

Flow Conditioners

Bulletin SS02007 Issue/Rev. 1.1 (7/20)

Smith Meter® Turbine Meters

Smith Meter® Flow Conditioners optimize turbine meter performance by reducing fluid swirl and velocity profile distortion caused by valves, pumps, strainers, thermowells, joint misalignment, piping configurations, welding projections, or other constructions.

Flow Straightening Assemblies

Pipeline or Loading Rack Service

A complete meter run typically consists of a 10-pipe diameter upstream assembly with in-line straightening insert and a 5-pipe diameter downstream section.



Features

- API Compliance meets the design requirements of API MPMS Chapter 5, Section 3.
- Stainless steel straightening vane insert.
- Designed and manufactured to meet the requirements of ASME B31.3.

Options

- NACE Compliance to MR0175/ISO 15156-1.
- One hundred percent X-ray of all girth welds with examination procedure and level of acceptance per ASME B31.3.
- Doweling of flanges provides repeatable alignment ensuring measurement performance as factory tested.

Maximum Working Pressure¹ – PSI (kPa)

Class	Carbon Steel Flanges	Stainless Steel Flanges
150 ASME	285 (1,965)	275 (1,896)
300 ASME	740 (5,102)	720 (4,964)
600 ASME	1,480 (10,205)	1,440 (9,929)
900 ASME	2,220 (15,307)	2,160 (14,893)

Class	Carbon Steel and Stainless Steel Flanges
PN16 DIN 2633	232 (1,600)
PN25 DIN 2634	362 (2,500)
PN40 DIN 2635	580 (4,000)

Materials of Construction

Flow Straightening Assemblies	Carbon steel
Straightening Vane Insert	300 series stainless steel
Optional (C/F)	Stainless steel flow straightening assembly

Specifications

End Connections

Class 150, 300, 600, 900 ASME B16.5 standard finished raised face (RF), 125-250 AARH smooth finish RF, or ring-type joint (RTJ) flanges.

PN16 DIN 2633, PN25 DIN 2634, PN40 DIN 2635 raised face (RF) form C DIN 2526 flanges.

¹ Maximum working pressures are for temperatures of -20°F to 100°F (-28°C to 38°C). Consult factory for maximum working pressures at other temperatures.

Application Considerations

Size:

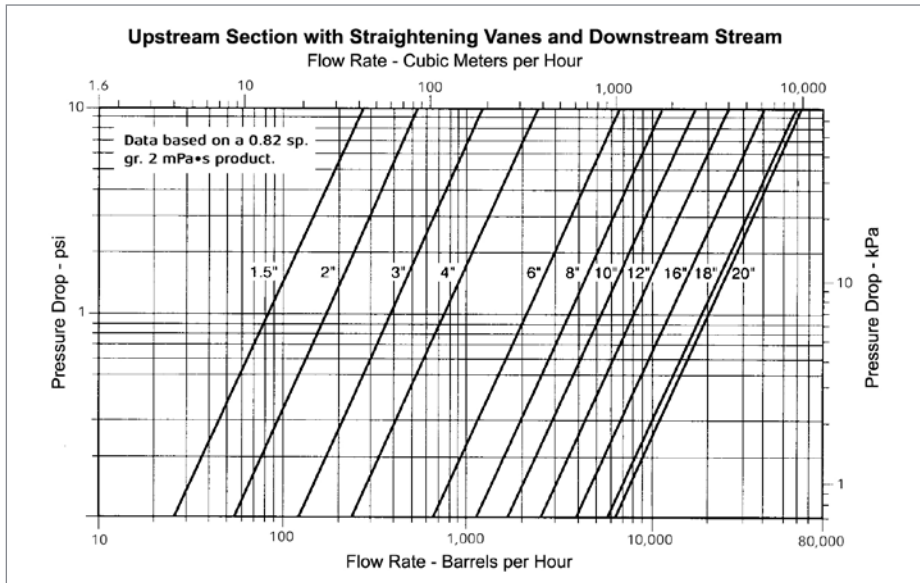
Flow conditioners and straightening assemblies (both upstream and downstream) must be the same pipe size as the meter.

Installation:

Unidirectional – One upstream and one downstream flow straightening assembly.

Bidirectional – Two upstream flow straightening assemblies.

Pressure Drop²



To approximate pressure drop for sections with other products, multiply the chart value by the factor given below:

Product	Sp. Gr.	Viscosity ³	Factor
LPG	0.51	0.2 mPa*s	0.40
Gasoline	0.73	0.7 mPa*s	0.72
Water	1.00	1.0 mPa*s	1.00
No. 6 Oil	0.95	20.0 mPa*s	2.03

Catalog Code – Flow Straightening Assemblies

1	2	3	4	5	6	7	8	9
K	2	2						

Positions 1 and 2: Product Line

K2 - Turbine Meter

Position 3: Item

2 - Flow Straightening Assembly

Position 4: Type

A - Upstream Section with Straightening Vanes
 B - Downstream Section

Position 5: Size

A - 1.5"	H - 8"	R - 10" Short
B - 2"	J - 10"	T - 12" Short
C - 3"	K - 12"	V - 16" Short
D - 3" x 4"*	L - 16"	
E - 4"	M - 18"	
F - 4" x 6"*	N - 20"	
G - 6"	P - 1.5" x 2"*	

*For meters of smaller size than the line in which they are installed.

Position 6: Pressure Class

A - Class 150 ANSI	H - PN16 DIN 2633
B - Class 300 ANSI	J - PN25 DIN 2634
D - Class 600 ANSI	K - PN40 DIN 2635
E - Class 900 ANSI	

Positions 7 and 8: End Connections/Tube Material

00 - RF, CS Flanges/CS Tubes
 A1 - RF, SS Flanges/SS Tubes
 B0 - RTJ, CS Flanges/CS Tubes
 C1 - RTJ, SS Flanges/SS Tubes
 D0 - RF 125-250 AARH, CS Flanges/CS Tubes
 E1 - RF 125-250 AARH, SS Flanges/SS Tubes

Position 9: Compliance/Inspection

0 - ASME B31.3
 1 - NACE Compliance*
 2 - PED Compliance*
 3 - X-Ray 100% Per ASME B31.3*
 X - Special

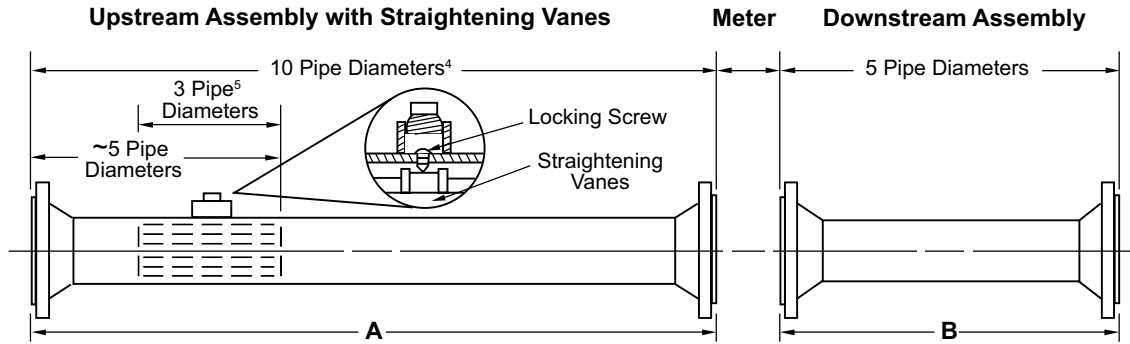
*Designed and Manufactured to ASME B31.3

2 Based on schedule 40 pipe.

3 1 cP = 1 mPa*s.

Dimensions – Flow Straightening Sections

Inches (mm)



Nominal Pipe Size	A	B	Weight					
			150 Class ANSI and PN16 DIN 2633		300 Class ANSI PN25 DIN 2634 PN40 DIN 2635		600 Class ANSI	
			Upstream	Downstream	Upstream	Downstream	Upstream	Downstream
1.5"	15" (381)	7.5" (191)	30 lb (14 kg)	25 lb (11 kg)	37 lb (17 kg)	32 lb (14 kg)	45 lb (20 kg)	40 lb (18 kg)
1.5" - 2"	15" (381)	7.5" (191)	31 lb (14 kg)	25 lb (11 kg)	38 lb (17 kg)	32 lb (14 kg)	C/F	C/F
2"	20" (508)	10" (254)	33 lb (15 kg)	27 lb (12 kg)	40 lb (18 kg)	34 lb (15 kg)	50 lb (23 kg)	44 lb (20 kg)
3" or 3" x 4"	30" (762)	15" (381)	44 lb (20 kg)	36 lb (16 kg)	55 lb (25 kg)	47 lb (21 kg)	60 lb (27 kg)	52 lb (24 kg)
4" or 4" x 6"	40" (1,016)	20" (508)	65 lb (30 kg)	50 lb (23 kg)	85 lb (38 kg)	70 lb (32 kg)	120 lb (54 kg)	105 lb (48 kg)
6"	60" (1,524)	30" (762)	135 lb (61 kg)	95 lb (43 kg)	175 lb (79 kg)	135 lb (61 kg)	250 lb (114 kg)	210 lb (95 kg)
8"	80" (2,032)	40" (1,016)	255 lb (116 kg)	170 lb (77 kg)	310 lb (141 kg)	225 lb (102 kg)	410 lb (186 kg)	325 lb (148 kg)
10" Short	96" (2,438)	50" (1,270)	407 lb (184 kg)	265 lb (120 kg)	492 lb (223 kg)	340 lb (154 kg)	C/F	C/F
10"	100" (2,540)	50" (1,270)	420 lb (191 kg)	265 lb (120 kg)	505 lb (229 kg)	340 lb (154 kg)	695 lb (316 kg)	540 lb (245 kg)
12" Short	114" (2,896)	60" (1,524)	630 lb (286 kg)	410 lb (186 kg)	750 lb (340 kg)	525 lb (238 kg)	C/F	C/F
12"	120" (3,048)	60" (1,524)	655 lb (297 kg)	410 lb (186 kg)	775 lb (352 kg)	525 lb (238 kg)	950 lb (431 kg)	705 lb (320 kg)
16" Short	152" (3,861)	80" (2,032)	1,248 lb (566 kg)	775 lb (352 kg)	1,488 lb (675 kg)	1,015 lb (461 kg)	C/F	C/F
16"	160" (4,064)	80" (2,032)	1,290 lb (586 kg)	775 lb (352 kg)	1,530 lb (695 kg)	1,015 lb (461 kg)	C/F	C/F
18"	180" (4,572)	90" (2,286)	1,760 lb (799 kg)	1,025 lb (465 kg)	2,090 lb (949 kg)	1,335 lb (615 kg)	C/F	C/F
20"	200" (5,080)	100" (2,540)	2,280 lb (1,035 kg)	1,320 lb (599 kg)	C/F	C/F	C/F	C/F

Note: Dimensions – inches to the nearest tenth (millimeters to the nearest whole mm), each independently dimensioned from respective engineering drawings.

4 Increase to a minimum of 20 pipe diameters without straightening vanes and 40 pipe diameters if meter is preceded by valves or sudden changes in flow diameter.

5 Two pipe diameters for 16" and larger.

Straightening Vanes

Straightening vanes are thin-wall stainless steel tubes held in place by a locking screw.

Material of Construction: 300 series stainless steel.

Catalog Code – Straightening Vanes

1	2	3	4	5	6
K	2	1	2		

Positions 1 and 2: Product line

K2 - Turbine meter

Position 3: Item

1 - Flow conditioner

Position 4: Type

2 - Locking screw style straightening vane insert

3 - Captive flange style straightening vane insert

Position 5: Size

A - 1.5" J - 10"

B - 2" K - 12"

C - 3" L - 16"

E - 4" M - 18"

G - 6" N - 20"

H - 8"

Position 6: Flow straightening assembly pipe schedule

0 - 40

1 - 20

2 - 80

3 - 120

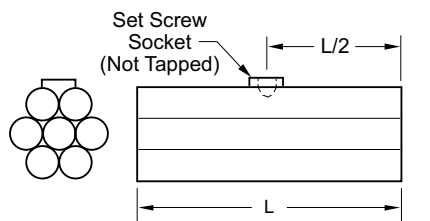
4 - 160

5 - XXS

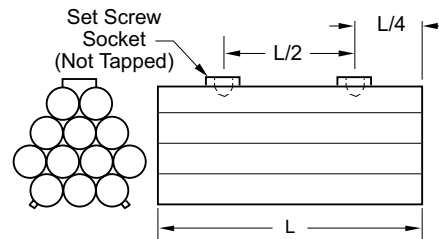
6 - STD

Dimensions – Straightening Vanes

Inches (mm)



One set screw socket used on 1.5" through 8" nominal pipe sizes.

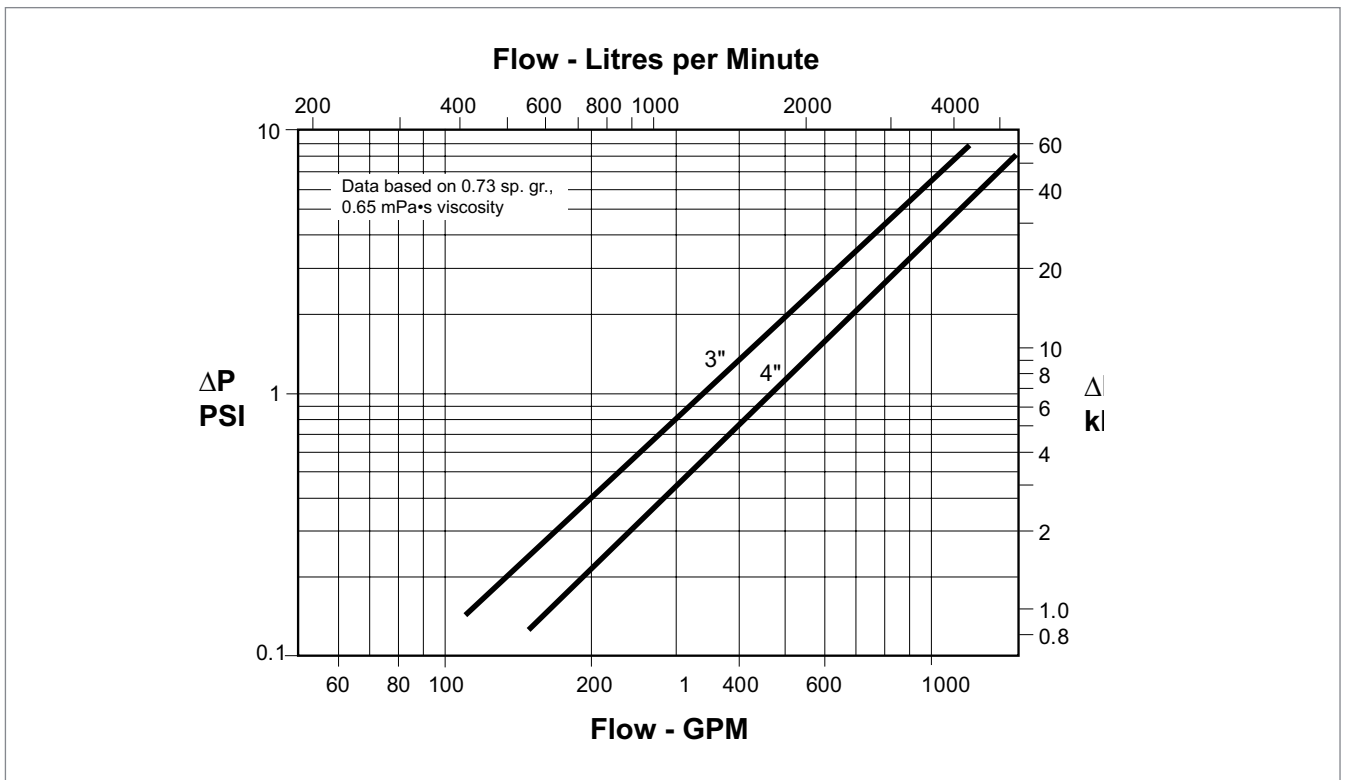


Two set screw sockets used on 10" through 20" nominal pipe sizes.

Nominal Pipe Size	L	Nominal Set Screw Diameter
1.5"	4.5"	3/8"
2"	6"	3/8"
3"	9"	3/8"
4"	12"	3/8"
6"	18"	3/8"
8"	24"	1/2"
10"	30"	1/2"
12"	32"	1/2"
16"	32"	1/2"
18"	36"	1/2"
20"	40"	1/2"

Note: Dimensions – inches to the nearest tenth (millimetres to the nearest whole mm), each independently dimensioned from respective engineering drawings.

Pressure Drop – Strate Plate for the GL 3" and 4" Turbine Meters



Revisions included in SS02007 Issue/Rev. 1.1 (7/20):

Added 10" Short, 12" Short, and 16" Short to dimensions nominal pipe size table, page 3.

The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.