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FRICITION HEAD

FOR SCHEDULE 40 PLASTIC PIPE

Velocity in FT. / SEC. Friction head loss in feet of water per 100 ft. of pipe.

| GALS. PER MIN. | 1/2" PIPE | | 3/4" PIPE | | 1" PIPE | | 1 1/4" PIPE | | 1 1/2" PIPE | | 2" PIPE | | 2 1/2" PIPE | | 3" PIPE | | 4" PIPE | |
|----------------|-----------|-------|-----------|-------|---------|-------|-------------|-------|-------------|--------|---------|-------|-------------|-------|---------|-------|---------|-------|
| | VEL | LOSS | VEL | LOSS | VEL | LOSS | VEL | LOSS | VEL | LOSS | VEL | LOSS | VEL | LOSS | VEL | LOSS | VEL | LOSS |
| 2 | 2.11 | 3.54 | 1.20 | 0.90 | 0.74 | 0.28 | 0.43 | 0.07 | 0.31 | 0.03 | 0.43 | 0.04 | | | | | | |
| 4 | 4.22 | 12.79 | 2.40 | 3.26 | 1.48 | 1.01 | 0.86 | 0.26 | 0.63 | 0.13 | 0.38 | 0.08 | | | | | | |
| 6 | 6.33 | 27.10 | 3.61 | 6.90 | 2.22 | 2.13 | 1.29 | 0.56 | 0.94 | 0.27 | 0.57 | 0.08 | 0.40 | 0.03 | | | | |
| 8 | 8.44 | 46.17 | 4.81 | 11.75 | 2.97 | 3.63 | 1.71 | 0.96 | 1.26 | 0.45 | 0.76 | 0.13 | 0.54 | 0.06 | | | | |
| 10 | 10.55 | 69.80 | 6.01 | 17.77 | 3.71 | 5.49 | 2.14 | 1.45 | 1.57 | 0.68 | 0.95 | 0.20 | 0.67 | 0.09 | 0.43 | 0.03 | | |
| 12 | 15.05 | 97.84 | 7.21 | 24.90 | 4.45 | 7.69 | 2.57 | 2.03 | 1.89 | 0.96 | 1.15 | 0.28 | 0.80 | 0.12 | 0.52 | 0.04 | | |
| 15 | | | 9.01 | 37.65 | 5.56 | 11.63 | 3.21 | 3.06 | 2.36 | 1.45 | 1.43 | 0.43 | 1.00 | 0.18 | 0.65 | 0.06 | 0.38 | 0.02 |
| 18 | | | 10.82 | 52.77 | 6.67 | 16.30 | 3.86 | 4.29 | 2.83 | 2.03 | 1.72 | 0.60 | 1.20 | 0.25 | 0.78 | 0.09 | 0.45 | 0.02 |
| 20 | | | 12.02 | 64.14 | 7.42 | 19.81 | 4.28 | 5.22 | 3.15 | 2.46 | 1.91 | 0.73 | 1.34 | 0.31 | 0.87 | 0.11 | 0.50 | 0.03 |
| 25 | | | | | 9.27 | 29.95 | 5.36 | 7.89 | 3.94 | 3.73 | 2.39 | 1.10 | 1.67 | 0.47 | 1.08 | 0.16 | 0.63 | 0.04 |
| 30 | | | | | 11.12 | 41.99 | 6.43 | 11.06 | 4.72 | 5.22 | 2.86 | 1.55 | 2.01 | 0.65 | 1.30 | 0.23 | 0.76 | 0.06 |
| 35 | | | | | 12.98 | 55.86 | 7.50 | 14.71 | 5.51 | 6.95 | 3.34 | 2.06 | 2.34 | 0.87 | 1.52 | 0.30 | 0.88 | 0.08 |
| 40 | | | | | 14.83 | 71.53 | 8.57 | 18.84 | 6.30 | 8.90 | 3.82 | 2.64 | 2.68 | 1.11 | 1.73 | 0.39 | 1.01 | 0.10 |
| 45 | | | | | 16.68 | 88.97 | 9.64 | 23.43 | 7.08 | 11.07 | 4.30 | 3.28 | 3.01 | 1.38 | 1.95 | 0.48 | 1.13 | 0.13 |
| 50 | | | | | | | 10.71 | 28.48 | 7.87 | 13.45 | 4.77 | 3.99 | 3.35 | 1.68 | 2.17 | 0.58 | 1.26 | 0.16 |
| 55 | 0.61 | 0.03 | | | | | 11.78 | 33.97 | 8.66 | 16.05 | 5.25 | 4.76 | 3.68 | 2.00 | 2.38 | 0.70 | 1.38 | 0.19 |
| 60 | 0.67 | 0.03 | | | | | 12.85 | 39.91 | 9.44 | 18.85 | 5.73 | 5.59 | 4.02 | 2.35 | 2.60 | 0.82 | 1.51 | 0.22 |
| 65 | 0.72 | 0.03 | | | | | 13.93 | 46.29 | 10.23 | 21.87 | 6.21 | 6.48 | 4.35 | 2.73 | 2.82 | 0.95 | 1.64 | 0.25 |
| 70 | 0.78 | 0.04 | | | | | 15.00 | 53.10 | 11.02 | 25.08 | 6.68 | 7.44 | 4.69 | 3.13 | 3.03 | 1.09 | 1.76 | 0.29 |
| 75 | 0.83 | 0.04 | | | | | 16.07 | 60.34 | 11.81 | 28.50 | 7.16 | 8.45 | 5.02 | 3.56 | 3.25 | 1.24 | 1.89 | 0.33 |
| 80 | 0.89 | 0.05 | | | | | 17.14 | 68.00 | 12.59 | 32.12 | 7.64 | 9.52 | 5.35 | 4.01 | 3.47 | 1.39 | 2.01 | 0.37 |
| 85 | 0.94 | 0.06 | | | | | 18.21 | 76.08 | 13.38 | 35.94 | 8.12 | 10.65 | 5.69 | 4.49 | 3.68 | 1.56 | 2.14 | 0.42 |
| 90 | 1.00 | 0.06 | | | | | 19.28 | 84.57 | 14.17 | 39.95 | 8.59 | 11.84 | 6.02 | 4.99 | 3.90 | 1.73 | 2.27 | 0.46 |
| 95 | 1.05 | 0.07 | | | | | | | 14.95 | 44.16 | 9.07 | 13.09 | 6.36 | 5.51 | 4.12 | 1.92 | 2.39 | 0.51 |
| 100 | 1.11 | 0.08 | | | | | | | 15.74 | 48.56 | 9.55 | 14.40 | 6.69 | 6.06 | 4.33 | 2.11 | 2.52 | 0.56 |
| 110 | 1.22 | 0.09 | | | | | | | 17.31 | 57.93 | 10.50 | 17.18 | 7.36 | 7.23 | 4.77 | 2.51 | 2.77 | 0.67 |
| 120 | 1.33 | 0.11 | | | | | | | 18.89 | 68.06 | 11.46 | 20.18 | 8.03 | 8.50 | 5.20 | 2.95 | 3.02 | 0.79 |
| 130 | 1.44 | 0.12 | | | | | | | 20.46 | 78.93 | 12.41 | 23.40 | 8.70 | 9.86 | 5.63 | 3.43 | 3.27 | 0.91 |
| 140 | 1.55 | 0.14 | | | | | | | 22.04 | 90.55 | 13.37 | 26.85 | 9.37 | 11.31 | 6.07 | 3.93 | 3.52 | 1.05 |
| 150 | 1.66 | 0.16 | | | | | | | 23.61 | 102.89 | 14.32 | 30.51 | 10.04 | 12.85 | 6.50 | 4.47 | 3.78 | 1.19 |
| 160 | 1.77 | 0.18 | | | | | | | | | 15.28 | 34.38 | 10.71 | 14.48 | 6.94 | 5.03 | 4.03 | 1.34 |
| 170 | 1.89 | 0.20 | | | | | | | | | 16.23 | 38.46 | 11.38 | 16.20 | 7.37 | 5.63 | 4.28 | 1.50 |
| 180 | 2.00 | 0.23 | | | | | | | | | 17.19 | 42.76 | 12.05 | 18.01 | 7.80 | 6.26 | 4.53 | 1.67 |
| 190 | 2.11 | 0.25 | | | | | | | | | 18.14 | 47.26 | 12.72 | 19.91 | 8.24 | 6.92 | 4.78 | 1.84 |
| 200 | 2.22 | 0.28 | | | | | | | | | 19.10 | 51.97 | 13.39 | 21.89 | 8.67 | 7.61 | 5.03 | 2.03 |
| 220 | 2.44 | 0.33 | | | | | | | | | 21.01 | 62.01 | 14.72 | 26.12 | 9.54 | 9.08 | 5.54 | 2.42 |
| 240 | 2.66 | 0.39 | | | | | | | | | 22.92 | 72.85 | 16.06 | 30.68 | 10.40 | 10.66 | 6.04 | 2.84 |
| 260 | 2.88 | 0.45 | | | | | | | | | | | 17.40 | 35.59 | 11.27 | 12.37 | 6.54 | 3.30 |
| 280 | 3.11 | 0.52 | | | | | | | | | | | 18.74 | 40.82 | 12.14 | 14.19 | 7.05 | 3.78 |
| 300 | 3.33 | 0.59 | | | | | | | | | | | 20.08 | 46.38 | 13.00 | 16.12 | 7.55 | 4.30 |
| 320 | 3.55 | 0.66 | | | | | | | | | | | 21.42 | 52.27 | 13.87 | 18.17 | 8.05 | 4.84 |
| 340 | 3.77 | 0.74 | | | | | | | | | | | 22.76 | 58.48 | 14.74 | 20.33 | 8.56 | 5.42 |
| 360 | 3.99 | 0.82 | | | | | | | | | | | 24.09 | 65.02 | 15.60 | 22.60 | 9.06 | 6.02 |
| 380 | 4.21 | 0.91 | | | | | | | | | | | 25.43 | 71.86 | 16.47 | 24.98 | 9.57 | 6.66 |
| 400 | 4.44 | 1.00 | | | | | | | | | | | | | 17.34 | 27.46 | 10.07 | 7.32 |
| 450 | 4.99 | 1.24 | | | | | | | | | | | | | 19.51 | 34.16 | 11.33 | 9.11 |
| 500 | 5.55 | 1.51 | | | | | | | | | | | | | 21.67 | 41.52 | 12.59 | 11.07 |
| 550 | 6.10 | 1.80 | | | | | | | | | | | | | 23.84 | 49.53 | 13.84 | 13.20 |
| 600 | 6.66 | 2.11 | | | | | | | | | | | | | 26.01 | 58.20 | 15.10 | 15.51 |
| 650 | 7.21 | 2.45 | | | | | | | | | | | | | 28.17 | 67.50 | 16.36 | 17.99 |
| 700 | 7.76 | 2.81 | | | | | | | | | | | | | | | 17.62 | 20.64 |
| 750 | 8.32 | 3.19 | | | | | | | | | | | | | | | 18.88 | 23.45 |
| 800 | 8.87 | 3.60 | | | | | | | | | | | | | | | 20.14 | 26.43 |
| 850 | 9.43 | 4.03 | | | | | | | | | | | | | | | 21.40 | 29.57 |

The velocity of two (2) feet per second is generally accepted as the velocity to carry solids.
 The shaded area above indicates those accepted velocities over two (2) ft. / sec. and less than eight (8) ft. / sec.

Data shown is calculated from the Hazen-Williams equation:

$$H = 1043.94 \times (Q^{1.852}) / (C^{1.852} \times D^{4.8655})$$

USING: C = 150 for water at 60 degrees F. C = coefficient for roughness of the interior pipe surface for plastic pipe

H = head loss in FT.

V = fluid velocity in FT. / SEC.

D = inside diameter of the pipe in INCHES.

Q = flow rate GPM.

FRICTION HEAD

FOR SCHEDULE 40 IRON OR STEEL PIPE

Velocity in FT. / SEC. Friction head loss in feet of water per 100 ft. of pipe.

| GALS. PER MIN. | 1/2" PIPE | | 3/4" PIPE | | 1" PIPE | | 1 1/4" PIPE | | 1 1/2" PIPE | | 2" PIPE | | 2 1/2" PIPE | | 3" PIPE | | 4" PIPE | | |
|----------------------|-----------|--------|-----------|---------|---------|----------|-------------|----------|-------------|-------|---------|-------|-------------|-------|---------|--------|---------|-------|-------|
| | VEL | LOSS | VEL | LOSS | VEL | LOSS | VEL | LOSS | VEL | LOSS | VEL | LOSS | VEL | LOSS | VEL | LOSS | VEL | LOSS | |
| 2 | 2.11 | 7.51 | 1.20 | 1.91 | 0.74 | 0.59 | 0.43 | 0.16 | 0.31 | 0.07 | 0.19 | 0.02 | | | | | | | |
| 4 | 4.22 | 27.10 | 2.40 | 6.90 | 1.48 | 2.13 | 0.86 | 0.56 | 0.63 | 0.27 | 0.38 | 0.08 | 0.27 | 0.03 | | | | | |
| 6 | 6.33 | 57.43 | 3.61 | 14.62 | 2.22 | 4.52 | 1.29 | 1.19 | 0.94 | 0.56 | 0.57 | 0.17 | 0.40 | 0.07 | 0.26 | 0.02 | | | |
| 8 | 8.44 | 97.84 | 4.81 | 24.90 | 2.97 | 7.69 | 1.71 | 2.03 | 1.26 | 0.96 | 0.76 | 0.28 | 0.54 | 0.12 | 0.35 | 0.04 | | | |
| 10 | 10.55 | 147.91 | 6.01 | 37.65 | 3.71 | 11.63 | 2.14 | 3.06 | 1.57 | 1.45 | 0.95 | 0.43 | 0.67 | 0.18 | 0.43 | 0.06 | 0.25 | 0.02 | |
| 12 | 15.05 | 207.32 | 7.21 | 52.77 | 4.45 | 16.30 | 2.57 | 4.29 | 1.89 | 2.03 | 1.15 | 0.60 | 0.80 | 0.25 | 0.52 | 0.09 | 0.30 | 0.02 | |
| 15 | | | 9.01 | 79.77 | 5.56 | 24.64 | 3.21 | 6.49 | 2.36 | 3.07 | 1.43 | 0.91 | 1.00 | 0.38 | 0.65 | 0.13 | 0.38 | 0.04 | |
| 18 | | | 10.82 | 111.81 | 6.67 | 34.54 | 3.86 | 9.10 | 2.83 | 4.30 | 1.72 | 1.27 | 1.20 | 0.54 | 0.78 | 0.19 | 0.45 | 0.05 | |
| 20 | | | 12.02 | 135.91 | 7.42 | 41.99 | 4.28 | 11.06 | 3.15 | 5.22 | 1.91 | 1.55 | 1.34 | 0.65 | 0.87 | 0.23 | 0.50 | 0.06 | |
| 25 | | | | | 9.27 | 63.47 | 5.36 | 16.71 | 3.94 | 7.89 | 2.39 | 2.34 | 1.67 | 0.99 | 1.08 | 0.34 | 0.63 | 0.09 | |
| 30 | | | | | 11.12 | 88.97 | 6.43 | 23.43 | 4.72 | 11.07 | 2.86 | 3.28 | 2.01 | 1.38 | 1.30 | 0.48 | 0.76 | 0.13 | |
| 35 | | | | | 12.98 | 118.36 | 7.50 | 31.17 | 5.51 | 14.72 | 3.34 | 4.37 | 2.34 | 1.84 | 1.52 | 0.64 | 0.88 | 0.17 | |
| 40 | | | | | 14.83 | 151.57 | 8.57 | 39.91 | 6.30 | 18.85 | 3.82 | 5.59 | 2.68 | 2.35 | 1.73 | 0.82 | 1.01 | 0.22 | |
| 45 | | | | | 16.68 | 188.51 | 9.64 | 49.64 | 7.08 | 23.45 | 4.30 | 6.95 | 3.01 | 2.93 | 1.95 | 1.02 | 1.13 | 0.27 | |
| 50 | 6" PIPE | 0.55 | 0.04 | | | | | 10.71 | 60.34 | 7.87 | 28.50 | 4.77 | 8.45 | 3.35 | 3.56 | 2.17 | 1.24 | 1.26 | 0.33 |
| 55 | | 0.61 | 0.05 | | | | | 11.78 | 71.99 | 8.66 | 34.00 | 5.25 | 10.08 | 3.68 | 4.25 | 2.38 | 1.48 | 1.38 | 0.39 |
| 60 | | 0.67 | 0.06 | | | | | 12.85 | 84.57 | 9.44 | 39.95 | 5.73 | 11.84 | 4.02 | 4.99 | 2.60 | 1.73 | 1.51 | 0.46 |
| 65 | | 0.72 | 0.07 | | | | | 13.93 | 98.09 | 10.23 | 46.33 | 6.21 | 13.74 | 4.35 | 5.79 | 2.82 | 2.01 | 1.64 | 0.54 |
| 70 | | 0.78 | 0.08 | | | | | 15.00 | 112.52 | 11.02 | 53.15 | 6.68 | 15.76 | 4.69 | 6.64 | 3.03 | 2.31 | 1.76 | 0.61 |
| 75 | | 0.83 | 0.10 | | | | | 16.07 | 127.85 | 11.81 | 60.39 | 7.16 | 17.91 | 5.02 | 7.54 | 3.25 | 2.62 | 1.89 | 0.70 |
| 80 | | 0.89 | 0.11 | | | | | 17.14 | 144.08 | 12.59 | 68.06 | 7.64 | 20.18 | 5.35 | 8.50 | 3.47 | 2.95 | 2.01 | 0.79 |
| 85 | | 0.94 | 0.12 | | | | | 18.21 | 161.20 | 13.38 | 76.15 | 8.12 | 22.58 | 5.69 | 9.51 | 3.68 | 3.30 | 2.14 | 0.88 |
| 90 | | 1.00 | 0.13 | | | | | 19.28 | 179.21 | 14.17 | 84.65 | 8.59 | 25.10 | 6.02 | 10.57 | 3.90 | 3.67 | 2.27 | 0.98 |
| 95 | | 1.05 | 0.15 | | | | | | | 14.95 | 93.56 | 9.07 | 27.74 | 6.36 | 11.68 | 4.12 | 4.06 | 2.39 | 1.08 |
| 100 | | 1.11 | 0.16 | | | | | | | 15.74 | 102.89 | 9.55 | 30.51 | 6.69 | 12.85 | 4.33 | 4.47 | 2.52 | 1.19 |
| 110 | | 1.22 | 0.19 | | | | | | | 17.31 | 122.75 | 10.50 | 36.40 | 7.36 | 15.33 | 4.77 | 5.33 | 2.77 | 1.42 |
| 120 | | 1.33 | 0.23 | | | | | | | 18.89 | 144.21 | 11.46 | 42.76 | 8.03 | 18.01 | 5.20 | 6.26 | 3.02 | 1.67 |
| 130 | | 1.44 | 0.26 | 8" PIPE | | | | | | 20.46 | 167.26 | 12.41 | 49.59 | 8.70 | 20.89 | 5.63 | 7.26 | 3.27 | 1.94 |
| 140 | | 1.55 | 0.30 | 0.90 | 0.08 | | | | | 22.04 | 191.86 | 13.37 | 56.89 | 9.37 | 23.96 | 6.07 | 8.33 | 3.52 | 2.22 |
| 150 | | 1.66 | 0.34 | 0.96 | 0.09 | | | | | 23.61 | 218.01 | 14.32 | 64.64 | 10.04 | 27.23 | 6.50 | 9.46 | 3.78 | 2.52 |
| 160 | | 1.77 | 0.39 | 1.02 | 0.10 | | | | | | | 15.28 | 72.85 | 10.71 | 30.68 | 6.94 | 10.66 | 4.03 | 2.84 |
| 170 | | 1.89 | 0.43 | 1.09 | 0.11 | | | | | | | 16.23 | 81.50 | 11.38 | 34.33 | 7.37 | 11.93 | 4.28 | 3.18 |
| 180 | | 2.00 | 0.48 | 1.15 | 0.13 | | | | | | | 17.19 | 90.60 | 12.05 | 38.16 | 7.80 | 13.26 | 4.53 | 3.54 |
| 190 | | 2.11 | 0.53 | 1.22 | 0.14 | | | | | | | 18.14 | 100.15 | 12.72 | 42.18 | 8.24 | 14.66 | 4.78 | 3.91 |
| 200 | | 2.22 | 0.59 | 1.28 | 0.15 | 10" PIPE | | | | | | 19.10 | 110.13 | 13.39 | 46.38 | 8.67 | 16.12 | 5.03 | 4.30 |
| 220 | | 2.44 | 0.70 | 1.41 | 0.18 | 0.89 | 0.06 | | | | | 21.01 | 131.39 | 14.72 | 55.34 | 9.54 | 19.23 | 5.54 | 5.13 |
| 240 | | 2.66 | 0.82 | 1.54 | 0.22 | 0.98 | 0.07 | | | | | 22.92 | 154.36 | 16.06 | 65.02 | 10.40 | 22.60 | 6.04 | 6.02 |
| 260 | | 2.88 | 0.95 | 1.67 | 0.25 | 1.06 | 0.08 | | | | | | | 17.40 | 75.40 | 11.27 | 26.21 | 6.54 | 6.99 |
| 280 | | 3.11 | 1.09 | 1.79 | 0.29 | 1.14 | 0.09 | | | | | | | 18.74 | 86.50 | 12.14 | 30.06 | 7.05 | 8.01 |
| 300 | | 3.33 | 1.24 | 1.92 | 0.33 | 1.22 | 0.11 | | | | | | | 20.08 | 98.29 | 13.00 | 34.16 | 7.55 | 9.11 |
| 320 | | 3.55 | 1.40 | 2.05 | 0.37 | 1.30 | 0.12 | | | | | | | 21.42 | 110.76 | 13.87 | 38.50 | 8.05 | 10.26 |
| 340 | | 3.77 | 1.56 | 2.18 | 0.41 | 1.38 | 0.14 | | | | | | | 22.76 | 123.93 | 14.74 | 43.07 | 8.56 | 11.48 |
| 360 | | 3.99 | 1.74 | 2.31 | 0.46 | 1.46 | 0.15 | 12" PIPE | | | | | | 24.09 | 137.76 | 15.60 | 47.88 | 9.06 | 12.76 |
| 380 | | 4.21 | 1.92 | 2.43 | 0.51 | 1.54 | 0.17 | 1.08 | 0.07 | | | | | 25.43 | 152.27 | 16.47 | 52.92 | 9.57 | 14.11 |
| 400 | | 4.44 | 2.11 | 2.56 | 0.56 | 1.63 | 0.18 | 1.13 | 0.08 | | | | | | 17.34 | 58.20 | 10.07 | 15.51 | |
| 450 | | 4.99 | 2.63 | 2.88 | 0.69 | 1.83 | 0.23 | 1.28 | 0.09 | | | | | | 19.51 | 72.38 | 11.33 | 19.29 | |
| 500 | | 5.55 | 3.19 | 3.20 | 0.84 | 2.03 | 0.28 | 1.42 | 0.12 | | | | | | 21.67 | 87.98 | 12.59 | 23.45 | |
| 550 | | 6.10 | 3.81 | 3.52 | 1.00 | 2.24 | 0.33 | 1.56 | 0.14 | | | | | | 23.84 | 104.96 | 13.84 | 27.98 | |
| 600 | | 6.66 | 4.48 | 3.84 | 1.18 | 2.44 | 0.39 | 1.70 | 0.16 | | | | | | 26.01 | 123.32 | 15.10 | 32.87 | |
| 650 | | 7.21 | 5.19 | 4.16 | 1.37 | 2.64 | 0.45 | 1.84 | 0.19 | | | | | | 28.17 | 143.02 | 16.36 | 38.12 | |
| 700 | | 7.76 | 5.96 | 4.48 | 1.57 | 2.84 | 0.52 | 1.98 | 0.22 | | | | | | | | | 17.62 | 43.73 |
| 750 | | 8.32 | 6.77 | 4.80 | 1.78 | 3.05 | 0.59 | 2.13 | 0.24 | | | | | | | | | 18.88 | 49.69 |
| 800 | | 8.87 | 7.63 | 5.12 | 2.01 | 3.25 | 0.66 | 2.27 | 0.28 | | | | | | | | | 20.14 | 56.00 |
| 850 | | 9.43 | 8.53 | 5.44 | 2.24 | 3.45 | 0.74 | 2.41 | 0.31 | | | | | | | | | 21.40 | 62.65 |

The velocity of two (2) feet per second is generally accepted as the velocity to carry solids.
 The shaded area above indicates those accepted velocities over two (2) ft. / sec. and less than eight (8) ft. / sec.

Data shown is calculated from the Hazen-Williams equation:

$$H = 1043.94 \times (Q^{1.852}) / (C^{1.852} \times D^{4.8655})$$

USING: C = 100 for water at 60 degrees F. C = coefficient for roughness of the interior pipe surface
 H = head loss in FT.
 V = fluid velocity in FT. / SEC.
 D = inside diameter of the pipe in INCHES.
 Q = flow rate GPM.

| Fitting | Nominal pipe size | | | | | | | | | | | | |
|------------------------|-------------------|------|-----|--------|--------|------|--------|------|------|------|------|------|------|
| | 1/2" | 3/4" | 1" | 1 1/4" | 1 1/2" | 2" | 2 1/2" | 3" | 4" | 6" | 8" | 10" | 12" |
| 90° elbow | 1.6 | 2.1 | 2.6 | 3.5 | 4.0 | 5.2 | 6.2 | 7.7 | 10.1 | 15.2 | 20.0 | 25.1 | 29.8 |
| 45° elbow | 0.8 | 1.1 | 1.4 | 1.8 | 2.2 | 2.8 | 3.3 | 4.1 | 5.4 | 8.1 | 10.6 | 13.4 | 15.9 |
| Tee (thru flow) | 1.0 | 1.4 | 1.8 | 2.3 | 2.7 | 3.5 | 4.1 | 5.1 | 6.7 | 10.1 | 13.3 | 16.7 | 19.9 |
| Tee (branch Flow) | 3.1 | 4.1 | 5.3 | 6.9 | 8.1 | 10.3 | 12.3 | 15.3 | 20.1 | 30.3 | 39.9 | 50.1 | 59.7 |
| Check valve | 5.2 | 6.9 | 8.7 | 11.5 | 13.4 | 17.2 | 20.6 | 25.5 | 33.6 | 50.5 | 66.5 | 83.6 | 99.0 |
| Gate valve (full open) | 0.4 | 0.6 | 0.7 | 0.9 | 1.1 | 1.4 | 1.7 | 2.0 | 2.7 | 4.0 | 5.3 | 6.7 | 8.0 |