



OPTIMASS 1000

Technical Datasheet

Sensor for mass flow

- First choice for universal applications
- Best price-performance ratio
- Stainless steel measuring tubes
- Optimized flow divider
- Secondary pressure containment as standard
- Optional heating jacket



KROHNE

The universal solution for the process industry

OPTIMASS 1000 is the only sensor for mass flow in its class with secondary pressure containment as standard. OPTIMASS 1000 reliably measures mass flow of liquids and gases, concentration and density of liquids.



- ① Comprehensive diagnosis capabilities
- ② All standard process connections available, including hygienic type connections
- ③ Secondary containment in stainless steel 304L or 316L
- ④ Same electronics for all sensors with redundant storage of calibration and sensor data
- ⑤ Modular electronics with all output options, see separate data sheet for details

Highlights

- Innovative twin measuring tube
- Easily drained and easy to clean
- Insensitive of installation and external factors
- Long working life
- Optimized flow divider for minimum pressure loss
- High accuracy with best price-performance ratio
- Modular electronics concept: electronics and sensor easy to replace
- Data redundancy: accurate plug & play replacement of electronics

Industries

- Wastewater
- Chemical
- Food & Beverage
- Paper & Pulp
- Petrochemistry
- Pharmaceutical
- Water

Applications

- Suitable for all standard applications up to 130°C / 266°F
- With hygienic type process connections for food and pharmaceutical applications

Mass flowmeter product family

All meters consist of a sensor and a converter, which may be mounted integral to the sensor, or remotely, either with a field mount kit, a wall mount housing or a 19" rack mount module.

A sensor mount converter (MFC 010) with a Modbus[®] output only is also possible for OEM manufacturers or where the user does not require a converter with analogue outputs.

Converter: Common hardware for all converters makes spares holding simpler



- ❶ MFC 300 C: Compact or integrally mounted on sensor
- ❷ MFC 300 F: Field mount up to 300 m / 1000 ft from sensor
- ❸ MFC 300 W: Wall mount for non-hazardous areas
- ❹ MFC 300 R: 19" Rack mount module for control room installation
- ❺ MFC 010: Sensor electronics with Modbus[®] output

Sensor: Sensors for any applications



- ❶ OPTIMASS 1000: The general purpose solution for the process industry
- ❷ OPTIMASS 3000: The meter for low flow applications
- ❸ OPTIMASS 7000: The optimum solution for the chemical, food & beverage and pharmaceutical industry
- ❹ OPTIMASS 8000: The meter for high pressure and elevated temperatures
- ❺ OPTIMASS 9000: The high temperature solution up to 350°C / 660°F

Technical Data

Operating data

Size	S15	S25	S40	S50
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Flow rate

Nominal flow rate [kg/h]	4800	20000	60000	125000
Nominal flow rate [lbs/min]	175	735	2200	4600
Maximum flow rate	130% of nominal flow rate			
Minimum flow rate	Depending on measuring error required			

Accuracy

Accuracy, liquid	±0.2% of actual measured flow rate
Accuracy, gas	±0.75% of actual measured flow rate
Repeatability	Better than 0.05% plus zero stability (includes the combined effects of repeatability, linearity and hysteresis)
Zero stability	±0.025% of nominal flow rate with respective sensor size

Reference conditions

Product	Water
Temperature	20°C / 68°F
Operating pressure	1 bar _{rel.} / 14.5 psig

Density

Measuring range	400...2500 kg/m ³ / 25...155 lbs/ft ³
Accuracy	±2 kg/m ³ / ±0.13 lbs/ft ³ (S15: ±5 kg/m ³ / ±0.33 lbs/ft ³)
Accuracy (on-site calibration)	±0.5 kg/m ³ / ±0.033 lbs/ft ³

Temperature

Measuring range	-40...+130°C / -40...+266°F
Accuracy	±1°C / ±1.8°F

Device specifications

Size	S15	S25	S40	S50
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Materials

Measuring tube	Stainless steel 1.4462 / AISI 318L
Flange raised face	Stainless steel 1.4435 / AISI 316L
Flanges	Stainless steel 1.4435 / AISI 316L
Outer cylinder (secondary pressure containment)	Stainless steel 1.4301 / AISI 304 (optional: stainless steel 1.4435 / AISI 316L)
Sensor electronics housing	Stainless steel 1.4435 / AISI 316L

Nominal pressure at 20°C or 68°F

Measuring tube	-1...100 bar _{rel.} / -14.5...1450 psig
Outer cylinder (secondary pressure containment)	-1...63 bar _{rel.} / -14.5...910 psig
	Optional: -1...100 bar _{rel.} / -14.5...1450 psig

Size	S15	S25	S40	S50
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Temperature

Process temperature - flanged connections	-40...+130°C / -40...+266°F
Process temperature - hygienic connections	-20...+130°C / -4...+266°F
Ambient temperature - compact version	-40...+55°C / -40...+130°F
Ambient temperature - remote version	-40...+60°C / -40...+140°F

Process effects on the sensor

Temperature	0.0075% of the nominal flow rate per 1°C / 0.004% of the nominal flow rate per 1°F
Pressure	0.015% of the nominal flow rate per 1 bar _{rel.} / 0.001% of the nominal flow rate per 1 psig

Approvals

Size	S15	S25	S40	S50
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Mechanical

Protection category (acc. to EN 60529)	IP 67; NEMA 4X
European Pressure Equipment directive	PED 97-23 EC (acc. to AD 2000 Regelwerk)

ATEX (acc. to 94/9/EC)

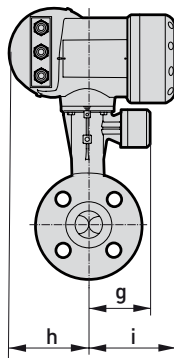
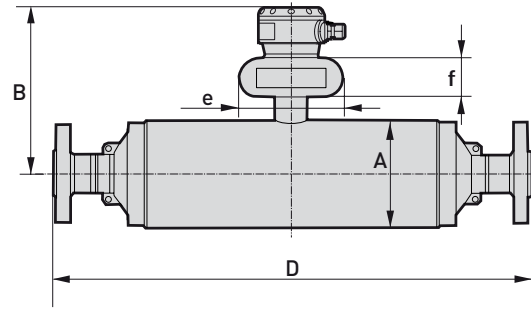
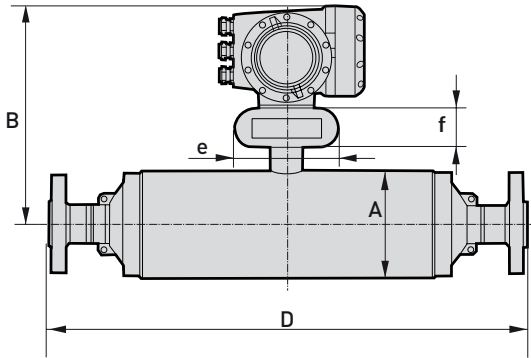
OPTIMASS 1300 C - With "flameproof" terminal compartment	II 2 G EEx d ib IIC T4...T1
	II 2 D Ex tD A21 IP6x T195°C
	II 2(1) G EEx d ib[ia] IIC T4...T1
	II 2(1) D Ex tD [iaD] A21 IP6x T195°C
OPTIMASS 1300 C - With "increased safety" terminal compartment	II 2 G EEx de ib IIC T4...T1
	II 2 D Ex tD A21 IP6x T195°C
	II 2(1) G EEx de ib[ia] IIC T4...T1
	II 2(1) D Ex tD [iaD] A21 IP6x T195°C
OPTIMASS 1000 and 1010 C	II 2 G EEx ib IIC T4...T1
	II 2 D Ex ibD 21 T175°C
MFC 300 F- With "flameproof" terminal compartment	II 2(1) G EEx d [ia] IIC T6
	II 2(1) D Ex tD [iaD] A21 IP6x T85°C
MFC 300 F- With "increased safety" terminal compartment	II 2(1) G EEx de [ia] IIC T6
	II 2(1) D Ex tD [iaD] A21 IP6x T85°C
Factory Mutual / CSA	Class I, Div 1 groups A, B, C, D
	Class II, Div 1 groups E,F,G
	Class III, Div 1 hazardous areas
	Class I, Div 2 groups A, B, C, D
	Class II, Div 2 groups F,G
	Class III, Div 2 hazardous areas

Electromagnetic compatibility (EMC)

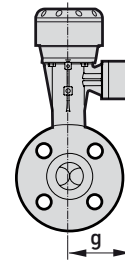
to CE	EN 50081-1 (1992); EN 50082-2 (1994);
	Namur NE 21/5.95;
	89/336/EEC (EMC);
	72/73/EEC (Low Voltage Directive)

Dimensions and weights

Flanged version



①



②

- ① Compact version
- ② Remote version

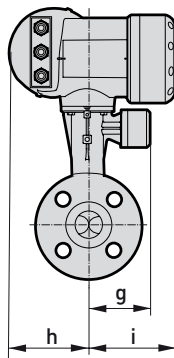
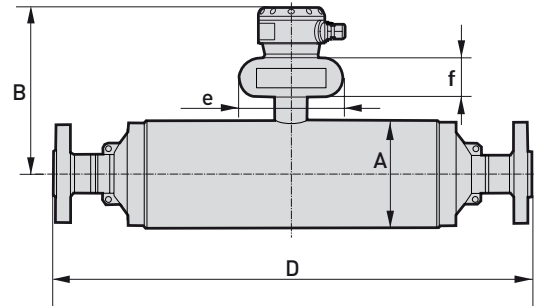
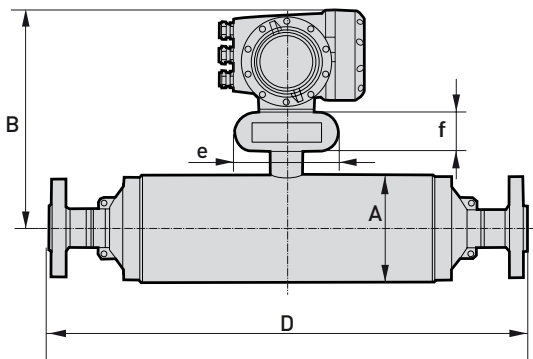
DN15...DN25: Dimensions and weights in mm and kg

	Size											
	DN15						DN25					
	DN15PN40	DN25PN40	DN15PN100	1/2" ASME600	1" ASME150	1" ASME600	DN25PN40	DN40PN40	DN25PN100	1" ASME600	1 1/2" ASME150	1 1/2" ASME600
Dimensions [mm]												
A	101.6						114.3					
B	231						237					
D	505		515		535	561	545		571		579	607
e	160						160					
f	60						60					
g	98.5						98.5					
h	123.5						123.5					
i	137						137					
Weights [kg]												
Aluminum housing (compact)	13.5						16.5					
Stainless steel housing (compact)	18.8						21.8					
Aluminum junction box (remote)	11.5						14.5					
Stainless steel junction box (remote)	12.4						15.4					

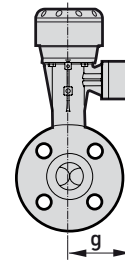
DN15...DN25: Dimensions and weights in inches and lbs

	Size											
	DN15						DN25					
	DN15PN40	DN25PN40	DN15PN100	1/2" ASME600	1" ASME150	1" ASME600	DN25PN40	DN40PN40	DN25PN100	1" ASME600	1 1/2" ASME150	1 1/2" ASME600
Dimensions [inches]												
A	4.0						4.5					
B	9.1						9.3					
D	19.9		20.3		21.1	22.1	21.5		22.5		22.8	23.9
e	6.3						6.3					
f	2.4						2.4					
g	3.9						3.9					
h	4.9						4.9					
i	5.4						5.4					
Weights [lbs]												
Aluminum housing (compact)	30						36					
Stainless steel housing (compact)	41						48					
Aluminum junction box (remote)	25						32					
Stainless steel junction box (remote)	27						34					

Flanged version



①



②

- ① Compact version
- ② Remote version

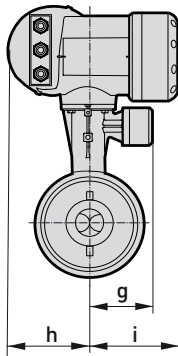
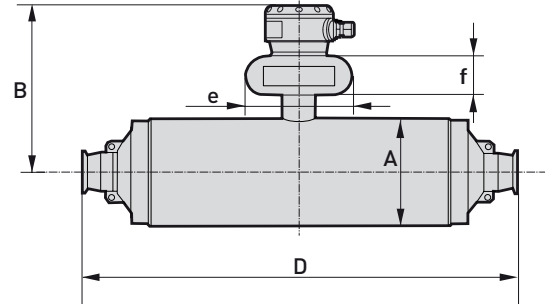
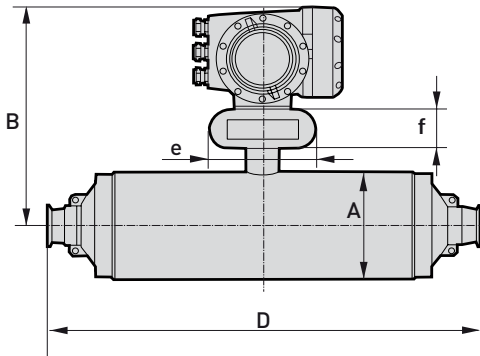
DN40...DN50: Dimensions and weights in mm and kg

	Size												
	DN40						DN50						
	DN40PN40	DN50PN40	DN40PN100	1 1/2" ASME600	2" ASME150	2" ASME600	DN50PN40	DN80PN40	DN50PN63	DN50PN100	2" ASME600	3" ASME150	3" ASME600
Dimensions [mm]													
A	168.3						219.1						
B	264						290						
D	714	742	758	745	776	884	892	904	914	908	946		
e	160						160						
f	60						60						
g	98.5						98.5						
h	123.5						123.5						
i	137						137						
Weights [kg]													
Aluminum housing (compact)	29.5						57.5						
Stainless steel housing (compact)	34.8						62.8						
Aluminum junction box (remote)	25.5						51.5						
Stainless steel junction box (remote)	26.4						52.4						

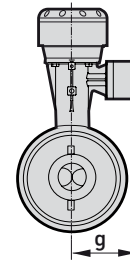
DN40...DN50: Dimensions and weights in inches and lbs

	Size												
	DN40						DN50						
	DN40PN40	DN50PN40	DN40PN100	1 1/2" ASME600	2" ASME150	2" ASME600	DN50PN40	DN80PN40	DN50PN63	DN50PN100	2" ASME600	3" ASME150	3" ASME600
Dimensions [inches]													
A	6.6						8.6						
B	10.4						11.4						
D	28.1	29.2	29.8	29.3	30.6	34.8	35.1	35.6	36.0	35.7	37.2		
e	6.3						6.3						
f	2.4						2.4						
g	3.9						3.9						
h	4.9						4.9						
i	5.4						5.4						
Weights [lbs]													
Aluminum housing (compact)	65						127						
Stainless steel housing (compact)	77						138						
Aluminum junction box (remote)	56						113						
Stainless steel junction box (remote)	58						115						

Hygienic version



1



2

- 1 Compact version
- 2 Remote version

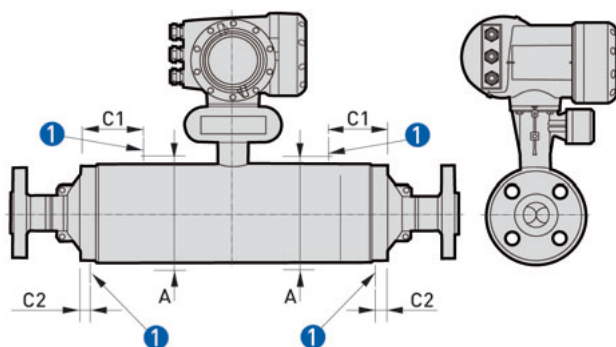
Dimensions and weights in mm and kg

	Size			
	DN15	DN25	DN40	DN50
	1" Tri-clover ISO	1½" Tri-clover ISO	2" Tri-clover ISO	3" Tri-clover ISO
Dimensions [mm]				
A	101.6	114.3	168.3	219.1
B	311	317	344	370
D	474	505	667	817
e	160	160	160	160
f	60	60	60	60
g	98.5	98.5	98.5	98.5
h	123.5	123.5	123.5	123.5
i	137	137	137	137
Weights [kg]				
Aluminum housing (compact)	13.5	16.5	29.5	57.5
Stainless steel housing (compact)	18.8	21.8	34.8	62.8
Aluminum junction box (remote)	11.5	14.5	25.5	51.5
Stainless steel junction box (remote)	12.4	15.4	26.4	52.4

Dimensions and weights in inches and lbs

	Size			
	DN15	DN25	DN40	DN50
	1" Tri-clover ISO	1½" Tri-clover ISO	2" Tri-clover ISO	3" Tri-clover ISO
Dimensions [inches]				
A	4.0	4.5	6.6	8.6
B	12.2	12.5	13.5	14.6
D	18.7	19.9	26.3	32.1
e	6.3	6.3	6.3	6.3
f	2.4	2.4	2.4	2.4
g	3.9	3.9	3.9	3.9
h	4.9	4.9	4.9	4.9
i	5.4	5.4	5.4	5.4
Weights [lbs]				
Aluminum housing (compact)	30	36	65	127
Stainless steel housing (compact)	41	48	77	138
Aluminum junction box (remote)	25	32	56	113
Stainless steel junction box (remote)	27	34	58	115

Version with heating jacket



① Connection

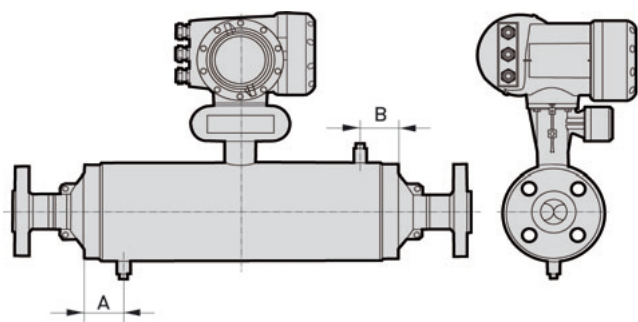
Dimensions and weights in mm and kg

	Size				
	DN15	DN25	DN40	DN50	
	Connection size ½" / 12 mm	Connection size ½" / 12 mm	Connection size ½" / 12 mm	Connection size ½" / 12 mm	Connection size 1" / 25 mm
Dimensions [mm]					
A	1151	1421	2061	2541	2541
B	231	237	264	290	290
C1	51	55	90	105	100
C2	20	20	20	20	26
Weights [kg]					
Aluminum housing (compact)	13.5	16.5	29.5	57.5	
Stainless steel housing (compact)	18.8	21.8	34.8	62.8	
Aluminum junction box (remote)	11.5	14.5	25.5	51.5	
Stainless steel junction box (remote)	12.4	15.4	26.4	52.4	

Dimensions and weights in inches and lbs

	Size				
	DN15	DN25	DN40	DN50	
	Connection size ½" / 12 mm	Connection size ½" / 12 mm	Connection size ½" / 12 mm	Connection size ½" / 12 mm	Connection size 1" / 25 mm
Dimensions [inches]					
A	45.3	55.9	81.1	100.0	100.0
B	9.1	9.3	10.4	11.4	11.4
C1	2	2.2	3.5	4.1	3.9
C2	0.8	0.8	0.8	0.8	1.0
Weights [lbs]					
Aluminum housing (compact)	30	36	65	127	
Stainless steel housing (compact)	41	48	77	138	
Aluminum junction box (remote)	25	32	56	113	
Stainless steel junction box (remote)	27	34	58	115	

Version with purge ports



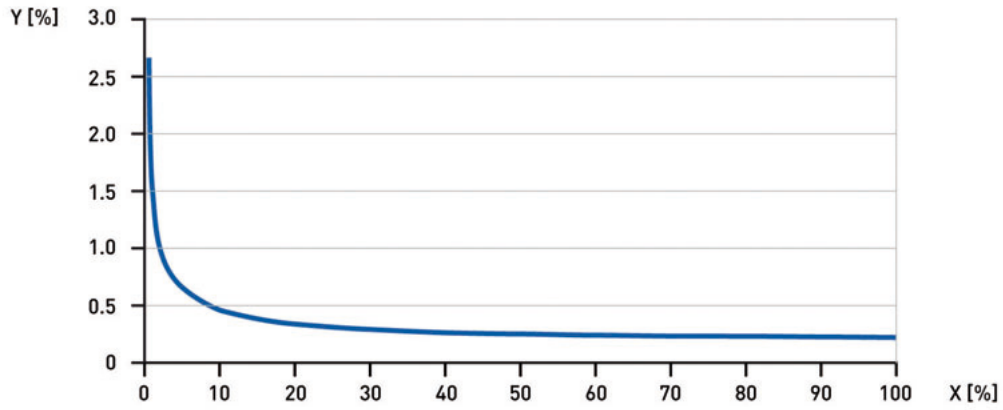
Dimensions and weights in mm and kg

	Size			
	DN15	DN25	DN40	DN50
Dimensions [mm]				
A	30	30	65	65
B	30	30	65	65
Weights [kg]				
Aluminum housing (compact)	13.5	16.5	29.5	57.5
Stainless steel housing (compact)	18.8	21.8	34.8	62.8
Aluminum junction box (remote)	11.5	14.5	25.5	51.5
Stainless steel junction box (remote)	12.4	15.4	26.4	52.4

Dimensions and weights in inches and lbs

	Size			
	DN15	DN25	DN40	DN50
Dimensions [inches]				
A	1.2	1.2	2.6	2.6
B	1.2	1.2	2.6	2.6
Weights [lbs]				
Aluminum housing (compact)	30	36	65	127
Stainless steel housing (compact)	41	48	77	138
Aluminum junction box (remote)	25	32	56	113
Stainless steel junction box (remote)	27	34	58	115

Measuring accuracy



Y[%]: measuring error; X[%]: nominal flow rate

Full-scale ranges and accuracy

Full-scale range	1 : 1	1 : 2	1 : 5	1 : 10	1 : 20
Accuracy	0.225	0.250	0.325	0.450	0.700

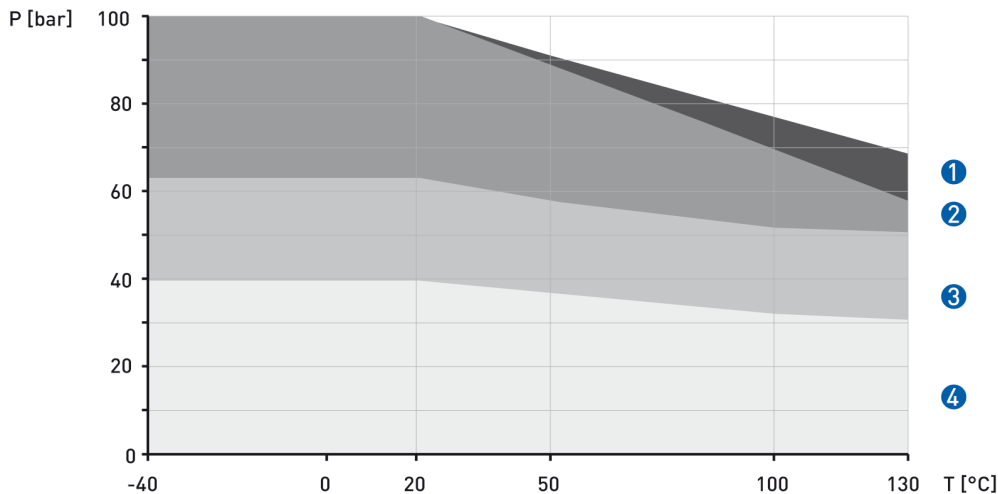
Guidelines for maximum operating pressure

Note:

Ensure that the meters are used within their operating limits. Observe the following illustrations.

Flanged connections as per DIN 2501:

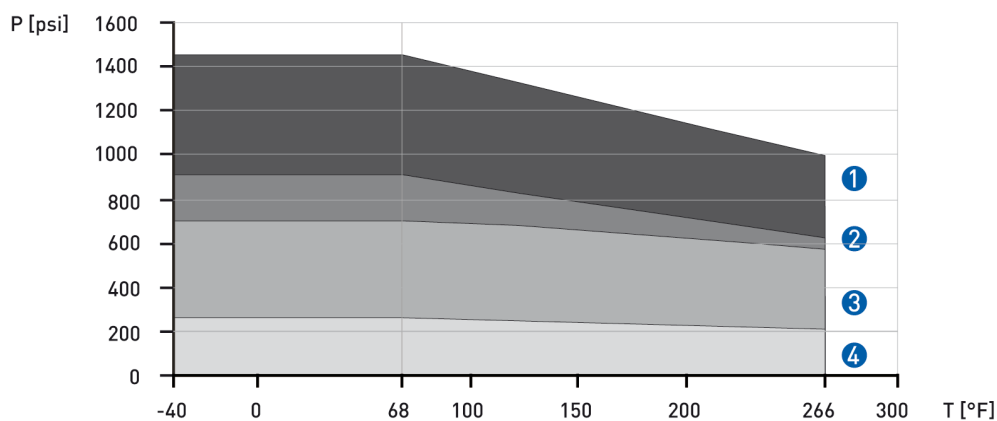
Pressure / temperature de-rating for stainless steel meters



- ① PN100 flanges for sizes S15 and S25
- ② PN100 flanges for sizes S40 and S50
- ③ PN63 flanges and secondary pressure containment PN63; secondary pressure containment PN100 see PN100 flanges and sizes
- ④ PN40 flanges; secondary pressure containment PN100 see PN100 flanges and sizes

Flanged connections as per ASME:

Pressure / temperature de-rating for stainless steel meters



- ① ASME 600 lbs and secondary pressure containment 1450 psi
- ② Secondary pressure containment 910 psi
- ③ ASME 300 lbs
- ④ ASME 150 lbs

Note:

All hygienic type process connections rated to 10 barg / 145 psig at 20°C / 68°F.

KROHNE Product Overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Mass flowmeters
- Ultrasonic flowmeters
- Vortex flowmeters
- Flow controllers
- Level measuring instruments
- Pressure gauges
- Temperature measuring instruments
- Water solutions & analysis
- Oil and gas turnkey solutions

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