

# BVT Sizing Table



Inlet Diameter		Throat Diameter		Beta Ratio	Overall Length		Outlet Diameter		$\Delta P = \text{Differential Pressure of } 100'' \text{ wc (24.864 kPa)}$						
									Water Flow at 60 F (16 C)					$\Delta H = \text{Headloss}$	
(inches)	(mm)	(inches)	(mm)		(inches)	(mm)	(inches)	(mm)	US GPM	US MGD	LPS	m <sup>3</sup> /d	R <sub>D</sub> (10 <sup>-3</sup> )	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 BVT 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. Wyatt Engineering encourages users to contact their local Wyatt-Badger representatives, or call us directly, for definitive sizing information.

### Incompressible Flow Relationships

$$\Delta P_N = 100 (Q_N / Q)^2$$

$$\Delta H_N = \Delta H (Q_N / Q)^{1.88}$$

$$Q_N = Q (\Delta P / 100)^{0.5}$$

### Examples:

For a 12.00" x 8.700" BVT, find

$$\Delta P \text{ at } 10\,000 \text{ US GPM}$$

$$\Delta H \text{ at } 10\,000 \text{ US GPM}$$

$$Q_N \text{ at } 750'' \text{ wc}$$

### Solutions:

Found using the "Incompressible Flow Relationships"

$$\Delta P_N = 100 (10\,000 / 5\,019.38)^2 = 396.92'' \text{ wc}$$

$$\Delta H_N = 5.0 (10\,000 / 5\,019.38)^{1.88} = 18.3'' \text{ wc}$$

$$Q_N = 5\,019.38 (750 / 100)^{0.5} = 13\,746.14 \text{ US GPM}$$