

FOR STANDARDS COMPLIANCE AND STANDARD FEATURES REFER TO PAGE D-3.

### STANDARD MATERIAL LIST

|    | PART             | MATERIAL                                                                      |
|----|------------------|-------------------------------------------------------------------------------|
| 1  | Body             | ASTM A216 WCB                                                                 |
| 2  | Retainer         | ASTM A108 Type 1215                                                           |
| 3  | Ball             | ASTM A108, Carbon Steel, Chrome Plated or ASTM A276, Type 316 Stainless Steel |
| 4  | Stem             | ASTM A108 Type 1215                                                           |
| 5  | Packing Gland    | ASTM A108 Type 1215                                                           |
| 6  | Stem Seals       | PTFE                                                                          |
| 7  | Seats            | RPTFE                                                                         |
| 8  | Gland Screws     | ASTM A193 B7                                                                  |
| 9  | Gland Plate      | 302 & 304 SS                                                                  |
| 10 | Stem Nut         | 316 SS                                                                        |
| 11 | Lever            | ASTM A366 Steel with Vinyl Grip                                               |
| 12 | Stem Bearing     | RPTFE                                                                         |
| 13 | Stop             | ASTM A108 Type 1215                                                           |
| 14 | Stop Screw       | SAE J429 Grade 2                                                              |
| 15 | Lock Plate       | ASTM A366 Steel                                                               |
| 16 | Body Seal        | RPTFE                                                                         |
| 17 | Lockwasher       | 302 or 304 SS                                                                 |
| 18 | Grounding Spring | SS                                                                            |

### VARIATIONS AVAILABLE

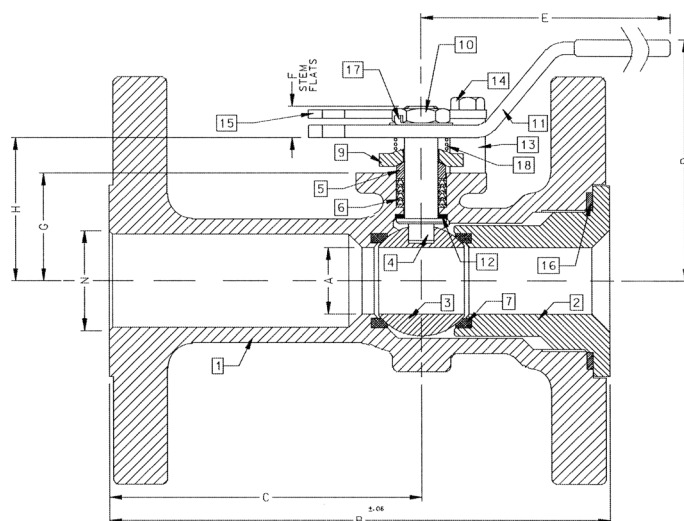
- 88A-740 Series (316 SS Ball & Stem)
- 88A-730 Series (Ni-Cu Ball & Stem)

### OPTIONS AVAILABLE

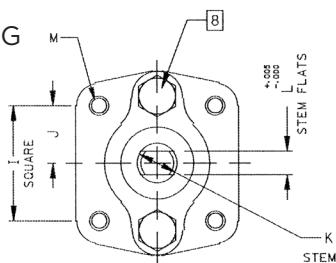
(MORE INFORMATION IN SECTION J)

- Minimum quantities apply.
- To specify an option, replace the "01" standard suffix with the suffix of the option.
- To specify multiple options, replace the "01" suffix with the desired suffixes in the numerical order shown below. NOTE: Not all suffixes can be combined together.

| (SUFFIX) | OPTION                                                                                                                           |
|----------|----------------------------------------------------------------------------------------------------------------------------------|
| -01      | Standard Configuration                                                                                                           |
| -04-     | 2.25" Stem Extension (Carbon Steel, Zinc Plated)                                                                                 |
| -10-     | SS Lever and Nut                                                                                                                 |
| -14-     | Side Vented Ball (Uni-Directional). Not available with plated CS ball.                                                           |
| -15-     | Wheel Handle, Steel                                                                                                              |
| -21-     | UHMWPE Seats                                                                                                                     |
| -24-     | Graphite packing, spiral wound graphite body seal, RPTFE bearing (API 607, 5th edition, ISO 10497-5:2004)                        |
| -26-     | Chlorine Service. Vented. Special Cleaning. Assembled dry. (for CS, Hastelloy and Ni-Cu valves. Ball must be Hastelloy or Ni-CU) |
| -35-     | PTFE Seats and Seals                                                                                                             |
| -38-     | PEEK Seats and Graphite Packing                                                                                                  |
| -49-     | No Lubrication. Assembled Dry.                                                                                                   |
| -65-     | MPTFE Seats and Graphite Packing (Fire Safe)                                                                                     |
| -67-     | Cleaned For Industrial Gases                                                                                                     |
| -69-     | Drilled and Tapped Purge Ports with Plugs                                                                                        |
| -70-     | 4" Extended Bonnet                                                                                                               |
| -73-     | 316 SS Spiral Wound Gaskets w/PTFE Filler                                                                                        |
| -76-     | Live Loaded (Lever)                                                                                                              |
| -77-     | Live Loaded (Gear, Actuator)                                                                                                     |
| -80-     | Multi-Seal (Super TFE)                                                                                                           |
| -82-     | Flat Face Flanges                                                                                                                |
| -90-     | Double Packed 4" Extended Bonnet                                                                                                 |
| -9P-     | Double Packed 4" Extended Bonnet with Monitoring Port                                                                            |
| -CE-     | CE Marking. See Page D-3 "Product Approvals" for availability.                                                                   |
| -EP-     | Garlock EVSP Stem Packing w/Spiral Wound Graphite Gasket (Fire Safe by Design)                                                   |
| -KF-     | PCTFE Stem Bearing                                                                                                               |
| -TC-     | With Test Certificate                                                                                                            |
| -TD-     | Tested to API Spec 6D                                                                                                            |
| -UL-     | UL & CSA Listed (w/Markings)                                                                                                     |



### ACTUATOR MOUNTING



**Pressure/Temperature Ratings - Page M-11, Graph No. 5**

### DIMENSIONS

| PRODUCT NO. | SIZE | A    | B    | C    | D    | E    | F    | G    | H    | I     | J     | K     | L     | M       | N    | WT. |
|-------------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|---------|------|-----|
| 88A-707-01  | 1.5" | 1.25 | 7.50 | 4.50 | 4.85 | 6.53 | 0.47 | 1.85 | 2.38 | 1.392 | 0.696 | 0.500 | 0.287 | 1/4-20  | 1.50 | 16  |
| 88A-708-01  | 2"   | 1.50 | 8.50 | 5.19 | 4.62 | 6.65 | 0.72 | 2.41 | 3.09 | 1.949 | 0.974 | 0.625 | 0.412 | 5/16-18 | 2.00 | 24  |

## 88A-700 SERIES

CARBON STEEL ASME CLASS 300 FLANGED STD. PORT BALL VALVE - 2.5" THRU 3"



FOR STANDARDS COMPLIANCE AND STANDARD FEATURES REFER TO PAGE D-3.

### STANDARD MATERIAL LIST

|    | PART             | MATERIAL                                      |
|----|------------------|-----------------------------------------------|
| 1  | Body             | ASTM A216 WCB                                 |
| 2  | Retainer         | ASTM A216 WCB                                 |
| 3  | Ball             | ASTM A108 Type 1215 or A216 WCB Chrome Plated |
| 4  | Stem             | ASTM A108 Type 1215                           |
| 5  | Packing Gland    | ASTM A108 Type 1215                           |
| 6  | Stem Seals       | PTFE                                          |
| 7  | Seats            | RPTFE                                         |
| 8  | Gland Screws     | ASTM A193 B7                                  |
| 9  | Gland Plate      | 302 or 304 SS                                 |
| 10 | Stem Nut         | ASTM A194 Grade 8                             |
| 11 | Lever            | ASTM A366 Steel with Vinyl Grip               |
| 12 | Stem Bearing     | RPTFE                                         |
| 13 | Stop             | ASTM A108 Type 1215                           |
| 14 | Stop Screw       | SAE J429 Grade 2                              |
| 15 | Lock Plate       | ASTM A366 Steel                               |
| 16 | Body Seal        | RPTFE                                         |
| 17 | Grounding Spring | SS                                            |
| 18 | Body Joint Stud  | ASTM A193 Grade B7                            |
| 19 | Body Joint Nut   | ASTM A194 Grade 2H                            |
| 20 | Lockwasher       | 302 or 304 SS                                 |

### VARIATIONS AVAILABLE

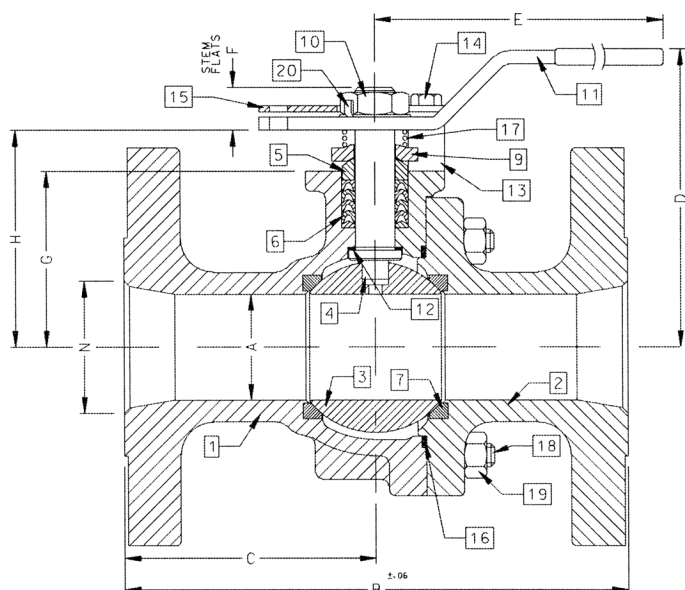
- 88A-740 Series (316 SS Ball & Stem)
- 88A-730 Series (Ni-Cu Ball & Stem)

### OPTIONS AVAILABLE

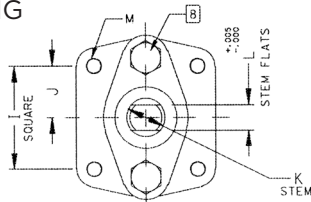
(MORE INFORMATION IN SECTION J)

- Minimum quantities apply.
- To specify an option, replace the "01" standard suffix with the suffix of the option.
- To specify multiple options, replace the "01" suffix with the desired suffixes in the numerical order shown below. NOTE: Not all suffixes can be combined together.

| (SUFFIX) | OPTION                                                                                                                           |
|----------|----------------------------------------------------------------------------------------------------------------------------------|
| -01      | Standard Configuration                                                                                                           |
| -04-     | 2.25" Stem Extension (Carbon Steel, Zinc Plated)                                                                                 |
| -10-     | SS Lever and Nut                                                                                                                 |
| -14-     | Side Vented Ball (Uni-Directional). Not available with plated CS ball.                                                           |
| -15-     | Wheel Handle, Steel                                                                                                              |
| -21-     | UHMWPE Seats                                                                                                                     |
| -24-     | Graphite packing, spiral wound graphite body seal, RPTFE bearing (API 607, 6th edition, ISO 10497:2010)                          |
| -26-     | Chlorine Service. Vented. Special Cleaning. Assembled dry. (for CS, Hastelloy and Ni-Cu valves. Ball must be Hastelloy or Ni-CU) |
| -35-     | PTFE Seats and Seals                                                                                                             |
| -38-     | PEEK Seats and Graphite Packing                                                                                                  |
| -49-     | No Lubrication. Assembled Dry.                                                                                                   |
| -59-     | SS External Trim                                                                                                                 |
| -65-     | MPTFE Seats and Graphite Packing (Fire Safe)                                                                                     |
| -67-     | Cleaned For Industrial Gases                                                                                                     |
| -69-     | Drilled and Tapped Purge Port with Plug                                                                                          |
| -70-     | 4" Extended Bonnet                                                                                                               |
| -73-     | 316 SS Spiral Wound Gaskets w/PTFE Filler                                                                                        |
| -76-     | Live Loaded (Lever)                                                                                                              |
| -77-     | Live Loaded (Gear, Actuator)                                                                                                     |
| -80-     | Multi-Seal (Super TFE)                                                                                                           |
| -82-     | Flat Face Flanges                                                                                                                |
| -90-     | Double Packed 4" Extended Bonnet                                                                                                 |
| -9P-     | Double Packed 4" Extended Bonnet with Monitoring Port                                                                            |
| -CE-     | CE Marking. See Page D-3 "Product Approvals" for availability.                                                                   |
| -EP-     | Garlock EVSP Stem Packing w/Spiral Wound Graphite Gasket (Fire Safe by Design)                                                   |
| -KF-     | PCTFE Stem Bearing                                                                                                               |
| -MG-     | Gear Operator with Standard Handwheel                                                                                            |
| -MH-     | Gear Operator with Standard Handwheel & Locking Device                                                                           |
| -MJ-     | Gear Operator with Oversize Handwheel                                                                                            |
| -MK-     | Gear Operator with Oversize Handwheel & Locking Device                                                                           |
| -TC-     | With Test Certificate                                                                                                            |
| -TD-     | Tested to API Spec 6D                                                                                                            |
| -UL-     | UL & CSA Listed (w/Markings)                                                                                                     |



### ACTUATOR MOUNTING



### DIMENSIONS

| PRODUCT NO. | SIZE | A    | B     | C    | D    | E    | F    | G    | H    | I     | J     | K     | L     | M       | N    | WT. |
|-------------|------|------|-------|------|------|------|------|------|------|-------|-------|-------|-------|---------|------|-----|
| 88A-709-01  | 2.5" | 2.00 | 9.50  | 4.75 | 5.61 | 8.41 | 0.80 | 3.31 | 4.08 | 1.949 | 0.974 | 0.750 | 0.477 | 5/16-18 | 2.50 | 39  |
| 88A-700-01  | 3"   | 2.50 | 11.12 | 5.56 | 6.24 | 8.41 | 0.80 | 3.94 | 4.71 | 1.949 | 0.974 | 0.750 | 0.477 | 5/16-18 | 3.00 | 55  |

REV. 04MAY17

Pressure/Temperature Ratings - Page M-11, Graph No. 5

FOR STANDARDS COMPLIANCE AND STANDARD FEATURES REFER TO PAGE D-3.

## STANDARD MATERIAL LIST

|    | PART             | MATERIAL                                      |
|----|------------------|-----------------------------------------------|
| 1  | Body             | ASTM A216 WCB                                 |
| 2  | Retainer         | ASTM A216 WCB                                 |
| 3  | Ball             | ASTM A108 Type 1215 or A216 WCB Chrome Plated |
| 4  | Stem             | ASTM A108 Type 1215                           |
| 5  | Packing Gland    | ASTM A108 Type 1215                           |
| 6  | Stem Seals       | PTFE                                          |
| 7  | Seats            | RPTFE                                         |
| 8  | Gland Screws     | ASTM A193 B7                                  |
| 9  | Gland Plate      | 316 SS                                        |
| 10 | Adapter Screw    | 316 SS                                        |
| 11 | Handle Adapter   | ASTM A366 Steel with Vinyl Grip               |
| 12 | Stem Bearing     | RPTFE                                         |
| 13 | Stop             | ASTM A108 Type 1215                           |
| 14 | Stop Screw       | SAE J429 Grade 2                              |
| 15 | Lock Plate       | ASTM A366 Steel                               |
| 16 | Body Seal        | RPTFE                                         |
| 17 | Grounding Spring | SS                                            |
| 18 | Body Joint Stud  | ASTM A193 Grade B7                            |
| 19 | Body Joint Nut   | ASTM A194 Grade 2H                            |
| 20 | Adapter Screw    | 316 SS                                        |
| 21 | Pipe Handle      | Galvanized Steel (not shown)                  |

## VARIATIONS AVAILABLE

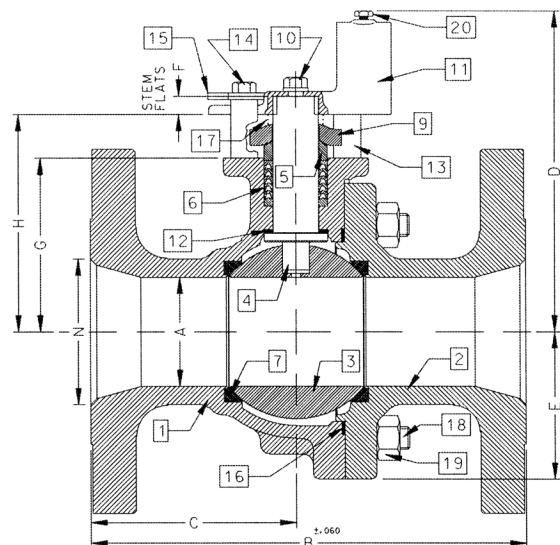
- 88A-740 Series (316 SS Ball & Stem)
- 88A-730 Series (Ni-Cu Ball & Stem)

## OPTIONS AVAILABLE

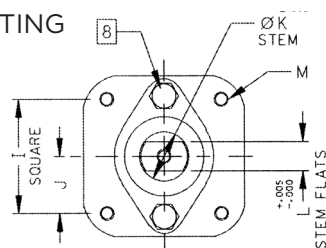
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| (SUFFIX) | OPTION                                                                                                                           |
|----------|----------------------------------------------------------------------------------------------------------------------------------|
| -01      | Standard Configuration                                                                                                           |
| -14-     | Side Vented Ball (Uni-Directional). Not available with plated CS ball.                                                           |
| -21-     | UHMWPE Seats                                                                                                                     |
| -24-     | Fire Safe - graphite packing & seals (API 607, 5th edition, ISO 10497-5:2004) 4" & 6" (API 607, 6th edition, ISO 10497:2010) 8"  |
| -26-     | Chlorine Service. Vented. Special Cleaning. Assembled dry. (for CS, Hastelloy and Ni-Cu valves. Ball must be Hastelloy or Ni-CU) |
| -35-     | PTFE Seats and Seals                                                                                                             |
| -49-     | No Lubrication. Assembled Dry.                                                                                                   |
| -59-     | SS External Trim                                                                                                                 |
| -65-     | MPTFE Seats and Graphite Packing (Fire Safe)                                                                                     |
| -67-     | Cleaned For Industrial Gases                                                                                                     |
| -69-     | Drilled and Tapped Purge Ports with Plugs                                                                                        |
| -70-     | 4" Extended Bonnet                                                                                                               |
| -73-     | 316 SS Spiral Wound Gaskets w/PTFE Filler                                                                                        |
| -76-     | Live Loaded (Lever)                                                                                                              |
| -77-     | Live Loaded (Gear, Actuator)                                                                                                     |
| -80-     | Multi-Seal (Super TFE)                                                                                                           |
| -82-     | Flat Face Flanges                                                                                                                |
| -90-     | Double Packed 4" Extended Bonnet                                                                                                 |
| -9P-     | Double Packed 4" Extended Bonnet with Monitoring Port                                                                            |
| -CE-     | CE Marking. See Page D-3 "Product Approvals" for availability.                                                                   |
| -EP-     | Garlock EVSP Stem Packing w/Spiral Wound Graphite Gasket (Fire Safe by Design)                                                   |
| -KF-     | PCTFE Stem Bearing                                                                                                               |
| -MG-     | Gear Operator with Standard Handwheel                                                                                            |
| -MH-     | Gear Operator with Standard Handwheel & Locking Device                                                                           |
| -MJ-     | Gear Operator with Oversize Handwheel                                                                                            |
| -MK-     | Gear Operator with Oversize Handwheel & Locking Device                                                                           |
| -TC-     | With Test Certificate                                                                                                            |
| -TD-     | Tested to API Spec 6D                                                                                                            |
| -UL-     | UL & CSA Listed (w/Markings)                                                                                                     |



## ACTUATOR MOUNTING



## DIMENSIONS

| PRODUCT NO. | SIZE | A    | B     | C    | D     | E    | F    | G    | H    | I     | J     | K     | L     | M      | N    | WT. |
|-------------|------|------|-------|------|-------|------|------|------|------|-------|-------|-------|-------|--------|------|-----|
| 88A-70A-01  | 4"   | 3.00 | 12.00 | 5.68 | 8.80  | 4.06 | 0.50 | 4.75 | 5.95 | 2.840 | 1.420 | 1.250 | 0.725 | 3/8-16 | 4.00 | 95  |
| 88A-70C-01  | 6"   | 4.00 | 15.88 | 7.38 | 9.99  | 5.25 | 0.50 | 5.94 | 7.13 | 2.840 | 1.420 | 1.250 | 0.725 | 3/8-16 | 6.00 | 187 |
| 88A-70E-01  | 8"   | 6.00 | 19.75 | 9.00 | 13.73 | 7.30 | 1.00 | 7.75 | 9.48 | 4.596 | 2.298 | 2.000 | 1.375 | 3/4-10 | 8.00 | 400 |

**Pressure/Temperature Ratings - Page M-11, Graph No. 5**

# 88A-700 SERIES

CARBON STEEL ASME CLASS 300 FLANGED STD. PORT BALL VALVE - 10"



FOR STANDARDS COMPLIANCE AND STANDARD FEATURES REFER TO PAGE D-3.

## STANDARD MATERIAL LIST

|    | PART            | MATERIAL                                      |
|----|-----------------|-----------------------------------------------|
| 1  | Body            | ASTM A216 WCB                                 |
| 2  | Retainer        | ASTM A216 WCB                                 |
| 3  | Ball            | ASTM A108 Type 1215 or A216 WCB Chrome Plated |
| 4  | Stem            | ASTM A108 Type 1215                           |
| 5  | Packing Gland   | ASTM A108 Type 1215                           |
| 6  | Stem Seals      | PTFE                                          |
| 7  | Seats           | RPTFE                                         |
| 8  | Gland Screws    | ASTM A193 B7                                  |
| 9  | Gland Plate     | 316 SS                                        |
| 10 | Stem Bearing    | RPTFE                                         |
| 11 | Body Seal       | RPTFE                                         |
| 12 | Body Joint Stud | ASTM A193 Grade B7                            |
| 13 | Body Joint Nut  | ASTM A194 Grade 2H                            |

## VARIATIONS AVAILABLE

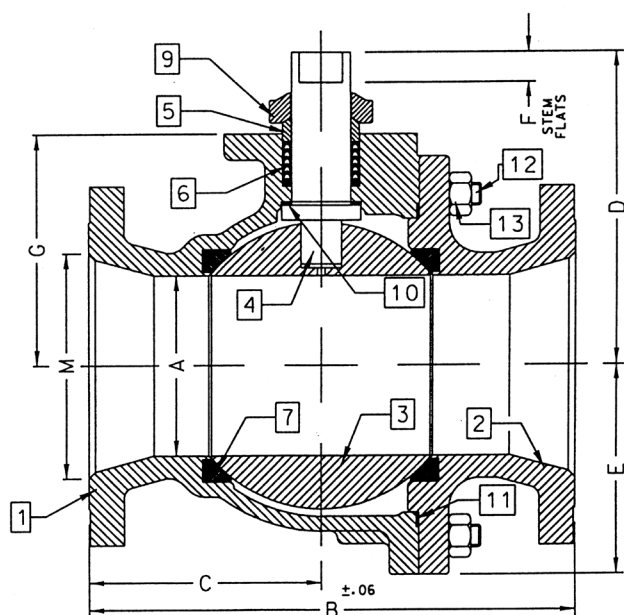
- 88A-730 Series (Ni-Cu Ball & Stem)
- 88A-740 Series (316 SS Ball & Stem)

## OPTIONS AVAILABLE

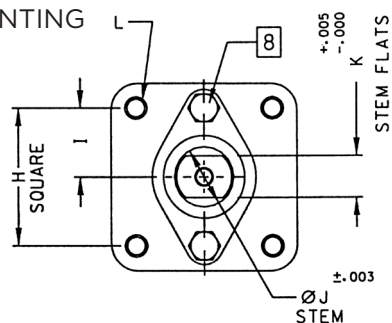
(MORE INFORMATION IN SECTION J)

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- To specify multiple options, replace the "01" suffix with the desired suffixes in the numerical order shown below. NOTE: Not all suffixes can be combined together.

| (SUFFIX) | OPTION                                                                                                                           |
|----------|----------------------------------------------------------------------------------------------------------------------------------|
| -01      | Standard Configuration                                                                                                           |
| -14-     | Side Vented Ball (Uni-Directional). Not available with plated CS ball.                                                           |
| -21-     | UHMWPE Seats                                                                                                                     |
| -24-     | Graphite packing, spiral wound graphite body seal, RPTFE bearing (API 607, 5th edition, ISO 10497-5:2004)                        |
| -26-     | Chlorine Service. Vented. Special Cleaning. Assembled dry. (for CS, Hastelloy and Ni-Cu valves. Ball must be Hastelloy or Ni-CU) |
| -35-     | PTFE Seats and Seals                                                                                                             |
| -49-     | No Lubrication. Assembled Dry.                                                                                                   |
| -65-     | MPTFE Seats and Graphite Packing (Fire Safe)                                                                                     |
| -67-     | Cleaned For Industrial Gases                                                                                                     |
| -69-     | Drilled and Tapped Purge Port with Plugs                                                                                         |
| -70-     | 4" Extended Bonnet                                                                                                               |
| -77-     | Live Loaded (Gear, Actuator)                                                                                                     |
| -80-     | Multi-Seal (Super TFE)                                                                                                           |
| -82-     | Flat Face Flanges                                                                                                                |
| -90-     | Double Packed 4" Extended Bonnet                                                                                                 |
| -9P-     | Double Packed 4" Extended Bonnet with Monitoring Port                                                                            |
| -CE-     | CE Marking. See Page D-3 "Product Approvals" for availability.                                                                   |
| -EP-     | Garlock EVSP Stem Packing w/Spiral Wound Graphite Gasket (Fire Safe by Design)                                                   |
| -KF-     | PCTFE Stem Bearing                                                                                                               |
| -MG-     | Gear Operator with Standard Handwheel                                                                                            |
| -MH-     | Gear Operator with Standard Handwheel & Locking Device                                                                           |
| -MJ-     | Gear Operator with Oversize Handwheel                                                                                            |
| -MK-     | Gear Operator with Oversize Handwheel & Locking Device                                                                           |
| -TC-     | With Test Certificate                                                                                                            |
| -TD-     | Tested to API Spec 6D                                                                                                            |
| -UL-     | UL & CSA Listed (w/Markings)                                                                                                     |



## ACTUATOR MOUNTING



**Pressure/Temperature Ratings - Page M-1, Graph No. 5**

## DIMENSIONS

| PRODUCT NO. | SIZE | A    | B     | C     | D     | E    | F    | G     | H     | I     | J     | K     | L      | M     |
|-------------|------|------|-------|-------|-------|------|------|-------|-------|-------|-------|-------|--------|-------|
| 88A-70G-01  | 10"  | 8.00 | 22.38 | 10.69 | 12.83 | 9.56 | 1.00 | 10.22 | 4.596 | 2.298 | 2.000 | 1.375 | 3/4-10 | 10.00 |

REV. 04MAY17

The listed  $C_v$  "factors" are derived from actual flow testing, at Apollo's Pageland, South Carolina factory. 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  $C_v$  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
- $\Delta P$  = Pressure drop (psig)
- SpGr = Specific gravity at flowing temperature
- $C_v$  = 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
- $\Delta P$  = Pressure drop (psig)
- SpGr = Specific gravity (based on air = 1.0)
- $P_2$  = Outlet pressure-psia (psig + 14.7)
- T = (temp. °F + 460)
- $C_v$  = Valve constant

**CAUTION:** The gas equation shown, is valid at very low pressure drop ratios. The gas equation is NOT valid when the ratio of pressure drop ( $\Delta P$ ) to inlet pressure ( $P_1$ ) exceeds 0.02.

**NOTE:** Only use the gas equation shown if  $(P_1 - P_2)/P_1$  is less than 0.02.

### CV FACTORS FOR APOLLO® VALVES (CONTINUED ON M-4)

| VALVE                    | SIZE (IN.) |     |     |     |    |      |     |     |     |     |     |    |    |    |    |
|--------------------------|------------|-----|-----|-----|----|------|-----|-----|-----|-----|-----|----|----|----|----|
|                          | 1/4        | 3/8 | 1/2 | 3/4 | 1  | 1.25 | 1.5 | 2   | 2.5 | 3   | 4   | 6  | 8  | 10 | 12 |
| 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  | --  | --  | --  | --  | -- | -- | -- | -- |
| 71-AR 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 | --  | --  | --  | -- | -- | -- | -- |
| 72-1xx-A/72-9xx-A Series | --         | --  | 26  | 48  | 65 | 125  | 170 | 245 | --  | --  | --  | -- | -- | -- | -- |
| 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 | -- | -- | -- | -- |
| 76-AR 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 | --  | --  | --  | -- | -- | -- | -- |
| 76FJ-100 Series          | 8.1        | 15  | 15  | 51  | 68 | 125  | 177 | 389 | --  | --  | --  | -- | -- | -- | -- |
| 76FK-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  | --  | --  | --  | -- | -- | -- | -- |
| 76J-100 Series           | 8.4        | 7.2 | 15  | 30  | 43 | 48   | 84  | 108 | 190 | 370 | --  | -- | -- | -- | -- |
| 76J-AR Series            | 8.4        | 7.2 | 15  | 30  | 43 | 48   | 84  | 108 | 190 | 370 | 670 | -- | -- | -- | -- |
| 76K-100 Series           | 8.4        | 7.2 | 15  | 30  | 43 | 48   | 84  | 108 | 190 | 370 | --  | -- | -- | -- | -- |
| 76K-AR Series            | 8.4        | 7.2 | 15  | 30  | 43 | 48   | 84  | 108 | 190 | 370 | 670 | -- | -- | -- | -- |
| 7K-100 Series            | --         | --  | 15  | 51  | 68 | 125  | 177 | 389 | 503 | --  | --  | -- | -- | -- | -- |
| 77-AR Series             | 8.1        | 15  | 15  | 51  | 68 | --   | 177 | 389 | --  | --  | --  | -- | -- | -- | -- |

REV. 21APR17

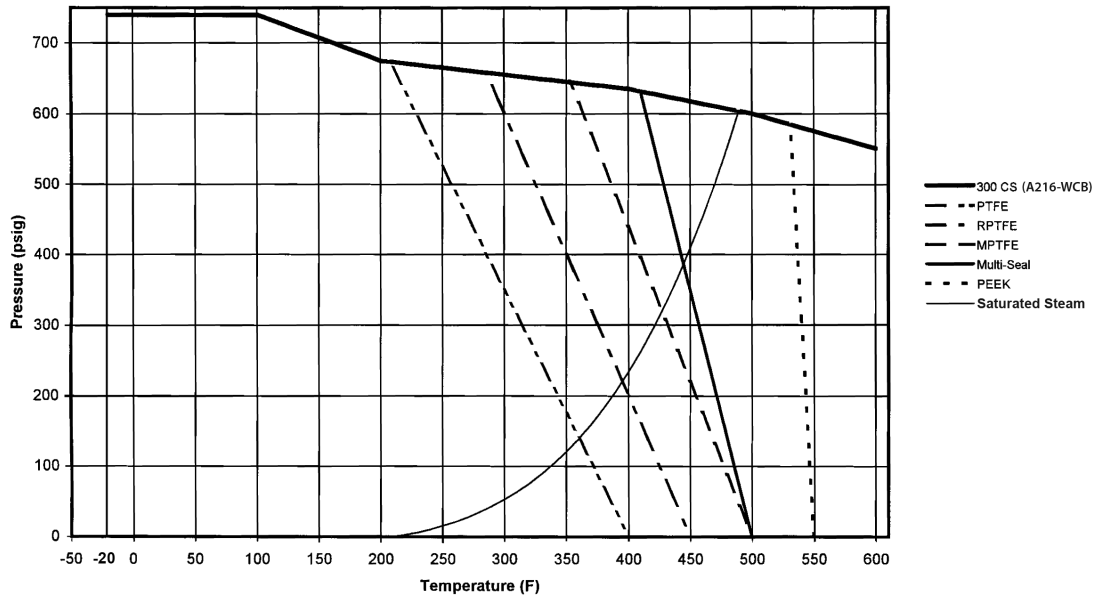
**CV FACTORS FOR APOLLO® VALVES (CONTINUED FROM M-3)**

| VALVE              | SIZE (IN.) |     |     |     |    |      |     |     |     |      |      |      |      |       |       |
|--------------------|------------|-----|-----|-----|----|------|-----|-----|-----|------|------|------|------|-------|-------|
|                    | 1/4        | 3/8 | 1/2 | 3/4 | 1  | 1.25 | 1.5 | 2   | 2.5 | 3    | 4    | 6    | 8    | 10    | 12    |
| 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 | --  | --   | --   | --   | --   | --    | --    |
| 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  | --   | --   | --   | --    | --    |
| 80 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 |
| 87A-F00 Series     | --         | --  | --  | --  | 75 | --   | 195 | 410 | 545 | 1021 | 2016 | 4837 | --   | --    | --    |
| 87B-100 Series     | --         | --  | --  | --  | -- | --   | --  | --  | --  | 375  | 673  | 1099 | 1902 | 3890  | --    |
| 87J-100 Series     | --         | --  | --  | --  | -- | --   | 86  | 104 | 234 | 375  | 673  | 1099 | 1902 | 3890  | --    |
| 87J-200 Series     | --         | --  | 15  | 19  | 75 | --   | 195 | 410 | 545 | 1021 | 2016 | 4837 | 9250 | 15170 | 22390 |
| 87J-700 Series     | --         | --  | --  | --  | -- | --   | 86  | 104 | 234 | 375  | 673  | 1099 | 1902 | 3890  | --    |
| 87J-900 Series     | --         | --  | 15  | 19  | 75 | --   | 195 | 410 | 545 | 1021 | 2016 | 4837 | 9250 | 15170 | 22390 |
| 87K-100 Series     | --         | --  | --  | --  | -- | --   | 86  | 104 | 234 | 375  | 673  | 1099 | 1902 | 3890  | --    |
| 87K-200 Series     | --         | --  | 15  | 19  | 75 | --   | 195 | 410 | 545 | 1021 | 2016 | 4837 | 9250 | 15170 | 22390 |
| 87K-700 Series     | --         | --  | --  | --  | -- | --   | 86  | 104 | 234 | 375  | 673  | 1099 | 1902 | 3890  | --    |
| 87K-900 Series     | --         | --  | 15  | 19  | 75 | --   | 195 | 410 | 545 | 1021 | 2016 | 4837 | 9250 | 15170 | 22390 |
| 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 |
| 88A-F00 Series     | --         | --  | --  | --  | 75 | --   | 195 | 410 | 545 | 1021 | 2016 | 4837 | --   | --    | --    |
| 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  | --  | --   | --   | --   | --   | --    | --    |
| 90-100 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 | --   | --   | --    | --    |
| 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  | --   | --   | --   | --    | --    |

**CLASS 300**

**(CS) ASTM A216-WCB**

**GRAPH 5**



**CLASS 300**

**(SS) ASTM A351-CF8M**

**GRAPH 6**

