

### Standard Design Table for HVT-CI (3"-20") Line Sizes

At Differential Pressure = 100" of water

Line Size in inches	Beta Ratio	Throat Diameter	Laying Length	D <sub>RC</sub>	Water Flow at 60 °F		R <sub>D</sub> (10 <sup>-3</sup> )	With HL
					MGD	GPM		
3.00	A 0.5000	1.50	11.50	2.20	0.1877	130.38	123	12.1
	B 0.6000	1.80	11.50	2.50	0.2806	194.85	183	8.9
	C 0.7000	2.10	11.50	2.80	0.4087	283.84	267	5.0
4.00	A 0.5250	2.10	13.70	3.00	0.3707	257.40	182	10.9
	B 0.6000	2.40	13.70	3.30	0.4988	346.40	244	9.0
	C 0.7000	2.80	13.70	3.70	0.7266	504.60	356	5.1
5.00	A 0.4800	2.40	18.50	3.70	0.4782	332.11	187	11.2
	B 0.6000	3.00	18.50	4.20	0.7794	541.24	305	8.2
	C 0.7000	3.50	18.50	4.70	1.1353	788.44	445	4.5
6.00	A 0.5000	3.00	20.80	4.50	0.7510	521.51	245	10.5
	B 0.5833	3.50	20.80	5.00	1.0525	730.92	344	8.5
	C 0.7000	4.20	20.80	5.60	1.6349	1135.35	534	4.5
8.00	A 0.5250	4.20	25.40	6.10	1.4826	1029.59	363	9.5
	B 0.6000	4.80	25.40	6.70	1.9952	1385.58	489	7.9
	C 0.7000	5.60	25.40	7.50	2.9065	2018.40	712	4.4
10.00	A 0.4800	4.80	31.00	7.40	1.9129	1328.42	375	9.8
	B 0.6000	6.00	31.00	8.50	3.1176	2164.97	611	7.0
	C 0.7000	7.00	31.00	9.50	4.5414	3153.75	890	4.1
12.00	A 0.5000	6.00	35.60	9.00	3.0039	2086.06	491	9.1
	B 0.5833	7.00	35.60	10.00	4.2101	2923.66	688	7.5
	C 0.7000	8.40	35.60	11.30	6.5396	4541.40	1068	3.8
14.00	A 0.5000	7.00	40.50	10.50	4.0887	2839.35	572	8.8
	B 0.6000	8.40	40.50	11.80	6.1104	4243.34	855	6.7
	C 0.7000	9.80	40.50	13.20	8.9011	6181.35	1246	3.6
16.00	A 0.5250	8.40	44.70	12.30	5.9304	4118.36	726	8.2
	B 0.6125	9.80	42.30	13.20	8.3707	5812.99	1025	6.9
	C 0.7000	11.20	39.30	14.00	11.6260	8073.59	1424	5.0
18.00	A 0.5000	9.00	50.30	13.60	6.7588	4693.63	736	8.4
	B 0.6222	11.20	46.50	15.00	10.9919	7633.23	1197	6.6
	C 0.7000	12.60	43.50	15.80	14.7141	10218.14	1602	4.9
20.00	A 0.4900	9.80	55.60	15.00	7.9931	5550.79	783	8.3
	B 0.6300	12.60	50.70	16.80	13.9745	9704.49	1369	6.4
	C 0.7000	14.00	47.60	17.60	18.1656	12614.99	1780	4.8

#### Calculations for a Given HVT-CI for Water at 60 °F

$$h_{wA} = 100 (Q_A/Q)^2$$

$$Q_A = Q \sqrt{h_{wA} / 100}$$

$$HL_A = HL (Q_A/Q)^{1.88}$$

#### Example:

For a 48" C HVT-CI, find:

- $h_{wA}$  at 200 MGD
- $HL_A$  at 200 MGD
- $Q_A$  at  $h_{wA} = 500"$

#### Solution:

- $h_{wA} = 100 (200/104.6338)^2 = 365.36"$
- $HL_A = 4.0 (200/104.6338)^{1.88} = 13.5"$
- $Q_A = 104.6338 \sqrt{500/100} = 233.97$  MGD

#### Symbols

- D = Inlet diameter, inches
- d = Throat diameter, inches
- Beta =  $\beta = d/D$
- LL = Meter laying length, inches
- D<sub>RC</sub> = Meter outlet diameter, inches (Watch for butterfly valve interference)
- $h_w$  = Differential pressure, inches of water at 68 °F, 14.7 PSIA
- HL = Headloss, inches of water at 68 °F, 14.7 PSIA, values as tabulated
- Q = Flow rates as tabulated in MGD and GPM
- Subscript A = Indicates any differential pressure ( $h_{wA}$ ) or any headloss ( $HL_A$ ) when any flow rate ( $Q_A$ ) passes through a given HVT

#### Notes

- Flow in throat must not cavitate!
- For standard accuracy, R<sub>D</sub> must be greater than 75 000.
- Design information in the standard design tables can be used for HVTs which have the same geometry but are made of other materials.

### Standard Design Table for HVT-CI (24"-96") Line Sizes

At Differential Pressure = 100" of water

Line Size in inches	Beta Ratio	Throat Diameter	Laying Length	D <sub>RC</sub>	Water Flow at 60 °F		R <sub>D</sub> (10 <sup>-3</sup> )	With HL
					MGD	GPM		
24.00	A 0.5250	12.60	64.10	18.50	13.3435	9266.31	1089	7.6
	B 0.5833	14.00	61.70	19.40	16.8403	11694.65	1375	6.9
	C 0.7000	16.80	56.00	21.10	26.1584	18165.59	2136	4.6
30.00	A 0.5000	15.00	81.90	22.70	18.7745	13037.85	1226	7.6
	B 0.6000	18.00	76.70	24.60	28.0580	19484.74	1833	6.3
	C 0.7000	21.00	70.40	26.30	40.8726	28383.73	2670	4.4
36.00	A 0.5000	18.00	96.60	27.20	27.0353	18774.50	1472	7.3
	B 0.5833	21.00	91.50	29.10	37.8907	26312.96	2063	6.3
	C 0.7000	25.20	82.90	31.60	58.8565	40872.57	3204	4.3
42.00	A 0.5000	21.00	113.40	31.70	36.7980	25554.19	1717	7.1
	B 0.6000	25.20	106.10	34.40	54.9937	38190.09	2566	5.9
	C 0.7000	29.40	97.40	36.90	80.1102	55632.11	3738	4.2
48.00	A 0.5250	25.20	126.10	37.00	53.3740	37065.25	2179	6.6
	B 0.6125	29.40	118.80	39.70	75.3363	52316.90	3076	5.6
	C 0.7000	33.60	109.90	42.10	104.6338	72662.35	4272	4.0
54.00	A 0.5000	27.00	143.00	40.80	60.8294	42242.63	2207	6.8
	B 0.6000	32.40	133.60	44.20	90.9080	63130.56	3299	5.6
	C 0.7000	37.80	122.60	47.40	132.4271	91963.28	4806	3.9
60.00	A 0.5000	30.00	159.70	45.30	75.0980	52151.40	2453	6.6
	B 0.6000	36.00	149.40	49.10	112.2321	77938.97	3666	5.5
	C 0.7000	42.00	137.10	52.70	163.4903	113534.92	5340	3.9
66.00	A 0.5000	33.00	175.50	49.80	90.8686	63103.19	2698	6.5
	B 0.6000	39.60	164.00	54.00	135.8009	94306.15	4032	5.4
	C 0.7000	46.20	150.30	57.90	197.8232	137377.25	5874	3.8
72.00	A 0.5000	36.00	191.40	54.40	108.1411	75098.01	2943	6.4
	B 0.6000	43.20	178.80	59.00	161.6142	112232.11	4399	5.3
	C 0.7000	50.40	164.00	63.30	235.4260	163490.28	6408	3.7
84.00	A 0.5000	42.00	223.80	63.40	147.1921	102216.74	3434	6.2
	B 0.6000	50.40	209.20	68.80	219.9749	152760.38	5132	5.1
	C 0.7000	58.80	192.10	73.80	320.4410	222528.44	7475	3.6
96.00	A 0.5000	48.00	255.40	72.50	192.2509	133507.58	3924	6.0
	B 0.6000	57.60	238.70	78.60	287.3142	199523.76	5865	5.0
	C 0.7000	67.20	219.10	84.30	418.5351	290649.39	8543	3.5

- 1 Cast Iron Body: painted or coated as specified  
Flanges: 125 PSI, 250 PSI, or as specified
- 2 Throat Liner: Stainless steel, or as specified
- 3 Pressure Tap Bushings: Stainless steel, or as specified

