



Pressure Reducing Valve with Low Flow By-Pass

Model: 720-2B

The BERMAD 720-2B is a hydraulically operated, diaphragm actuated pressure reducing control valve that reduces a high upstream pressure to a lower constant downstream pressure, regardless of fluctuating demand or varying upstream pressure. The by-pass handles low flows when the main valve shuts off.



1.0 General Information:

- Valve type: diaphragm actuated, single chamber
- Valve pattern: Y (oblique) or angle
- Available sizes: 1.5"-24" / DN40-600
- Maximum working pressure: 250 or 300 psi/ 16 or 21 bar
- End connections:
 - Grooved: (OGS) ANSI/AWWA C606 (1.5"-8"/DN40-200)
 - Flanged: ANSI B16.5 class #150 & #300 (1.5"-24"/DN40-600)
 - Threaded: NPT/BSP (1.5"-3"/DN40-80)
- Working temperature: water up to 140°F/60°C

2.0 Certificates:

- NSF 61
- NSF 372
- Others:



DVGW
Germany



ACS
France



GOST
Russia



PZH
Poland



PUB
Singapore



ISO 9001-
2008

Job/Owner

| | |
|------------|--|
| System No. | |
| Location | |

Contractor

| | |
|--------------|--|
| Submitted by | |
| Date | |

Engineer

| | |
|--------------|--|
| Spec Section | |
| Paragraph | |
| Approved | |
| Date | |





3.0 Construction Materials:

Main Valve

- Body, cover and partition:
 - Standard: Ductile Iron, Epoxy Fusion Bonded Coating
 - Optional: Stainless Steel 316
- Internals:
 - Stainless Steel, Bronze, coated Steel, POM
- Bolts, nuts and studs:
 - Stainless Steel 316
- Elastomers:
 - Diaphragm: EPDM, Nylon fabric-reinforced
 - Seal: NBR
 - O-Rings: EPDM
- Control trim:
 - Control accessories: Stainless Steel 316
 - Tubing & fittings: Stainless Steel 316

Low Flow By-Pass

- Body: DRZ low-lead forged brass
- Cover: Glass reinforced nylon
- Internals: Stainless Steel, PTFE
- Filter screen: Stainless steel 303
- Elastomers: EPDM
- By-Pass trim: Stainless steel

4.0 Control Information

- Pilot setting range:
 - Standard: 14.5-145 psi / 1-10 bar
 - Other: on request
- By-Pass setting range: 15-90 psi / 1-6 bar

Note: By-Pass should be set 5-7 psi above main valve pilot setting

5.0 General Notes:

- By-Pass Sizes:
 - Main valve 1.5"-3" / DN40-DN80: By-Pass ½" / DN15
 - Main Valve 4"-8" / DN100-DN200: By-Pass ¾" / DN20
- Recommendation:
 - Install a pressure relief valve model 73Q at downstream side
 - Install a strainer (stone and gravel trap) model 70F at valve upstream

6.0 Specify When Ordering:

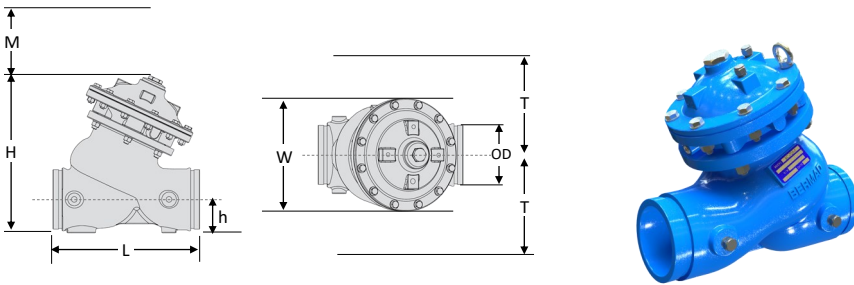
- Minimum and maximum flow rate (gpm, m³/h)
- Inlet pressure (psi, bar)
- Outlet pressure - Pilot setting (psi, bar)
- Body material: Ductile Iron (standard) or Stainless Steel
- End connections: Grooved (standard), Flanged or Threaded





7.0 Dimensions & Weights:

7.1 Grooved Valves - Ductile Iron, ANSI/AWWA C606 (Standard)



| Nominal Size | Inch | 1.5" | 2" | 2.5" | 3" | 4" | 6" | 8" |
|--------------|------|------|------|------|-------|-------|-------|-------|
| | mm | 40 | 50 | 65 | 80 | 100 | 150 | 200 |
| OD | Inch | 1.90 | 2.37 | 2.87 | 3.50 | 4.50 | 6.63 | 8.63 |
| | mm | 48.3 | 60.3 | 73 | 88.9 | 114.3 | 168.3 | 219.1 |
| L | Inch | 8.07 | 8.27 | 8.46 | 9.84 | 12.60 | 16.34 | 19.69 |
| | mm | 205 | 210 | 215 | 250 | 320 | 415 | 500 |
| W | Inch | 4.80 | 4.80 | 4.80 | 6.61 | 7.87 | 12.60 | 15.35 |
| | mm | 122 | 122 | 122 | 168 | 200 | 320 | 390 |
| h | Inch | 1.30 | 1.57 | 1.57 | 2.36 | 2.91 | 3.74 | 4.92 |
| | mm | 33 | 40 | 40 | 60 | 74 | 95 | 125 |
| H | Inch | 7.64 | 7.91 | 7.91 | 10.43 | 12.80 | 18.31 | 20.83 |
| | mm | 194 | 201 | 201 | 265 | 325 | 465 | 529 |
| Weight | lb. | 13 | 14 | 14 | 37 | 64 | 128 | 225 |
| | Kg | 6 | 6.2 | 6.5 | 17 | 29 | 58 | 102 |
| M | Inch | 3.86 | 3.86 | 4.17 | 5.67 | 6.89 | 12.36 | 15.43 |
| | mm | 98 | 98 | 106 | 144 | 175 | 314 | 392 |
| T | Inch | 8.46 | 8.74 | 8.74 | 9.06 | 9.29 | 9.88 | 10.35 |
| | mm | 215 | 222 | 222 | 230 | 236 | 251 | 263 |

■ Notes:

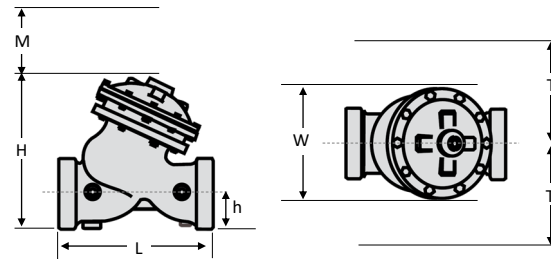
- Clearances T are based on the use of both sides of the valve for control accessories. In cases where both sides are not used, the clearance of the unused side should be equal to W
- M - Minimal required space for actuator replacement and trim clearance
- Dimensions & Weights tables refer to basic valves
- Envelope dimensions vary according to valve model
- Control loop and control accessories adds approximately 5 lbs./2.3 kg to the weight of a basic valve





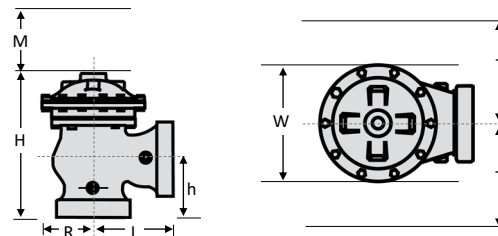
7.2 Threaded Valves - Ductile Iron, NPT, BSP

| Nominal Size | Inch | 1.5" | 2" | 2.5" | 3" |
|--------------|------|------|------|------|-------|
| | mm | 40 | 50 | 65 | 80 |
| L | Inch | 6.10 | 6.10 | 8.35 | 9.84 |
| | mm | 155 | 155 | 212 | 250 |
| W | Inch | 5.08 | 5.08 | 5.08 | 6.42 |
| | mm | 129 | 129 | 129 | 163 |
| h | Inch | 1.46 | 1.57 | 1.89 | 2.20 |
| | mm | 37 | 40 | 48 | 56 |
| H | Inch | 7.91 | 7.99 | 8.23 | 10.39 |
| | mm | 201 | 203 | 209 | 264 |
| Weight | lb. | 12 | 12 | 18 | 37 |
| | Kg | 5.5 | 5.5 | 8 | 17 |
| M | Inch | 3.86 | 3.86 | 4.17 | 5.67 |
| | mm | 98 | 98 | 106 | 144 |
| T | Inch | 8.46 | 8.74 | 8.74 | 9.06 |
| | mm | 215 | 222 | 222 | 230 |



7.3 Threaded Valves Angle - Ductile Iron, NPT, BSP

| Nominal Size | Inch | 1.5" | 2" | 2.5" | 3" |
|--------------|------|------|------|------|-------|
| | mm | 40 | 50 | 65 | 80 |
| L | Inch | - | 4.76 | 5.51 | 6.26 |
| | mm | - | 121 | 140 | 159 |
| R | Inch | - | 2.44 | 2.44 | 3.15 |
| | mm | - | 62 | 62 | 80 |
| W | Inch | - | 4.84 | 4.84 | 6.42 |
| | mm | - | 123 | 123 | 163 |
| h | Inch | - | 3.27 | 4.02 | 4.53 |
| | mm | - | 83 | 102 | 115 |
| H | Inch | - | 8.86 | 9.53 | 11.57 |
| | mm | - | 225 | 242 | 294 |
| Weight | lb. | - | 12 | 15 | 33 |
| | Kg | - | 5.5 | 7 | 15 |
| M | Inch | - | 3.86 | 4.17 | 5.67 |
| | mm | - | 98 | 106 | 144 |
| T | Inch | - | 8.74 | 8.74 | 9.06 |
| | mm | - | 222 | 222 | 230 |



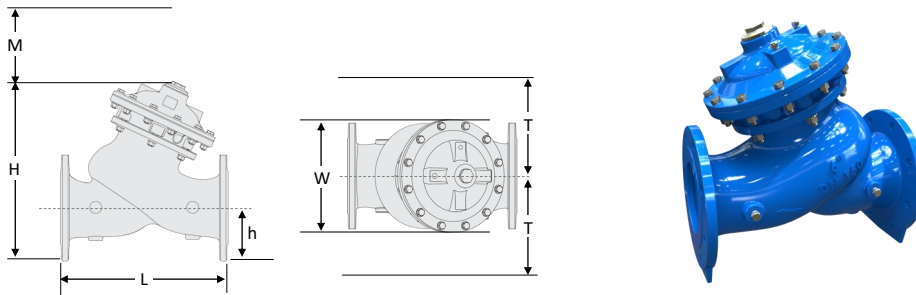
■ Notes:

- Clearances T are based on the use of both sides of the valve for control accessories. In cases where both sides are not used, the clearance of the unused side should be equal to W
- M - Minimal required space for actuator replacement and trim clearance
- Dimensions & Weights tables refer to basic valves
- Envelope dimensions vary according to valve model
- Control loop and control accessories adds approximately 5 lbs./2.3 kg to the weight of a basic valve





7.4 Flanged Valves - Ductile Iron, Sigma Series - Class ANSI150 and ANSI300



| Nominal Size | Inch mm | 1.5" | 2" | 2.5" | 3" | 4" | 6" | 8" | 10" | 12" | 14"* | 16" | 18"* | 20"* | 24"* |
|--------------|------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 40 | 50 | 65 | 80 | 100 | 150 | 200 | 250 | 300 | 350* | 400 | 450* | 500* | 600* |
| L | Inch | 9.06 | 9.06 | 11.42 | 12.20 | 13.78 | 18.90 | 23.62 | 28.74 | 33.46 | 38.58 | 43.31 | 47.24 | 49.21 | 57.09 |
| | mm | 230 | 230 | 290 | 310 | 350 | 480 | 600 | 730 | 850 | 980 | 1100 | 1200 | 1250 | 1450 |
| W | Inch | 6.10 | 6.50 | 7.48 | 8.27 | 10.04 | 12.60 | 15.75 | 18.90 | 22.44 | 23.03 | 32.09 | 32.09 | 32.09 | 36.22 |
| | mm | 155 | 165 | 190 | 210 | 255 | 320 | 400 | 480 | 570 | 585 | 815 | 815 | 815 | 920 |
| h | Inch | 3.19 | 3.39 | 3.82 | 4.25 | 5.12 | 6.42 | 7.60 | 8.94 | 10.71 | 11.77 | 13.15 | 14.21 | 15.67 | 19.29 |
| | mm | 81 | 86 | 97 | 108 | 130 | 163 | 193 | 227 | 272 | 299 | 334 | 361 | 398 | 490 |
| H | Inch | 9.21 | 9.69 | 11.57 | 13.11 | 15.59 | 20.24 | 24.33 | 28.54 | 34.69 | 35.79 | 46.10 | 47.05 | 48.03 | 48.82 |
| | mm | 234 | 246 | 294 | 333 | 396 | 514 | 618 | 725 | 881 | 909 | 1171 | 1195 | 1220 | 1240 |
| Weight | lb. | 26 | 31 | 60 | 77 | 121 | 212 | 348 | 564 | 888 | 1008 | 2147 | 2258 | 2392 | 2844 |
| | Kg | 12 | 14 | 27 | 35 | 55 | 96 | 158 | 256 | 403 | 457 | 974 | 1024 | 1085 | 1290 |
| M | Inch | 3.86 | 3.86 | 4.25 | 5.67 | 6.89 | 12.36 | 15.43 | 19.96 | 24.21 | 24.21 | 32.48 | 32.48 | 32.48 | 32.48 |
| | mm | 98 | 98 | 108 | 144 | 175 | 314 | 392 | 507 | 615 | 615 | 825 | 825 | 825 | 825 |
| T | Inch | 8.86 | 8.86 | 9.06 | 9.17 | 9.92 | 9.92 | 10.35 | 10.83 | 11.38 | 12.72 | 13.31 | 12.72 | 14.49 | 14.49 |
| | mm | 225 | 225 | 230 | 233 | 252 | 252 | 263 | 275 | 289 | 323 | 338 | 323 | 368 | 368 |

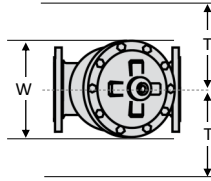
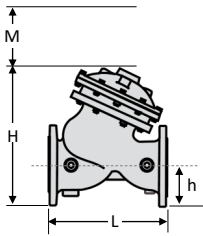
■ Notes:

- * Reduced bore
- Clearances T are based on the use of both sides of the valve for control accessories. In cases where both sides are not used, the clearance of the unused side should be equal to W
- M - Minimal required space for actuator replacement and trim clearance
- Dimensions & Weights tables refer to basic valves
- Envelope dimensions vary according to valve model
- Control loop and control accessories adds approximately 5 lbs./2.3 kg to the weight of a basic valve





7.5 Flanged Valves - Stainless Steel



| Nominal Size | | Inch | 1.5" | 2" | 2.5" | 3" | 4" | 6" | 8" | 10" | 12" |
|----------------------------|--------|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| | | mm | 40 | 50 | 65 | 80 | 100 | 150 | 200 | 250 | 300 |
| ANSI 150# & PN 10/16 | L | Inch | 8.07 | 8.07 | 8.46 | 9.84 | 12.60 | 16.34 | 19.69 | 23.82 | 28.54 |
| | | mm | 205 | 205 | 215 | 250 | 320 | 415 | 500 | 605 | 725 |
| | W | Inch | 6.10 | 6.50 | 7.01 | 7.87 | 8.78 | 12.60 | 15.35 | 18.90 | 21.93 |
| | | mm | 155 | 165 | 178 | 200 | 223 | 320 | 390 | 480 | 557 |
| | h | Inch | 3.07 | 3.27 | 3.50 | 3.94 | 4.37 | 5.63 | 6.77 | 8.15 | 9.53 |
| | | mm | 78 | 83 | 89 | 100 | 111 | 143 | 172 | 207 | 242 |
| | H | Inch | 9.41 | 9.61 | 9.84 | 12.17 | 14.21 | 20.16 | 22.99 | 27.40 | 32.36 |
| | | mm | 239 | 244 | 250 | 309 | 361 | 512 | 584 | 696 | 822 |
| | Weight | lb. | 20 | 23 | 29 | 49 | 82 | 165 | 276 | 478 | 816 |
| | | Kg | 9.1 | 10.6 | 13 | 22 | 37 | 75 | 125 | 217 | 370 |
| ANSI 300# & PN25 | L | Inch | 8.07 | 8.27 | 8.74 | 10.39 | 13.19 | 17.05 | 20.63 | 25.08 | 30.00 |
| | | mm | 205 | 210 | 222 | 264 | 335 | 433 | 524 | 637 | 762 |
| | W | Inch | 6.10 | 6.50 | 7.48 | 8.27 | 10.00 | 12.60 | 15.35 | 18.58 | 21.93 |
| | | mm | 155 | 165 | 190 | 210 | 254 | 320 | 390 | 472 | 557 |
| | h | Inch | 3.07 | 3.27 | 3.74 | 4.13 | 5.00 | 6.26 | 7.52 | 8.78 | 10.28 |
| | | mm | 78 | 83 | 95 | 105 | 127 | 159 | 191 | 223 | 261 |
| | H | Inch | 9.41 | 9.61 | 10.12 | 12.36 | 14.88 | 20.79 | 23.70 | 27.99 | 33.27 |
| | | mm | 239 | 244 | 257 | 314 | 378 | 528 | 602 | 711 | 845 |
| | Weight | lb. | 22 | 27 | 33 | 55 | 95 | 187 | 322 | 540 | 904 |
| | | Kg | 10 | 12.2 | 15 | 25 | 43 | 85 | 146 | 245 | 410 |
| M | Inch | 3.86 | 3.86 | 4.17 | 5.67 | 6.89 | 12.36 | 15.43 | 19.96 | 24.21 | |
| | mm | 98 | 98 | 106 | 144 | 175 | 314 | 392 | 507 | 615 | |
| T | Inch | 8.46 | 8.74 | 8.74 | 9.06 | 9.29 | 9.88 | 10.35 | 10.87 | 11.54 | |
| | mm | 215 | 222 | 222 | 230 | 236 | 251 | 263 | 276 | 293 | |

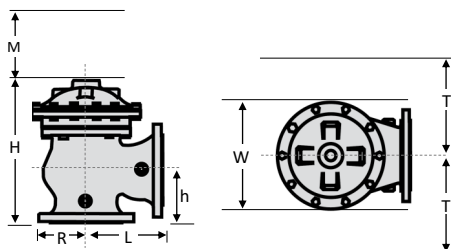
■ Notes:

- Clearances T are based on the use of both sides of the valve for control accessories. In cases where both sides are not used, the clearance of the unused side should be equal to W
- M - Minimal required space for actuator replacement and trim clearance
- Dimensions & Weights tables refer to basic valves
- Envelope dimensions vary according to valve model
- Control loop and control accessories adds approximately 5 lbs./2.3 kg to the weight of a basic valve





7.6 Flanged Valves - Ductile Iron, Angel



| Nominal Size | | Inch | 1.5" | 2" | 2.5" | 3" | 4" | 6" | 8" | 10" | 12" | 14"* | 16" | 18"* |
|----------------------------|--------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | mm | 40 | 50 | 65 | 80 | 100 | 150 | 200 | 250 | 300 | 350* | 400 | 450* |
| ANSI 150# & PN 10/16 | L | Inch | 4.88 | 4.88 | 5.87 | 5.98 | 7.52 | 8.86 | 10.43 | 12.60 | 15.59 | 15.75 | 17.72 | 17.72 |
| | | mm | 124 | 124 | 149 | 152 | 191 | 225 | 265 | 320 | 396 | 400 | 450 | 450 |
| | R | Inch | 3.27 | 3.27 | 3.74 | 3.94 | 4.53 | 6.30 | 7.68 | 7.99 | 10.98 | 10.39 | 12.60 | 12.60 |
| | | mm | 83 | 83 | 95 | 100 | 115 | 160 | 195 | 203 | 279 | 264 | 320 | 320 |
| | W | Inch | 6.50 | 6.50 | 7.01 | 7.87 | 9.02 | 12.60 | 15.35 | 18.90 | 21.97 | 21.97 | 29.13 | 29.13 |
| | | mm | 165 | 165 | 178 | 200 | 229 | 320 | 390 | 480 | 558 | 558 | 740 | 740 |
| | h | Inch | 3.35 | 3.35 | 4.29 | 4.02 | 5.00 | 5.98 | 7.99 | 8.74 | 10.83 | 10.98 | 14.57 | 14.57 |
| | | mm | 85 | 85 | 109 | 102 | 127 | 152 | 203 | 222 | 275 | 279 | 370 | 370 |
| | H | Inch | 8.94 | 8.94 | 9.88 | 11.06 | 13.39 | 17.32 | 21.61 | 24.92 | 30.63 | 30.75 | 42.68 | 42.68 |
| | | mm | 227 | 227 | 251 | 281 | 340 | 440 | 549 | 633 | 778 | 781 | 1084 | 1084 |
| | Weight | lb. | 21 | 22 | 26 | 47 | 77 | 157 | 260 | 452 | 772 | 816 | 1764 | 1808 |
| | | Kg | 9.5 | 10 | 12 | 21.5 | 35 | 71 | 118 | 205 | 350 | 370 | 800 | 820 |
| ANSI 300# & PN25 | L | Inch | 4.88 | 4.88 | 5.87 | 6.26 | 7.87 | 9.21 | 10.91 | 13.23 | 16.34 | 16.50 | 18.39 | 18.39 |
| | | mm | 124 | 124 | 149 | 159 | 200 | 234 | 277 | 336 | 415 | 419 | 467 | 467 |
| | R | Inch | 3.07 | 3.27 | 3.74 | 4.13 | 5.00 | 6.26 | 7.52 | 8.78 | 10.28 | 11.54 | 12.76 | 14.09 |
| | | mm | 78 | 83 | 95 | 105 | 127 | 159 | 191 | 223 | 261 | 293 | 324 | 358 |
| | W | Inch | 6.50 | 6.50 | 7.48 | 8.27 | 10.00 | 12.60 | 15.00 | 17.52 | 20.51 | 23.03 | 25.59 | 27.99 |
| | | mm | 165 | 165 | 190 | 210 | 254 | 320 | 381 | 445 | 521 | 585 | 650 | 711 |
| | h | Inch | 3.35 | 3.35 | 4.29 | 4.29 | 5.31 | 6.50 | 8.50 | 9.29 | 11.57 | 11.77 | 15.20 | 15.20 |
| | | mm | 85 | 85 | 109 | 109 | 135 | 165 | 216 | 236 | 294 | 299 | 386 | 386 |
| | H | Inch | 8.94 | 8.94 | 9.88 | 11.30 | 13.78 | 17.83 | 21.97 | 25.55 | 31.34 | 31.54 | 43.27 | 43.27 |
| | | mm | 227 | 227 | 251 | 287 | 350 | 453 | 558 | 649 | 796 | 801 | 1099 | 1099 |
| | Weight | lb. | 24 | 25 | 30 | 51 | 90 | 179 | 304 | 514 | 860 | 937 | 1885 | 1918 |
| | | Kg | 11 | 11.5 | 13.5 | 23 | 41 | 81 | 138 | 233 | 390 | 425 | 855 | 870 |
| M | Inch | 3.86 | 3.86 | 4.17 | 5.67 | 6.89 | 12.36 | 15.43 | 19.96 | 24.21 | 24.21 | 32.48 | 32.48 | |
| | mm | 98 | 98 | 106 | 144 | 175 | 314 | 392 | 507 | 615 | 615 | 825 | 825 | |
| T | Inch | 8.46 | 8.74 | 8.74 | 9.06 | 9.29 | 9.88 | 10.35 | 10.87 | 11.54 | 11.54 | 12.24 | 12.24 | |
| | mm | 215 | 222 | 222 | 230 | 236 | 251 | 263 | 276 | 293 | 293 | 311 | 311 | |

■ Notes:

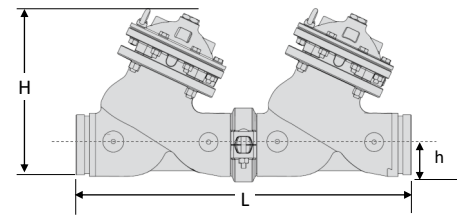
- Clearances T are based on the use of both sides of the valve for control accessories. In cases where both sides are not used, the clearance of the unused side should be equal to W
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- Dimensions & Weights tables refer to basic valves
- Envelope dimensions vary according to valve model
- Control loop and control accessories adds approximately 5 lbs./2.3 kg to the weight of a basic valve





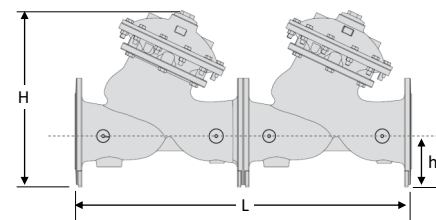
7.7 Grooved Dual Combo Valves 72S-H - ANSI/AWWA C606 (Standard)

| Nominal Size | Inch | 1.5" | 2" | 2.5" | 3" | 4" | 6" | 8" |
|--------------|------|-------|-------|-------|-------|-------|-------|-------|
| | mm | 40 | 50 | 65 | 80 | 100 | 150 | 200 |
| OD | Inch | 1.90 | 2.37 | 2.87 | 3.50 | 4.50 | 6.63 | 8.63 |
| | mm | 48.3 | 60.3 | 73 | 88.9 | 114.3 | 168.3 | 219.1 |
| L | Inch | 16.19 | 16.69 | 17.08 | 19.83 | 25.35 | 32.83 | 39.57 |
| | mm | 411 | 424 | 434 | 504 | 644 | 834 | 1005 |
| W | Inch | 4.80 | 4.80 | 4.80 | 6.61 | 7.87 | 12.60 | 15.35 |
| | mm | 122 | 122 | 122 | 168 | 200 | 320 | 390 |
| h | Inch | 1.30 | 1.57 | 1.57 | 2.36 | 2.91 | 3.74 | 4.92 |
| | mm | 33 | 40 | 40 | 60 | 74 | 95 | 125 |
| H | Inch | 7.64 | 7.91 | 7.91 | 10.43 | 12.80 | 18.31 | 20.83 |
| | mm | 194 | 201 | 201 | 265 | 325 | 465 | 529 |
| Weight | lb. | 31 | 32 | 33 | 79 | 132 | 263 | 457 |
| | Kg | 14 | 14.4 | 15 | 36 | 60 | 120 | 208 |



7.8 Flanged, Dual Combo Valves 72S-H– Ductile Iron, Sigma Series

| Nominal Size | Inch | 1.5" | 2" | 2.5" | 3" | 4" | 6" | 8" |
|--------------|------|-------|-------|-------|-------|-------|-------|-------|
| | mm | 40 | 50 | 65 | 80 | 100 | 150 | 200 |
| L | Inch | 18.23 | 18.23 | 22.95 | 24.53 | 27.68 | 37.91 | 47.36 |
| | mm | 463 | 463 | 583 | 623 | 703 | 963 | 1203 |
| W | Inch | 6.10 | 6.50 | 7.48 | 8.27 | 10.04 | 12.60 | 15.75 |
| | mm | 155 | 165 | 190 | 210 | 255 | 320 | 400 |
| h | Inch | 3.19 | 3.39 | 3.82 | 4.25 | 5.12 | 6.42 | 7.60 |
| | mm | 81 | 86 | 97 | 108 | 130 | 163 | 193 |
| H | Inch | 9.21 | 9.69 | 11.57 | 13.11 | 15.59 | 20.24 | 24.33 |
| | mm | 234 | 246 | 294 | 333 | 396 | 514 | 618 |
| Weight | lb. | 54 | 63 | 120 | 155 | 244 | 424 | 698 |
| | Kg | 25 | 29 | 55 | 71 | 111 | 193 | 317 |



- Notes:
 - Dimensions & Weights tables refer to basic valves
 - Envelope dimensions vary according to valve model
 - Control loop and control accessories adds approximately 10 lbs./ 5 kg to the weight of a basic valves



8.0 Performance—Modulating Valves (with V-Port)

8.1 Design Flow Rate (based on 10 ft/s)

| Inch | 1.5" | 2" | 2.5" | 3" | 4" | 6" | 8" | 10" | 12" | 14" | 16" | 18" | 20" | 24" |
|--------------------|------|-----|------|------|------|------|-------|-------|-------|-----------------|-----|-----|-----|-----|
| mm | 40 | 50 | 65 | 80 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 |
| GPM | 55 | 98 | 153 | 220 | 391 | 881 | 1,566 | 2,447 | 3,523 | Consult Factory | | | | |
| m ³ /hr | 13 | 22 | 35 | 50 | 89 | 200 | 356 | 556 | 800 | | | | | |
| l/sec | 3.5 | 6.2 | 9.6 | 13.9 | 24.7 | 55.6 | 98.8 | 154.4 | 222.3 | | | | | |

8.2 Design Flow Rate (based on 8 ft/s)

| Inch | 1.5" | 2" | 2.5" | 3" | 4" | 6" | 8" | 10" | 12" | 14" | 16" | 18" | 20" | 24" |
|--------------------|------|-----|------|------|------|------|-------|-------|-------|-----------------|-----|-----|-----|-----|
| mm | 40 | 50 | 65 | 80 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 |
| GPM | 44 | 78 | 122 | 176 | 313 | 705 | 1,253 | 1,957 | 2,819 | Consult Factory | | | | |
| m ³ /hr | 10 | 18 | 28 | 40 | 71 | 160 | 285 | 445 | 640 | | | | | |
| l/sec | 2.8 | 4.9 | 7.7 | 11.1 | 19.8 | 44.5 | 79.0 | 123.5 | 177.8 | | | | | |

8.3 Minimum Flow Rate

| Inch | 1.5" | 2" | 2.5" | 3" | 4" | 6" | 8" | 10" | 12" | 14" | 16" | 18" | 20" | 24" |
|--------------------|------|------|------|------|------|------|------|------|------|-----------------|-----|-----|-----|-----|
| mm | 40 | 50 | 65 | 80 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 |
| GPM | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | Consult Factory | | | | |
| m ³ /hr | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | | | | | |
| l/sec | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | | | | | |

8.4 Flow Properties - Grooved, Threaded and Stainless Steel Flanged Valves

| | Inch | 1.5" | 2" | 2.5" | 3" | 4" | 6" | 8" |
|----|------------------------|------|-----|------|-----|-----|-----|-----|
| | mm | 40 | 50 | 65 | 80 | 100 | 150 | 200 |
| Cv | psi, GPM | 42 | 50 | 54 | 113 | 196 | 452 | 800 |
| Kv | m ³ /hr/bar | 36 | 43 | 47 | 98 | 170 | 391 | 693 |
| K | - | 3.1 | 5.3 | 12.7 | 6.7 | 5.4 | 5.2 | 5.2 |

8.5 Flow Properties - Flanged, Ductile Iron Sigma Series

| | Inch | 1.5" | 2" | 2.5" | 3" | 4" | 6" | 8" | 10" | 12" | 14"* | 16" | 18"* | 20"* | 24"* |
|----|------------------------|------|-----|------|-----|-----|-----|-----|------|------|------|------|------|------|------|
| | mm | 40 | 50 | 65 | 80 | 100 | 150 | 200 | 250 | 300 | 350* | 400 | 450* | 500* | 600* |
| Cv | psi, GPM | 53 | 55 | 84 | 118 | 162 | 523 | 886 | 1513 | 2241 | 2145 | 3430 | 3430 | 3430 | 3430 |
| Kv | m ³ /hr/bar | 46 | 48 | 73 | 102 | 140 | 453 | 767 | 1310 | 1940 | 1857 | 2970 | 2970 | 2970 | 2970 |
| K | - | 1.9 | 4.3 | 5.3 | 6.2 | 8 | 3.9 | 4.3 | 3.6 | 3.4 | 6.8 | 4.6 | 7.3 | 11.1 | 23 |

8.6 Differential Pressure Calculation (for fully open valve)

Valve flow coefficient, Kv or Cv $Kv(Cv) = Q \sqrt{\frac{Gf}{\Delta P}}$
 Where:
 Kv = Valve flow coefficient (flow in m³/h at 1bar ΔP)
 Cv = Valve flow coefficient (flow in gpm at 1psiΔP)
 (Cv = 1.155 Kv)
 Q = Flow rate (m³/h ; gpm)
 ΔP = Differential pressure (bar ; psi)
 Gf = Liquid specific gravity (Water = 1.0)

Practical formulas for water:
 $Q = Kv \sqrt{\Delta P}$ $\Delta P = \left(\frac{Q}{Kv}\right)^2$

Flow resistance or Head loss coefficient, $K = \Delta H \frac{2g}{V^2}$
 Where:
 K = Flow resistance or Head loss coefficient (dimensionless)
 ΔH = Head loss (m ; feet)
 V = Nominal size flow velocity (m/sec ; feet/sec.)
 g = Acceleration of gravity (9.81 m/sec² ; 32.18 feet/sec²)

Practical formula:
 $\Delta H = K \frac{V^2}{2g}$





9.0 Performance—Non Modulating Valves (with Flat Disk)

9.1 Flow Properties - Grooved, Threaded and Stainless Steel Flanged Valves

| | Inch | 1.5" | 2" | 2.5" | 3" | 4" | 6" | 8" |
|----|------------------------|------|-----|------|-----|-----|-----|-----|
| | mm | 40 | 50 | 65 | 80 | 100 | 150 | 200 |
| Cv | psi, GPM | 49 | 58 | 64 | 133 | 231 | 531 | 941 |
| Kv | m ³ /hr/bar | 42 | 50 | 55 | 115 | 200 | 460 | 815 |
| K | - | 2.3 | 3.9 | 9.3 | 4.9 | 3.9 | 3.8 | 3.8 |

9.2 Flow Properties - Flanged, Ductile Iron Sigma Series

| | Inch | 1.5" | 2" | 2.5" | 3" | 4" | 6" | 8" | 10" | 12" | 14"* | 16" | 18"* | 20"* | 24"* |
|----|------------------------|------|-----|------|-----|-----|-----|------|------|------|------|------|------|------|------|
| | mm | 40 | 50 | 65 | 80 | 100 | 150 | 200 | 250 | 300 | 350* | 400 | 450* | 500* | 600* |
| Cv | psi, GPM | 66 | 72 | 113 | 150 | 231 | 624 | 1045 | 1709 | 2472 | 2472 | 3812 | 3812 | 3812 | 3812 |
| Kv | m ³ /hr/bar | 57 | 62 | 98 | 130 | 200 | 540 | 905 | 1480 | 2140 | 2140 | 3300 | 3300 | 3300 | 3300 |
| K | - | 1.2 | 2.6 | 2.9 | 3.8 | 3.9 | 2.7 | 3.1 | 2.8 | 2.8 | 5.1 | 3.7 | 5.9 | 9 | 18.7 |

9.3 Differential Pressure Calculation (for fully open valve)

Valve flow coefficient, Kv or Cv $Kv(Cv) = Q \sqrt{\frac{Gf}{\Delta P}}$
 Where:

Kv = Valve flow coefficient (flow in m³/h at 1bar ΔP)

Cv = Valve flow coefficient (flow in gpm at 1psiΔP)
 (Cv = 1.155 Kv)

Q = Flow rate (m³/h ; gpm)

ΔP = Differential pressure (bar ; psi)

Gf = Liquid specific gravity (Water = 1.0)

Practical formulas for water:

$$Q = Kv \sqrt{\Delta P} \quad \Delta P = \left(\frac{Q}{Kv} \right)^2$$

Flow resistance or Head loss coefficient, $K = \Delta H \frac{2g}{V^2}$
 Where:

K = Flow resistance or Head loss coefficient (dimensionless)

ΔH = Head loss (m ; feet)

V = Nominal size flow velocity (m/sec ; feet/sec.)

g = Acceleration of gravity (9.81 m/sec² ; 32.18 feet/sec²)

Practical formula:

$$\Delta H = K \frac{V^2}{2g}$$

