

Type K Copper Water Tube

C=140

psi Loss per 100 Feet of Tube (psi/100 ft.)

Sizes 1/2" through 3" Flow 1 through 600 gpm

| Nominal Size | 1/2" | | 5/8" | | 3/4" | | 1" | | 1 1/4" | | 1 1/2" | | 2" | | 2 1/2" | | 3" | |
|--------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|
| Pipe OD | 0.625 | | 0.750 | | 0.875 | | 1.125 | | 1.375 | | 1.625 | | 2.125 | | 2.625 | | 3.125 | |
| Avg. ID | 0.5270 | | 0.652 | | 0.745 | | 0.995 | | 1.245 | | 1.481 | | 1.959 | | 2.435 | | 2.907 | |
| Avg. Wall | 0.049 | | 0.049 | | 0.065 | | 0.065 | | 0.065 | | 0.072 | | 0.083 | | 0.095 | | 0.109 | |
| Flow (gpm) | Velocity (ft/s) | Loss (psi) | Velocity (ft/s) | Loss (psi) | Velocity (ft/s) | Loss (psi) | Velocity (ft/s) | Loss (psi) | Velocity (ft/s) | Loss (psi) | Velocity (ft/s) | Loss (psi) | Velocity (ft/s) | Loss (psi) | Velocity (ft/s) | Loss (psi) | Velocity (ft/s) | Loss (psi) |
| 1 | 1.47 | 1.09 | 0.96 | 0.39 | 0.74 | 0.20 | 0.41 | 0.05 | 0.26 | 0.02 | 0.19 | 0.01 | 0.11 | 0.00 | 0.07 | 0.00 | 0.05 | 0.00 |
| 2 | 2.94 | 3.94 | 1.92 | 1.40 | 1.47 | 0.73 | 0.82 | 0.18 | 0.53 | 0.06 | 0.37 | 0.03 | 0.21 | 0.01 | 0.14 | 0.00 | 0.10 | 0.00 |
| 3 | 4.41 | 8.35 | 2.88 | 2.97 | 2.21 | 1.55 | 1.24 | 0.38 | 0.79 | 0.13 | 0.56 | 0.05 | 0.32 | 0.01 | 0.21 | 0.00 | 0.14 | 0.00 |
| 4 | 5.88 | 14.23 | 3.84 | 5.05 | 2.94 | 2.64 | 1.65 | 0.65 | 1.05 | 0.22 | 0.74 | 0.09 | 0.43 | 0.02 | 0.28 | 0.01 | 0.19 | 0.00 |
| 5 | 7.35 | 21.51 | 4.80 | 7.64 | 3.68 | 3.99 | 2.06 | 0.98 | 1.32 | 0.33 | 0.93 | 0.14 | 0.53 | 0.04 | 0.34 | 0.01 | 0.24 | 0.01 |
| 6 | 8.81 | 30.15 | 5.76 | 10.70 | 4.41 | 5.59 | 2.47 | 1.37 | 1.58 | 0.46 | 1.12 | 0.20 | 0.64 | 0.05 | 0.41 | 0.02 | 0.29 | 0.01 |
| 7 | 10.28 | 40.12 | 6.72 | 14.24 | 5.15 | 7.44 | 2.88 | 1.82 | 1.84 | 0.61 | 1.30 | 0.26 | 0.74 | 0.07 | 0.48 | 0.02 | 0.34 | 0.01 |
| 8 | 11.75 | 51.37 | 7.68 | 18.24 | 5.88 | 9.53 | 3.30 | 2.33 | 2.11 | 0.78 | 1.49 | 0.34 | 0.85 | 0.09 | 0.55 | 0.03 | 0.39 | 0.01 |
| 9 | 13.22 | 63.90 | 8.64 | 22.68 | 6.62 | 11.85 | 3.71 | 2.90 | 2.37 | 0.97 | 1.67 | 0.42 | 0.96 | 0.11 | 0.62 | 0.04 | 0.43 | 0.02 |
| 10 | 14.69 | 77.66 | 9.60 | 27.57 | 7.35 | 14.41 | 4.12 | 3.52 | 2.63 | 1.18 | 1.86 | 0.51 | 1.06 | 0.13 | 0.69 | 0.05 | 0.48 | 0.02 |
| 11 | | | 10.56 | 32.89 | 8.09 | 17.19 | 4.53 | 4.21 | 2.90 | 1.41 | 2.05 | 0.61 | 1.17 | 0.16 | 0.76 | 0.05 | 0.53 | 0.02 |
| 12 | | | 11.52 | 38.64 | 8.82 | 20.20 | 4.95 | 4.94 | 3.16 | 1.66 | 2.23 | 0.71 | 1.28 | 0.18 | 0.83 | 0.06 | 0.58 | 0.03 |
| 14 | | | 13.44 | 51.41 | 10.29 | 26.87 | 5.77 | 6.57 | 3.69 | 2.21 | 2.60 | 0.95 | 1.49 | 0.24 | 0.96 | 0.08 | 0.68 | 0.04 |
| 16 | | | 15.36 | 65.83 | 11.76 | 34.41 | 6.59 | 8.42 | 4.21 | 2.83 | 2.98 | 1.22 | 1.70 | 0.31 | 1.10 | 0.11 | 0.77 | 0.05 |
| 18 | | | 17.28 | 81.88 | 13.23 | 42.80 | 7.42 | 10.47 | 4.74 | 3.52 | 3.35 | 1.51 | 1.91 | 0.39 | 1.24 | 0.13 | 0.87 | 0.06 |
| 20 | | | | | 14.70 | 52.02 | 8.24 | 12.72 | 5.26 | 4.28 | 3.72 | 1.84 | 2.13 | 0.47 | 1.38 | 0.16 | 0.97 | 0.07 |
| 22 | | | | | 16.17 | 62.06 | 9.07 | 15.18 | 5.79 | 5.10 | 4.09 | 2.19 | 2.34 | 0.56 | 1.51 | 0.19 | 1.06 | 0.08 |
| 24 | | | | | 17.64 | 72.91 | 9.89 | 17.84 | 6.32 | 5.99 | 4.46 | 2.58 | 2.55 | 0.66 | 1.65 | 0.23 | 1.16 | 0.10 |
| 26 | | | | | | | 10.71 | 20.69 | 6.84 | 6.95 | 4.84 | 2.99 | 2.76 | 0.77 | 1.79 | 0.27 | 1.26 | 0.11 |
| 28 | | | | | | | 11.54 | 23.73 | 7.37 | 7.97 | 5.21 | 3.43 | 2.98 | 0.88 | 1.93 | 0.30 | 1.35 | 0.13 |
| 30 | | | | | | | 12.36 | 26.96 | 7.90 | 9.06 | 5.58 | 3.89 | 3.19 | 1.00 | 2.06 | 0.35 | 1.45 | 0.15 |
| 35 | | | | | | | 14.42 | 35.87 | 9.21 | 12.05 | 6.51 | 5.18 | 3.72 | 1.33 | 2.41 | 0.46 | 1.69 | 0.19 |
| 40 | | | | | | | 16.48 | 45.94 | 10.53 | 15.43 | 7.44 | 6.63 | 4.25 | 1.70 | 2.75 | 0.59 | 1.93 | 0.25 |
| 45 | | | | | | | | | 11.84 | 19.20 | 8.37 | 8.25 | 4.78 | 2.11 | 3.10 | 0.73 | 2.17 | 0.31 |
| 50 | | | | | | | | | 13.16 | 23.33 | 9.30 | 10.03 | 5.32 | 2.57 | 3.44 | 0.89 | 2.41 | 0.38 |
| 55 | | | | | | | | | 14.48 | 27.84 | 10.23 | 11.96 | 5.85 | 3.07 | 3.78 | 1.06 | 2.66 | 0.45 |
| 60 | | | | | | | | | 15.79 | 32.70 | 11.16 | 14.05 | 6.38 | 3.60 | 4.13 | 1.25 | 2.90 | 0.53 |
| 65 | | | | | | | | | 17.11 | 37.93 | 12.09 | 16.30 | 6.91 | 4.18 | 4.47 | 1.45 | 3.14 | 0.61 |
| 70 | | | | | | | | | 18.43 | 43.51 | 13.02 | 18.70 | 7.44 | 4.79 | 4.82 | 1.66 | 3.38 | 0.70 |
| 75 | | | | | | | | | | | 13.95 | 21.24 | 7.97 | 5.45 | 5.16 | 1.89 | 3.62 | 0.80 |
| 80 | | | | | | | | | | | 14.88 | 23.94 | 8.51 | 6.14 | 5.50 | 2.13 | 3.86 | 0.90 |
| 85 | | | | | | | | | | | 15.81 | 26.79 | 9.04 | 6.87 | 5.85 | 2.38 | 4.10 | 1.01 |
| 90 | | | | | | | | | | | 16.74 | 29.78 | 9.57 | 7.63 | 6.19 | 2.65 | 4.35 | 1.12 |
| 95 | | | | | | | | | | | 17.67 | 32.91 | 10.10 | 8.44 | 6.54 | 2.93 | 4.59 | 1.24 |
| 100 | | | | | | | | | | | 18.60 | 36.19 | 10.63 | 9.28 | 6.88 | 3.22 | 4.83 | 1.36 |
| 110 | | | | | | | | | | | | | 11.69 | 11.07 | 7.57 | 3.84 | 5.31 | 1.62 |
| 120 | | | | | | | | | | | | | 12.76 | 13.01 | 8.26 | 4.51 | 5.79 | 1.91 |
| 130 | | | | | | | | | | | | | 13.82 | 15.08 | 8.95 | 5.23 | 6.28 | 2.21 |
| 140 | | | | | | | | | | | | | 14.88 | 17.30 | 9.63 | 6.00 | 6.76 | 2.54 |
| 150 | | | | | | | | | | | | | 15.95 | 19.66 | 10.32 | 6.82 | 7.24 | 2.88 |
| 160 | | | | | | | | | | | | | 17.01 | 22.16 | 11.01 | 7.69 | 7.72 | 3.25 |
| 170 | | | | | | | | | | | | | 18.07 | 24.79 | 11.70 | 8.60 | 8.21 | 3.63 |
| 180 | | | | | | | | | | | | | | | 12.39 | 9.56 | 8.69 | 4.04 |
| 190 | | | | | | | | | | | | | | | 13.07 | 10.57 | 9.17 | 4.46 |
| 200 | | | | | | | | | | | | | | | 13.76 | 11.62 | 9.66 | 4.91 |
| 225 | | | | | | | | | | | | | | | 15.48 | 14.46 | 10.86 | 6.10 |
| 250 | | | | | | | | | | | | | | | 17.20 | 17.57 | 12.07 | 7.42 |
| 275 | | | | | | | | | | | | | | | 18.92 | 20.96 | 13.28 | 8.85 |
| 300 | | | | | | | | | | | | | | | | | 14.48 | 10.40 |
| 325 | | | | | | | | | | | | | | | | | 15.69 | 12.06 |
| 350 | | | | | | | | | | | | | | | | | 16.90 | 13.84 |
| 375 | | | | | | | | | | | | | | | | | 18.11 | 15.72 |
| 400 | | | | | | | | | | | | | | | | | 19.31 | 17.72 |
| 425 | | | | | | | | | | | | | | | | | | |
| 450 | | | | | | | | | | | | | | | | | | |
| 475 | | | | | | | | | | | | | | | | | | |
| 500 | | | | | | | | | | | | | | | | | | |
| 550 | | | | | | | | | | | | | | | | | | |

Note: Dark shaded area of chart indicates velocities over 7' per second. Use with caution

The velocity values were derived using the following equation $V = \frac{0.408 \times Q_{gpm}}{d^2}$

Table are based upon the following Hazen-Williams equation: $H_f = 0.2083 \times \left(\frac{100}{C}\right)^{1.852} \times \frac{Q^{1.852}}{D^{4.8655}}$ for change in psi per foot of elevation. Pressure loss for uphill elevation and pressure gain for downhill elevation changes.