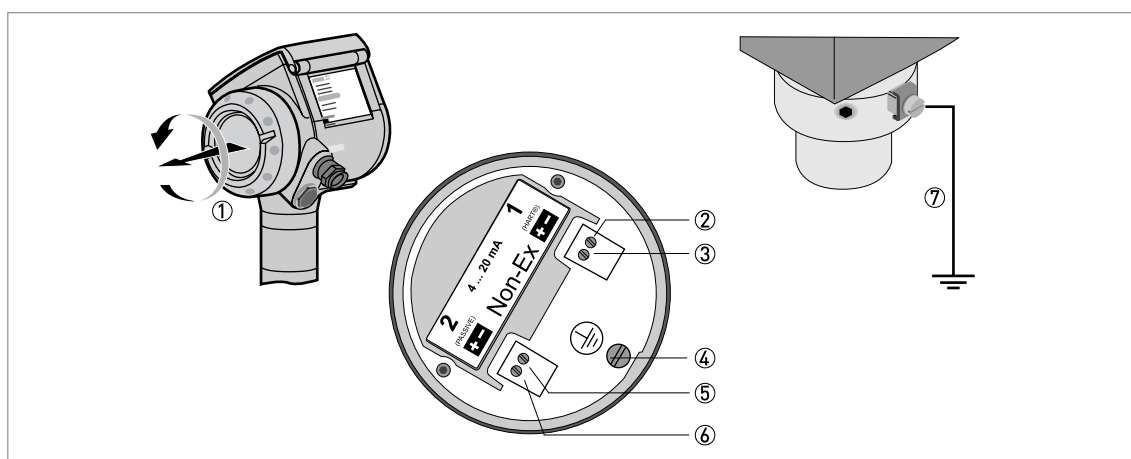


Figure 4-1: Electrical installation

- ① Terminal compartment cover
- ② Output 1: current output -
- ③ Output 1: current output +
- ④ Grounding terminal in the housing
- ⑤ Output 2: current output - (option)
- ⑥ Output 2: current output + (option)
- ⑦ Grounding terminal between the process connection and the converter

Output 1 energizes the device and is used for HART® communication. If the device has the second current output option, use a separate power supply to energize output 2.

4.2.1 Non-Ex devices

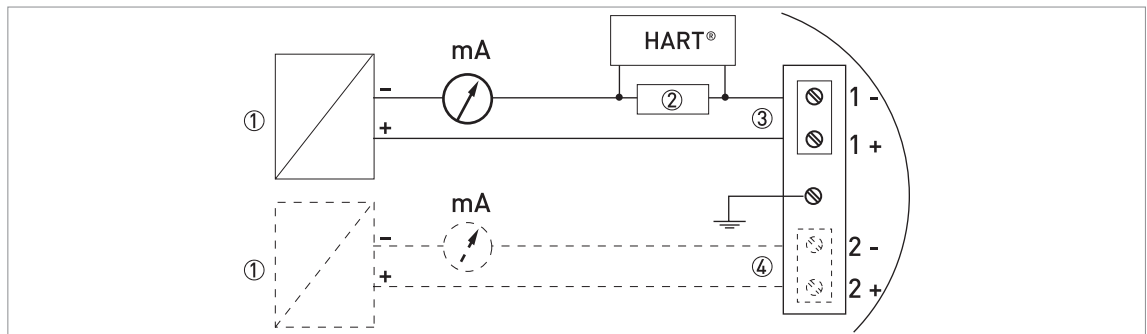


Figure 4-2: Electrical connections for non-Ex devices

- ① Power supply
- ② Resistor for HART® communication
- ③ Output 1: 14...30 VDC for an output of 22 mA at the terminal
- ④ Output 2: 10...30 VDC for an output of 22 mA at the terminal

4.2.2 Devices for hazardous locations

For electrical data for device operation in hazardous locations, refer to the related certificates of compliance and supplementary instructions (ATEX, IECEx, FM, CSA, ...). You can find this documentation on the CD-ROM delivered with the device or it can be downloaded free of charge from the website (Download Center).

4.2.3 PROFIBUS PA

For electrical data for PROFIBUS PA networks, refer to the PROFIBUS PA supplement. You can find this documentation on the CD-ROM delivered with the device or it can be downloaded free of charge from the website (Downloadcenter).

4.2.4 FOUNDATION Fieldbus

For electrical data for FOUNDATION Fieldbus networks, refer to the FOUNDATION Fieldbus supplement. You can find this documentation on the CD-ROM delivered with the device or it can be downloaded free of charge from the website (Downloadcenter).

4.3 Protection category

The device fulfills all requirements per protection category IP 66/67 (equivalent to NEMA type 4X (housing) and type 6P (antenna)).

Make sure that the cable gland is watertight.

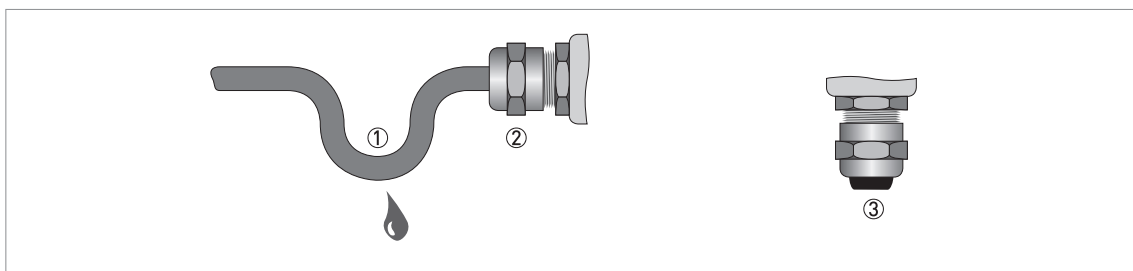


Figure 4-3: How to make the installation agree with protection category IP 67

- Make sure that the gaskets are not damaged.
- Make sure that the electrical cables are not damaged.
- Make sure that the electrical cables agree with the national electrical code.
- The cables are in a loop in front of the device (1) so water does not go into the housing.
- Tighten the cable feedthroughs (2).
- Close unused cable feedthroughs with dummy plugs (3).

4.4 Networks

4.4.1 General information

The device uses the HART[®] communication protocol. This protocol agrees with the HART[®] Communication Foundation standard. The device can be connected point-to-point. It can also operate in a multi-drop network of up to 15 devices.

The device output is factory-set to communicate point-to-point. To change the communication mode from **point-to-point** to **multi-drop**, refer to "Network configuration" in the handbook.

4.4.2 Point-to-point connection

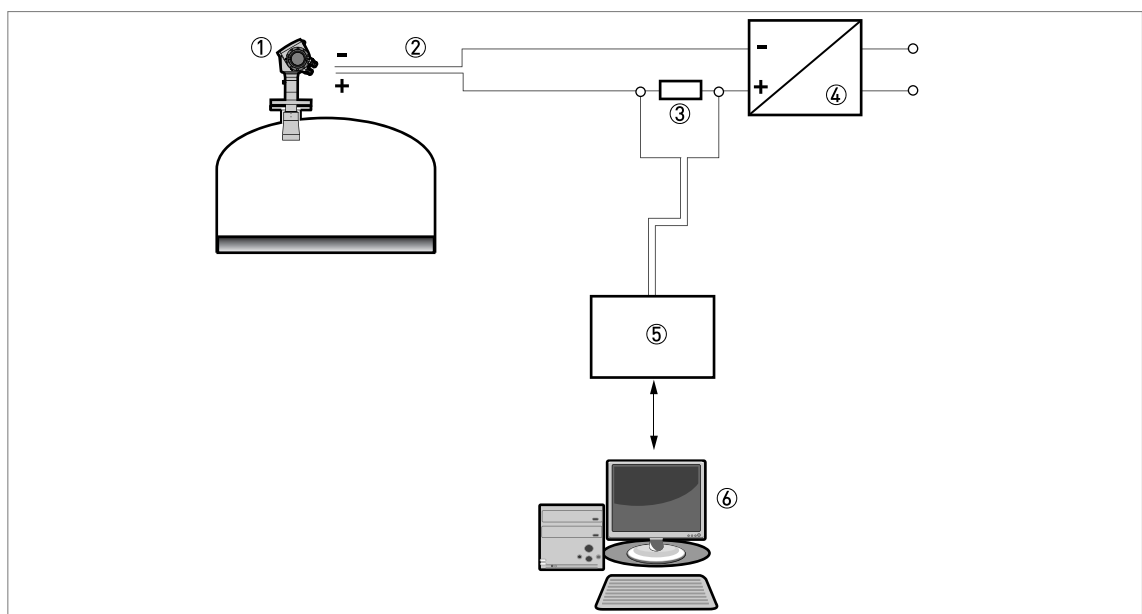


Figure 4-4: Point-to-point connection (non-Ex)

- ① Address of the device (0 for point-to-point connection)
- ② 4...20 mA + HART[®]
- ③ Resistor for HART[®] communication
- ④ Power supply
- ⑤ HART[®] converter
- ⑥ HART[®] communication software

4.4.3 Multi-drop networks

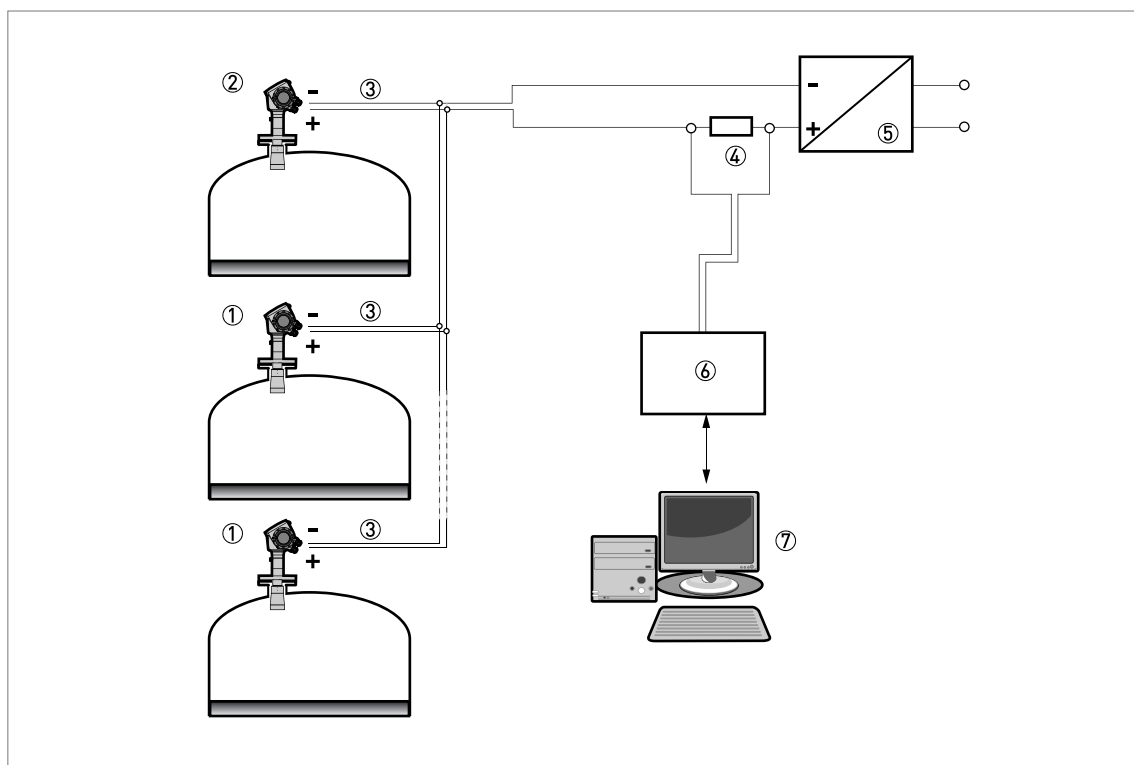


Figure 4-5: Multi-drop network (non-Ex)

- ① Address of the device (n+1 for multidrop networks)
- ② Address of the device (1 for multidrop networks)
- ③ 4 mA + HART®
- ④ Resistor for HART® communication
- ⑤ Power supply
- ⑥ HART® converter
- ⑦ HART® communication software

4.4.4 Fieldbus networks

FOUNDATION Fieldbus™ network (non-Ex)

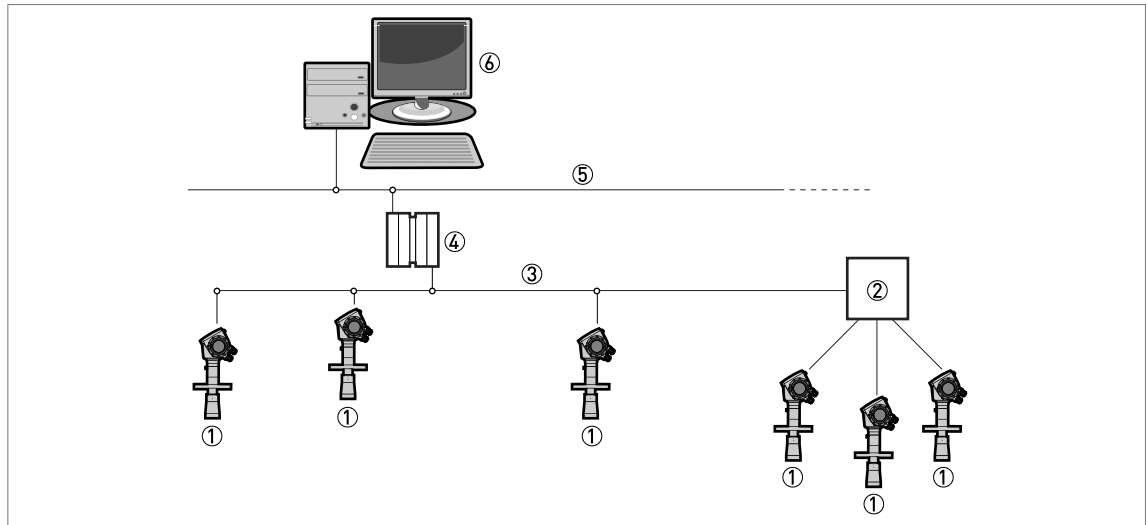


Figure 4-6: FOUNDATION Fieldbus™ network (non-Ex)

- ① Field device
- ② Junction box
- ③ H1 network
- ④ H1/HSE converter
- ⑤ High Speed Ethernet (HSE)
- ⑥ Workstation

It is necessary to have a separate power supply to energize devices with the FOUNDATION™ Fieldbus output option (4-wire device with local HART® connection). The FF terminal is connected to a Fieldbus Power Hub. The 24 VDC terminal energizes the device. The power supply is not shown in the illustration.

PROFIBUS PA/DP network (non-Ex)

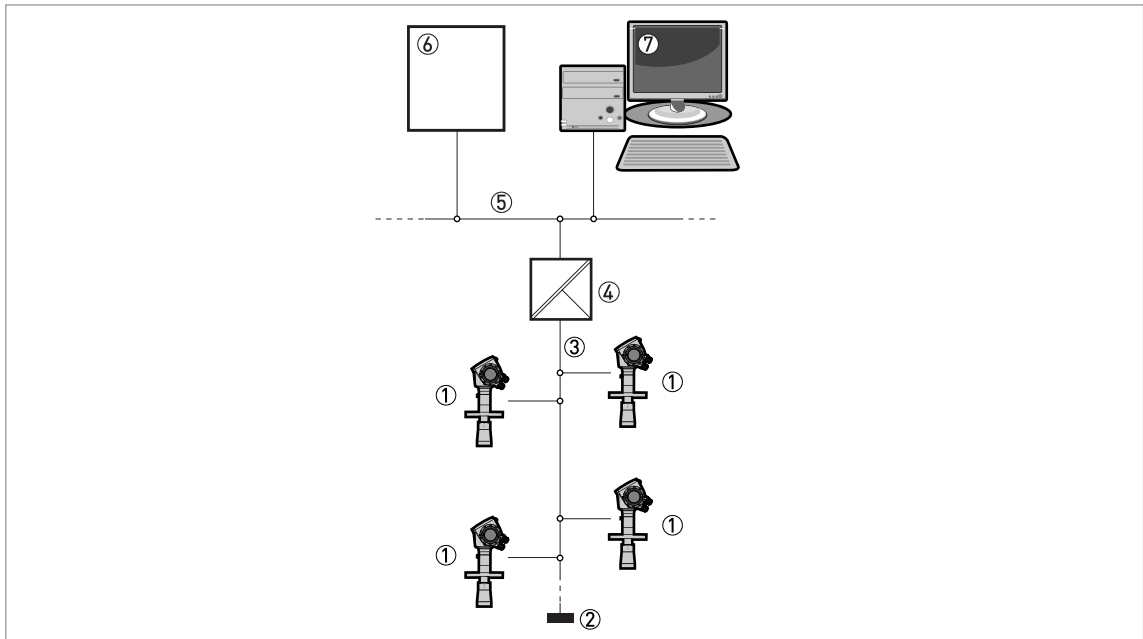


Figure 4-7: PROFIBUS PA/DP network (non-Ex)

- ① Field device
- ② Bus termination
- ③ PROFIBUS PA bus segment
- ④ Segment coupler (PA/DP link)
- ⑤ PROFIBUS DP bus line
- ⑥ Control system (PLC / Class 1 master device)
- ⑦ Engineering or operator workstation (Control tool / Class 2 master device)

*It is necessary to have a separate power supply to energize devices with the PROFIBUS PA output option (4-wire device with local HART[®] connection). The **PROFIBUS PA** terminal is connected to a segment coupler. The **24 VDC** terminal energizes the device. The power supply is not shown in the illustration.*

You can help us to assist you as quickly as possible by giving us a few items of information.

Then just fax them to us. Your personal consultant will contact you within 24 hours.

5.1 Device data

Connection type	<input type="checkbox"/> Flange	<input type="checkbox"/> Threaded	Specify standard and size:
	<input type="checkbox"/> Hygienic		
Connection material	<input type="checkbox"/> 316L	<input type="checkbox"/> Hastelloy® C-22	<input type="checkbox"/> With PP or PTFE flange plate protection ①
Antenna type and material	<input type="checkbox"/> Horn, 316L	<input type="checkbox"/> Horn, HC-22	<input type="checkbox"/> Drop, PTFE
	<input type="checkbox"/> Drop, PP	<input type="checkbox"/> Hygienic, PEEK	
Antenna extensions for high nozzles ②	<input type="checkbox"/> Without	<input type="checkbox"/> With	Specify number:
Feedthrough/Sealing ③	<input type="checkbox"/> Standard / FKM/FPM (-40...+200°C)	<input type="checkbox"/> Standard / Kalrez® 6375 (-20...+200°C)	<input type="checkbox"/> Standard / EPDM (-50...+150°C)
	<input type="checkbox"/> Metaglas®/ FKM/FPM (-30...+200°C)	<input type="checkbox"/> Metaglas®/ Kalrez® 6375 (-20...+200°C)	<input type="checkbox"/> Metaglas®/ EPDM (-30...+150°C)
Outputs	<input type="checkbox"/> 1 output 4...20 mA/HART®	<input type="checkbox"/> 2 outputs 4...20 mA/HART® + 4...20 mA	<input type="checkbox"/> PROFIBUS PA (4-wire + local HART®)
	<input type="checkbox"/> FOUNDATION Fieldbus (4-wire + local HART®)		
Display	<input type="checkbox"/> Without	<input type="checkbox"/> With	Specify language:
Approvals	<input type="checkbox"/> No Ex	<input type="checkbox"/> ATEX Ex ia	<input type="checkbox"/> ATEX Ex d[ia]
	<input type="checkbox"/> WHG ④	<input type="checkbox"/> FM IS Class 1 Div. 1 (Dual Seal)	<input type="checkbox"/> FM XP-IS Class 1 Div. 1 (Dual Seal)
	<input type="checkbox"/> CSA IS Class 1 Div. 1 (Dual Seal)	<input type="checkbox"/> CSA XP-IS Class 1 Div. 2 (Dual Seal)	<input type="checkbox"/> IECEx Ex ia
	<input type="checkbox"/> IECEx Ex d[ia]	<input type="checkbox"/> NEPSI Ex ia	<input type="checkbox"/> NEPSI Ex dia
	<input type="checkbox"/> ATEX Ex nA	<input type="checkbox"/> INMETRO BR-Ex ia	<input type="checkbox"/> INMETRO BR-Ex d[ia]

① For devices with the Drop antenna option

② None for devices with the HC-22, flange plate protection and hygienic antenna options. Max. 5 antenna extensions for devices with the Drop antenna option. Max. 10 antenna extensions for devices with the horn antenna option.

③ If the device does not have the distance piece option, maximum process temperature is 150°C / 302°F. If the device has the distance piece option, maximum process temperature is 200°C / 392°F. The temperature limits for the feedthrough and gasket materials must agree with the temperature limits of the antenna type.

④ Pending

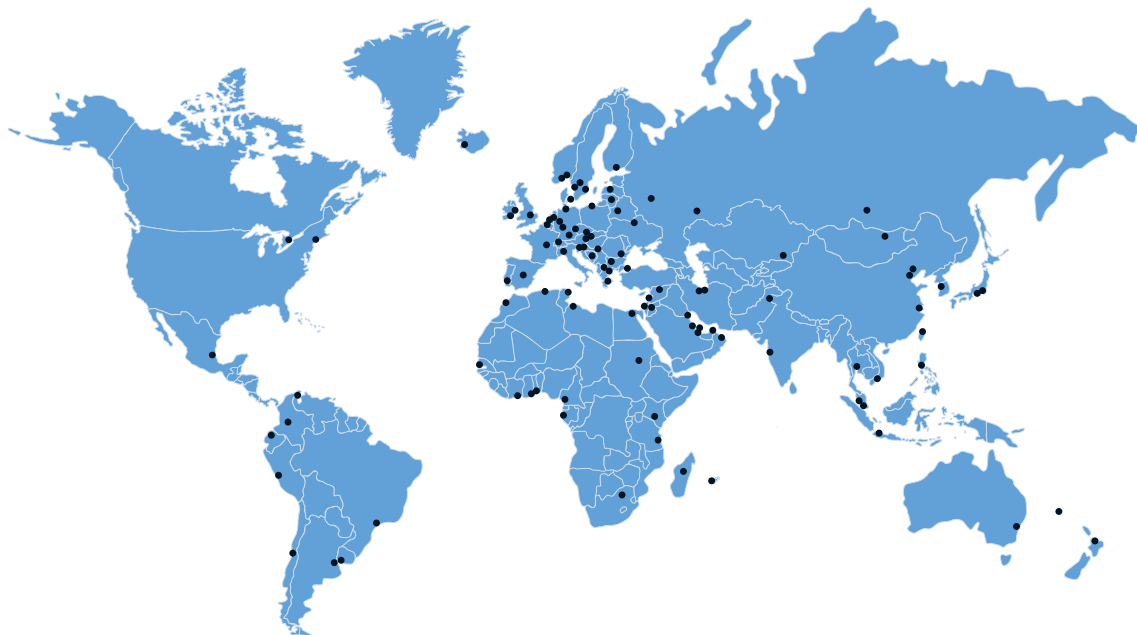
5.2 Rating data

Product name:	
Operating pressure:	
Rated pressure:	
Process connection temperature:	
Ambient temperature:	
Dielectric constant:	
Measurand (level, volume,...):	
Tank height:	
Comments (indoors, exposed to weather, ...):	

5.3 Contact data

Company:	
Contact person:	
Telephone number:	
Fax number:	
E-mail:	





KROHNE product overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Ultrasonic flowmeters
- Mass flowmeters
- Vortex flowmeters
- Flow controllers
- Level meters
- Temperature meters
- Pressure meters
- Analysis products
- Measuring systems for the oil and gas industry
- Measuring systems for sea-going tankers

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www.krohne.com

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