

# ENGINEERING INFORMATION - PIPE RESISTANCE AND MUELLER PRODUCT FLOW DATA

# 16.27

REV. 4-99

## Equivalent resistance of bends, fittings, and valves, length of straight pipe in feet \*

|                                   | Screwed fittings   |         |                         |       | 90° welding elbows & smooth bends |             |         |         |         |         | Miter elbows (No. of miters) |       |       |       |       | Welding tees |       | Valves (screwed, flanged, or welded) |       |       |             |       |
|-----------------------------------|--|---------|-------------------------|-------|-----------------------------------|-------------|---------|---------|---------|---------|------------------------------|-------|-------|-------|-------|--------------|-------|--------------------------------------|-------|-------|-------------|-------|
|                                   | 45° ell  | 90° ell | 180° close return bends | Tee   | R/d = 1                           | R/d = 1-1/2 | R/d = 2 | R/d = 4 | R/d = 6 | R/d = 8 | 1-45°                        | 1-60° | 1-90° | 2-90° | 3-90° | Forge d      | Miter | Gate                                 | Globe | Angle | Swing Check |       |
| k factor =                        | 0.42   | 0.90    | 2.00                    | 1.80  | 0.48                              | 0.36        | 0.27    | 0.21    | 0.27    | 0.36    | 0.45                         | 0.90  | 1.80  | 0.60  | 0.45  | 1.35         | 1.80  | 0.21                                 | 10    | 5.0   | 2.5         |       |
| L/d' ratio n =                    | 14   | 30      | 67                      | 60    | 16                                | 12          | 9       | 7       | 9       | 12      | 15                           | 30    | 60    | 20    | 15    | 45           | 60    | 7                                    | 333   | 167   | 83          |       |
| Nom. Pipe Size (inches)           |  |         |                         |       |                                   |             |         |         |         |         |                              |       |       |       |       |              |       |                                      |       |       |             |       |
| Inside diam. d (inches) Sched. 40 | L = equivalent length in feet of schedule 40 (standard weight) straight pipe |         |                         |       |                                   |             |         |         |         |         |                              |       |       |       |       |              |       |                                      |       |       |             |       |
| 1/2                               | 0.622  | 0.73    | 1.55                    | 3.47  | 3.10                              | 0.83        | 0.62    | 0.47    | 0.36    | 0.47    | 0.62                         | 0.78  | 1.55  | 3.10  | 1.04  | 0.78         | 2.33  | 3.10                                 | 0.36  | 17.3  | 8.65        | 4.32  |
| 3/4                               | 0.824  | 0.96    | 2.06                    | 4.60  | 4.12                              | 1.10        | 0.82    | 0.62    | 0.48    | 0.62    | 0.82                         | 1.03  | 2.06  | 4.12  | 1.37  | 1.03         | 3.09  | 4.12                                 | 0.48  | 22.9  | 11.4        | 5.72  |
| 1                                 | 1.049  | 1.22    | 2.62                    | 5.82  | 5.24                              | 1.40        | 1.05    | 0.79    | 0.61    | 0.79    | 1.05                         | 1.31  | 2.62  | 5.24  | 1.75  | 1.31         | 3.93  | 5.24                                 | 0.61  | 29.1  | 14.6        | 7.27  |
| 1-1/4                             | 1.380  | 1.61    | 3.45                    | 7.66  | 6.90                              | 1.84        | 1.38    | 1.03    | 0.81    | 1.03    | 1.38                         | 1.72  | 3.45  | 6.90  | 2.30  | 1.72         | 5.17  | 6.90                                 | 0.81  | 38.3  | 19.1        | 9.58  |
| 1-1/2                             | 1.610  | 1.88    | 4.02                    | 8.95  | 8.04                              | 2.14        | 1.61    | 1.21    | 0.94    | 1.21    | 1.61                         | 2.01  | 4.02  | 8.04  | 2.68  | 2.01         | 6.04  | 8.04                                 | 0.94  | 44.7  | 22.4        | 11.2  |
| 2                                 | 2.067  | 2.41    | 5.17                    | 11.5  | 10.3                              | 2.76        | 2.07    | 1.55    | 1.21    | 1.55    | 2.07                         | 2.58  | 5.17  | 10.3  | 3.45  | 2.58         | 7.75  | 10.3                                 | 1.21  | 57.4  | 28.7        | 14.4  |
| 2-1/2                             | 2.469  | 2.88    | 6.16                    | 13.7  | 12.3                              | 3.29        | 2.47    | 1.85    | 1.44    | 1.85    | 2.47                         | 3.08  | 6.16  | 12.3  | 4.11  | 3.08         | 9.25  | 12.3                                 | 1.44  | 68.5  | 34.3        | 17.1  |
| 3                                 | 3.068  | 3.58    | 7.67                    | 17.1  | 15.3                              | 4.09        | 3.07    | 2.30    | 1.79    | 2.30    | 3.07                         | 3.84  | 7.67  | 15.3  | 5.11  | 3.84         | 11.5  | 15.3                                 | 1.79  | 85.2  | 42.6        | 21.3  |
| 4                                 | 4.026  | 4.70    | 10.1                    | 22.4  | 20.2                              | 5.37        | 4.03    | 3.02    | 2.35    | 3.02    | 4.03                         | 5.04  | 10.1  | 20.2  | 6.71  | 5.04         | 15.1  | 20.2                                 | 2.35  | 112.0 | 56.0        | 28.0  |
| 5                                 | 5.047  | 5.88    | 12.6                    | 28.0  | 25.2                              | 6.72        | 5.05    | 3.78    | 2.94    | 3.78    | 5.05                         | 6.30  | 12.6  | 25.2  | 8.40  | 6.30         | 18.9  | 25.2                                 | 2.94  | 140.0 | 70.0        | 35.0  |
| 6                                 | 6.065  | 7.07    | 15.2                    | 33.8  | 30.4                              | 8.09        | 6.07    | 4.55    | 3.54    | 4.55    | 6.07                         | 7.58  | 15.2  | 30.4  | 10.1  | 7.58         | 22.8  | 30.4                                 | 3.54  | 168.0 | 84.1        | 42.1  |
| 8                                 | 7.981  | 9.31    | 20.0                    | 44.6  | 40.0                              | 10.6        | 7.98    | 5.98    | 4.65    | 5.98    | 7.98                         | 9.97  | 20.0  | 40.0  | 13.3  | 9.97         | 29.9  | 40.0                                 | 4.65  | 222.0 | 111.0       | 55.5  |
| 10                                | 10.02  | 11.7    | 25.0                    | 55.7  | 50.0                              | 13.3        | 10.0    | 7.51    | 5.85    | 7.51    | 10.0                         | 12.5  | 25.0  | 50.0  | 16.7  | 12.5         | 37.6  | 50.0                                 | 5.85  | 278.0 | 139.0       | 69.5  |
| 12                                | 11.94  | 13.9    | 29.8                    | 66.3  | 59.6                              | 15.9        | 11.9    | 8.95    | 6.96    | 8.95    | 11.9                         | 14.9  | 29.8  | 59.6  | 19.9  | 14.9         | 44.8  | 59.6                                 | 6.96  | 332.0 | 166.0       | 83.0  |
| 14                                | 13.13  | 15.3    | 32.8                    | 73.0  | 65.6                              | 17.5        | 13.1    | 9.85    | 7.65    | 9.85    | 13.1                         | 16.4  | 32.8  | 65.6  | 21.9  | 16.4         | 49.2  | 65.6                                 | 7.65  | 364.0 | 182.0       | 91.0  |
| 16                                | 15.00  | 17.5    | 37.5                    | 83.5  | 75.0                              | 20.0        | 15.0    | 11.2    | 8.75    | 11.2    | 15.0                         | 18.8  | 37.5  | 75.0  | 25.0  | 18.8         | 56.2  | 75.0                                 | 8.75  | 417.0 | 208.0       | 104.0 |
| 18                                | 16.88  | 19.7    | 42.1                    | 93.8  | 84.2                              | 22.5        | 16.9    | 12.7    | 9.85    | 12.7    | 16.9                         | 21.1  | 42.1  | 84.2  | 28.1  | 21.1         | 63.2  | 84.2                                 | 9.85  | 469.0 | 234.0       | 117.0 |
| 20                                | 18.81  | 22.0    | 47.0                    | 105.0 | 94.0                              | 25.1        | 18.8    | 14.1    | 11.0    | 14.1    | 18.8                         | 23.5  | 47.0  | 94.0  | 31.4  | 23.5         | 70.6  | 94.0                                 | 11.0  | 522.0 | 261.0       | 131.0 |
| 24                                | 22.63  | 26.4    | 56.6                    | 126.0 | 113.0                             | 30.2        | 22.6    | 17.0    | 13.2    | 17.0    | 22.6                         | 28.3  | 56.6  | 113.0 | 37.8  | 28.3         | 85.0  | 113.0                                | 13.2  | 629.0 | 314.0       | 157.0 |

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## FLOW DATA THROUGH MUELLER SERVICE MATERIALS EXPRESSED AS EQUIVALENT LENGTHS OF STRAIGHT PIPE

| Size   | Fitting                        | Equivalent Length in Feet |               |
|--------|--------------------------------|---------------------------|---------------|
|        |                                | Sched. 40 Steel           | Type K Copper |
| 1/2"   | Corp. Stop                     | 9.16                      | 6.12          |
| 3/4"   | Corp. Stop                     | 6.08                      | 5.86          |
| 1"     | Corp. Stop                     | 5.86                      | 6.67          |
| 1-1/4" | Corp. Stop                     | 8.16                      | 7.46          |
| 1-1/2" | Corp. Stop                     | 7.82                      | 7.70          |
| 2"     | Corp. Stop                     | 7.48                      | 8.38          |
| 1/2"   | CurbStop                       | 4.73                      | 3.14          |
| 3/4"   | CurbStop                       | 3.55                      | 4.04          |
| 1"     | CurbStop                       | 3.37                      | 3.85          |
| 1-1/4" | CurbStop                       | 4.08                      | 3.56          |
| 1-1/2" | CurbStop                       | 4.43                      | 4.43          |
| 2"     | -                              | 4.38                      | 4.79          |
| 5/8"   | H- 10890- 10891 Meter Coupling | .69                       | .28           |
| 3/4"   | H- 10890- 10891 Meter Coupling | 1.28                      | .89           |
| 5/8"   | H- 10892 Meter Coupling        | 2.48**                    | 1.22**        |
| 3/4"   | H- 10892 Meter Coupling        | 1.70                      | 1.09          |

| Size        | Meter Yokes Catalog Number | Riser | Equivalent Length in Feet |               |
|-------------|----------------------------|-------|---------------------------|---------------|
|             |                            |       | Sched. 40 Steel           | Type K Copper |
| 5/8" x 3/4" | H-14111                    | -     | 7.8                       | 5.65          |
| 5/8" x 3/4" | H- 14121                   | -     | 8.33                      | 5.96          |
| 5/8" x 3/4" | H- 14026                   | 9"    | 15.35                     | 12.80         |
| 5/8" x 3/4" | H- 14020                   | 9"    | 10.20                     | 7.18          |
| 5/8" x 3/4" | H- 14020                   | 15"   | 11.30                     | 7.92          |
| 5/8" x 3/4" | H- 14020                   | 18"   | 14.60                     | 10.20         |
| 5/8" x 3/4" | H- 14090                   | 20"   | 12.50                     | 9.15          |
| 5/8" x 3/4" | H- 10840                   | -     | 11.50                     | 7.83          |

\*\* Referred to 1/2" Pipe.

NOTE. Only a partial list of Mueller Meter Yokes are in above list. Generally a flat allowance of 10 feet of pipe is adequate for any Meter Yoke as few services are designed with narrow friction allowances.