

# 77-648-27 SERIES

## 2" Full Port 3-Way Diversion Bronze Ball Valve

Female NPT Thread, 2" 400 CWP (psig), Cold Non-Shock

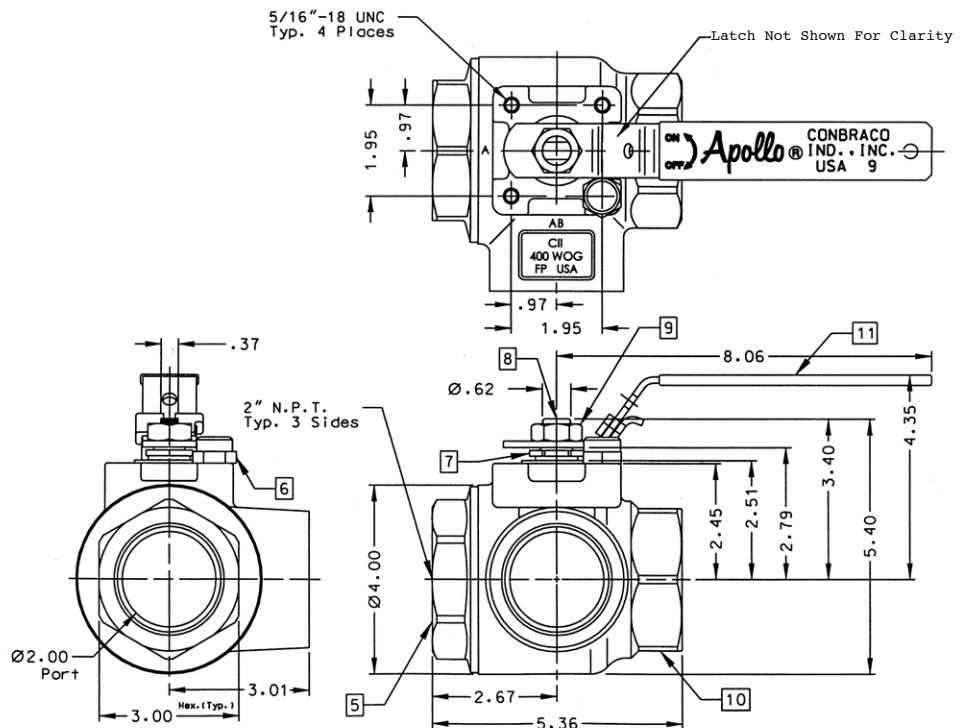
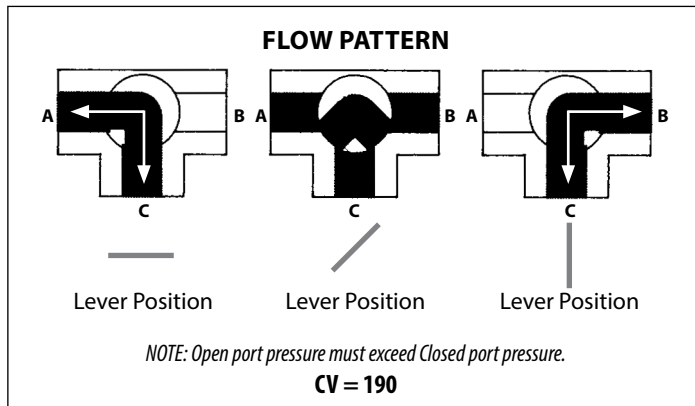


### FEATURES

- Cast Body & Retainer
- MPTFE seats and stem packing
- Four Bolt ISO Mounting ISO 5211 (F07)
- Blow-out-proof stem design
- Adjustable packing gland
- SS Lever and Nut
- Latch Lock Lever

### STANDARD MATERIAL LIST

|    | PART           | MATERIAL         |
|----|----------------|------------------|
| 1  | Stem packing   | MPTFE            |
| 2  | Stem bearing   | RPTFE            |
| 3  | Ball           | A276 316 SS      |
| 4  | Seat (2)       | MPTFE            |
| 5  | Retainer       | ASTM B584 C84400 |
| 6  | Stop           | A276 316 SS      |
| 7  | Gland          | ASTM B-16        |
| 8  | Stem           | A276 316 SS      |
| 9  | Lever Nut      | 304 SS           |
| 10 | Body           | ASTM B584 C84400 |
| 11 | Lever and Grip | SS w/Vinyl       |



FOR PRESSURE/TEMPERATURE RATINGS, REFER TO PAGE M-10, GRAPH NO. 3

# FLOW DATA

## For Apollo® Ball Valves

The listed Cv "factors" are derived from actual flow testing, in the Apollo® Ball Valve Division, Conbraco Industries, Inc., Pageland, South Carolina. These tests were completed using standard "off the shelf" valves with no special preparation and utilizing standard schedule 40 pipe. It should be understood that these factors are for the valve only and also include the connection configuration. The flow testing is done utilizing water as a fluid media and is a direct statement of the gallons of water flowed per minute with a 1 psig pressure differential across the valve/connection unit. Line pressure is not a factor. Because the Cv is a factor, the formula can be used to estimate flow of most media for valve sizing.

### FLOW OF LIQUID

$$Q = C_v \sqrt{\frac{\Delta P}{\text{SpGr}}}$$

$$\text{or } \Delta P = \frac{(Q)^2 (\text{SpGr})}{(C_v)^2}$$

#### Where:

Q = flow in US gpm  
 ΔP = pressure drop (psig)  
 SpGr = specific gravity at flowing temperature  
 Cv = valve constant

### FLOW OF GAS

$$Q = 1360 C_v \sqrt{\frac{(\Delta P) (P_2)}{(\text{SpGr}) (T)}}$$

$$\text{or } \Delta P = \frac{5.4 \times 10^{-7} (\text{SpGr}) (T) (Q)^2}{(C_v)^2 (P_2)}$$

#### Where:

Q = flow in SCFH  
 ΔP = pressure drop (psig)  
 SpGr = specific gravity (based on air = 1.0)  
 P<sub>2</sub> = outlet pressure-psia (psig + 14.7)  
 T = (temp. °F + 460)  
 Cv = valve constant

### Cv FACTORS FOR APOLLO VALVES

| SIZE (IN.)<br>VALVE | 1/4 | 3/8 | 1/2 | 3/4 | 1  | 1.25 | 1.5 | 2   | 2.5 | 3    | 4    | 6  | 8  | 10 | 12 |
|---------------------|-----|-----|-----|-----|----|------|-----|-----|-----|------|------|----|----|----|----|
| 32-100/200 Series   | 5.1 | 6.6 | 8   | 24  | 30 | 45   | 55  | 95  | --  | --   | --   | -- | -- | -- | -- |
| 64-100/200 Series   | 6   | 7   | 19  | 34  | 50 | 104  | 268 | 309 | 629 | 1018 | 1622 | -- | -- | -- | -- |
| 64W Series          | --  | --  | --  | --  | -- | --   | --  | --  | 629 | 1018 | 1622 | -- | -- | -- | -- |
| 70B-140 Series      | 8.4 | 7.2 | 15  | 30  | 43 | 48   | 84  | 108 | 190 | 370  | 670  | -- | -- | -- | -- |
| 70-100/200 Series   | 8.4 | 7.2 | 15  | 30  | 43 | 48   | 84  | 108 | 190 | 370  | 670  | -- | -- | -- | -- |
| 70-300/400 Series   | --  | --  | 15  | 30  | 43 | 48   | 84  | 108 | --  | --   | --   | -- | -- | -- | -- |
| 70-600 Series       | 2.3 | 4.5 | 5.4 | 12  | 14 | 21   | 34  | 47  | --  | --   | --   | -- | -- | -- | -- |
| 70-800 Series       | 8.4 | 7.2 | 15  | 30  | 43 | 48   | 84  | --  | --  | --   | --   | -- | -- | -- | -- |
| 71AR Series         | --  | --  | --  | 30  | 43 | 48   | 84  | 108 | 190 | 370  | --   | -- | -- | -- | -- |
| 71-100/200 Series   | --  | --  | --  | 30  | 43 | 48   | 84  | 108 | 190 | 370  | --   | -- | -- | -- | -- |
| 72-100/900 Series   | --  | --  | 26  | 48  | 65 | 125  | 170 | 216 | --  | --   | --   | -- | -- | -- | -- |
| 73A-100 Series      | 8.4 | 7.2 | 15  | 30  | 43 | 48   | 84  | 108 | --  | --   | --   | -- | -- | -- | -- |
| 73-300/400 Series   | --  | --  | 26  | 48  | 65 | 125  | 170 | 216 | --  | --   | --   | -- | -- | -- | -- |
| 74-100 Series       | 8.4 | 7.2 | 15  | 30  | 43 | 48   | 84  | 108 | 190 | 370  | 670  | -- | -- | -- | -- |
| 75-100 Series       | 8.4 | 7.2 | 15  | 30  | 43 | 48   | 84  | 108 | 190 | 370  | 670  | -- | -- | -- | -- |
| 76AR Series         | 8.4 | 7.2 | 15  | 30  | 43 | 48   | 84  | 108 | 190 | 370  | 670  | -- | -- | -- | -- |
| 76F-100 Series      | 8.1 | 15  | 15  | 51  | 68 | 125  | 177 | 389 | --  | --   | --   | -- | -- | -- | -- |
| 76-100 Series       | 8.4 | 7.2 | 15  | 30  | 43 | 48   | 84  | 108 | 190 | 370  | --   | -- | -- | -- | -- |
| 76-300/400 Series   | --  | --  | 26  | 48  | 65 | 125  | 170 | 216 | --  | --   | --   | -- | -- | -- | -- |
| 76-600 Series       | 2.3 | 4.5 | 5.4 | 12  | 14 | 21   | 34  | 47  | --  | --   | --   | -- | -- | -- | -- |
| 7K-100 Series       | --  | --  | 15  | 51  | 68 | 125  | 177 | 389 | 503 | --   | --   | -- | -- | -- | -- |
| 77AR Series         | 8.1 | 15  | 15  | 51  | 68 | 125  | 177 | 389 | --  | --   | --   | -- | -- | -- | -- |
| 77C-100/200 Series  | 4.5 | 7.2 | 16  | 36  | 68 | 125  | 177 | 389 | 503 | --   | --   | -- | -- | -- | -- |
| 77D-140 Series      | 4.5 | 7.2 | 16  | 36  | 68 | 125  | 177 | 389 | --  | --   | --   | -- | -- | -- | -- |
| 77D-640 Series      | --  | --  | --  | 11  | 24 | 35   | --  | --  | --  | --   | --   | -- | -- | -- | -- |
| 77G-UL Series       | 4.5 | 7.2 | 16  | 36  | 68 | 125  | 177 | 389 | 503 | --   | --   | -- | -- | -- | -- |
| 77W Series          | --  | --  | 16  | 36  | 68 | 125  | 177 | 389 | --  | --   | --   | -- | -- | -- | -- |
| 77X Series          | --  | --  | 16  | 36  | 68 | --   | --  | --  | --  | --   | --   | -- | -- | -- | -- |
| 77-100/200 Series   | 8.1 | 15  | 15  | 51  | 68 | 125  | 177 | 389 | 503 | --   | --   | -- | -- | -- | -- |
| 79 Series           | 8.5 | 8.5 | 9.8 | 32  | 44 | 66   | 148 | 218 | 440 | 390  | --   | -- | -- | -- | -- |

continued on next page

# FLOW DATA

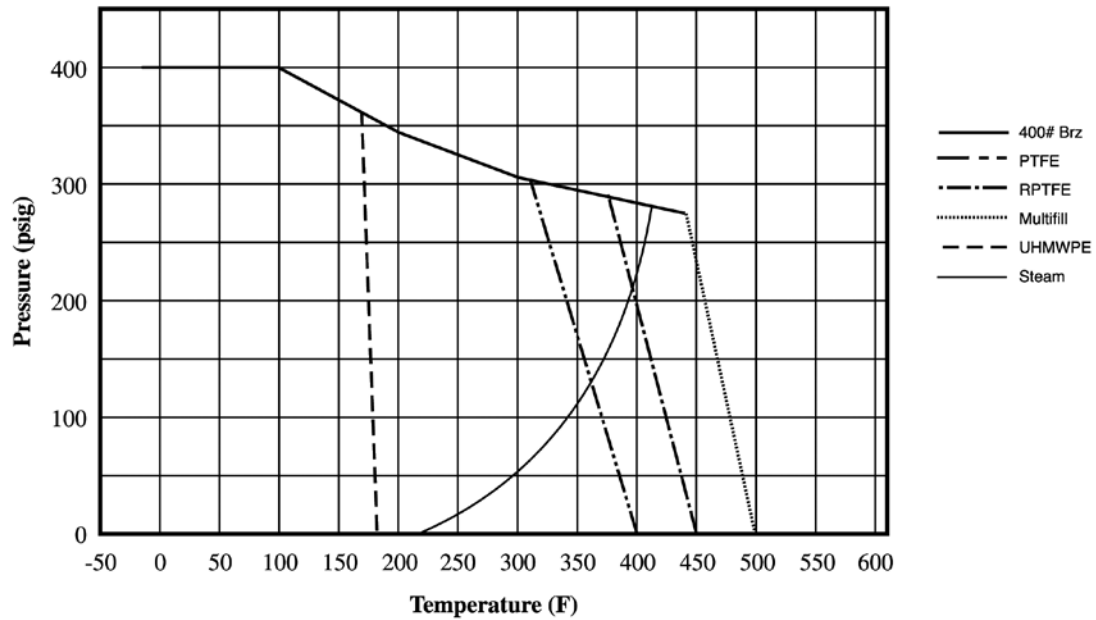
## For Apollo® Ball Valves

### Cv FACTORS FOR APOLLO VALVES (continued from page M-3)

| SIZE (IN.)         | 1/4 | 3/8 | 1/2 | 3/4 | 1  | 1.25 | 1.5 | 2   | 2.5 | 3    | 4    | 6    | 8    | 10    | 12    |
|--------------------|-----|-----|-----|-----|----|------|-----|-----|-----|------|------|------|------|-------|-------|
| VALVE              |     |     |     |     |    |      |     |     |     |      |      |      |      |       |       |
| 80/81 Series       | 8.4 | 7.2 | 15  | 30  | 43 | 48   | 84  | 108 | 190 | 370  | --   | --   | --   | --    | --    |
| 82-100/200 Series  | 8.1 | 14  | 26  | 51  | 68 | 120  | 170 | 376 | 510 | 996  | 1893 | --   | --   | --    | --    |
| 83A/83B Series     | 8.1 | 14  | 26  | 51  | 68 | 120  | 170 | 376 | --  | --   | --   | --   | --   | --    | --    |
| 83R-100/200 Series | --  | --  | --  | --  | -- | --   | 170 | 376 | --  | 996  | 1893 | --   | --   | --    | --    |
| 86A/86B Series     | 8.1 | 14  | 26  | 51  | 68 | 120  | 170 | 376 | --  | --   | --   | --   | --   | --    | --    |
| 86R-100/200 Series | --  | --  | --  | --  | -- | --   | 170 | 376 | --  | 996  | 1893 | --   | --   | --    | --    |
| 87A-100 Series     | --  | --  | --  | --  | -- | --   | 86  | 104 | 234 | 375  | 673  | 1099 | 1902 | 3890  | --    |
| 87A-200 Series     | --  | --  | 15  | 19  | 75 | --   | 195 | 410 | 545 | 1021 | 2016 | 4837 | 9250 | 15170 | 22390 |
| 87A-700 Series     | --  | --  | --  | --  | -- | --   | 86  | 104 | 234 | 375  | 673  | 1099 | 1902 | 3890  | --    |
| 87A-900 Series     | --  | --  | 15  | 19  | 75 | --   | 195 | 410 | 545 | 1021 | 2016 | 4837 | 9250 | 15170 | 22390 |
| 87B-100 Series     | --  | --  | --  | --  | -- | --   | --  | --  | --  | 375  | 673  | 1099 | 1902 | 3890  | --    |
| 88A-100 Series     | --  | --  | --  | --  | -- | --   | 86  | 104 | 234 | 375  | 673  | 1099 | 1902 | 3890  | --    |
| 88A-200 Series     | --  | --  | 15  | 19  | 75 | --   | 195 | 410 | 545 | 1021 | 2016 | 4837 | 9250 | 15170 | 22390 |
| 88A-700 Series     | --  | --  | --  | --  | -- | --   | 86  | 104 | 234 | 375  | 673  | 1099 | 1902 | 3890  | --    |
| 88A-900 Series     | --  | --  | 15  | 19  | 75 | --   | 195 | 410 | 545 | 1021 | 2016 | 4837 | 9250 | 15170 | 22390 |
| 88B-100 Series     | --  | --  | --  | --  | -- | --   | --  | --  | --  | 375  | 673  | 1099 | 1902 | 3890  | --    |
| 89-100 Series      | 8.4 | 7.2 | 15  | 30  | 43 | 48   | 84  | 108 | 190 | 370  | --   | --   | --   | --    | --    |
| 9A-100 Series      | 8.3 | 6.7 | 5.7 | 10  | 16 | 25   | 40  | 62  | --  | --   | --   | --   | --   | --    | --    |
| 91-100 Series      | 8.3 | 6.7 | 5.7 | 10  | 16 | 25   | 40  | 62  | --  | --   | --   | --   | --   | --    | --    |
| 92-100 Series      | 8.3 | 6.7 | 5.7 | 10  | 16 | 25   | 40  | 62  | --  | --   | --   | --   | --   | --    | --    |
| 93-100 Series      | 8.3 | 6.7 | 5.7 | 10  | 16 | 25   | 40  | 62  | --  | --   | --   | --   | --   | --    | --    |
| 94A-100/200 Series | 6   | 7   | 19  | 34  | 50 | 104  | 268 | 309 | 629 | 1018 | 1622 | --   | --   | --    | --    |
| 95-100/200 Series  | --  | --  | 15  | 51  | 68 | --   | --  | --  | --  | --   | --   | --   | --   | --    | --    |
| 95A-300/400 Series | --  | --  | 19  | 34  | 50 | --   | --  | --  | --  | --   | --   | --   | --   | --    | --    |
| 96-100 Series      | 8.3 | 6.7 | 5.7 | 10  | 16 | 25   | 40  | 62  | --  | --   | --   | --   | --   | --    | --    |
| 399-100 Series     | 8.4 | 7.2 | 15  | 30  | 43 | 48   | 84  | 108 | 190 | 370  | --   | --   | --   | --    | --    |
| 489-100 Series     | 8.4 | 7.2 | 15  | 30  | 43 | 48   | 84  | 108 | 190 | 370  | --   | --   | --   | --    | --    |

# PRESSURE TEMPERATURE RATINGS

## 400# Bronze (GRAPH 3)



## 600# Bronze (GRAPH 4)

