



FLOW, KV VALUES AND ZETA VALUES FOR GATE VALVES, RESILIENT SEATED

APPENDIX 6

Calculated flow (m³/hr) going through a nominal valve size (DN40 = inside dia of 40 mm) at different flow velocities

| Water velocity (m/sec) | DN40 | DN50 | DN65 | DN80 | DN100 | DN125 | DN150 | DN200 | DN250 | DN300 | DN350 | DN400 | DN450 | DN500 | DN600 | DN700 | DN800 | DN900 | DN1000 |
|------------------------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 1 | 5 | 7 | 12 | 18 | 28 | 44 | 64 | 113 | 177 | 254 | 346 | 452 | 573 | 707 | 1018 | 1385 | 1810 | 2290 | 2827 |
| 1,5 | 7 | 11 | 18 | 27 | 42 | 66 | 95 | 170 | 265 | 382 | 520 | 679 | 859 | 1060 | 1527 | 2078 | 2714 | 3435 | 4241 |
| 2 | 9 | 14 | 24 | 36 | 57 | 88 | 127 | 226 | 353 | 509 | 693 | 905 | 1145 | 1414 | 2036 | 2771 | 3619 | 4580 | 5655 |
| 2,5 | 11 | 18 | 30 | 45 | 71 | 110 | 159 | 283 | 442 | 636 | 866 | 1131 | 1431 | 1767 | 2545 | 3464 | 4524 | 5726 | 7069 |
| 3 | 14 | 21 | 36 | 54 | 85 | 133 | 191 | 339 | 530 | 763 | 1039 | 1357 | 1718 | 2121 | 3054 | 4156 | 5429 | 6871 | 8482 |
| 3,5 | 16 | 25 | 42 | 63 | 99 | 155 | 223 | 396 | 619 | 891 | 1212 | 1583 | 2004 | 2474 | 3563 | 4849 | 6333 | 8016 | 9896 |
| 4 | 18 | 28 | 48 | 72 | 113 | 177 | 254 | 452 | 707 | 1018 | 1385 | 1810 | 2290 | 2827 | 4072 | 5542 | 7238 | 9161 | 11310 |
| 4,5 | 20 | 32 | 54 | 81 | 127 | 199 | 286 | 509 | 795 | 1145 | 1559 | 2036 | 2576 | 3181 | 4580 | 6234 | 8143 | 10306 | 12723 |
| 5 | 23 | 35 | 60 | 90 | 141 | 221 | 318 | 565 | 884 | 1272 | 1732 | 2262 | 2863 | 3534 | 5089 | 6927 | 9048 | 11451 | 14137 |

Hydraulic values, fully open valve

| | DN40 | DN50 | DN65 | DN80 | DN100 | DN125 | DN150 | DN200 | DN250 | DN300 | DN350 | DN400 | DN450 | DN500 | DN600 | DN700 | DN800 | DN900 | DN1000 |
|--------------------------------------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|
| Kv (m³/hr - 1 bar) | 310 | 555 | 650 | 1050 | 1945 | 2770 | 5715 | 7755 | 15405 | 27295 | 37150 | 48520 | 61410 | 75815 | 109175 | 148600 | 194090 | 229572 | 283422 |
| Cv (Usg/min - 1 psi) | 363 | 649 | 761 | 1229 | 2276 | 3241 | 6687 | 9073 | 18024 | 31935 | 43466 | 56768 | 71850 | 88704 | 127735 | 173862 | 227085 | 268599 | 331604 |
| Zeta | 0.04 | 0.03 | 0.07 | 0.06 | 0.04 | 0.05 | 0.02 | 0.04 | 0.03 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |

NOTE: Hydraulic figures are based on tests or calculations, depending on size. Value uncertainty as per ref EN1267

Definitions / formulas:

Kv-value: Actual flow of water (m³/hr) creating pressure loss of 1 bar.

Pressure loss coefficient Zeta (K) value: Ratio of static to dynamic pressure loss.

Zeta (K) = Diff pressure / (500 X V²)

Diff pressure (Pa)

V: Water flow velocity (m/sec)

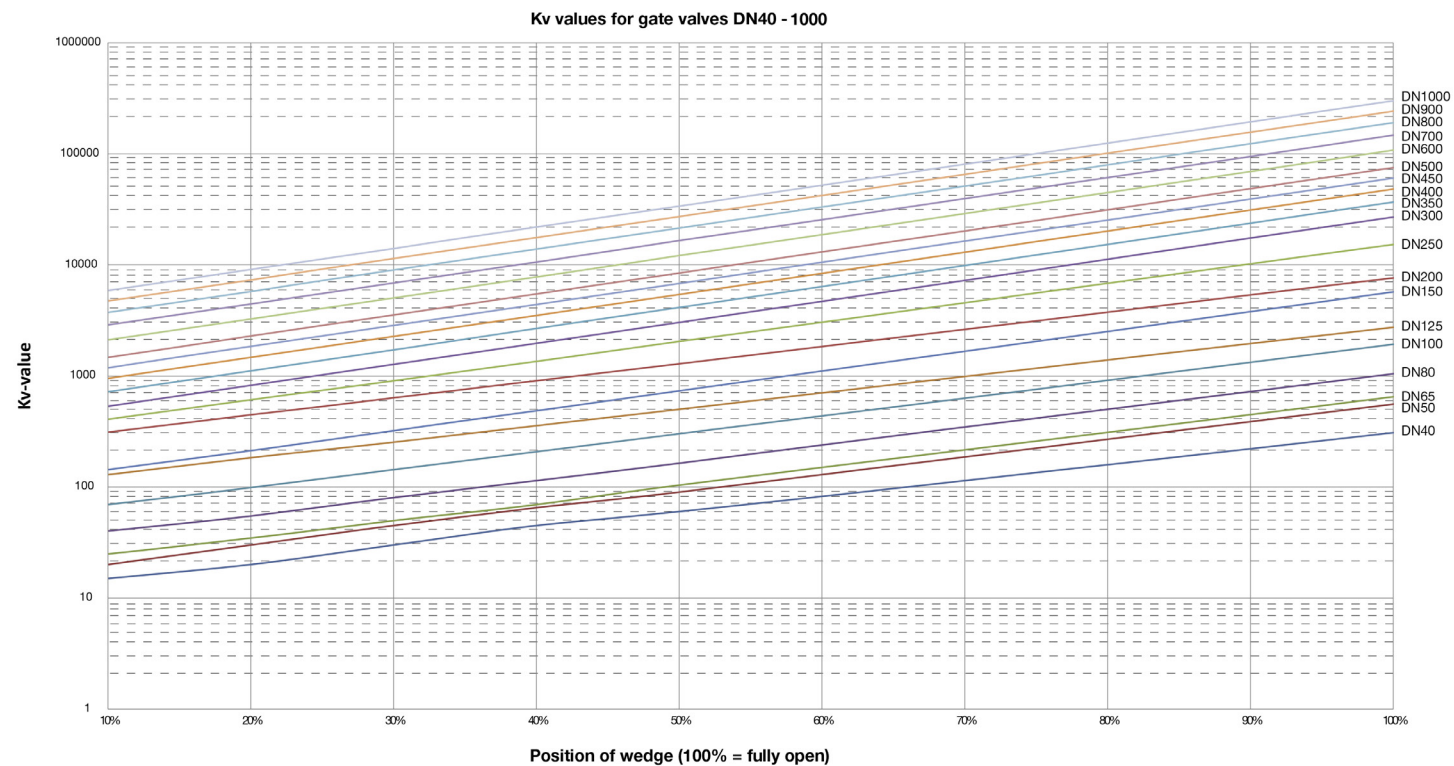
Actual diff pressure (bar) = (Q / Kv)²

Q: Actual water flow (m³/hr)

Kv values, valve in semi-open position. Percentage, based on turns of stem, from closed to fully open valve.

| Opening of valve | DN40 | DN50 | DN65 | DN80 | DN100 | DN125 | DN150 | DN200 | DN250 | DN300 | DN350 | DN400 | DN450 | DN500 | DN600 | DN700 | DN800 | DN900 | DN1000 |
|------------------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|
| 10% | 15 | 20 | 25 | 40 | 70 | 130 | 145 | 315 | 410 | 535 | 725 | 950 | 1200 | 1480 | 2135 | 2905 | 3790 | 4485 | 5538 |
| 20% | 20 | 30 | 35 | 55 | 100 | 185 | 215 | 450 | 615 | 825 | 1125 | 1470 | 1860 | 2295 | 3305 | 4495 | 5870 | 9930 | 12259 |
| 30% | 30 | 45 | 50 | 80 | 145 | 255 | 325 | 640 | 915 | 1280 | 1740 | 2275 | 2875 | 3550 | 5115 | 6960 | 9095 | 15497 | 19132 |
| 40% | 45 | 65 | 70 | 115 | 210 | 360 | 490 | 915 | 1370 | 1980 | 2695 | 3520 | 4455 | 5500 | 7920 | 10780 | 14080 | 22703 | 28029 |
| 50% | 60 | 90 | 105 | 165 | 305 | 505 | 740 | 1305 | 2055 | 3065 | 4175 | 5450 | 6900 | 8515 | 12265 | 16690 | 21800 | 30812 | 38040 |
| 75% | 135 | 225 | 260 | 420 | 770 | 1185 | 2055 | 3180 | 5625 | 9150 | 12450 | 16260 | 20580 | 25410 | 36590 | 49805 | 65050 | 63740 | 78692 |
| 100% | 310 | 555 | 650 | 1050 | 1945 | 2770 | 5715 | 7755 | 15405 | 27295 | 37150 | 48520 | 61410 | 75815 | 109175 | 148600 | 194090 | 229572 | 283422 |

NOTE: Hydraulic figures are based on tests or calculations, depending on size. Value uncertainty as per ref EN1267



Zeta (K) values, valve in semi-open positions. Percentage, is based on turns of stem, from closed to fully open valve.

| Opening of valve | DN40 | DN50 | DN65 | DN80 | DN100 | DN125 | DN150 | DN200 | DN250 | DN300 | DN350 | DN400 | DN450 | DN500 | DN600 | DN700 | DN800 | DN900 | DN1000 |
|------------------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 10% | 18 | 25 | 46 | 41 | 33 | 23 | 39 | 26 | 37 | 45 | 46 | 45 | 46 | 46 | 46 | 46 | 46 | 52.09 | 52.09 |
| 20% | 10 | 11 | 23 | 22 | 16 | 11 | 18 | 13 | 17 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 10.63 | 10.63 |
| 30% | 5 | 5 | 11 | 10 | 8 | 6 | 8 | 6 | 7 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 4.36 | 4.36 |
| 40% | 2 | 2 | 6 | 5 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2.03 | 2.03 |
| 50% | 1 | 1 | 3 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.10 | 1.10 |
| 75% | 0.23 | 0.20 | 0.42 | 0.37 | 0.27 | 0.28 | 0.19 | 0.25 | 0.20 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.26 | 0.26 |
| 100% | 0.04 | 0.03 | 0.07 | 0.06 | 0.04 | 0.05 | 0.02 | 0.04 | 0.03 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |

NOTE: Hydraulic figures are based on both tests and calculations, depending on size. Value uncertainty, ref EN1267

Zeta (K) for gate valves DN40 - 1000

