DECON
DECON INDUSTRIES LIMITED
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Registered Quality to ISO 9001

Process Instrumentation
The Netpark Incubator, Thomas Wright Way
Netpark Sedgefield, County Durham, TS21 3FD, UK
Phone: +44 1740 625273 Fax: +44 1740 625251

VENTURI TUBE METER

Description	Application	Flow Measurement Accuracy
The DECON Venturi Tube is a differential-producing primary flow element that accurately and repeatable measures the flows of liquids or gases in closed and full pipe use conditions. The venture tube incorporates an efficient hydraulic shape with static pressure taps in the throat and inlet sections, the venture tube can be provided with pressure rating 125 to 2500 PSI, BW or flange connections.	The cast iron series is often used in municipal water and waste water applications. Known for longevity of service with minimal maintenance, DECON fabricated venturi are ideal for metering potable water, sludge, slurries, as well as gases and clean fluids, steam, chemic or petrochemical products..	For pipe Reynolds numbers greater than 75 000 and with a normalized piping configuration, the DECON Venturi Tube provides a flow measurement accuracy of ± 0.50% without flow calibration. With independent flow calibration, DECON provide the user with ± 0.25% accuracy.

FEATURES:

- **High Accuracy**
- **Reliable Operation**
- **Energy Efficient**
- **Different Options for a Variety of Applications**

Technical Specifications

Accuracy

For pipe Reynolds numbers greater than 75 000 and a normalized piping configuration, the DECON Venturi Tube provides a flow measurement uncertainty of: ± 0.50% for standard meters and ± 0.25% for flow calibrated meters.

Pressure Loss

The permanent pressure loss of the DECON Venturi Tube is shown in Figure 1.

Temperature Range

Cast iron DECON can handle process temperatures between -20 °F and +350 °F (-30 °C and +175 °C).

Pressure Range/End Connections

Flanged end connections per ANSI B16.1 for 1250PSIG and 2500 PSIG service are available. A variety of other end connections is also available including: Butt Weld, Socket Weld, Mechanical joint flanges per AWWA C110 or C111, as well as plain-end designs.

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Headloss Comparison

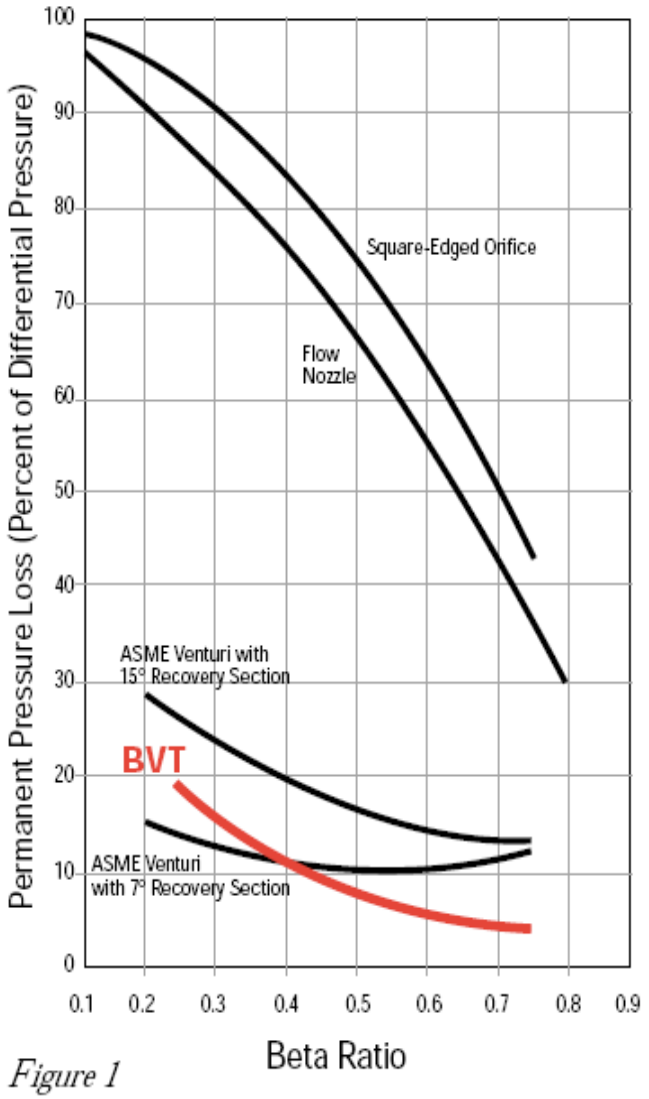

Figure 1

Beta Ratio

DECON Venturi Tubes are available with a wide range of diameter ratios (d/D). This provides users with accurate flow measurement over a broad range of flow rates for a given line size.

Piping Requirements

Designed for full-pipe flow,DECON flow meters may be mounted either horizontally or vertically. For recommended upstream piping, refer to DECON Engineering Technical Manual

Energy Considerations

Figure 1 compares the head-loss of the DECON design with that of other primary flow elements. The pressure recovery of the DECON Venturi Tube means reduced pumping costs. The DECON Venturi has a shorter laying length and exhibits better recovery than typical classical and modified venturi meters.

Design Concepts

The DECON Venturi is designed to provide a high degree of accuracy with unquestionable and predictable performance. Key to this design is the following:

Accuracy: Static inlet and throat pressure sensation provides a highly accurate, stable, and predictable flow measurement signal for flow rates with pipe Reynolds numbers as low as 75 000.

Reliability: The DECON Venturi Tube is free of protrusions and sharp-edged, debris-collecting annuli. Static pressure taps reduce flow noise. The internal contour is designed to minimize the buildup of solids and deter erosion, corrosion, and scaling.

Energy Savings: DECON Venturi Tubes operate with minimal head-loss. This results in less energy consumption, lower operational costs, and a lower cost of ownership.

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Inlet Diameter		Throat Diameter		Beta Ratio	Overall Length		Outlet Diameter		ΔP = Differential Pressure of 100" wc (24.864 kPa)						
									Water Flow at 60 F (16 C)					ΔH = Headloss	
(inches)	(mm)	(inches)	(mm)		(inches)	(mm)	(inches)	(mm)	US GPM	US MGD	LPS	m^3/d	$R_D(10^{-3})$	in. wc	kPa
4.000	101.6	1.800	45.72	0.4500	13.25	337	2.90	74	186.30	0.268	11.75	1015.51	132	11.6	2.88
4.000	101.6	2.400	60.96	0.6000	13.00	330	3.41	87	348.00	0.501	21.96	1896.97	246	8.3	2.06
4.000	101.6	2.900	73.66	0.7250	11.50	292	3.66	93	557.71	0.803	35.19	3040.07	394	5.0	1.24
6.000	152.4	2.700	68.58	0.4500	17.50	445	4.18	106	419.17	0.604	26.45	2284.90	197	12.4	3.08
6.000	152.4	3.600	91.44	0.6000	17.00	432	4.94	125	783.01	1.128	49.40	4268.18	369	8.8	2.19
6.000	152.4	4.350	110.49	0.7250	16.00	406	5.42	138	1254.84	1.807	79.17	6840.15	591	5.0	1.24
8.000	203.2	3.600	91.44	0.4500	21.50	546	5.63	143	745.19	1.073	47.01	4062.04	263	11.7	2.91
8.000	203.2	4.800	121.92	0.6000	21.00	533	6.65	169	1392.02	2.005	87.82	7587.88	492	8.2	2.04
8.000	203.2	5.800	147.32	0.7250	19.00	483	7.17	182	2230.84	3.212	140.74	12160.27	788	5.0	1.24
10.000	254.0	4.800	121.92	0.4800	25.50	648	7.15	182	1333.49	1.920	84.13	7268.82	377	11.2	2.78
10.000	254.0	5.800	147.32	0.5800	25.00	635	8.00	203	2013.24	2.899	127.02	10974.17	569	8.9	2.21
10.000	254.0	7.250	184.15	0.7250	22.00	559	8.92	227	3485.68	5.019	219.91	19000.42	985	5.1	1.27
12.000	304.8	5.800	147.32	0.4833	30.50	775	8.69	221	1948.56	2.806	122.94	10621.59	459	10.7	2.66
12.000	304.8	7.250	184.15	0.6042	30.00	762	9.93	252	3182.44	4.583	200.78	17347.45	749	7.9	1.96
12.000	304.8	8.700	220.98	0.7250	26.00	660	10.67	271	5019.38	7.228	316.67	27360.60	1182	5.0	1.24
14.000	355.6	6.300	160.02	0.4500	34.50	876	9.63	245	2282.15	3.286	143.98	12440.00	461	11.7	2.91
14.000	355.6	8.700	220.98	0.6214	33.50	851	11.67	296	4625.86	6.661	291.85	25215.54	934	7.4	1.84
14.000	355.6	10.150	257.81	0.7250	30.00	762	12.41	315	6831.93	9.838	431.03	37240.82	1379	5.0	1.24
16.000	406.4	7.250	184.15	0.4531	40.50	1029	10.95	278	3024.19	4.355	190.80	16484.86	534	11.9	2.96
16.000	406.4	10.150	257.81	0.6344	37.00	940	13.42	341	6344.86	9.137	400.30	34585.79	1120	7.0	1.74
16.000	406.4	11.600	294.64	0.7250	34.00	864	14.19	360	8923.34	12.850	562.98	48641.07	1576	4.9	1.22
18.000	457.2	8.700	220.98	0.4833	45.50	1156	13.03	331	4384.26	6.313	276.60	23898.57	688	10.2	2.54
18.000	457.2	10.150	257.81	0.5639	43.50	1105	14.27	362	6123.38	8.818	386.32	33378.48	961	8.4	2.09
18.000	457.2	13.050	331.47	0.7250	39.00	991	15.94	405	11293.60	16.263	712.52	61561.35	1773	4.8	1.19
20.000	508.0	10.150	257.81	0.5075	48.00	1219	14.79	376	6005.93	8.649	378.92	32738.31	848	9.7	2.41
20.000	508.0	11.600	294.64	0.5800	47.50	1207	16.01	407	8052.97	11.596	508.06	43896.68	1138	8.2	2.04
20.000	508.0	14.500	368.30	0.7250	41.00	1041	17.65	448	13942.72	20.078	879.65	76001.67	1970	4.8	1.19
24.000	609.6	11.600	294.64	0.4833	59.00	1499	17.38	441	7794.24	11.224	491.74	42486.34	918	9.9	2.46
24.000	609.6	14.500	368.30	0.6042	57.00	1448	19.85	504	12729.75	18.331	803.12	69389.80	1499	7.3	1.81
24.000	609.6	17.400	441.96	0.7250	49.00	1245	21.15	537	20077.52	28.912	1266.69	109442.40	2364	4.6	1.14
30.000	762.0	13.050	331.47	0.4350	71.50	1816	20.17	512	9764.84	14.061	616.07	53228.08	920	11.4	2.83
30.000	762.0	17.400	441.96	0.5800	67.00	1702	23.36	593	18119.18	26.092	1143.14	98767.54	1706	8.5	2.11
30.000	762.0	21.750	552.45	0.7250	62.00	1575	26.57	675	31371.12	45.174	1979.21	171003.75	2954	4.5	1.12
36.000	914.4	17.400	441.96	0.4833	85.50	2172	25.72	653	17537.04	25.253	1106.42	95594.27	1376	9.6	2.39
36.000	914.4	21.750	552.45	0.6042	84.00	2134	29.43	748	28641.95	41.244	1807.03	156127.05	2248	7.2	1.79
36.000	914.4	26.100	662.94	0.7250	74.00	1880	31.82	808	45174.41	65.051	2850.06	246245.40	3545	4.4	1.09
42.000	1066.8	18.900	480.06	0.4500	99.50	2527	28.53	725	20539.37	29.577	1295.83	111959.96	1382	10.8	2.69
42.000	1066.8	26.100	662.94	0.6214	97.00	2464	34.67	881	41632.76	59.951	2626.62	226939.87	2801	6.7	1.67
42.000	1066.8	30.450	773.43	0.7250	87.00	2210	37.06	941	61487.39	88.542	3879.25	335167.35	4136	4.3	1.07
48.000	1219.2	21.750	552.45	0.4531	113.00	2870	32.85	834	27217.75	39.194	1717.17	148363.75	1602	10.5	2.61
48.000	1219.2	30.450	773.43	0.6344	110.00	2794	40.26	1023	57103.74	82.229	3602.69	311272.09	3361	6.1	1.52
48.000	1219.2	34.800	883.92	0.7250	98.00	2489	42.31	1075	80310.06	115.646	5066.78	437769.60	4727	4.3	1.07

This sizing table can be used as a guide to aid the user in choosing the proper DECON Venturi Tube for a given application. Depending on the details of that application, a more appropriate selection, or a more accurate estimation of the performance of a given selection, may be available. DECON Engineering encourages users to contact their local DECON representatives, or call us directly, for definitive sizing information.

Incompressible Flow Relationships	**Examples:** For a 12.00" x 8.700" BVT, find	**Solutions:** Found using the "Incompressible Flow Relationships"
$\Delta P_N = 100 (Q_N / Q)^2$	ΔP at 10 000 US GPM	$\Delta P_N = 100 (10\,000 / 5\,019.38)^2 = 396.92$" wc
$\Delta H_N = \Delta H (Q_N / Q)^{1.86}$	ΔH at 10 000 US GPM	$\Delta H_N = 5.0 (10\,000 / 5\,019.38)^{1.86} = 18.3$" wc
$Q_N = Q (\Delta P / 100)^{0.5}$	Q_N at 750" wc	$Q_N = 5\,019.38 (750 / 100)^{0.5} = 13\,746.14$ US GPM

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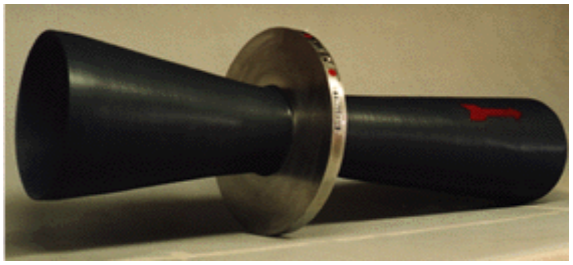
DIESEL LOCOMOTIVE TURBOCHARGER FLOW METER 20" DIAMETER WITH A 10.17"

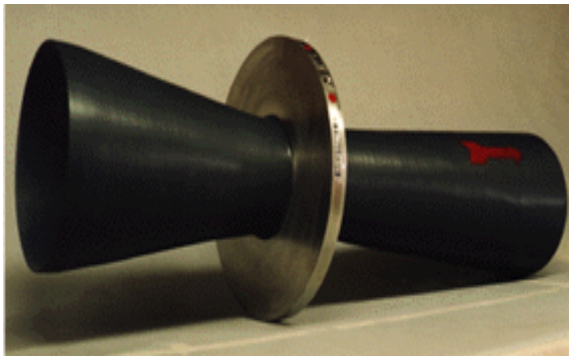
Diesel locomotive turbocharger flow meter 24.64" diameter with an 8.64" throat



12"x4.35" DVT-2300 FRP Venturi w/316 STN. STL. FLNG.

20 x 10.080 DVT-2300 Venturi Flowmeter - Ready to go THROAT

30" DVT-2300 Venturi 30"x12.960 w/150 C.S. FLNG



12"x4.35" DVT-2300 FRP Venturi w/316 STN. STL. FLNG.

96" Vinyl ester fiberglass universal venturi tube manufactured by DECON for BIF.

Special 12" Reverse Flow FRP Venturis Bi-directional flow measurement

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Venturi Flow Meter- Model DVT-2300

Description: The DVT-2300 is an all fiberglass design, utilizing DERAKANE Epoxy Vinyl Ester Resin. It is non-corrosive, self scouring, dimensionally stable and can be used with line temperatures of up to 180 degrees F with standard resin and up to 250 degrees F with high temperature resin. The DECON DVT-2300 can be supplied with bronze, stainless steel or other metal throat materials.

The high and low pressure connections are 316 stainless steel. The Venturi is supplied ready to install with integral neoprene flange gaskets. Size range is for piping from 3/4" to 120".

The DVT-2300 is a short laying length design featuring high accuracy and Low Permanent Pressure Loss. The flow conditions within the inlet section allow for closer coupling with upstream pipe fittings. Should pressure drop be of importance in a particular piping network, the outlet cone can be extended to satisfy the user's head loss requirements.

Specifications: The flow meter shall be of the differential pressure producing type for insertion within the pipe line. The inlet shall consist of a conic convergent section for flow conditioning. The throat inlet section included angle shall not exceed 22 degrees and shall have a minimum length of 0.5 times the throat diameter. The throat section shall be cylindrical with a length at least 0.5 times the throat diameter and shall have sharp intersections to support a protected and stable throat pressure profile. Meters with blended radii shall not be considered. Devices amplifying the differential pressure by causing a change in the direction of the flow stream within the throat shall not be considered. The outlet cone shall have an included angle of 10 degrees. The outlet cone length may be selected to minimize laying length or to maximize pressure recovery.

The entire flow meter, inlet section, throat section, outlet cone and integral flange shall be fabricated from thermosetting epoxy vinyl ester resin, reinforced with not less than 30% fiberglass by weight. Pressure connections shall be 316 stainless steel. The pressure connecting passage shall be within the integral mounting flange. The device shall be designed for mounting between ANSI flanges and shall include flange gaskets. The metering element shall have single high and low pressure connections. The manufacturer shall furnish flow versus differential curves to the design engineers for approval.

The device performance and metering similitude shall be substantiated by the manufacturer's traceable independent testing. Performance substantiation shall include coefficient value, predictability, effects from installation and line pressure loss from hydraulic shape. The meters coefficient shall be independent of line size and shall be constant and predictable at low Reynolds numbers. The un-calibrated accuracy shall be at least ± 0.75% of actual flow based on 2 standard deviation values calculated from a significant sample size. The device shall be a DECON DVT-2300 or approved equal.

DVT-2300
PVC Venturi
inserted in schedule 40 PVC pipe with
316 stainless steel pressure taps
calibrated for air service
by CEESI

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Capacity and Dimensions
DVT-2300

Rate of flow in gallons per minute @100 inches of water differential
Estimated shipping weight: LBS

size	D	d	B	L	150F	300F	tf	Dci	Ei	Eo	GPM	Lbs.
6a	6	2.680	0.4467	20.7	8.750	9.875	0.875	5.7	7.4	12.5	406	10
6b	6	3.580	0.5967	16.0	8.750	9.875	0.875	5.7	5.2	10.0	750	9
6c	6	4.320	0.7200	10.9	8.750	9.875	0.875	5.7	3.3	6.7	1153	8
8a	8	3.580	0.4475	27.9	11.000	12.125	0.875	7.6	10.3	16.8	724	14
8b	8	4.770	0.5963	21.7	11.000	12.125	0.875	7.6	7.4	13.4	1332	12
8c	8	5.760	0.7200	14.9	11.000	12.125	0.875	7.6	4.9	9.1	2050	10
10a	10	4.770	0..4770	34.1	13.375	12.125	0.875	9.5	12.5	20.7	1293	20
10b	10	5.760	0.5760	28.7	13.375	12.125	0.875	9.5	10.1	17.8	1923	18
10c	10	7.200	0.7200	18.9	13.375	12.125	0.875	9.5	6.5	11.5	3203	16
12a	12	5.760	0.4800	40.9	16.125	16.225	0.875	11.4	15.2	24.9	1887	30
12b	12	7.200	0.6000	32.7	16.125	16.225	0.875	11.4	11.7	20.2	3038	26
12c	12	8.640	0.7200	22.9	16.125	16.225	0.875	11.4	8.1	13.9	4612	22
14a	14	6.260	0.4471	49.9	17.750	19.125	0.875	13.3	19.1	29.6	2214	40
14b	14	8.640	0.6171	36.7	17.750	19.125	0.875	13.3	13.3	22.5	4413	35
14c	14	10.080	0.7200	26.9	17.750	19.125	0.875	13.3	9.7	16.2	6278	30
16a	16	7.200	0.4500	56.7	20.250	21.250	0.875	15.2	21.9	33.9	2930	50
16b	16	10.080	0.6300	40.6	20.250	21.250	0.875	15.2	14.9	24.9	6050	42
16c	16	11.520	0.7200	30.8	20.250	21.250	0.875	15.2	11.3	18.6	8200	30
18a	18	8.640	0.4800	61.9	21.625	23.500	0.875	17.1	23.5	37.5	4245	65
18b	18	10.080	0.5600	58.3	21.625	23.500	0.875	17.1	20.0	33.5	5854	55
18c	18	12.960	0.7200	34.7	21.625	23.500	0.875	17.1	12.8	21.0	10371	45
20a	20	10.080	0.5040	66.6	23.875	25.750	0.875	19.0	25.0	40.8	5812	80
20b	20	11.520	0.5760	58.3	23.875	25.750	0.875	19.0	21.4	36.0	7695	70
20c	20	14.400	0.7200	38.6	23.875	25.750	0.875	19.0	14.3	23.4	12807	60
24a	24	11.250	0.4800	82.6	28.250	30.500	0.875	22.8	31.5	50.2	7548	125
24b	24	14.400	0.6000	66.0	28.250	30.500	0.875	22.8	24.4	40.8	12158	110
24c	24	17.040	0.7100	47.8	28.250	30.500	0.875	22.8	17.9	29.0	17774	95
30a	30	12.960	0.4320	108.1	34.750	37.500	1.250	28.5	42.8	64.0	9465	220
30b	30	17.040	0.5680	89.0	34.750	37.500	1.250	28.5	32.8	54.9	16780	200
30c	30	21.600	0.7200	57.9	34.750	37.500	1.250	28.5	21.5	35.1	28830	160
36a	36	17.040	0.4733	124.8	41.250	44.000	1.250	34.2	47.9	75.7	16429	380
36b	36	21.600	0.6000	99.1	41.250	44.000	1.250	34.2	36.6	61.2	27349	330
36c	36	25.920	0.7200	69.5	41.250	44.000	1.250	34.2	25.9	42.3	41514	280
42a	42	18.720	0.4457	149.7	48.000	50.750	1.250	39.9	58.7	89.5	19794	580
42b	42	25.920	0.6171	110.5	48.000	50.750	1.250	39.9	40.9	68.1	39723	500
42c	42	30.240	0.7200	81.0	48.000	50.750	1.250	39.9	30.2	49.3	56500	410
48a	48	21.600	0.4500	170.5	54.500	58.750	1.250	45.6	66.7	102.3	26369	880
48b	48	30.240	0.6300	122.0	54.500	58.750	1.250	45.6	45.3	75.1	54443	740
48c	48	34.560	0.7200	92.6	54.500	58.750	1.250	45.6	34.7	56.4	73798	600

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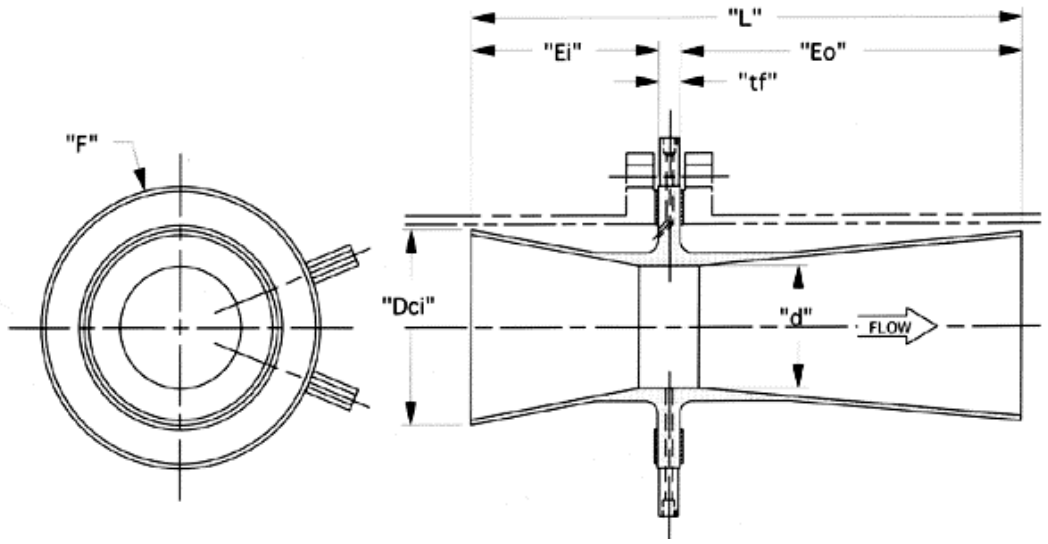
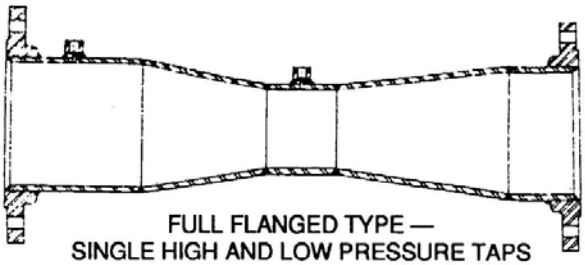
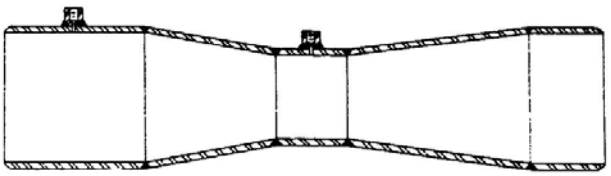




FULL FLANGED TYPE —
SINGLE HIGH AND LOW PRESSURE TAPS



WELD-IN TYPE —
SINGLE HIGH AND LOW PRESSURE TAPS

GENERAL INSTALLATION DRAWING
DUAL SENSOR, SPLIT RANGE CONFIGURATION