

BVT-IP Sizing Table



Pipe Inside Diameter		Throat Diameter		Beta Ratio	Overall Length		Outlet Diameter		ΔP = Differential Pressure of 100" wc (24.864 kPa)						
(inches)	(mm)	(inches)	(mm)		(inches)	(mm)	(inches)	(mm)	Water Flow at 60 F (16 C)				ΔH = Headloss		
								US GPM	US MGD	LPS	m ³ /d	R _D (10 ⁻³)	in. wc	kPa	
3.000	76.2	1.609	40.9	0.5363	7.12	180.8	2.50	63.5	149.41	0.215	9.43	814.44	141	8.5	2.12
3.000	76.2	1.798	45.7	0.5993	6.53	165.8	2.60	66.0	189.51	0.273	11.96	1033.03	178	6.7	1.68
3.000	76.2	2.171	55.1	0.7237	5.36	136.2	2.70	68.6	289.10	0.416	18.24	1575.88	272	3.8	0.96
4.000	101.6	1.800	45.7	0.4500	10.57	268.5	3.30	83.8	184.47	0.266	11.64	1005.52	130	10.5	2.62
4.000	101.6	2.203	56.0	0.5508	9.31	236.5	3.40	86.4	280.96	0.405	17.73	1531.53	198	7.8	1.95
4.000	101.6	2.814	71.5	0.7035	7.40	188.0	3.60	91.4	481.79	0.694	30.40	2626.25	340	4.0	1.00
6.000	152.4	2.529	64.2	0.4215	16.50	419.1	4.90	124.5	363.10	0.523	22.91	1979.25	171	10.9	2.70
6.000	152.4	3.114	79.1	0.5190	14.65	372.1	5.10	129.5	557.74	0.803	35.19	3040.24	263	8.3	2.05
6.000	152.4	4.000	101.6	0.6667	10.65	270.5	5.20	132.1	959.47	1.382	60.53	5230.04	452	4.5	1.13
6.000	152.4	4.428	112.5	0.7380	10.45	265.4	5.60	142.2	1209.34	1.741	76.30	6592.11	569	3.4	0.84
8.000	203.2	3.466	88.0	0.4333	21.75	552.5	6.50	165.1	682.75	0.983	43.07	3721.67	241	10.2	2.52
8.000	203.2	4.018	102.1	0.5023	20.00	508.0	6.70	170.2	925.84	1.333	58.41	5046.76	327	8.4	2.08
8.000	203.2	4.919	124.9	0.6149	17.00	431.8	7.10	180.3	1425.11	2.052	89.91	7768.29	503	5.6	1.39
8.000	203.2	5.978	151.8	0.7473	13.40	340.4	7.40	188.0	2211.58	3.185	139.53	12055.31	781	3.2	0.80
10.000	254.0	3.991	101.4	0.3991	28.25	717.6	8.00	203.2	902.64	1.300	56.95	4920.29	255	11.0	2.73
10.000	254.0	4.919	124.9	0.4919	25.30	642.6	8.40	213.4	1385.32	1.995	87.40	7551.37	391	8.4	2.09
10.000	254.0	6.343	161.1	0.6343	19.00	482.6	8.50	215.9	2384.72	3.434	150.45	12999.11	674	5.0	1.24
10.000	254.0	6.907	175.4	0.6907	15.90	403.9	8.65	219.7	2887.75	4.158	182.19	15741.09	816	3.8	0.95
12.000	304.8	4.892	124.3	0.4077	33.60	853.4	9.70	246.4	1357.07	1.954	85.62	7397.37	320	10.4	2.60
12.000	304.8	5.675	144.1	0.4729	31.15	791.2	10.00	254.0	1838.80	2.648	116.01	10023.31	433	8.7	2.15
12.000	304.8	6.966	176.9	0.5805	26.90	683.3	10.35	262.9	2829.77	4.075	178.53	15425.05	666	6.2	1.53
12.000	304.8	8.000	203.2	0.6667	21.10	535.9	10.50	266.7	3837.87	5.527	242.13	20920.18	904	4.2	1.04
14.000	355.6	5.600	142.2	0.4000	39.50	1003.3	10.30	261.6	1777.28	2.559	112.13	9687.93	359	10.5	2.61
14.000	355.6	6.958	176.7	0.4970	33.80	858.5	10.45	265.4	2774.05	3.995	175.02	15121.33	560	8.0	1.98
14.000	355.6	8.044	204.3	0.5746	27.90	708.7	10.60	269.2	3767.53	5.425	237.69	20536.76	760	6.2	1.54
14.000	355.6	9.757	247.8	0.6969	27.30	693.4	12.10	307.3	5776.92	8.319	364.47	31489.92	1166	3.6	0.88
16.000	406.4	6.932	176.1	0.4333	43.35	1101.1	13.10	332.7	2731.00	3.933	172.30	14886.66	482	9.3	2.32
16.000	406.4	8.036	204.1	0.5023	38.90	988.1	13.20	335.3	3703.37	5.333	233.65	20187.06	654	7.7	1.92
16.000	406.4	9.838	249.9	0.6149	29.15	740.4	13.30	337.8	5700.46	8.209	359.64	31073.16	1007	5.2	1.28
16.000	406.4	11.255	285.9	0.7034	26.60	675.6	13.40	340.4	7707.13	11.098	486.24	42011.50	1361	3.4	0.85
18.000	457.2	8.011	203.5	0.4451	48.00	1219.2	14.80	375.9	3651.51	5.259	230.39	19905.97	573	8.9	2.22
18.000	457.2	9.984	228.2	0.4991	44.15	1121.4	14.90	378.5	4626.29	6.662	291.87	25217.88	726	7.7	1.91
18.000	457.2	9.849	250.2	0.5472	39.50	1003.3	15.00	381.0	5611.24	8.080	354.01	30586.85	881	6.6	1.65
18.000	457.2	11.350	288.3	0.6306	31.25	793.8	15.10	383.5	7625.92	10.981	481.12	41568.85	1197	4.7	1.18
18.000	457.2	12.592	319.8	0.6996	37.00	939.8	15.80	401.3	9631.89	13.870	607.68	52503.38	1512	3.4	0.85
20.000	508.0	8.959	227.6	0.4480	53.25	1352.6	16.50	419.1	4568.69	6.579	288.24	24903.88	645	8.7	2.17
20.000	508.0	9.839	249.9	0.4920	50.35	1278.9	16.70	424.2	5542.45	7.981	349.67	30211.87	783	7.7	1.92
20.000	508.0	11.377	289.0	0.5689	42.30	1074.4	16.80	426.7	7525.57	10.837	474.79	41021.83	1063	6.1	1.51
20.000	508.0	13.813	350.9	0.6907	36.50	927.1	16.90	429.3	11549.08	16.631	728.63	62953.98	1631	3.5	0.87
24.000	609.6	9.783	248.5	0.4076	66.80	1696.7	19.50	495.3	5427.15	7.815	342.40	29583.35	639	9.6	2.39
24.000	609.6	11.349	288.3	0.4729	61.90	1572.3	20.10	510.5	7353.88	10.590	463.96	40085.94	866	8.0	1.98
24.000	609.6	13.931	353.8	0.5805	50.65	1286.5	20.40	518.2	11317.32	16.297	714.01	61690.64	1332	5.7	1.41
24.000	609.6	16.000	406.4	0.6667	39.25	997.0	20.50	520.7	15351.46	22.106	968.53	83680.72	1807	3.8	0.96
30.000	762.0	11.265	286.1	0.3755	86.50	2197.1	24.00	609.6	7180.65	10.340	453.03	39141.67	676	10.4	2.60
30.000	762.0	12.645	321.2	0.4215	82.15	2086.6	24.50	622.3	9077.49	13.072	572.70	49481.36	855	9.0	2.23
30.000	762.0	16.086	408.6	0.5362	71.30	1811.0	25.80	655.3	14933.27	21.504	942.14	81401.13	1406	6.5	1.61
30.000	762.0	17.975	456.6	0.5992	65.15	1654.8	26.50	673.1	18939.76	27.273	1194.91	103240.47	1784	5.1	1.27
30.000	762.0	21.711	551.5	0.7237	50.40	1280.2	27.50	698.5	28913.00	41.635	1824.13	157604.55	2723	2.9	0.73
36.000	914.4	16.022	407.0	0.4451	92.20	2341.9	29.10	739.1	14607.23	21.034	921.57	79623.88	1146	8.2	2.04
36.000	914.4	19.705	500.5	0.5474	80.50	2044.7	30.40	772.2	22461.89	32.345	1417.13	122439.63	1763	6.1	1.51
36.000	914.4	22.004	558.9	0.6112	73.00	1854.2	31.30	795.0	28484.40	41.018	1797.09	155268.26	2235	4.8	1.18
36.000	914.4	25.183	639.6	0.6995	62.45	1586.2	32.40	823.0	38524.08	55.475	2430.49	209994.49	3023	3.1	0.78
42.000	1066.8	17.889	454.4	0.4259	114.15	2899.3	29.60	751.8	18174.99	26.172	1146.66	99071.74	1223	8.5	2.11
42.000	1066.8	19.653	499.2	0.4679	108.63	2759.3	31.40	797.6	22038.12	31.735	1390.39	120129.65	1482	7.6	1.88
42.000	1066.8	22.023	559.4	0.5244	101.23	2571.3	33.70	856.0	27924.64	40.211	1761.77	152217.00	1878	6.4	1.60
42.000	1066.8	25.414	645.5	0.6051	90.64	2302.2	37.10	942.3	37926.46	54.614	2392.79	206736.86	2551	4.8	1.19
42.000	1066.8	30.664	778.9	0.7301	74.23	1885.6	41.60	1057	57820.33	83.261	3647.90	315178.21	3889	2.7	0.68
48.000	1219.2	19.567	497.0	0.4076	133.19	3383.1	32.90	835.7	21710.85	31.264	1369.74	118345.68	1278	8.8	2.20
48.000	1219.2	21.957	557.7	0.4574	125.73	3193.5	35.30	896.6	27472.23	39.560	1733.23	149750.94	1617	7.7	1.90
48.000	1219.2	25.437	646.1	0.5299	114.86	2917.3	38.80	985.5	37294.05	53.703	2352.89	203289.62	2195	6.2	1.55
48.000	1219.2	31.045	788.5	0.6468	97.33	2472.3	44.40	1128	57374.04	82.619	3619.74	312745.47	3377	3.9	0.97
48.000	1219.2	35.353	898.0	0.7365	83.88	2130.4	47.60	1209.0	77045.00	110.945	4860.78	419971.77	4535	2.7	0.66

This sizing table can be used as a guide to aid the user in choosing the proper insert BVT for a given application and reflects the most commonly-used sizes. Other sizes and special geometries are available, often at no additional cost. Depending on the details of your 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 20.00" x 13.813" BVT-IP or BVT-IL, find

ΔP at 20 000 US GPM

ΔH at 20 000 US GPM

Q_N at 750" wc

Found using the "Incompressible Flow Relationships"

$$\Delta P_N = 100 (20\ 000 / 11\ 549.08)^2 = 299.89" \text{ wc}$$

$$\Delta H_N = 3.3 (20\ 000 / 11\ 549.08)^{1.88} = 9.3" \text{ wc}$$

$$Q_N = 11\ 549.08 (750 / 100)^{0.5} = 31\ 628.46 \text{ US GPM}$$