

SITRANS F flowmeters

SITRANS F X

SITRANS FX300

Overview



SITRANS F X vortex flow meters provide accurate volumetric and mass flow measurement of steam, gases and liquids as an all in one solution with integrated temperature and pressure compensation.

Benefits

- All devices have 2-wire technology and HART communication
- Temperature compensation for saturated steam as standard feature
- Integrated temperature and pressure compensation enabling direct compensation of density
- Pressure, temperature and flow can be read at a single point. No additional installation of pressure and temperature sensors
- Direct measurement of energy
- Optimum process reliability thanks to Intelligent Signal Processing (ISP) - stable readings, free of external perturbations
- Fully welded stainless steel construction with high corrosion, pressure and temperature resistance
- Maintenance-free sensor design
- Ready to use due to plug & play feature. No additional cabling work
- Minimal pressure drop

Application

The SITRANS FX300 is a compact flow meter in a single or dual transmitter version, suitable for measuring industrial steam, gases, as well as conductive and non-conductive liquids. E.g. steam (saturated steam, superheated steam), industrial gases (compressed air, nitrogen, liquefied gases, flue gases), and conductive and non conductive liquids (demineralized water, boiler feed water, solvents, heat transfer oil).

The main applications of SITRANS FX300 can be found in the following sectors:

- Chemical
- Petrochemical
- Oil & Gas
- Power plants
 - Air
 - Heating
 - Cooling
 - Chilling
- Food & beverage
 - Pharmaceutical
 - Sugar refineries
 - Dairies
 - Breweries
 - Producers of soft drinks
- Refining
- Water & waste water

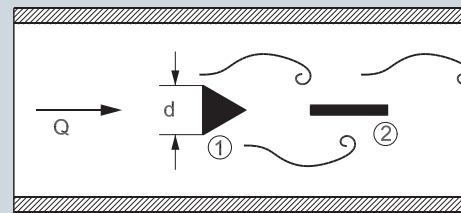
System Overview

Version	Single transmitter			Dual transmitter
	Standard	Pressure sensor	Pressure sensor and isolation valve	
Options				Standard
Flange				
Sandwich				

Function

Operating Principle

SITRANS F X vortex flow meters measure flow rate by detecting the frequency at which alternating vortices are shed from a bluff body inserted into the flow stream. This principle of measurement is known as Von Karman's vortex street principle: alternating vortices form behind an object in a stream. The frequency of the alternating vortices is proportional to the flow rate. The passage of a vortex causes a slight stress on a wing placed downstream of the bluff body. The stress is picked up and counted as pressure surges by a dual Piezo crystal placed inside the wing.



① = Bluff Body, ② = Sensor

The flow meter calculates the flow velocity using the following equation:

$$Q = A \cdot V = A \cdot d / St \cdot f = 101,93 \cdot f / K \text{ [m}^3\text{/h]}$$

Where:

- Q = flow rate [m³/h]
- f = vortex shedding frequency [Hz]
- K = calibration constant [pulses/ft³]
- d = diameter of the bluff body [m]
- St = Strouhal Number
- A = cross-section area [m²]
- V = flow velocity [m/s]

Requirements

In order to generate the vortex streets, the medium must have a minimum of velocity:

- For steam and gases, the flow rate must be between 2 to 80 m/s (6.6 to 262 ft/s)
- For liquids the flow rate must be between 0.4 to 10 m/s (1.3 to 32.8 ft/s)

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Design

SITRANS FX300 volumetric and mass flow meter is available in the following configurations:

SITRANS FX300 Single transmitter

The single transmitter is available as a flange or sandwich solution in the following versions:

- **Vortex standard flow meter**
Measurement with integrated temperature sensor for standard feature
- **Vortex flow meter with pressure sensor**
Measurement with integrated temperature and pressure sensors for compensation of gases, wet gases, gas mixtures or steam (for energy measurement).
- **Vortex flow meter with pressure sensor and isolation valve**
Allowing the pressure sensor to be shut off for the purpose of pressure or leak testing of the pipeline or for being exchanged without interrupting the process. Using the built-in two-way valve, the pressure sensor can also be calibrated and tested at a later time.

SITRANS FX300 Dual transmitter

This is a genuine redundant system with two independent sensors and two converters providing twofold functional reliability and availability of the measurement. This variant is optimally suited for measurements in multi product pipelines, where different products are moved through one after the other.

The dual converter is available as:

- **Vortex standard flow meter**
Measurement with temperature sensor for saturated steam compensation as standard feature

Technical specifications

Input	
Measuring range limits	See „Dimensional Drawings“
Media pressure	1 ... 100 bar (Higher pressures on request)
Output	
Current output	
• Measuring range	4 ... 20 mA
• Over range	20.8 mA \pm 1 % (105 % \pm 1 %)
• Load	100 Ω
- min.	$R_{\max} = (U_{\text{Power Supply}} - 14 \text{ V}) / 22 \text{ mA}$
- max.	
• Error signal	NAMUR NE 43
• Maximum output	22 mA (112.5 %)
• Multidrop mode	4 mA
Digital output	
• Communication	HART
• Physical layer	FSK
• Device category	Transmitter
Pulse Output	
• Pulse frequency	Max. 0.5 Hz
• Power supply	24 V DC as NAMUR or
• Non-Ex version	open < 1 mA, max. 36 V, closed 100 mA, $U < 2 \text{ V}$
• Ex version	open < 1 mA, max. 30 V, closed 100 mA, $U < 2 \text{ V}$

Accuracy

Standard version

- For liquids
- $Re \geq 20\,000$ $\pm 0.75 \%$
- For steam and gases
- $Re \geq 20\,000$ $\pm 1 \%$
- For steam, gases and liquids
- $10\,000 < Re < 20\,000$ $\pm 2 \%$

Pressure and temperature compensated version

- For liquids
- $10\,000 < Re < 20\,000$ $\pm 2 \%$
- $Re \geq 20\,000$ $\pm 0.75 \%$
- For gases and steam
- $10\,000 < Re < 20\,000$ $\pm 2.5 \%$
- $Re \geq 20\,000$ $\pm 1.5 \%$

Installation conditions

- Inlet run $\geq 20 \times DN$
- Outlet run $\geq 5 \times DN$

Rated operation conditions

Ambient temperature

- Non-Ex version -40 ... +85 °C (-40 ... +185 °F)
- Ex version -40 ... +65 °C (-40 ... +149 °F)

Storage temperature

-50 ... +85 °C (-58 ... +185 °F)

Media temperature

-40 ... +240 °C (-40 ... +464 °F)

Density

Taken into consideration when rating

Viscosity

< 10 cP

Reynolds number

10 000 ... 2 300 000

Media pressure limit

Max. 100 bar
(Higher pressure on request)

Design

Material

- Sensor 1.4404/316L
Hastelloy C22 (on request)
- Housing Aluminium
Aluminium seawater resistant
- Sensor gasket 1.4435/316L/FPM
Hastelloy C22/FFKM (on request)

Process connections

- Flange version EN or ASME flanges
DN 15 ... 300 (½ ... 12")
- Sandwich version DN 15 ... 100 (½ ... 4")

Degree of protection

IP66/IP67

Dimensions and weights

See „Dimensional Drawings“

Display and operating interface

Local display

2 lines, 10 characters per line

Languages

German, English, French

Power supply

- Standard version 14 ... 36 V DC
- Ex version 14 ... 30 V DC

Certificates and approvals

Explosion protection

- ATEX II 2G EEx d ia [ia] IIC T6
- FM US/C Class I, II, III, Div 1 & 2

Calibration

All flow meters will be delivered with a 3 point calibration certificate

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SITRANS FX300

Selection and Ordering data		Order No.
SITRANS FX300 Flanged Single transmitter and T_{max} = 240 °C (464 °F)		7 ME 2 6 0 0 -
Connection size	Sensor size	
DN 15 (½")	DN 15	1 A
DN 25 (1")	DN 25	2 B
DN 40 (1½")	DN 40	2 K
DN 50 (2")	DN 50	2 R
DN 80 (3")	DN 80	3 L
DN 100 (4")	DN 100	3 S
DN 150 (6")	DN 150	4 M
DN 200 (8")	DN 200	4 T
DN 250 (10")	DN 250	4 W
DN 300 (12")	DN 300	5 E
Flange norm and nominal pressure		
Form B1/B2	EN 1092-1	
PN 10	DN 200 ... 300	A
PN 16	DN 50 ... 300	B
PN 25	DN 200 ... 300	C
PN 40	DN 15 ... 300	D
PN 63	DN 50 ... 150	E
PN 100	DN 15 ... 150	F
RF	ASME B16.5	
150 lb	½ ... 12"	J
300 lb	½ ... 12"	K
600 lb	½ ... 6"	L
Sensor material/Gasket		
Stainless steel 1.4404 (316L)/1.4435 (316L)/FPM		1
Hastelloy C22/C276/FPM		3
Stainless steel 1.4404 (316L)/1.4435 (316L)/FFKM		5
Hastelloy C22/C276/FFKM		7
Transmitter design		
Compact, none cable		1
Approval and cable gland		
Non Ex, M20x1,5		1
Non Ex, ½" NPT		2
ATEX, M20x1,5		4
ATEX, ½" NPT		5
FM US/C, M20x1.5		6
FM US/C, ½" NPT		7
Transmitter, display and communication		
With display, HART		A
Pressure sensor and isolation valve		
Without pressure sensor		A
With pressure sensor, range:		
4 bar		B
6 bar		D
10 bar		E
16 bar		G
25 bar		H
40 bar		K
60 bar		L
100 bar		N
With isolation valve and pressure sensor, range:		
4 bar		P
6 bar		Q
10 bar		R
16 bar		S
25 bar		U
40 bar		V
60 bar		W
100 bar		Y

Selection and Ordering data		Order No.
SITRANS FX300 Flanged Single transmitter and T_{max} = 240 °C (464 °F)		7 ME 2 6 0 0 -
Software		
Uncompensated for gases, steam and liquids respectively temperature compensation for saturated steam		1
Density compensation for superheated steam		4
Density compensation for gases, wet gases and mixed gases		7
Selection and Ordering data		Order code
Further designs		
Please add "-Z" to Order No. and specify Order code.		
Converter housing material		
Aluminium seawater resistant, color: grey		A10
Material certificate		
Certificate of compliance EN 10204-2.1		C10
Pressure test + 3.1 accordance EN 10204		C11
Material certificate pressure parts + certificate 3.1		C12
Material in accordance of NACE MR 0175-01		C13
PMI of pressure bearing metal parts + certificate 3.1		C14
Material certificate pressure parts + PMI/certificate 3.1		C15
Calibration certificate FX300		
As standard the flow device has a 3 point calibration certificate.		
Calibration certificate (5 point)		D11
Hardness test		
Hardness test on pressure bearing parts + 3.1		H30
Equotip LD procedure according to NACE MR 0175-01		
Cleaning for oil and fat		
Class 2 standard requirement		K40
Class 2 and 3.1 (EN 10204)		K42
Class 1 increased requirement (customer specified)		K46
Class 1 and 3.1 (EN 10204)		K48
Certificates		
General Arrangement Drawings		M50
Inspection and Test plan (ITP) + „M50“		M52
Welding procedure, -plan, welder-qualification + „M52“		M54
X-ray test on pressurized weldings + „M54“		M56
Dye penetration test on pressure bearing weldings + „M56“		M58
Stress calculation + „M58“		M59
Tag name plate		
Stainless steel tag with 3 mm characters, max. 2 x 8 characters (40 x 20 mm, add plain text)		Y17
Stainless steel tag with 2,5 mm characters, max. 8 x 40 characters (120 x 46 mm, add plain text)		Y18
Further data		
Please add "-Z" to Order No. and specify Order code and plain text.		
Input process data		
Medium specify; steam, gas, liquid and customised		Y40
Temperature specify; max./operating temp. and units		Y41
Pressure specify; max./operating pressure and units		Y42
Density specify; (only by customized medium) medium density and units		Y43
Viscosity specify; (only by customized medium) medium viscosity and units		Y44
Flow-rate specify; min./max. flow-rate and units		Y45





Selection and Ordering data		Order No.	Selection and Ordering data		Order code
SITRANS FX300 Flanged Dual transmitter and T_{max} = 240 °C (464 °F)		7 ME 2 8 0 0 -	Further designs Please add "-Z" to Order No. and specify Order code.		
Connection size	Sensor size		Converter housing material		
DN 40 (1½")	DN 40	2 K	Aluminium seawater resistant, color: grey		A10
DN 50 (2")	DN 50	2 R	Material certificate		
DN 80 (3")	DN 80	3 L	Certificate of compliance EN 10204-2.1		C10
DN 100 (4")	DN 100	3 S	Pressure test + 3.1 accordance EN 10204		C11
DN 150 (6")	DN 150	4 M	Material certificate pressure parts + certificate 3.1		C12
DN 200 (8")	DN 200	4 T	Material in accordance of NACE MR 0175-01		C13
DN 250 (10")	DN 250	4 W	PMI of pressure bearing metal parts + certificate 3.1		C14
DN 300 (12")	DN 300	5 E	Material certificate pressure parts + PMI/certificate 3.1		C15
Flange norm and nominal pressure			Calibration certificate FX300 As standard the flow device has a 3 point calibration certificate.		
Form B1/B2	EN 1092-1	A	Calibration certificate (5 point)		D11
PN 10	DN 200 ... 300	B	Hardness test		
PN 16	DN 50 ... 300	C	Hardness test on pressure bearing parts + 3.1 Eqotip LD procedure according to NACE MR 0175-01		H30
PN 25	DN 200 ... 300	D	Cleaning for oil and fat		
PN 40	DN 40 ... 300	E	Class 2 standard requirement		K40
PN 63	DN 50 ... 150	F	Class 2 and 3.1 (EN 10204)		K42
PN 100	DN 40 ... 150	F	Class 1 increased requirement (customer specified)		K46
RF	ASME B16.5	J	Class 1 and 3.1 (EN 10204)		K48
150 lb	1½ ... 12"	K	Certificates		
300 lb	1½ ... 12"	L	General Arrangement Drawings		M50
600 lb	1½ ... 6"	L	Inspection and Test plan (ITP) + „M50“		M52
Sensor material/Gasket		1	Welding procedure, -plan, welder-qualification + „M52“		M54
Stainless steel 1.4404 (316L)/1.4435 (316L)/FPM		3	X-ray test on pressurized weldings + „M54“		M56
Hastelloy C22/C276/FPM		5	Dye penetration test on pressure bearing weldings + „M56“		M58
Stainless steel 1.4404 (316L)/1.4435 (316L)/FFKM		7	Stress calculation + „M58“		M59
Hastelloy C22/C276/FFKM		7	Tag name plate		
Transducer design		1	Stainless steel tag with 3 mm characters, max. 2 x 8 characters (40 x 20 mm, add plain text)		Y17
Compact, none cable		1	Stainless steel tag with 2,5 mm characters, max. 8 x 40 characters (120 x 46 mm, add plain text)		Y18
Approval and cable gland		1	Further data Please add "-Z" to Order No. and specify Order code and plain text.		
Non Ex, M20x1,5		2	Input process data		
Non Ex, ½" NPT		4	Medium specify; steam, gas, liquid and customised		Y40
ATEX, M20x1,5		5	Temperature specify; max./operating temp. and units		Y41
ATEX, ½" NPT		6	Pressure specify; max./operating pressure and units		Y42
FM US/C, M20x1.5		7	Density specify; (only by customized medium) medium density and units		Y43
FM US/C, ½" NPT		7	Viscosity specify; (only by customized medium) medium viscosity and units		Y44
Transmitter, display and communication		A	Flow-rate specify; min./max. flow-rate and units		Y45
With display, HART		A			
Pressure sensor and isolation valve		1			
Without pressure sensor		1			
Software		1			
Uncompensated for gases, steam and liquids respectively temperature compensation for saturated steam		1			

SITRANS F flowmeters

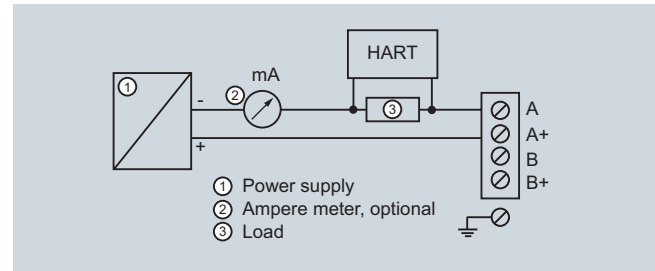
SITRANS F X

SITRANS FX300

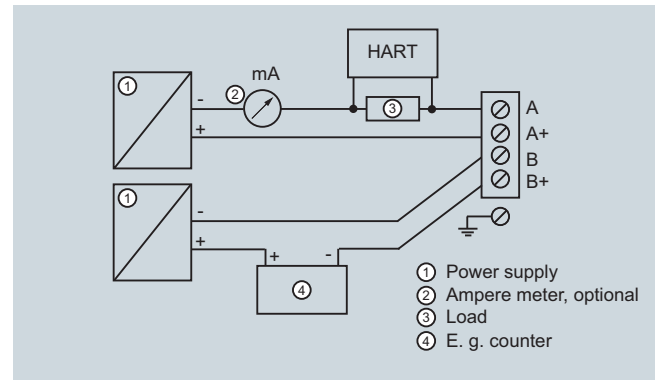
Accessories or spare parts for SITRANS FX300

Description	Order No.	
Seal disc 21,8-12-0,1	A5E02181439	
Socket only for DN 15/25 ; 1/2"	On request	
Socket only for DN 15/25 ; 1"	On request	
Pickup 1.4404	On request	
O-ring pickup	A5E02181464	
O-ring for pressure screw 17,13 x 2,62-FPM-70	A5E02181488	
Pressure sensor 4/6/10/16/25/40/60/100 bar	On request	
Cover gasket O-Ring 91.67 x 3.5	A5E02181492	
Converter housing gasket 59,35,5-2-N	A5E02181495	
O-ring DIN3771-20 x 1-FPM	A5E02181515	
O-ring 10x2-NBR	A5E02181525	
DUBOX plug, 5-pole-RM2	A5E02181527	
Electronic		
• Basic D-HART	A5E02181531	
• Steam D-HART	A5E02181541	
• Gas D-HART	A5E02181544	
Display	A5E02181558	
Cable feedthrough 10-pole (non Ex). O-ring for cable feedthrough 21,89 x 2,62 10 pole plug	A5E02181562	
Sensor replacement (incl. Seal disc, pickup, O-rings for pickup, and pressure screw		
• DN 15 (incl. 1/2" socket)	A5E02181087	
• DN 25 (incl. 1" socket)	A5E02181116	
• DN 40 ... 100	A5E02181152	
• DN 150 ... 300	A5E02275105	
Pressure sensor replacement (Incl. pressure sensor, DUBOX plug, 2 O-rings and calibration certificate)		
• 4 bar (58 psi)	A5E02181157	
• 6 bar (87 psi)	A5E02181175	
• 10 bar (145 psi)	A5E02181180	
• 16 bar (232 psi)	A5E02181221	
• 25 bar (363 psi)	A5E02181307	
• 40 bar (580 psi)	A5E02181316	
• 60 bar (870 psi)	A5E02181322	
• 100 bar (1450 psi)	A5E02181437	

Schematics

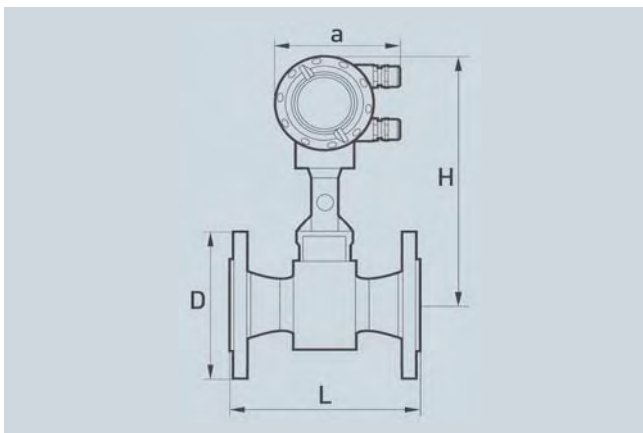


Load for HART communication

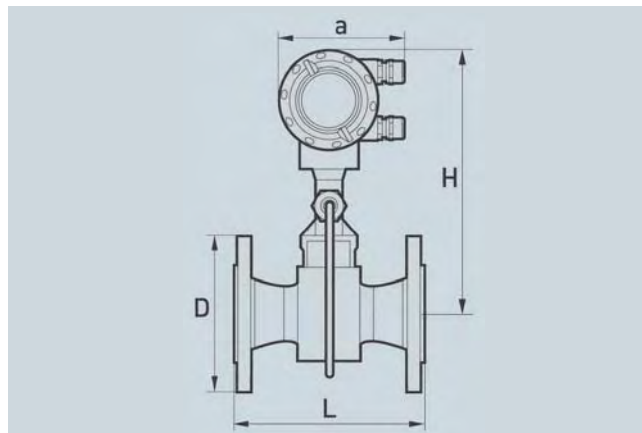


Connection pulse output

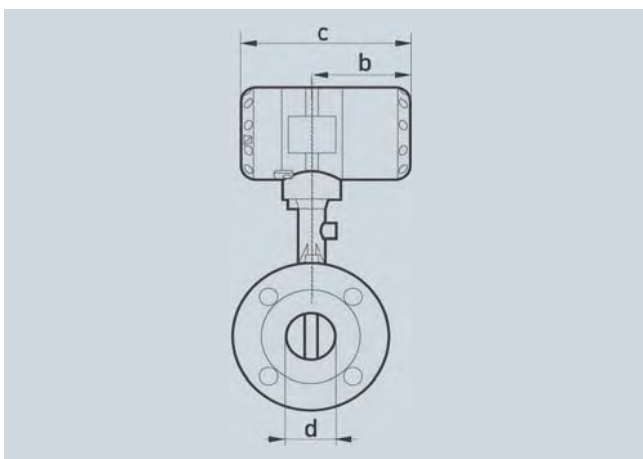
Dimensional drawings



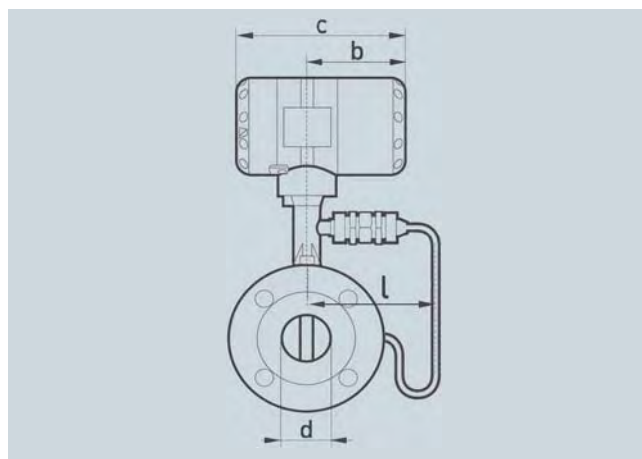
Flange version, frontal view, a = 133 mm (5.24 inches)



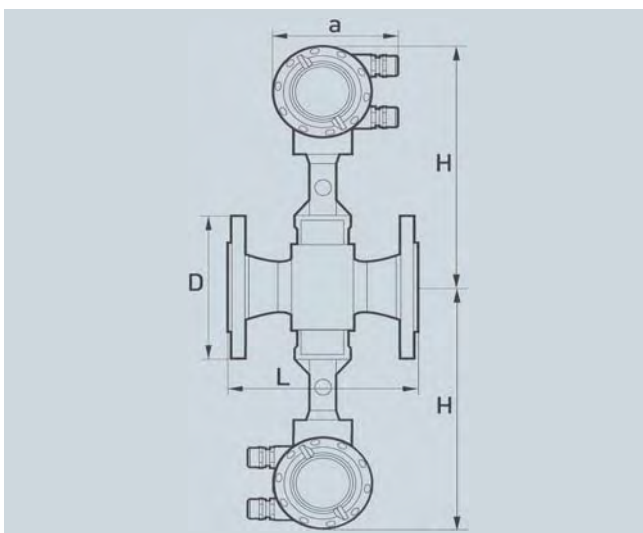
Flange version, frontal view, a = 133 mm (5.24 inches)



Flange version, side view, b = 105 mm (4.13 inches),
c = 179 mm (7.05 inches)



Flange version, side view, b = 105 mm (4.13 inches),
c = 179 mm (7.05 inches)



Flange version, dual converter, specified weight + 2.80 kg (6.17 lb)

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Flange version EN1092-1

Size	Pressure rating	Dimensions [mm (inches)]					Weight [kg (lb)]			
		DN	PN	d	D	L	H	I	Flow meter (with pressure sensor)	Flow meter (without pressure sensor)
15	40			17.3 (0.68)	95 (3.74)	200 (7.87)	265 (10.43)	144 (5.67)	6.1 (13.45)	5.5 (12.13)
15	100			17.3 (0.68)	105 (4.13)	200 (7.87)	265 (10.43)	144 (5.67)	7.1 (15.65)	6.5 (14.33)
25	40			28.5 (1.12)	115 (4.53)	200 (7.87)	265 (10.43)	144 (5.67)	7.9 (17.42)	7.3 (16.09)
25	100			28.5 (1.12)	140 (5.51)	200 (7.87)	265 (10.43)	144 (5.67)	9.9 (21.83)	9.3 (20.50)
40	40			43.1 (1.70)	150 (5.91)	200 (7.87)	270 (10.63)	144 (5.67)	10.8 (23.81)	10.2 (22.49)
40	100			42.5 (1.67)	170 (6.69)	200 (7.87)	270 (10.63)	144 (5.67)	14.8 (32.63)	14.2 (31.31)
50	16			54.5 (2.15)	165 (6.50)	200 (7.87)	275 (10.83)	144 (5.67)	12.7 (28.00)	12.1 (26.68)
50	40			54.5 (2.15)	165 (6.50)	200 (7.87)	275 (10.83)	144 (5.67)	12.9 (28.44)	12.3 (27.12)
50	63			54.5 (2.15)	180 (7.09)	200 (7.87)	275 (10.83)	144 (5.67)	16.9 (37.26)	16.3 (35.94)
50	100			53.9 (2.12)	195 (7.68)	200 (7.87)	275 (10.83)	144 (5.67)	18.4 (40.57)	17.8 (39.24)
80	16			82.5 (3.25)	200 (7.87)	200 (7.87)	290 (11.42)	154 (6.06)	17.4 (38.36)	16.8 (37.04)
80	40			82.5 (3.25)	200 (7.87)	200 (7.87)	290 (11.42)	154 (6.06)	19.4 (42.77)	18.8 (41.45)
80	63			81.7 (3.22)	215 (8.46)	200 (7.87)	290 (11.42)	154 (6.06)	23.4 (51.59)	22.8 (50.27)
80	100			80.9 (3.19)	230 (9.06)	200 (7.87)	290 (11.42)	154 (6.06)	27.4 (60.41)	26.8 (59.08)
100	16			107.1 (4.22)	220 (8.66)	250 (9.84)	310 (12.20)	164 (6.46)	22 (48.50)	21.4 (47.18)
100	40			107.1 (4.22)	235 (9.25)	250 (9.84)	310 (12.20)	164 (6.46)	25 (55.12)	24.4 (53.79)
100	63			106.3 (4.19)	250 (9.84)	250 (9.84)	310 (12.20)	164 (6.46)	30 (66.14)	29.4 (64.82)
100	100			104.3 (4.11)	265 (10.43)	250 (9.84)	310 (12.20)	164 (6.46)	36 (79.37)	35.4 (78.04)
150	16			159.3 (6.27)	285 (11.22)	300 (11.81)	325 (12.80)	174 (6.85)	35.8 (78.93)	35.2 (77.60)
150	40			159.3 (6.27)	300 (11.81)	300 (11.81)	325 (12.80)	174 (6.85)	41.8 (92.15)	41.2 (90.83)
150	63			157.1 (6.19)	345 (13.58)	300 (11.81)	325 (12.80)	174 (6.85)	59.8 (131.84)	59.2 (130.51)
150	100			154.1 (6.07)	355 (13.98)	300 (11.81)	325 (12.80)	174 (6.85)	67.8 (149.47)	67.2 (148.15)
200	10			206.5 (8.13)	340 (13.39)	300 (11.81)	350 (13.78)	194 (7.64)	38.4 (84.66)	37.8 (83.33)
200	16			206.5 (8.13)	340 (13.39)	300 (11.81)	350 (13.78)	194 (7.64)	38.4 (84.66)	37.8 (83.33)
200	25			206.5 (8.13)	360 (14.17)	300 (11.81)	350 (13.78)	194 (7.64)	47.4 (104.50)	46.8 (103.18)
200	40			206.5 (8.13)	375 (14.76)	300 (11.81)	350 (13.78)	194 (7.64)	55.4 (122.14)	54.8 (120.81)
250	10			260.4 (10.25)	395 (15.55)	380 (14.96)	370 (14.57)	224 (8.82)	58.0 (127.87)	57.4 (126.55)
250	16			260.4 (10.25)	405 (15.94)	380 (14.96)	370 (14.57)	224 (8.82)	59.0 (130.07)	58.4 (128.75)
250	25			258.8 (10.19)	425 (16.73)	380 (14.96)	370 (14.57)	224 (8.82)	75.0 (165.35)	74.4 (164.02)
250	40			258.8 (10.19)	450 (17.72)	380 (14.96)	370 (14.57)	224 (8.82)	93.0 (205.03)	92.4 (203.71)
300	10			309.7 (12.19)	445 (17.52)	450 (17.72)	395 (15.55)	244 (9.61)	76.3 (168.21)	75.7 (166.89)
300	16			309.7 (12.19)	460 (18.11)	450 (17.72)	395 (15.55)	244 (9.61)	82.8 (182.54)	82.2 (181.22)
300	25			307.9 (12.12)	485 (19.09)	450 (17.72)	395 (15.55)	244 (9.61)	99.3 (218.92)	98.7 (217.60)
300	40			307.9 (12.12)	515 (20.28)	450 (17.72)	395 (15.55)	244 (9.61)	128.1 (282.41)	127.5 (281.09)

Flange version ASME B16.5

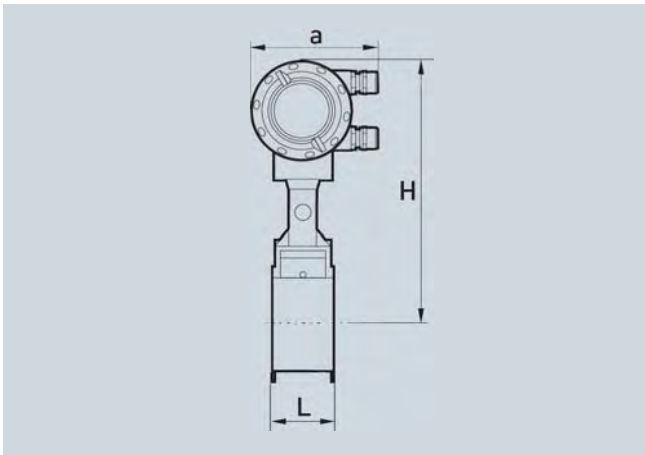
Size	Pressure rating	Dimensions [mm (inches)]					Weight [kg (lb)]	
		DN	class	d	D	L	H	I
1/2	150	15.8 (0.62)	90 (3.54)	200 (7.87)	265 (10.43)	144 (5.67)	5.1 (11.24)	4.5 (9.92)
1/2	300	15.8 (0.62)	95 (3.74)	200 (7.87)	265 (10.43)	144 (5.67)	5.5 (12.13)	4.9 (10.80)
1/2	600	13.9 (0.55)	95 (3.74)	200 (7.87)	265 (10.43)	144 (5.67)	5.7 (12.57)	5.1 (11.24)
1	150	26.6 (1.05)	110 (4.33)	200 (7.87)	265 (10.43)	144 (5.67)	6.8 (14.99)	6.2 (13.67)
1	300	26.6 (1.05)	125 (4.92)	200 (7.87)	265 (10.43)	144 (5.67)	7.8 (17.20)	7.2 (15.87)
1	600	24.3 (0.96)	125 (4.92)	200 (7.87)	265 (10.43)	144 (5.67)	8.1 (17.86)	7.5 (16.53)
1 1/2	150	40.9 (1.61)	125 (4.92)	200 (7.87)	270 (10.63)	144 (5.67)	8.9 (19.62)	8.3 (18.30)
1 1/2	300	40.9 (1.61)	155 (6.10)	200 (7.87)	270 (10.63)	144 (5.67)	11 (24.25)	10.4 (22.93)
1 1/2	600	38.1 (1.50)	155 (6.10)	200 (7.87)	270 (10.63)	144 (5.67)	12 (26.46)	11.4 (25.13)
2	150	52.6 (2.07)	150 (5.91)	200 (7.87)	275 (10.83)	144 (5.67)	11.6 (25.57)	11 (24.25)
2	300	52.6 (2.07)	165 (6.50)	200 (7.87)	275 (10.83)	144 (5.67)	13 (28.66)	12.4 (27.34)
2	600	49.3 (1.94)	165 (6.50)	200 (7.87)	275 (10.83)	144 (5.67)	14.5 (31.97)	13.9 (30.64)
3	150	78 (3.07)	190 (7.48)	200 (7.87)	290 (11.42)	154 (6.06)	20.4 (44.97)	19.8 (43.65)
3	300	78 (3.07)	210 (8.27)	200 (7.87)	290 (11.42)	154 (6.06)	23.4 (51.59)	22.8 (50.27)
3	600	73.7 (2.90)	210 (8.27)	200 (7.87)	290 (11.42)	154 (6.06)	24.4 (53.79)	23.8 (52.47)
4	150	102.4 (4.03)	230 (9.06)	250 (9.84)	310 (12.20)	164 (6.46)	24 (52.91)	23.4 (51.59)
4	300	102.4 (4.03)	255 (10.04)	250 (9.84)	310 (12.20)	164 (6.46)	32 (70.55)	31.4 (69.23)
4	600	97.2 (3.83)	275 (10.83)	250 (9.84)	310 (12.20)	164 (6.46)	41 (90.39)	40.4 (89.07)
6	150	154.2 (6.07)	280 (11.02)	300 (11.81)	325 (12.80)	174 (6.85)	36.8 (81.13)	36.2 (79.81)
6	300	154.2 (6.07)	320 (12.60)	300 (11.81)	325 (12.80)	174 (6.85)	51.8 (114.20)	51.2 (112.88)
6	600	146.3 (5.76)	355 (13.98)	300 (11.81)	325 (12.80)	174 (6.85)	76.8 (169.31)	46.2 (101.85)
8	150	202.7 (7.98)	345 (13.58)	300 (11.81)	350 (13.78)	194 (7.64)	50.6 (111.55)	50.0 (110.23)
8	300	202.7 (7.98)	380 (14.96)	300 (11.81)	350 (13.78)	194 (7.64)	75.4 (166.23)	74.8 (164.91)
10	150	254.5 (10.02)	405 (15.94)	380 (14.96)	370 (14.57)	224 (8.82)	75.0 (165.35)	74.4 (164.02)
10	300	254.5 (10.02)	455 (17.91)	380 (14.96)	370 (14.57)	224 (8.82)	107.0 (235.89)	106.4 (234.57)
12	150	304.8 (12.00)	485 (19.09)	450 (17.72)	395 (15.55)	244 (9.61)	106.9 (235.67)	106.3 (234.35)
12	300	304.8 (12.00)	520 (20.47)	450 (17.72)	395 (15.55)	244 (9.61)	151.9 (334.88)	151.3 (333.56)

SITRANS F flowmeters

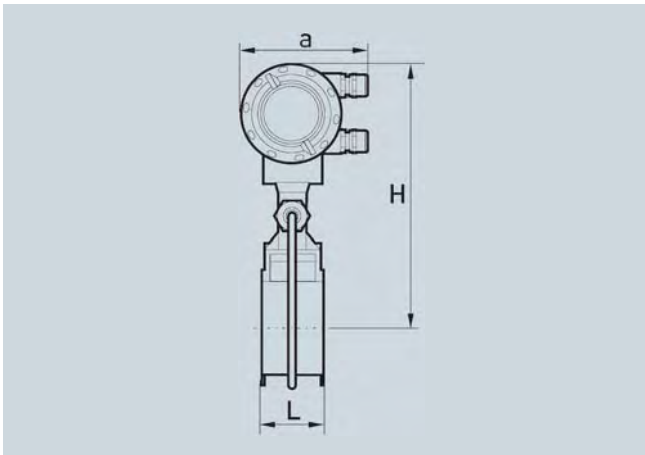
SITRANS F X

SITRANS FX300

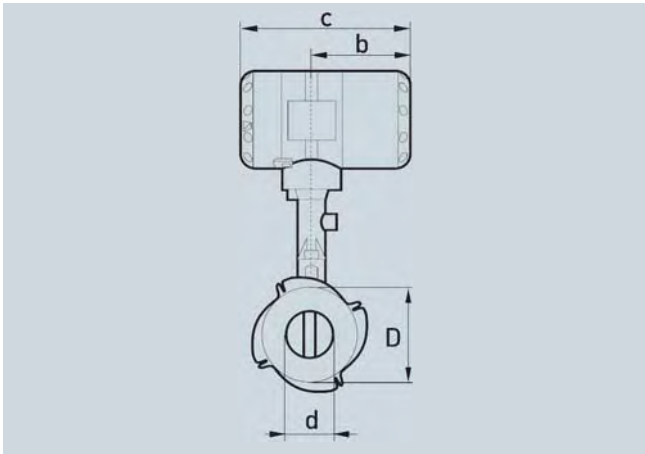
4



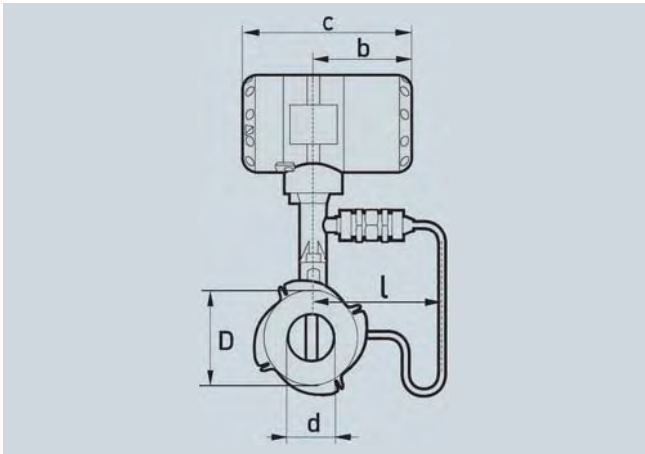
Sandwich version, front view, a = 133 mm (5.24 inches)



Sandwich version, front view, a = 133 mm (5.25 inches)



Sandwich version, side view, b = 105 mm (4.13 inches), c = 179 mm (7.05 inches)



Sandwich version, side view, b = 105 mm (4.13 inches), c = 179 mm (7.05 inches)

Sandwich version EN

Size	Pressure rating	Dimensions [mm (inches)]					Weight [kg (lb)]	
		d	D	L	H	I	Flow meter (with pressure sensor)	Flow meter (without pressure sensor)
DN	PN							
15	16 ... 100	16 (0.63)	45 (1.77)	65 (2.56)	265 (10.43)	144 (5.67)	4.1 (9.04)	3.5 (7.72)
25	16 ... 100	24 (0.94)	65 (2.56)	65 (2.56)	265 (10.43)	144 (5.67)	4.9 (10.80)	4.3 (9.48)
40	16 ... 100	38 (1.50)	82 (3.23)	65 (2.56)	270 (10.63)	144 (5.67)	5.5 (12.13)	4.9 (10.80)
50	16 ... 100	50 (1.97)	102 (4.02)	65 (2.56)	275 (10.83)	144 (5.67)	6.6 (14.55)	6 (13.23)
80	16 ... 100	74 (2.91)	135 (5.31)	65 (2.56)	290 (11.42)	155 (6.10)	8.8 (19.40)	8.2 (18.08)
100	16 ... 100	97 (3.82)	158 (6.22)	65 (2.56)	310 (12.20)	164 (6.46)	10.1 (22.27)	9.5 (20.94)

Sandwich version ASME

Size	Pressure rating	Dimensions [mm (inches)]					Weight [kg (lb)]	
		d	D	L	H	I	Flow meter (with pressure sensor)	Flow meter (without pressure sensor)
DN	class							
½"	150, 300	16 (0.63)	45 (1.77)	65 (2.56)	265 (10.43)	144 (5.67)	4.1 (9.04)	3.5 (7.72)
½"	600	16 (0.55)	45 (1.77)	65 (2.56)	265 (10.43)	144 (5.67)	4.1 (9.04)	3.5 (7.72)
1"	150, 300, 600	24 (0.94)	65 (2.56)	65 (2.56)	265 (10.43)	144 (5.67)	4.9 (10.80)	4.3 (9.48)
1½"	150, 300, 600	38 (1.50)	82 (3.23)	65 (2.56)	270 (10.63)	144 (5.67)	5.5 (12.13)	4.9 (10.80)
2"	150, 300, 600	50 (1.97)	102 (4.02)	65 (2.56)	275 (10.83)	144 (5.67)	6.6 (14.55)	6 (13.23)
3"	150, 300, 600	74 (2.91)	135 (5.31)	65 (2.56)	290 (11.42)	155 (6.10)	8.8 (19.40)	8.2 (18.08)
4"	150, 300, 600	97 (3.82)	158 (6.22)	65 (2.56)	310 (12.20)	164 (6.46)	10.1 (22.27)	9.5 (20.94)

SITRANS F flowmeters

SITRANS F X

SITRANS FX300

Flow tables

Measuring Range Limits

Size		Q _{min}	Q _{max}	Q _{min}	Q _{max}
DN to EN 1092-1	DN to ASME B16.5	EN 1092-1 [m ³ /h]	EN 1092-1 [m ³ /h]	ASME B16.5 [m ³ /h]	ASME B16.5 [m ³ /h]
Water					
15	½"	0.45	5.07	0.44	4.94
25	1"	0.81	11.40	0.81	11.40
40	1½"	2.04	28.58	2.04	28.58
50	2"	3.53	49.48	3.53	49.48
80	3"	7.74	108.37	7.74	108.37
100	4"	13.30	186.22	13.30	186.21
150	6"	30.13	421.86	30.13	421.86
200	8"	52.66	737.18	52.66	737.18
250	10"	81.43	1 140.02	81.43	1 140.02
300	12"	114.83	1 607.61	114.83	1 607.61

Values based on water at 20 °C (68 °F)

Air

15	½"	6.72	57.91	6.72	56.46
25	1"	10.20	130.29	10.20	130.29
40	1½"	25.35	326.63	25.35	326.63
50	2"	43.89	565.49	43.89	565.49
80	3"	96.14	1 238.64	96.14	1 238.60
100	4"	165.14	2 128.27	165.19	2 128.27
150	6"	374.23	4 821.60	374.23	4 821.60
200	8"	653.95	8 425.53	633.95	8 425.50
250	10"	977.16	13 028.81	977.16	13 028.14
300	12"	1 377.95	18 372.66	1 377.95	18 372.66

Values based on air at 20 °C (68 °F) and 1.013 bar_{abs} (14.7 psi_{abs})

Flow rate limits

Product	Nominal diameters		Minimum flow rates	Maximum flow rates
	to EN	to ASME	[m/s]	[m/s]
Liquids	DN 15 ... DN 300	DN ½"...DN 12"	$0.5 \times (998/\rho)^{0.5 \ 1)}$	$7 \times (998/\rho)^{0.47 \ 1)}$
Gas, steam/vapor	DN 15 ... DN 300	DN ½"...DN 12"	$6 \times (1.29/\rho)^{0.5 \ 2)}$	$7 \times (998/\rho)^{0.47 \ 3)}$

ρ = operating density [kg/m³]

¹⁾ Minimum flow rates 0.4 m/s (1.3 ft/s), maximum flow rates 10 m/s (32.8 ft/s)

²⁾ Minimum flow rates 2 m/s (6.6 ft/s), maximum flow rates 80 m/s (262 ft/s)

³⁾ Minimum flow rates 2 m/s (6.6 ft/s), maximum flow rates 80 m/s (262 ft/s); DN 15: 45 m/s (148 ft/s) and DN 25: 70 m/s (230 ft/s)

Measuring range saturated steam: 1 to 7 bar

Overpressure [bar]		1		3.5		5.2		7	
Density [kg/m ³]		1.13498		2.4258		3.27653		4.16732	
Temperature [°C]		120.6		148.2		160.4		170.6	
Flow [kg/h]		min.	max.	min.	max.	min.	max.	min.	max.
DN to EN 1092-1	DN to ASME B16.5								
15	½"	5.25	65.72	7.68	140.47	8.93	189.73	10.06	241.31
25	1"	11.82	147.87	17.28	316.05	20.09	426.89	22.66	542.95
40	1½"	29.64	370.71	43.33	792.33	50.63	1 070.2	56.8	1 361.2
50	2"	51.31	641.82	75.02	1 371.8	87.19	1 852.8	98.33	2 356.6
80	3"	112.41	1 405.8	164.33	3 004.7	191	4 058.4	215.39	5 161.8
100	4"	193.14	2 415.5	282.36	5 162.7	328.16	6 973.3	370.09	8 869.2
150	6"	437.56	5 472.4	639.69	11 696	743.45	15 798	838.44	20 093
200	8"	764.62	9 562.8	1 117.8	20 439	1 299.2	27 606	1 465.1	35 112
250	10"	1 177.07	14 655.07	1 716.4	31 161.66	1 993.6	42 039.68	2 247.44	53 426.86
300	12"	1 659.85	20 665.94	2 420.39	43 942.81	2 811.29	58 282.52	3 169.24	75 340.22

Measuring range saturated steam: 10.5 to 20 bar

Overpressure [bar]		10.5		14		17.5		20	
Density [kg/m ³]		5.88803		7.60297		9.31702		10.5442	
Temperature [°C]		186.2		198.5		208.5		215	
Flow [kg/h]		min.	max.	min.	max.	min.	max.	min.	max.
DN to EN 1092-1	DN to ASME B16.5								
15	½"	12.78	332.97	16.51	381.28	20.23	424.66	22.89	453.44
25	1"	26.93	749.18	30.6	857.88	33.87	955.48	36.04	1 020.2
40	1½"	67.51	1 878.2	76.72	2 150.7	84.93	2 395.3	90.35	2 557.7
50	2"	116.89	3 251.7	132.82	3 723.4	147.03	4 147	156.42	4 428.1
80	3"	256.03	7 122.4	290.93	8 155.8	322.06	9 083.7	342.62	9 699.3
100	4"	439.91	12 238	499.9	14 013	553.38	15 608	588.69	16 666
150	6"	996.62	27 725	1 132.5	31 747	1 253.7	35 359	1 333.7	37 756
200	8"	1 741.6	48 449	1 979	55 478	2 190.7	61 789	2 330.6	65 977
250	10"	2 670.28	66 065.16	3 033.45	75 626.77	3 357.4	84 214.04	3 571	89 910.45
300	12"	3 765.52	93 162.2	4 277.65	106 645.56	4 737.45	118 754	5 036.01	126 787.78

SITRANS F flowmeters

SITRANS F X

SITRANS FX300

Measuring range saturated steam: 15 to 100 psig

Overpressure [psig]		15		50		75		100	
Density [lbs/ft ³]		0.0719		0.1497		0.2036		0.2569	
Temperature [°F]		249.98		297.86		320.36		338.184	
Flow [lbs/h]		min.	max.	min.	max.	min.	max.	min.	max.
DN to EN 1092-1	DN to ASME B16.5								
15	½"	11.6	147.08	16.83	306	19.62	416.04	22.04	524.86
25	1"	26.25	330.92	37.86	688.48	44.15	936.09	49.59	1 180.9
40	1½"	65.81	829.61	94.92	1 726	110.68	2 346.7	124.32	2 960.5
50	2"	113.94	1 436.3	164.34	2 988	191.63	4 062.9	215.23	5 125.6
80	3"	249.57	3 146.1	360	6 545.3	419.74	8 899.4	471.45	11 227
100	4"	428.81	5 405.7	618.51	11 246	721.21	15 291	810.06	19 291
150	6"	971.47	12 246	1 401.2	25 478	1 633.9	34 642	1 835.2	43 703
200	8"	1 697.6	21 400	2 448.6	44 523	2 855.2	60 536	3 206.9	76 369
250	10"	2 562.72	32 308.86	3 777.85	68 699.63	4 371.7	92 681.52	4 946.03	117 785.23
300	12"	3 613.84	45 560.54	5 327.61	96 877.61	6 164.78	130 695.42	6 974.68	166 096.57

Measuring range saturated steam: 150 to 300 psig

Overpressure [psig]		150		200		250		300	
Density [lbs/ft ³]		0.3627		0.4681		0.5735		0.6792	
Temperature [°F]		366.08		388.04		406.22		422.06	
Flow [lbs/h]		min.	max.	min.	max.	min.	max.	min.	max.
DN to EN 1092-1	DN to ASME B16.5								
15	½"	27.79	728.25	35.86	833.73	43.94	928.44	52.04	1 015.5
25	1"	58.93	1 638.6	66.94	1 875.9	74.1	2 089	80.63	2 284.9
40	1½"	147.72	4 107.2	167.83	4 702.8	185.76	5 237	202.15	5 728
50	2"	255.75	7 111.9	290.56	8 141.9	321.6	9 066.8	350	9 917
80	3"	560.19	15 578	636.44	17 834	704.43	19 860	766.6	21 722
100	4"	962.54	26 766	1 093.5	30 643	1 210.4	34 124	1 317.2	37 324
150	6"	2 180.6	60 639)	2 477.4	69 421	2 742.1	77 307	2 984	84 556
200	8"	3 810.6	105 96054	4 329.2	121 310	4 791.7	135 090	5 214.5	147 760
250	10"	5 876.29	145 648.57	6 674.55	166 728.29	7 386.91	185 659.96	7 680.16	198 218.37
300	12"	8 286.49	205 387.25	9 412.15	235 112.94	10 416.7	261 809.55	10 830.22	279 518.87