

87A-F00 SERIES STAINLESS STEEL ASME CLASS 600 FLANGED FULL PORT BALL VALVE - 1"

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



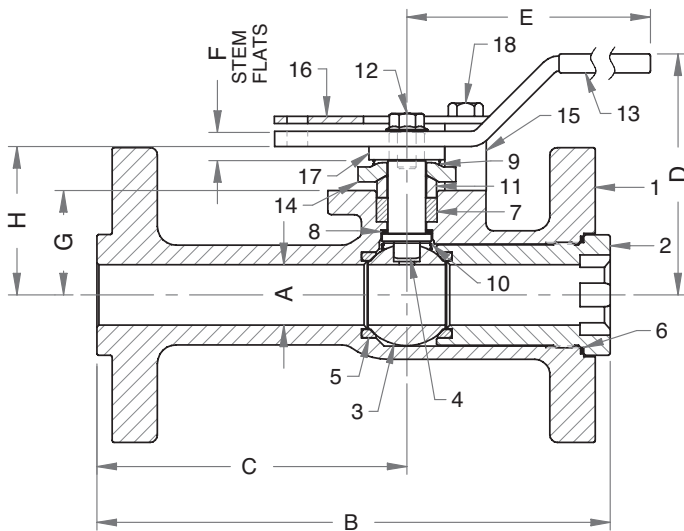
STANDARD MATERIAL LIST

| PART | MATERIAL | |
|------|--------------------|---|
| 1 | Body | ASTM A351-CF8M |
| 2 | Retainer | ASTM A276 Type 316 |
| 3 | Ball | ASTM A351-CF8M or ASTM A276 Type 316 |
| 4 | Stem | ASTM A276 Type 316 |
| 5 | Seats | Defined by Seat Suffix Selected See "95" or "80" also "38" & "21" |
| 6 | Body Seal | Defined by Seat Suffix Selected |
| 7 | Stem Seals | Defined by Seat Suffix Selected |
| 8 | Stem Bearing | Defined by Seat Suffix Selected |
| 9 | Grounding Spring | 316 Stainless Steel |
| 10 | Grounding Spring | 316 Stainless Steel |
| 11 | Packing Gland | ASTM A276 Type 316 |
| 12 | Stem Screw | Steel Zinc Plated |
| 13 | Lever & Grip | 316 Stainless Steel w/Vinyl Grip |
| 14 | Gland Plate | 316 Stainless Steel |
| 15 | Stops | ASTM A276 Type 316 |
| 16 | Lock Plate | 302 or 304 Stainless Steel |
| 17 | Spacer | ASTM A276 type 316 |
| 18 | Stop Screws | 316 Stainless Steel |
| 19 | Gland Plate Screws | ASTM A193-B8 |

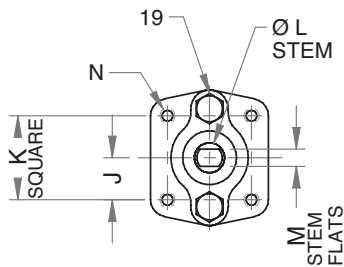
OPTIONS AVAILABLE: (MORE INFORMATION IN SECTION J)

- Complete the product number by adding a suffix (or multiple suffixes) to the base product number. A suffix for seat & seal materials **must** be selected.
- To specify multiple options, add the desired suffixes in the numerical order shown below. NOTE: Not all suffixes can be combined together.
- Minimum quantities may apply.

| (SUFFIX) | OPTION |
|----------|---|
| -04- | 2.25" Stem Extension (Carbon Steel, Zinc Plated) (1" - 2") |
| -14- | Side vented ball (uni-directional) |
| -21- | UHMWPE seats, graphite packing, spiral wound graphite body seal, PEEK bearing |
| -24- | Graphite packing, spiral wound graphite body seal, RPTFE bearing (API 607, 6th edition, ISO 10497:2010) |
| -38- | PEEK seats, graphite packing, spiral wound graphite body seal, PEEK bearing |
| -45- | Less lever and nut (bare stem) |
| -49- | No Lubrication. Assembled Dry. |
| -57- | Oxygen cleaned |
| -69- | Drilled & tapped purge port with plugs |
| -70- | 4" extended bonnet |
| -76- | Live loaded (lever operated) |
| -77- | Live loaded (gear operator or actuator) |
| -80- | Multiseal seats, PTFE chevron packing, spiral wound PTFE body seal, PEEK bearing |
| -82- | Flat Face Flanges |
| -90- | Double Packed 4" Extended Bonnet |
| -95- | Devlon® seats, graphite packing, spiral wound graphite body seal, PEEK bearing |
| -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) |
| -KB- | Kolsterised ball |
| -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 |
| -MP- | Positive material identification |
| -PH- | 17-4 PH stem |
| -TC- | Hydrostatic test with certified report |
| -TD- | API 6D Test (hydrostatic testing) |
| -TR- | Hydrostatic test with certified report & MTR |
| -TW- | Hydrostatic test with certified report & witnessed |



ACTUATOR MOUNTING



DIMENSIONS

| PRODUCT NUMBER | SIZE | A | B | C | D | E | F | G | H | J | K | L | M | N | WT. |
|----------------|------|------|------|------|------|------|------|-------|-------|------|------|-------|-------|---------|------|
| 87A-F05-XX | 1" | 1.00 | 8.50 | 5.13 | 3.99 | 6.65 | 0.45 | 1.730 | 2.460 | 0.98 | 1.95 | 0.625 | 0.412 | 5/16-18 | 13.0 |

Pressure/Temperature Ratings - Page M-25, Graph No. 34



87A-F00 SERIES

STAINLESS STEEL ASME CLASS 600 FLANGED FULL PORT BALL VALVE - 1.5" THRU 2.5"

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



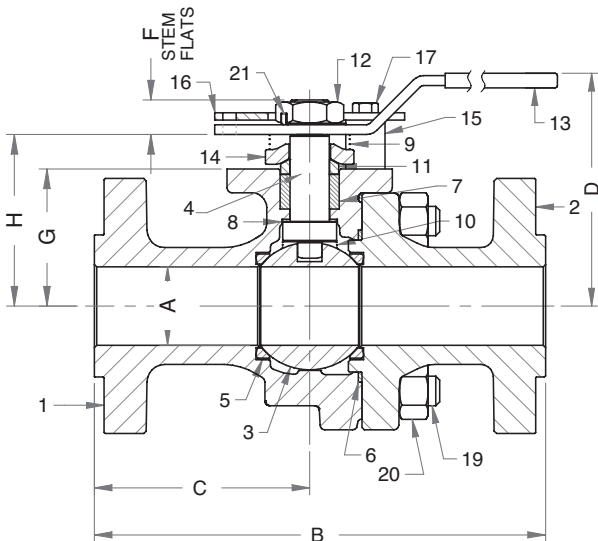
STANDARD MATERIAL LIST

| PART | MATERIAL | |
|------|--------------------|---|
| 1 | Body | ASTM A351-CF8M |
| 2 | Retainer | ASTM A351-CF8M |
| 3 | Ball | ASTM A351-CF8M or ASTM A276 Type 316 |
| 4 | Stem | ASTM A276 Type 316 |
| 5 | Seats | Defined by Seat Suffix Selected See "95" or "80" also "38" & "21" |
| 6 | Body Seal | Defined by Seat Suffix Selected |
| 7 | Stem Seals | Defined by Seat Suffix Selected |
| 8 | Stem Bearing | Defined by Seat Suffix Selected |
| 9 | Grounding Spring | 316 Stainless Steel |
| 10 | Grounding Spring | 316 Stainless Steel |
| 11 | Packing Gland | ASTM A276 Type 316 |
| 12 | Stem Nut | ASTM A194 Grade 8 |
| 13 | Lever & Grip | 316 Stainless Steel w/Vinyl Grip |
| 14 | Gland Plate | 316 Stainless Steel |
| 15 | Stops | ASTM A276 Type 316 |
| 16 | Lock Plate | 302 or 304 Stainless Steel |
| 17 | Stop Screws | 18-8 Stainless Steel |
| 18 | Gland Plate Screws | ASTM A193-B8 |
| 19 | Body Joint Stud | ASTM A193-B8 Grade B8M |
| 20 | Body Joint Nut | ASTM A194-Grade 8 |
| 21 | Lock Washer | 302 or 304 Stainless Steel |

OPTIONS AVAILABLE: (MORE INFORMATION IN SECTION J)

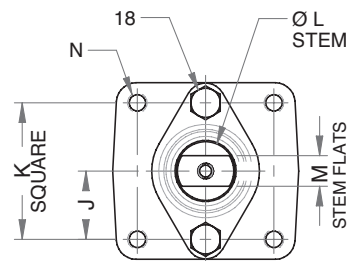
- Complete the product number by adding a suffix (or multiple suffixes) to the base product number. A suffix for seat & seal materials **must** be selected.
- To specify multiple options, add the desired suffixes in the numerical order shown below. NOTE: Not all suffixes can be combined together.
- Minimum quantities may apply.

| (SUFFIX) | OPTION |
|----------|---|
| -04- | 2.25" Stem Extension (Carbon Steel, Zinc Plated) (1" - 2") |
| -14- | Side vented ball (uni-directional) |
| -21- | UHMWPE seats, graphite packing, spiral wound graphite body seal, PEEK bearing |
| -24- | Graphite packing, spiral wound graphite body seal, RPTFE bearing (API 607, 6th edition, ISO 10497:2010) |
| -38- | PEEK seats, graphite packing, spiral wound graphite body seal, PEEK bearing |
| -45- | Less lever and nut (bare stem) |
| -49- | No Lubrication. Assembled Dry. |
| -57- | Oxygen cleaned |
| -69- | Drilled & tapped purge port with plugs |
| -70- | 4" extended bonnet |
| -76- | Live loaded (lever operated) |
| -77- | Live loaded (gear operator or actuator) |
| -80- | Multiseal seats, PTFE chevron packing, spiral wound PTFE body seal, PEEK bearing |
| -82- | Flat Face Flanges |
| -90- | Double Packed 4" Extended Bonnet |
| -95- | Devlon® seats, graphite packing, spiral wound graphite body seal, PEEK bearing |
| -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) |
| -KB- | Kolsterised ball |
| -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 |
| -MP- | Positive material identification |
| -PH- | 17-4 PH stem |
| -TC- | Hydrostatic test with certified report |
| -TD- | API 6D Test (hydrostatic testing) |
| -TR- | Hydrostatic test with certified report & MTR |
| -TW- | Hydrostatic test with certified report & witnessed |



Pressure/Temperature Ratings - Page M-25, Graph Nos. 34 & 35

ACTUATOR MOUNTING



DIMENSIONS

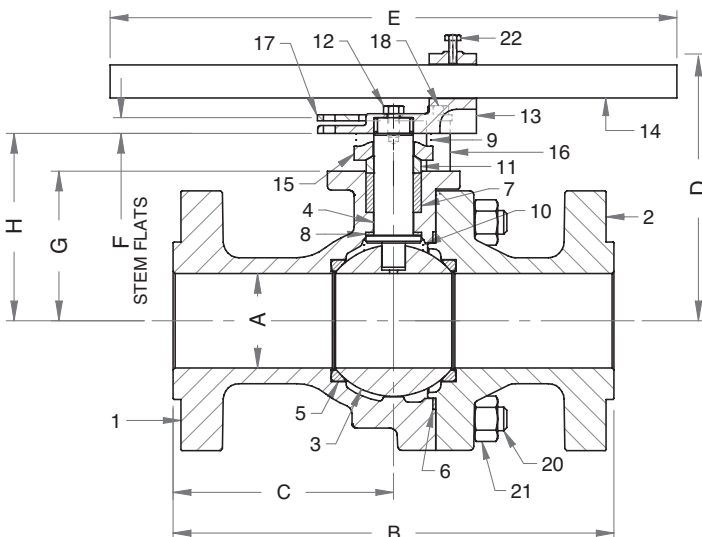
| PRODUCT NUMBER | SIZE | A | B | C | D | E | F | G | H | J | K | L | M | N | WT. |
|----------------|------|------|-------|------|------|-------|------|-------|-------|------|------|-------|-------|---------|------|
| 87A-F07-XX | 1.5" | 1.50 | 9.50 | 3.62 | 5.03 | 8.40 | 0.74 | 2.730 | 3.500 | 0.98 | 1.95 | 0.750 | 0.477 | 5/16-18 | 31.5 |
| 87A-F08-XX | 2" | 2.00 | 11.50 | 5.49 | 6.06 | 12.06 | 0.84 | 3.490 | 4.370 | 1.42 | 2.84 | 1.000 | 0.620 | 3/8-16 | 53.0 |
| 87A-F09-XX | 2.5" | 2.50 | 13.00 | 6.02 | 6.63 | 12.06 | 0.84 | 4.190 | 5.070 | 1.42 | 2.84 | 1.000 | 0.620 | 3/8-16 | 65.0 |

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



STANDARD MATERIAL LIST

| PART | MATERIAL | |
|------|--------------------|---|
| 1 | Body | ASTM A351-CF8M |
| 2 | Retainer | ASTM A351-CF8M |
| 3 | Ball | ASTM A351-CF8M or ASTM A276 Type 316 |
| 4 | Stem | ASTM A276 Type 316 |
| 5 | Seats | Defined by Seat Suffix Selected See "95" or "80" also "38" & "21" |
| 6 | Body Seal | Defined by Seat Suffix Selected |
| 7 | Stem Seals | Defined by Seat Suffix Selected |
| 8 | Stem Bearing | Defined by Seat Suffix Selected |
| 9 | Grounding Spring | 316 Stainless Steel |
| 10 | Grounding Spring | 316 Stainless Steel |
| 11 | Packing Gland | ASTM A276 Type 316 |
| 12 | Stem Screw | 304 Stainless Steel |
| 13 | Handle Adapter | 316 Stainless Steel |
| 14 | Pipe Handle | Galvanized Steel |
| 15 | Gland Plate | ASTM A351-CF8M |
| 16 | Stops | ASTM A276 Type 316 |
| 17 | Lock Plate | 302 or 304 Stainless Steel |
| 18 | Stop Screws | 18-8 Stainless Steel |
| 19 | Gland Plate Screws | ASTM A193-B8 |
| 20 | Body Joint Stud | ASTM A193-B8M |
| 21 | Body Joint Nut | ASTM A194 Grade 8 |
| 22 | Adapter Screw | 18-8 Stainless Steel |



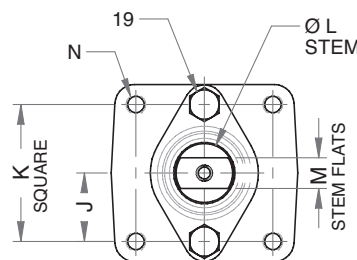
OPTIONS AVAILABLE: (MORE INFORMATION IN SECTION J)

- Complete the product number by adding a suffix (or multiple suffixes) to the base product number. A suffix for seat & seal materials **must** be selected.
- To specify multiple options, add the desired suffixes in the numerical order shown below. NOTE: Not all suffixes can be combined together.
- Minimum quantities may apply.

| (SUFFIX) | OPTION |
|----------|---|
| -14- | Side vented ball (uni-directional) |
| -21- | UHMWPE seats, graphite packing, spiral wound graphite body seal, PEEK bearing |
| -24- | Graphite packing, spiral wound graphite body seal, RPTFE bearing (API 607, 6th edition, ISO 10497:2010) |
| -38- | PEEK seats, graphite packing, spiral wound graphite body seal, PEEK bearing |
| -45- | Less lever and nut (bare stem) |
| -49- | No Lubrication. Assembled Dry. |
| -57- | Oxygen cleaned |
| -69- | Drilled & tapped purge port with plugs |
| -70- | 4" extended bonnet |
| -76- | Live loaded (lever operated) |
| -77- | Live loaded (gear operator or actuator) |
| -80- | Multiseal seats, PTFE chevron packing, spiral wound PTFE body seal, PEEK bearing |
| -82- | Flat Face Flanges |
| -90- | Double Packed 4" Extended Bonnet |
| -95- | Devlon® seats, graphite packing, spiral wound graphite body seal, PEEK bearing |
| -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) |
| -KB- | Kolsterised ball |
| -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 |
| -MP- | Positive material identification |
| -PH- | 17-4 PH stem |
| -TC- | Hydrostatic test with certified report |
| -TD- | API 6D Test (hydrostatic testing) |
| -TR- | Hydrostatic test with certified report & MTR |
| -TW- | Hydrostatic test with certified report & witnessed |

Pressure/Temperature Ratings - Page M-25, Graph No. 35

ACTUATOR MOUNTING



DIMENSIONS

| PRODUCT NUMBER | SIZE | A | B | C | D | E | F | G | H | J | K | L | M | N | WT. |
|----------------|------|------|-------|------|-------|-------|------|-------|-------|------|------|-------|-------|--------|-------|
| 87A-F00-XX | 3" | 3.00 | 14.00 | 7.00 | 8.55 | 18.00 | 0.50 | 4.750 | 5.946 | 1.42 | 2.84 | 1.250 | 0.725 | 3/8-16 | 101.0 |
| 87A-F0A-XX | 4" | 4.00 | 17.00 | 7.19 | 11.20 | 34.00 | 0.75 | 6.630 | 8.081 | 1.74 | 3.48 | 1.500 | 0.780 | 1/2-13 | 194.0 |

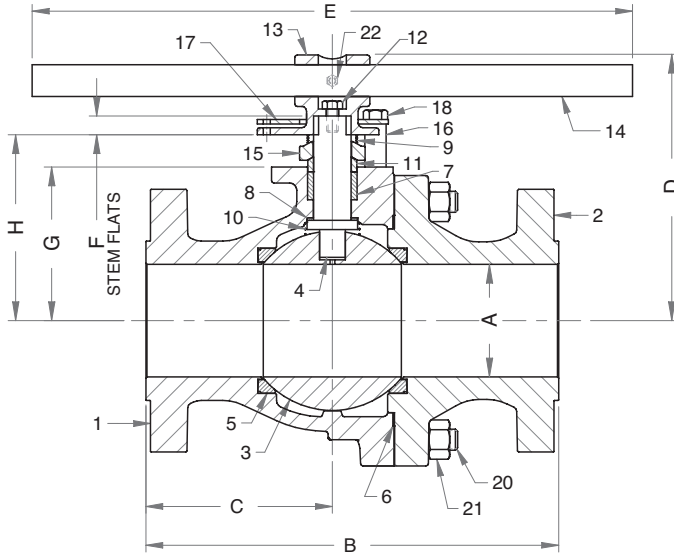


FOR STANDARDS COMPLIANCE AND STANDARD FEATURES REFER TO PAGE D-3.



STANDARD MATERIAL LIST

| PART | MATERIAL | |
|------|--------------------|---|
| 1 | Body | ASTM A351-CF8M |
| 2 | Retainer | ASTM A351-CF8M |
| 3 | Ball | ASTM A351-CF8M or ASTM A276 Type 316 |
| 4 | Stem | ASTM A276 Type 316 |
| 5 | Seats | Defined by Seat Suffix Selected See "95" or "80" also "38" & "21" |
| 6 | Body Seal | Defined by Seat Suffix Selected |
| 7 | Stem Seals | Defined by Seat Suffix Selected |
| 8 | Stem Bearing | Defined by Seat Suffix Selected |
| 9 | Grounding Spring | 316 Stainless Steel |
| 10 | Grounding Spring | 316 Stainless Steel |
| 11 | Packing Gland | ASTM A276 Type 316 |
| 12 | Stem Screw | 304 Stainless Steel |
| 13 | Handle Adapter | 316 Stainless Steel |
| 14 | Pipe Handle | Galvanized Steel |
| 15 | Gland Plate | 316 Stainless Steel |
| 16 | Stops | ASTM A276 Type 316 |
| 17 | Lock Plate | 302 or 304 Stainless Steel |
| 18 | Stop Screws | 316 Stainless Steel |
| 19 | Gland Plate Screws | ASTM A193-B8 |
| 20 | Body Joint Stud | ASTM A193-B8M |
| 21 | Body Joint Nut | ASTM A194 Grade 8 |
| 22 | Adapter Screw | 18-8 Stainless Steel |



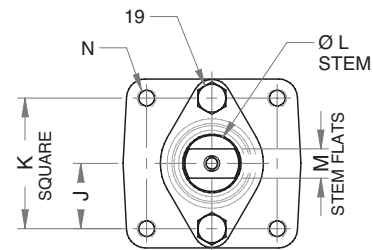
OPTIONS AVAILABLE: (MORE INFORMATION IN SECTION J)

- Complete the product number by adding a suffix (or multiple suffixes) to the base product number. A suffix for seat & seal materials **must** be selected.
- To specify multiple options, add the desired suffixes in the numerical order shown below. NOTE: Not all suffixes can be combined together.
- Minimum quantities may apply.

| (SUFFIX) | OPTION |
|----------|---|
| -14- | Side vented ball (uni-directional) |
| -21- | UHMWPE seats, graphite packing, spiral wound graphite body seal, PEEK bearing |
| -24- | Graphite packing, spiral wound graphite body seal, RPTFE bearing (API 607, 6th edition, ISO 10497:2010) |
| -38- | PEEK seats, graphite packing, spiral wound graphite body seal, PEEK bearing |
| -45- | Less lever and nut (bare stem) |
| -49- | No Lubrication. Assembled Dry. |
| -57- | Oxygen cleaned |
| -69- | Drilled & tapped purge port with plugs |
| -70- | 4" extended bonnet |
| -76- | Live loaded (lever operated) |
| -77- | Live loaded (gear operator or actuator) |
| -80- | Multiseal seats, PTFE chevron packing, spiral wound PTFE body seal, PEEK bearing |
| -82- | Flat Face Flanges |
| -90- | Double Packed 4" Extended Bonnet |
| -95- | Devlon® seats, graphite packing, spiral wound graphite body seal, PEEK bearing |
| -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) |
| -KB- | Kolsterised ball |
| -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 |
| -MP- | Positive material identification |
| -PH- | 17-4 PH stem |
| -TC- | Hydrostatic test with certified report |
| -TD- | API 6D Test (hydrostatic testing) |
| -TR- | Hydrostatic test with certified report & MTR |
| -TW- | Hydrostatic test with certified report & witnessed |

Pressure/Temperature Ratings - Page M-26, Graph No. 36

ACTUATOR MOUNTING



DIMENSIONS

| PRODUCT NUMBER | SIZE | A | B | C | D | E | F | G | H | J | K | L | M | N | WT. |
|----------------|------|------|-------|------|-------|-------|------|-------|-------|-------|------|------|-------|--------|-------|
| 87A-F00-XX | 6" | 6.00 | 22.00 | 9.94 | 14.17 | 45.00 | 1.00 | 8.190 | 9.915 | 2.298 | 4.59 | 2.00 | 1.375 | 3/4-10 | 500.0 |

REV. 04MAY17

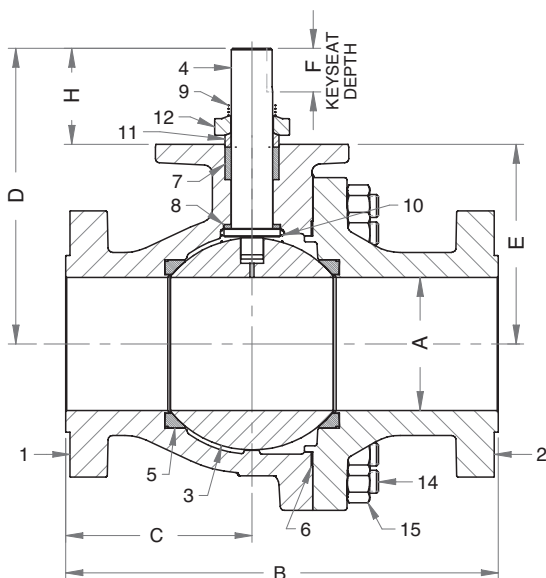
STAINLESS STEEL ASME CLASS 600 FLANGED FULL PORT BALL VALVE - 8"

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

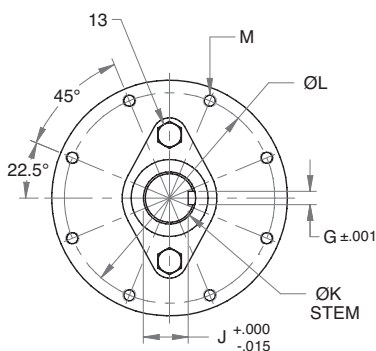


STANDARD MATERIAL LIST

| PART | MATERIAL | |
|------|--------------------|---|
| 1 | Body | ASTM A351-CF8M |
| 2 | Retainer | ASTM A351-CF8M |
| 3 | Ball | ASTM A351-CF8M or ASTM A276 Type 316 |
| 4 | Stem | ASTM A276 Type 316 |
| 5 | Seats | Defined by Seat Suffix Selected See "95" or "80" also "38" & "21" |
| 6 | Body Seal | Defined by Seat Suffix Selected |
| 7 | Stem Seals | Defined by Seat Suffix Selected |
| 8 | Stem Bearing | Defined by Seat Suffix Selected |
| 9 | Grounding Spring | 316 Stainless Steel |
| 10 | Grounding Spring | 316 Stainless Steel |
| 11 | Packing Gland | ASTM A276 Type 316 |
| 12 | Gland Plate | 316 Stainless Steel |
| 13 | Gland Plate Screws | ASTM A193-B8 |
| 14 | Body Joint Stud | ASTM A193 Grade B8M |
| 15 | Body Joint Nut | ASTM A194 Grade 8 |



ACTUATOR MOUNTING



DIMENSIONS

| PRODUCT NUMBER | SIZE | A | B | C | D | E | F | G | H | J | K | L | M | WT. |
|----------------|------|------|-------|-------|-------|-------|-------|-------|------|-------|------|-------|--------|-------|
| 87A-F0E-XX | 8" | 8.00 | 26.00 | 11.20 | 17.77 | 12.00 | 2.25* | 0.627 | 5.77 | 2.133 | 2.49 | 10.00 | 5/8-11 | 920.0 |

* Keyway Length

OPTIONS AVAILABLE: (MORE INFORMATION IN SECTION J)

- Complete the product number by adding a suffix (or multiple suffixes) to the base product number. A suffix for seat & seal materials **must** be selected.
- To specify multiple options, add the desired suffixes in the numerical order shown below. NOTE: Not all suffixes can be combined together.
- Minimum quantities may apply.

| (SUFFIX) | OPTION |
|----------|---|
| -14- | Side vented ball (uni-directional) |
| -21- | UHMWPE seats, graphite packing, spiral wound graphite body seal, PEEK bearing |
| -24- | Graphite packing, spiral wound graphite body seal, RPTFE bearing (API 607, 6th edition, ISO 10497:2010) |
| -38- | PEEK seats, graphite packing, spiral wound graphite body seal, PEEK bearing |
| -45- | Less lever and nut (bare stem) |
| -49- | No Lubrication. Assembled Dry. |
| -57- | Oxygen cleaned |
| -69- | Drilled & tapped purge port with plugs |
| -70- | 4" extended bonnet |
| -76- | Live loaded (lever operated) |
| -77- | Live loaded (gear operator or actuator) |
| -80- | Multiseal seats, PTFE chevron packing, spiral wound PTFE body seal, PEEK bearing |
| -82- | Flat Face Flanges |
| -90- | Double Packed 4" Extended Bonnet |
| -95- | Devlon® seats, graphite packing, spiral wound graphite body seal, PEEK bearing |
| -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) |
| -KB- | Kolsterised ball |
| -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 |
| -MP- | Positive material identification |
| -PH- | 17-4 PH stem |
| -TC- | Hydrostatic test with certified report |
| -TD- | API 6D Test (hydrostatic testing) |
| -TR- | Hydrostatic test with certified report & MTR |
| -TW- | Hydrostatic test with certified report & witnessed |

Pressure/Temperature Ratings - Page M-26, Graph No. 36

The listed C_v “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 C_v is a factor, the formula can be used to estimate flow of most media for valve sizing.

FLOW OF LIQUID

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

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

WHERE:

- Q = Flow in US gpm
- ΔP = Pressure drop (psig)
- SpGr = Specific gravity at flowing temperature
- C_v = Valve constant

FLOW OF GAS

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

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

WHERE:

- Q = Flow in SCFH
- ΔP = Pressure drop (psig)
- SpGr = Specific gravity (based on air = 1.0)
- P2 = 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 (ΔP) to inlet pressure (P1) exceeds 0.02.

NOTE: Only use the gas equation shown if (P1-P2)/P1 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 | -- | -- | -- | -- | -- | -- | -- |

FLOW DATA FOR APOLLO® BALL VALVES

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 | -- | -- | -- | -- | -- |

