

DESCRIPTION

Cox Flow Straighteners offer a simple method of reducing or eliminating flow swirl, as a result of pipe bends and the location of valves, thermowells or pressure taps naturally found in piping systems. The six vane straightening element within the upstream straightener (sizes 1/2 in. and up) produces less pressure drop compared to other flow conditioning methods. Two different options, flared or flanged connections, allow for a quick and easy installation. Collaboratively, the upstream and downstream flow straighteners prevent false readings from fluid swirl effects inherent in process piping systems. The straighteners can vastly improve flow meter performance.

APPLICATIONS

Flow straighteners are used in piping systems where flow meters are present, such as:

- Systems with inadequate straight runs of piping
- Test benches or calibration stands
- Custody transfer
- Process conditioning
- Bearing diagnostics (dual rotor meters)

OPERATION AND PERFORMANCE

Cox Flow Straighteners are attached both upstream and downstream of the flow meter and are designed to reduce or eliminate fluid swirl caused by pumps, piping bends, vibrations, valves and other related process variables within a piping system. As fluid enters the upstream straightener, fluid is first intercepted by a six bladed straightening vane (sizes 1/2 in. and up) to remove swirl and develop a symmetrical flow profile, prior to impelling the rotor.

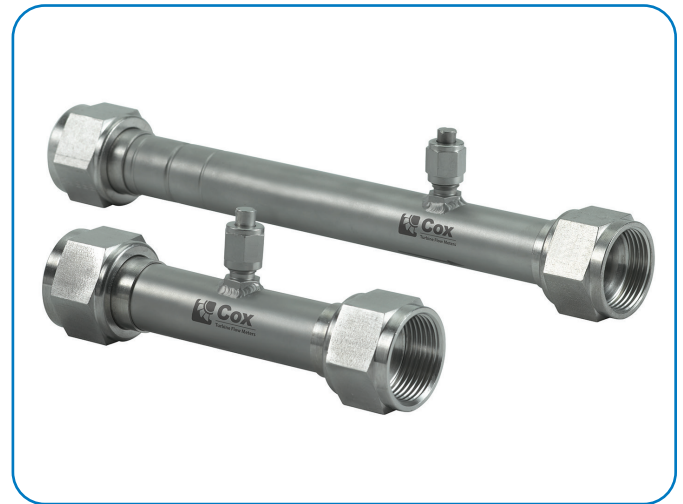
After passing through the meter, the fluid enters into the downstream straightener to control any exiting swirl influence on the rotor. The downstream straightener has an optional pressure port, in conjunction with the RTD tap, for measuring process pressures along with temperature.

PRESSURE RATINGS

- Flanged Models: In accordance with ANSI standards.
- Flared Models: See table below.

Size	Tube O.D. Size		Tube Thickness		MAWP	
	in.	mm	in.	mm	psig	bar
6	0.375	9.52	0.035	0.89	3000	206
8	0.50	12.7	0.049	1.24	3000	206
10	0.625	15.87	0.049	1.24	3000	206
12	0.75	19.05	0.065	1.65	3000	206
16	1.00	25.4	0.065	1.65	2400	165
20	1.25	31.75	0.095	2.41	2900	199
24	1.50	38.1	0.095	2.41	2400	165
32	2.00	50.8	0.120	3.05	2200	151

NOTE: Pressure ratings listed are for temperatures up to 100° F (37.8° C)
 Pressure rating is calculated with an allowable stress value of 20,000 psi for 316 SS per pressure piping code ASME B31.3.



CONSTRUCTION

For flared models, flow straighteners consist of a straight section of tubing with 37° (AN) flared fittings, nuts and sleeves made of 300 series stainless steel. Similarly, flanged models also consist of 300 stainless steel, required to achieve the desired pressure rating or compatibility with the fluids.

Pressure ports come standard on upstream straighteners, while a temperature port is standard on downstream straighteners. Stainless steel caps are provided, in the event the ports are not used. The downstream flow straightener can be ordered with an additional port for pressure.

INSTALLATION

When using AN fittings, cone washers should be installed to protect the seal surface and prevent leaks.

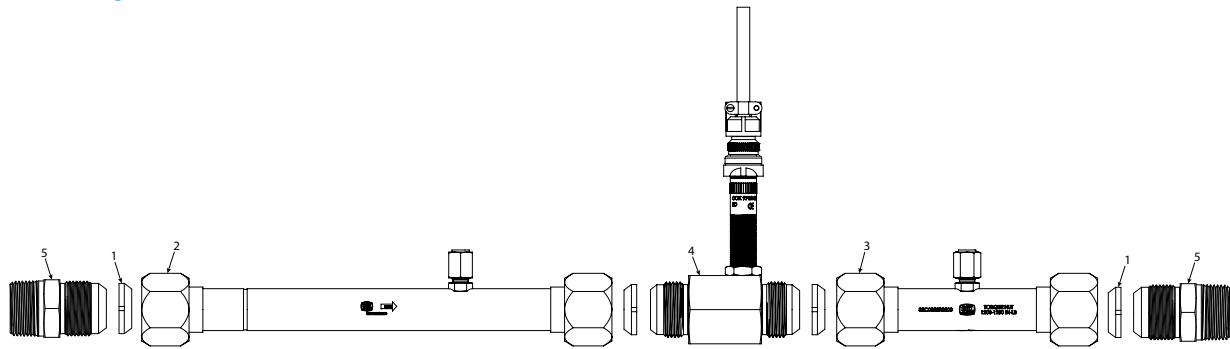
Both the upstream and downstream flow straighteners are assembled to the flow meter on their respective ends. Upstream flow straighteners are 10 pipe diameters in length and the downstream flow straighteners are five pipe diameters in length.

The straighteners are stainless steel, so if the mating part (for example, a flow meter) is also stainless steel, use anti-seize thread lubricant to prevent galling.

Use of thread sealants, or tapes, should be carefully applied. Particulates from these materials can dislodge and transfer into the flow meter, causing bearing contamination.

Technical Tip: When NPT threads are used, consider using flared (AN) fittings on the flowmeter and flow straighteners. Use an AN to NPT adapter on the pipe connection ends. This will avoid a step in the I.D. of the piping close to the turbine meter and facilitate ease of removal of the turbine meter for calibration. For an example, see ["NPT to AN Configuration" on page 2.](#)

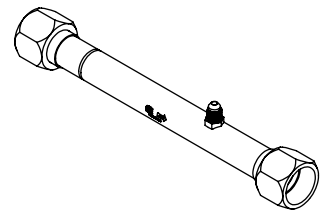
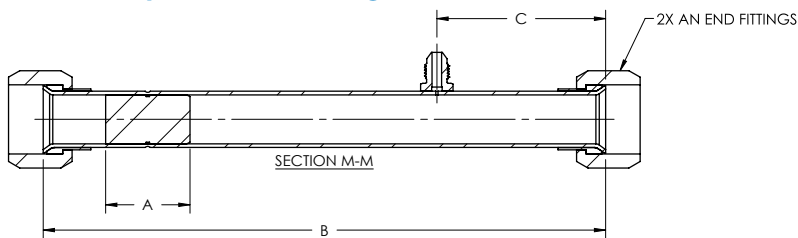
NPT to AN Configuration



Item #	Description
1	SEAL 37° Conical Copper Seal
2	Flow Straightener Upstream - AN
3	Flow Straightener Downstream - AN
4	Turbine Flow Meter - AN
5	Fitting Adapter - MNPT

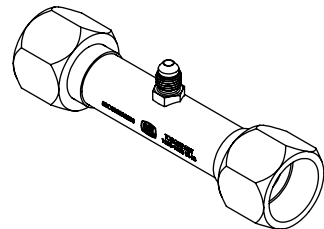
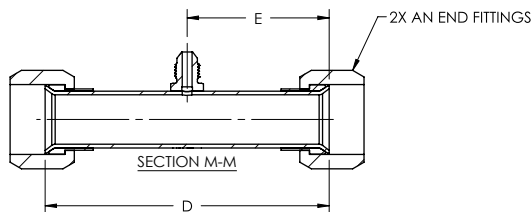
DIMENSIONS

AN Flared Upstream Flow Straighteners



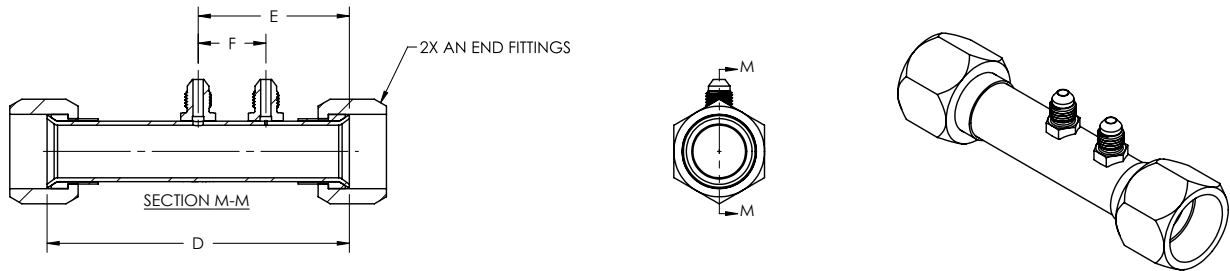
Tube Size in.	A in. (mm)	B in. (mm) ± 0.13 (3.30)	C in. (mm) ± 0.13 (3.30)
3/8	N/A	5.00 (127.0)	2.50 (63.50)
1/2	0.81 (20.57)	5.00 (127.0)	2.50 (63.50)
5/8	0.94 (23.88)	6.25 (158.75)	2.50 (63.50)
3/4	1.25 (31.75)	7.50 (190.5)	2.50 (63.50)
1	1.50 (38.10)	10.0 (254.0)	3.00 (76.20)
1-1/4	1.63 (41.40)	11.0 (279.4)	3.50 (88.90)
1-1/2	1.88 (47.75)	12.0 (304.8)	3.50 (88.90)
2	3.06 (77.72)	14.0 (355.6)	4.00 (101.6)

AN Flared Downstream Flow Straighteners (Single Port)



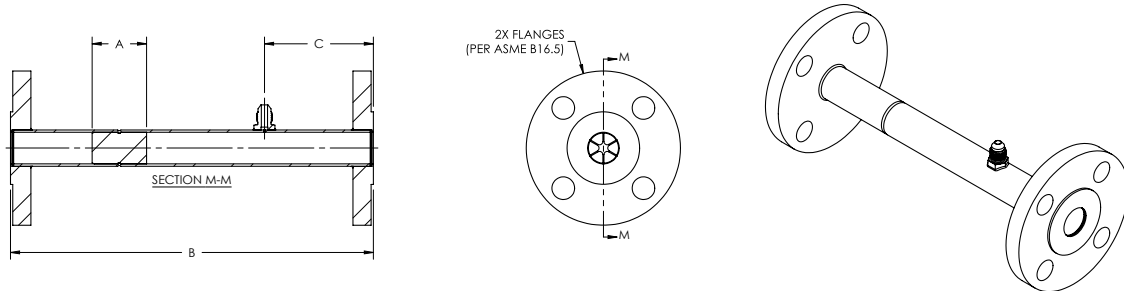
Tube Size in.	D in. (mm) ± 0.13 (3.30)	E in. (mm) ± 0.13 (3.30)
1/2	5.00 (127.0)	2.50 (63.50)
5/8	5.00 (127.0)	2.50 (63.50)
3/4	5.00 (127.0)	2.50 (63.50)
1	5.00 (127.0)	2.50 (63.50)
1-1/4	6.00 (152.4)	3.00 (76.20)
1-1/2	6.00 (152.4)	3.00 (76.20)
2	7.00 (177.8)	3.50 (88.90)
2-1/2	9.00 (228.6)	4.50 (114.3)

AN Flared Downstream Flow Straighteners (Dual Port)



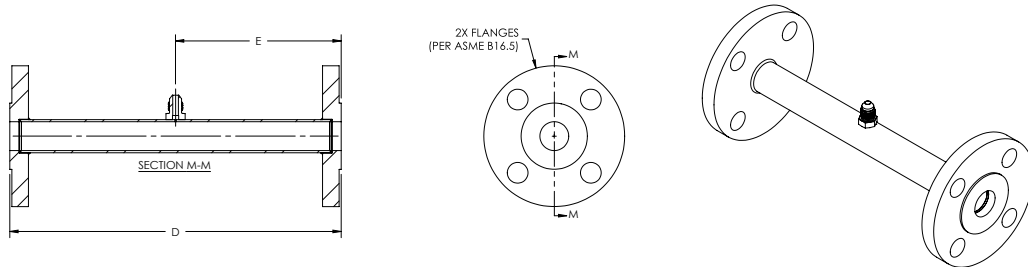
Tube Size in.	D in. (mm) ± 0.13 (3.30)	E in. (mm) ± 0.13 (3.30)	F in. (mm) ± 0.13 (3.30)
3/8	5.00 (127.0)	2.50 (63.50)	1.12 (28.45)
1/2	5.00 (127.0)	2.50 (63.50)	1.12 (28.45)
5/8	5.00 (127.0)	2.50 (63.50)	1.12 (28.45)
3/4	5.00 (127.0)	2.50 (63.50)	1.12 (28.45)
1	5.00 (127.0)	2.50 (63.50)	1.12 (28.45)
1-1/4	6.00 (152.4)	3.00 (76.20)	1.25 (31.75)
1-1/2	6.00 (152.4)	3.00 (76.20)	1.25 (31.75)
2	7.00 (177.8)	3.50 (88.90)	1.50 (38.10)

Flange Upstream Flow Straightener



Tube Size in. (mm)	A in. (mm)	B in. (mm) ± 0.13 (3.30)	C in. (mm) ± 0.13 (3.30)
1/2	0.81 (20.57)	6.00 (152.4)	2.00 (50.80)
3/4	1.25 (31.75)	7.50 (190.5)	2.25 (57.15)
1	1.50 (38.10)	10.0 (254.0)	3.00 (76.20)
1-1/4	1.63 (41.40)	11.0 (279.4)	3.75 (95.25)
1-1/2	1.88 (47.75)	12.0 (304.8)	4.00 (101.6)
2	3.06 (77.72)	14.0 (355.6)	4.44 (112.76)
2-1/2	4.92 (124.9)	17.5 (444.5)	5.25 (133.35)

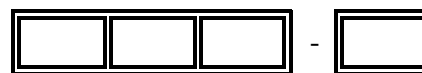
Flange Downstream Flow Straightener



Tube Size in.	D in. (mm) ± 0.13 (3.30)	E in. (mm) ± 0.13 (3.30)
1/2	6.00 (152.4)	3.00 (76.20)
3/4	7.50 (190.5)	3.75 (95.25)
1	10.0 (254.0)	5.00 (127.0)
1-1/4	10.0 (254.0)	5.00 (127.0)
1-1/2	12.0 (304.8)	6.00 (152.4)
2	12.0 (304.8)	6.00 (152.4)
2-1/2	12.0 (304.8)	6.00 (152.4)

PART NUMBERING CONSTRUCTION

Cox Flow Straighteners

**Model**

Flow Straightener

FS

Tube Size

3/8" (Available for LoFlo meters only.)

037

1/2"

050

5/8" (Available for AN end fittings only.)

062

3/4"

075

1"

100

1-1/4"

125

1-1/2"

150

2"

200

2-1/2" (Available for flange end fittings only.)

250

End Fittings

37° MS Flare

AN

150# RF Flange

F1

Straightener Configuration

Single | Upstream - 1 Pressure Port

U1P

Single | Downstream - 1 Temperature Port

D1T

Single | Downstream - 2 Ports (Pressure and Temperature)

DPT

Set | Upstream - 1 Pressure Port | Downstream - 1 Temperature Port

S1T

Set | Upstream - 1 Pressure Port | Downstream - 2 Ports (Pressure and Temperature)

SPT

Control. Manage. Optimize.

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