

# 87A-900 SERIES

## Stainless Steel ASME Class 300 Flanged Full Port Ball Valve - 1/2" through 1"

For **STANDARDS COMPLIANCE** and **STANDARD FEATURES** refer to page D-3.



### STANDARD MATERIAL LIST

|    | PART (1/2" & 3/4" VALVES) | MATERIAL                                 |
|----|---------------------------|------------------------------------------|
| 1  | Body                      | ASTM A351 CF8M                           |
| 2  | Retainer                  | ASTM A276 Type 316                       |
| 3  | Ball                      | ASTM A276 Type 316                       |
| 4  | Stem                      | ASTM A276 Type 316                       |
| 5  | Packing Gland             | ASTM A276 Type 316                       |
| 6  | Stem Seals                | PTFE                                     |
| 7  | Seats                     | RPTFE                                    |
| 8  | Stem Nut                  | 300 Series Stainless Steel               |
| 9  | Lever                     | 300 Series Stainless Steel w/ Vinyl Grip |
| 10 | Stem Bearing              | RPTFE                                    |
| 11 | Stop                      | 300 Series Stainless Steel               |
| 12 | Body Seal                 | RPTFE                                    |
| 13 | Lockwasher                | 300 Series Stainless Steel               |
| 14 | Grounding Spring          | ASTM A313 Stainless Steel                |
| 15 | Grounding Spring          | ASTM A313 Stainless Steel                |
|    | PART (1" VALVES)          | MATERIAL                                 |
| 1  | Body                      | ASTM A351 CF8M                           |
| 2  | Retainer                  | ASTM A276 Type 316                       |
| 3  | Ball                      | ASTM A276 Type 316                       |
| 4  | Stem                      | ASTM A276 Type 316                       |
| 5  | Packing Gland             | ASTM A276 Type 316                       |
| 6  | Stem Seals                | PTFE                                     |
| 7  | Seats                     | RPTFE                                    |
| 8  | Gland Screws              | ASTM A193 B8 Class 1                     |
| 9  | Gland Plate               | 302 or 304 SS                            |
| 10 | Stem Nut                  | 316 SS                                   |
| 11 | Lever                     | 302 or 304 with Vinyl Grip               |
| 12 | Stem Bearing              | RPTFE                                    |
| 13 | Stop                      | ASTM A276 Type 316                       |
| 14 | Stop Screw                | 18-8 SS                                  |
| 15 | Lock Plate                | 302 or 304 SS                            |
| 16 | Body Seal                 | RPTFE                                    |
| 17 | Lockwasher                | 302 or 304 SS                            |
| 18 | Grounding Spring          | SS                                       |

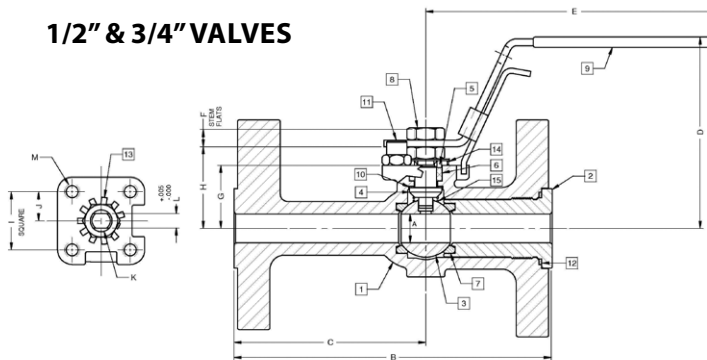
### VARIATIONS AVAILABLE:

87H - Hastelloy  
87M - Monel  
87N - Nickel

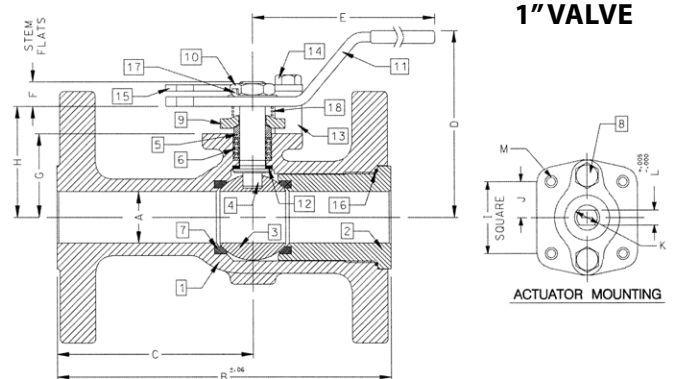
### OPTIONS AVAILABLE: (More information in Section J)

| (SUFFIX) | OPTION                                        |
|----------|-----------------------------------------------|
| -01      | Standard Configuration                        |
| -04-     | 2.25" CS Stem Extension                       |
| -14-     | Side Vented Ball (Uni-Directional)            |
| -15-     | Wheel Handle, Steel                           |
| -21-     | UHMWPE Seats                                  |
| -24-     | Fire Safe (Graphite Packing and Seal)         |
| -35-     | PTFE Seats and Seals                          |
| -38-     | PEEK Seats and Graphite Packing               |
| -49-     | No Lubrication. Assembled Dry.                |
| -57-     | Oxygen Cleaned                                |
| -65-     | MPTFE Seats and Graphite Packing (Fire Safe)  |
| -69-     | Drilled and Tapped Purge Port 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)                        |
| -90-     | 4" Extended Bonnet with Double Packing        |
| -9P-     | 4" Extended Bonnet with Double Packing & Port |
| -MP-     | Positive Material Identification              |
| -TC-     | With Test Certificate                         |
| -TD-     | Tested to API Spec 6D                         |
| -UL-     | UL & CSA Listed (w/Markings)                  |

### 1/2" & 3/4" VALVES



### 1" VALVE



FOR PRESSURE/TEMPERATURE RATINGS, REFER TO PAGE M-11, GRAPH NO. 6

| PRODUCT NUMBER | SIZE | A    | B    | C    | D    | E    | F    | G    | H    | I     | J     | K     | L     | M      | WT. |
|----------------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|--------|-----|
| 87A-903-01     | 1/2" | 0.50 | 5.50 | 3.31 | 3.31 | 5.11 | 0.30 | 1.09 | 1.38 | 1.000 | 0.500 | 0.375 | 0.245 | 10-24  | 6   |
| 87A-904-01     | 3/4" | 0.75 | 6.00 | 3.56 | 3.89 | 5.53 | 0.36 | 1.65 | 1.99 | 1.392 | 0.696 | 0.500 | 0.287 | 1/4-20 | 9   |
| 87A-905-01     | 1"   | 1.00 | 6.50 | 3.82 | 4.62 | 6.53 | 0.47 | 1.62 | 2.15 | 1.392 | 0.696 | 0.500 | 0.287 | 1/4-20 | 11  |



# 87A-900 SERIES

## Stainless Steel ASME Class 300 Flanged Full Port Ball Valve - 1.5" through 2.5"

For **STANDARDS COMPLIANCE** and **STANDARD FEATURES** refer to page D-3.



### STANDARD MATERIAL LIST

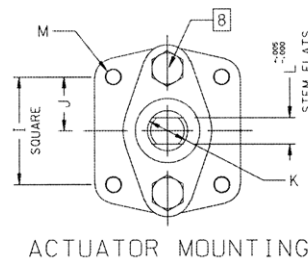
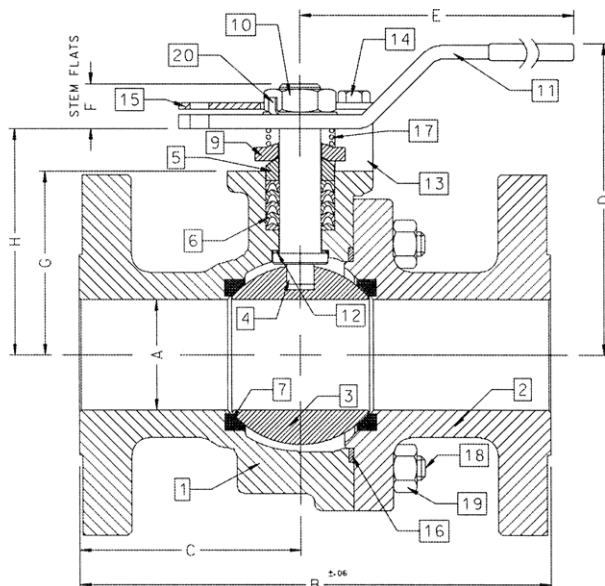
| PART                | MATERIAL                        |
|---------------------|---------------------------------|
| 1 Body              | ASTM A351 CF8M                  |
| 2 Retainer          | ASTM A351 CF8M                  |
| 3 Ball              | ASTM A276 Type 316 or A351 CF8M |
| 4 Stem              | ASTM A276 Type 316              |
| 5 Packing Gland     | ASTM A276 Type 316              |
| 6 Stem Seals        | PTFE                            |
| 7 Seats             | RPTFE                           |
| 8 Gland Screws      | ASTM A193 B8 Class 1            |
| 9 Gland Plate       | 316 SS                          |
| 10 Stem Nut         | 18-8 SS                         |
| 11 Lever            | 316 SS                          |
| 12 Stem Bearing     | RPTFE                           |
| 13 Stop             | ASTM A276 Type 316              |
| 14 Stop Screw       | 316 SS                          |
| 15 Lock Plate       | 302 or 304 SS                   |
| 16 Body Seal        | RPTFE                           |
| 17 Grounding Spring | SS                              |
| 18 Body Joint Stud  | ASTM A193 Grade B8M             |
| 19 Body Joint Nut   | ASTM A194 Grade 8               |
| 20 Lockwasher       | 302 or 304 SS                   |

### VARIATIONS AVAILABLE:

87H - Hastelloy  
87M - Monel  
87N - Nickel

### OPTIONS AVAILABLE: (More information in Section J)

| (SUFFIX) | OPTION                                                 |
|----------|--------------------------------------------------------|
| -01      | Standard Configuration                                 |
| -04-     | 2.25" CS Stem Extension (up to 2")                     |
| -14-     | Side Vented Ball (Uni-Directional)                     |
| -21-     | UHMWPE Seats                                           |
| -24-     | Fire Safe (Graphite Packing and Seal)                  |
| -35-     | PTFE Seats and Seals                                   |
| -38-     | PEEK Seats and Graphite Packing (3" Only)              |
| -49-     | No Lubrication. Assembled Dry.                         |
| -57-     | Oxygen Cleaned                                         |
| -65-     | MPTFE Seats and Graphite Packing (Fire Safe)           |
| -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)                                 |
| -90-     | 4" Extended Bonnet with Double Packing                 |
| -9P-     | 4" Extended Bonnet with Double Packing & Port          |
| -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                       |
| -TC-     | With Test Certificate                                  |
| -TD-     | Tested to API Spec 6D                                  |
| -UL-     | UL & CSA Listed (w/Markings)                           |



**FOR PRESSURE/TEMPERATURE RATINGS, REFER TO PAGE M-11, GRAPH NO. 6**

| PRODUCT NUMBER | SIZE | A    | B    | C    | D    | E    | F    | G    | H    | I     | J     | K     | L     | M       | WT. |
|----------------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|---------|-----|
| 87A-907-01     | 1.5" | 1.50 | 7.50 | 3.50 | 4.62 | 6.65 | 0.72 | 2.41 | 3.09 | 1.949 | 0.974 | 0.625 | 0.412 | 5/16-18 | 21  |
| 87A-908-01     | 2"   | 2.00 | 8.50 | 4.00 | 5.61 | 8.41 | 0.80 | 3.31 | 4.08 | 1.949 | 0.974 | 0.750 | 0.477 | 5/16-18 | 37  |
| 87A-909-01     | 2.5" | 2.50 | 9.50 | 4.44 | 6.24 | 8.41 | 0.80 | 3.94 | 4.71 | 1.949 | 0.974 | 0.750 | 0.477 | 5/16-18 | 57  |

# 87A-900 SERIES

## Stainless Steel ASME Class 300 Flanged Full Port Ball Valve - 3" through 6"

For **STANDARDS COMPLIANCE** and **STANDARD FEATURES** refer to page D-3.



### STANDARD MATERIAL LIST

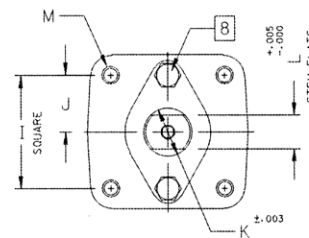
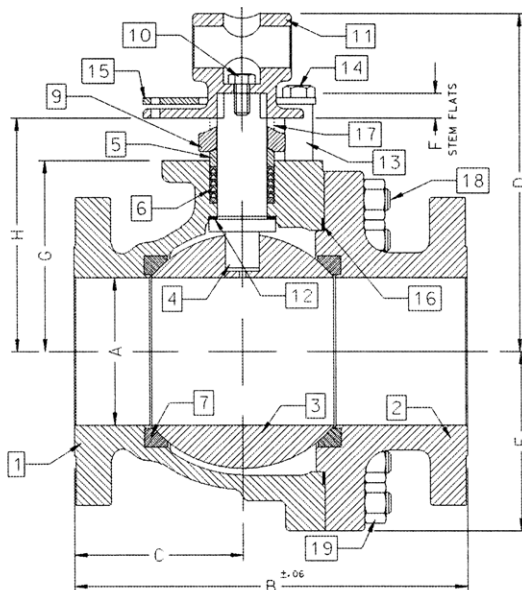
| PART                | MATERIAL                        |
|---------------------|---------------------------------|
| 1 Body              | ASTM A351 CF8M                  |
| 2 Retainer          | ASTM A351 CF8M                  |
| 3 Ball              | ASTM A276 Type 316 or A351 CF8M |
| 4 Stem              | ASTM A276 Type 316              |
| 5 Packing Gland     | ASTM A276 Type 316              |
| 6 Stem Seals        | PTFE                            |
| 7 Seats             | RPTFE                           |
| 8 Gland Screws      | ASTM A193 B8 Class 1            |
| 9 Gland Plate       | 316 SS                          |
| 10 Adapter Screw    | 18-8 SS                         |
| 11 Handle Adapter   | 316 SS                          |
| 12 Stem Bearing     | RPTFE                           |
| 13 Stop             | ASTM A276 Type 316              |
| 14 Stop Screw       | 316 SS                          |
| 15 Lock Plate       | 302 or 304 SS                   |
| 16 Body Seal        | RPTFE                           |
| 17 Grounding Spring | SS                              |
| 18 Body Joint Stud  | ASTM A193 Grade B8M             |
| 19 Body Joint Nut   | ASTM A194 Grade 8               |
| 20 Pipe Handle      | Galvanized Steel (not shown)    |

### VARIATIONS AVAILABLE:

87H - Hastelloy  
87N - Nickel

### OPTIONS AVAILABLE: (More information in Section J)

| (SUFFIX) | OPTION                                                 |
|----------|--------------------------------------------------------|
| -01      | Standard Configuration                                 |
| -14-     | Side Vented Ball (Uni-Directional)                     |
| -21-     | UHMWPE Seats                                           |
| -24-     | Fire Safe (Graphite Packing and Seal)                  |
| -35-     | PTFE Seats and Seals                                   |
| -38-     | PEEK Seats and Graphite Packing (3" Only)              |
| -49-     | No Lubrication. Assembled Dry.                         |
| -57-     | Oxygen Cleaned                                         |
| -65-     | MPTFE Seats and Graphite Packing (Fire Safe)           |
| -69-     | Drilled and Tapped Purge Port 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)                                 |
| -90-     | 4" Extended Bonnet with Double Packing                 |
| -9P-     | 4" Extended Bonnet with Double Packing & Port          |
| -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 |
| -PM-     | Positive Material Identification                       |
| -TC-     | With Test Certificate                                  |
| -TD-     | Tested to API Spec 6D                                  |
| -UL-     | UL & CSA Listed (w/Markings)                           |



ACTUATOR MOUNTING

FOR PRESSURE/TEMPERATURE RATINGS, REFER TO PAGE M-11, GRAPH NO. 6

| PRODUCT NUMBER | SIZE | A    | B     | C    | D     | E    | F    | G    | H    | I     | J     | K     | L     | M      | WT. |
|----------------|------|------|-------|------|-------|------|------|------|------|-------|-------|-------|-------|--------|-----|
| 87A-900-01     | 3"   | 3.00 | 11.12 | 5.24 | 8.80  | 4.06 | 0.50 | 4.75 | 5.95 | 2.840 | 1.420 | 1.250 | 0.725 | 3/8-16 | 78  |
| 87A-90A-01     | 4"   | 4.00 | 12.00 | 5.44 | 9.99  | 5.25 | 0.50 | 5.94 | 7.13 | 2.840 | 1.420 | 1.250 | 0.725 | 3/8-16 | 133 |
| 87A-90C-01     | 6"   | 6.00 | 15.88 | 6.82 | 13.73 | 7.30 | 1.00 | 7.75 | 9.48 | 4.596 | 2.298 | 2.000 | 1.375 | 3/4-10 | 329 |



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# 87A-900 SERIES

## Stainless Steel ASME Class 300 Flanged Full Port Ball Valve - 8" through 12"

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 A276 Type 316 or A351 CF8M |
| 4 Stem             | ASTM A276 Type 316              |
| 5 Packing Gland    | ASTM A276 Type 316              |
| 6 Stem Seals       | PTFE                            |
| 7 Seats            | RPTFE                           |
| 8 Gland Screws     | ASTM A193 B8 Class 1            |
| 9 Gland Plate      | 316 SS                          |
| 10 Stem Bearing    | RPTFE                           |
| 11 Body Seal       | RPTFE                           |
| 12 Body Joint Stud | ASTM A193 Grade B8M             |
| 13 Body Joint Nut  | ASTM A194 Grade 8               |

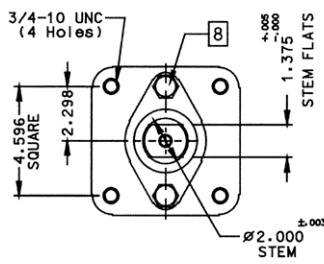
### VARIATIONS AVAILABLE:

87H - Hastelloy

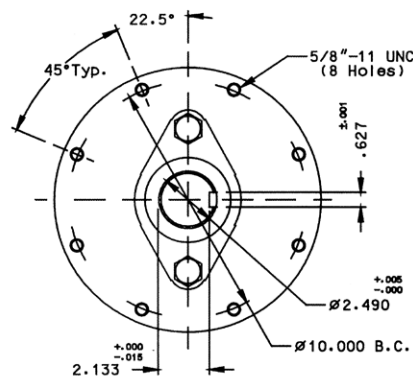
87N - Nickel

### OPTIONS AVAILABLE: (More information in Section J)

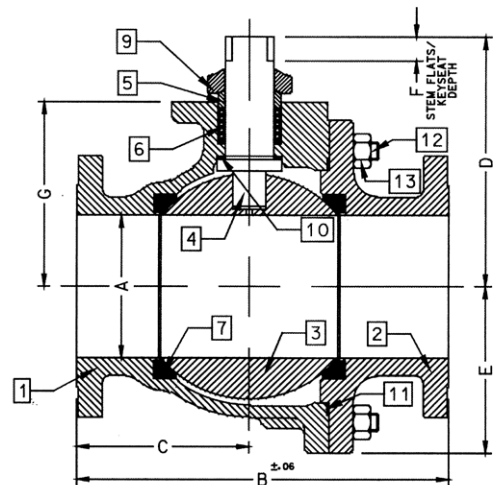
| (SUFFIX) | OPTION                                                 |
|----------|--------------------------------------------------------|
| -01      | Standard Configuration                                 |
| -14-     | Side Vented Ball (Uni-Directional)                     |
| -21-     | UHMWPE Seats                                           |
| -24-     | Fire Safe (Graphite Packing and Seal)                  |
| -35-     | PTFE Seats and Seals                                   |
| -49-     | No Lubrication. Assembled Dry.                         |
| -57-     | Oxygen Cleaned                                         |
| -65-     | MPTFE Seats and Graphite Packing (Fire Safe)           |
| -69-     | Drilled and Tapped Purge Ports with Plugs              |
| -70-     | 4" Extended Bonnet (8" Only)                           |
| -77-     | Live Loaded (Gear, Actuator)                           |
| -80-     | Multi-Seal (Super TFE)                                 |
| -90-     | 4" Extended Bonnet with Double Packing                 |
| -9P-     | 4" Extended Bonnet with Double Packing & Port          |
| -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 |
| -PM-     | Positive Material Identification                       |
| -TC-     | With Test Certificate                                  |
| -TD-     | Tested to API Spec 6D                                  |
| -UL-     | UL & CSA Listed (w/Markings)                           |



ACTUATOR MOUNTING: 8"



ACTUATOR MOUNTING: 10" & 12"



FOR PRESSURE/TEMPERATURE RATINGS, REFER TO PAGE M-11, GRAPH NO. 6

| PRODUCT NUMBER | SIZE | A     | B     | C     | D     | E     | F    | G     |
|----------------|------|-------|-------|-------|-------|-------|------|-------|
| 87A-90E-01     | 8"   | 8.00  | 19.75 | 9.38  | 12.83 | 9.56  | 1.00 | 10.22 |
| 87A-90G-01     | 10"  | 10.00 | 22.38 | 10.95 | 18.57 | 11.33 | 2.31 | 12.80 |
| 87A-90H-01     | 12"  | 12.00 | 25.50 | 12.84 | 20.31 | 13.40 | 2.31 | 14.92 |

# ASME FLANGED BALL VALVES

## Features and Benefits

87A, 87B, 88A, 88B, & 88L Series



### STANDARDS COMPLIANCE:

*Except where specifically noted all valves within this family of products complies with the requirements of this listed standard.*

|                      |                                                                                            |
|----------------------|--------------------------------------------------------------------------------------------|
| ASME B16.5           | "Pipe Flanges and Flanged Fittings"                                                        |
| ASME B16.10          | "Face to Face Dimensions of Valves"                                                        |
| ASME B16.34          | "Valves - Flanged, Threaded, and Welding End"                                              |
| ASME B16.33          | "Manual Operated Metallic Gas Valves for Use in Gas Piping Systems up to 125 psig"         |
| ASME B16.38          | "Large Metallic Valves for Gas Distribution (Manually Operated NPS 2.5" to 12", 125 psig)" |
| ASME B31.1           | "Power Piping"                                                                             |
| ASME B31.3           | "Chemical Plant and Petroleum Refinery Piping"                                             |
| ASME B31.8           | "Gas Transmission and Distribution Piping Systems"                                         |
| API 607, 5th edition | "Fire Test - Soft Seated Quarter Turn Valves" (-24 Option Required)                        |
| API 608              | "Ball Valves - Flanged, Threaded, and Welding End"                                         |
| MSS SP-25            | "Standard Marking System for Valves"                                                       |
| MSS SP-61            | "Pressure Testing of Steel Valves"                                                         |
| MSS SP-72            | "Ball Valves with Flanged or Buttweld Ends"                                                |
| UL 125               | "Valves for Anhydrous Ammonia and LP-Gas (Other than Safety Relief)"                       |
| NSF/ANSI 61 (2010)   | Section 8, Annex F & G                                                                     |
| NSF-372              | Drinking Water System Components - Lead Content                                            |

### STANDARDS FEATURES:

*Except where specifically noted all valves within this family of products include all listed features as standard.*

- Two Position Locking Device (Valves 6" FP, 8" SP and smaller)
- CHV Style Adjustable Stem Seals
- Four Point ISO 5211 Mounting Pad Bolt Pattern
- Slot Vented Ball for Thermal Expansion
- Rated 150 psig Saturated Steam
- Anti-static Grounded Ball and Stem
- Blow-out Proof Stem Design
- Cast Boss for Bleed / Drain Port
- Vacuum Service to 29 inches of Hg
- NACE MR0175 (2000) Compliance on all 87A/87B and 88A/88B Valves
- NACE MR0103 (2003) Compliance on all 87A/87B and 88A/88B Valves

### PRODUCT APPROVALS:

CSA (Reference: ASME B16.33 & B16.38)

UL (Reference: Control Number 195H)

- UL (YSDT) LP-Gas Shut-Off Valves
- UL (MHKZ) Manual Valves
- UL (YRBX) Flammable Liquid Shut-Off Valves
- UL (YRPV) Gas Shut-Off Valves
- UL (YQNZ) Compressed Gas Shut-Off Valves
- UL (YQAR) Anhydrous Ammonia Shut-Off Valves



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# ASME FLANGED BALL VALVES

87A, 87B, 88A, 88B, & 88L Series



## VARIATIONS AVAILABLE:

| REFERENCE DATA: |          |            |                       | ALLOY SERIES FLANGED BALL VALVES |          |             |          |         |
|-----------------|----------|------------|-----------------------|----------------------------------|----------|-------------|----------|---------|
| SIZE            | PORT     | ANSI CLASS | DIMENSIONAL DATA PAGE | STAINLESS STEEL                  | ALLOY 20 | * HASTELLOY | * NICKEL | * NI-CU |
| 1.5" & 2"       | Standard | 150        | D-1                   | 87A-10X                          | 87A-40X  | 87H-1HX     | 87N-1NX  | 87M-13X |
| 2.5" & 3"       | Standard | 150        | D-2                   | 87A-10X                          | 87A-40X  | 87H-1HX     | 87N-1NX  | N/A     |
| 4", 6" & 8"     | Standard | 150        | D-3                   | 87A-10X                          | 87A-40X  | 87H-1HX     | 87N-1NX  | N/A     |
| 10"             | Standard | 150        | D-4                   | 87A-10X                          | 87A-40X  | 87H-1HX     | 87N-1NX  | N/A     |
| 1/2", 3/4" & 1" | Full     | 150        | D-5                   | 87A-20X                          | 87A-50X  | 87H-2HX     | 87N-2NX  | 87M-23X |
| 1.5", 2" & 2.5" | Full     | 150        | D-6                   | 87A-20X                          | 87A-50X  | 87H-2HX     | 87N-2NX  | 87M-23X |
| 3", 4", & 6"    | Full     | 150        | D-7                   | 87A-20X                          | 87A-50X  | 87H-2HX     | 87N-2NX  | N/A     |
| 8", 10" & 12"   | Full     | 150        | D-8                   | 87A-20X                          | 87A-50X  | 87H-2HX     | 87N-2NX  | N/A     |
| 1.5" & 2"       | Standard | 300        | D-9                   | 87A-70X                          | 87A-80X  | 87H-7HX     | 87N-7NX  | N/A     |
| 2.5" & 3"       | Standard | 300        | D-10                  | 87A-70X                          | 87A-80X  | 87H-7HX     | 87N-7NX  | N/A     |
| 4", 6" & 8"     | Standard | 300        | D-11                  | 87A-70X                          | 87A-80X  | 87H-7HX     | 87N-7NX  | N/A     |
| 10"             | Standard | 300        | D-12                  | 87A-70X                          | 87A-80X  | 87H-7HX     | 87N-7NX  | N/A     |
| 1/2", 3/4" & 1" | Full     | 300        | D-13                  | 87A-90X                          | 87A-60X  | 87H-9HX     | 87N-9NX  | 87M-93X |
| 1.5", 2" & 2.5" | Full     | 300        | D-14                  | 87A-90X                          | 87A-60X  | 87H-9HX     | 87N-9NX  | 87M-93X |
| 3", 4", & 6"    | Full     | 300        | D-15                  | 87A-90X                          | 87A-60X  | 87H-9HX     | 87N-9NX  | N/A     |
| 8", 10" & 12"   | Full     | 300        | D-16                  | 87A-90X                          | 87A-60X  | 87H-9HX     | 87N-9NX  | N/A     |

\* Minimum Quantities May Apply

## ALLOY MATERIAL OF CONSTRUCTION FOR PRESSURE CONTAINING / RETAINING COMPONENTS:

| ALLOY        | STAINLESS STEEL | ALLOY 20     | HASTELLOY*   | NICKEL*       | NI-CU ALLOY*  |
|--------------|-----------------|--------------|--------------|---------------|---------------|
| Valve Series | 87A-100/200,    | 87A-400/500, | 87H-1H0/2H0, | 87N-1N0/2N0,  | 87M-130/230,  |
|              | 87A-700/900     | 87A-600/800  | 87H-7H0/9H0  | 87N-7N0/9N0   | 87M-730/930   |
| Body         | A351-CF8M       | A351-CN7M    | A494-CW12MW  | A494-CZ100    | A494-M35-1    |
| Retainer     | A351-CF8M or    | A351-CN7M or | A494-CW12MW  | A494-CZ100 or | A494-M35-1 or |
|              | A276-316        | B473-N08020  | or B574-C276 | B160-200      | B164-K400     |
| Ball         | A351-CF8M or    | A351-CN7M or | A494-CW12MW  | A494-CZ100 or | A494-M35-1 or |
|              | A276-316        | B473-N08020  | or B574-C276 | B160-200      | B164-K400     |
| Stem         | A276-316        | B473-N08020  | B574-C276    | B160-200      | B164-K400     |
| Fasteners    | A193-B8M,       | A193-B8M,    | A193-B8M,    | A193-B8M,     | A193-B8M,     |
|              | A194-Gr8        | A194-Gr8     | A194-Gr8     | A194-Gr8      | A194-Gr8      |

\* Minimum Quantities May Apply

# 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



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# FLOW DATA

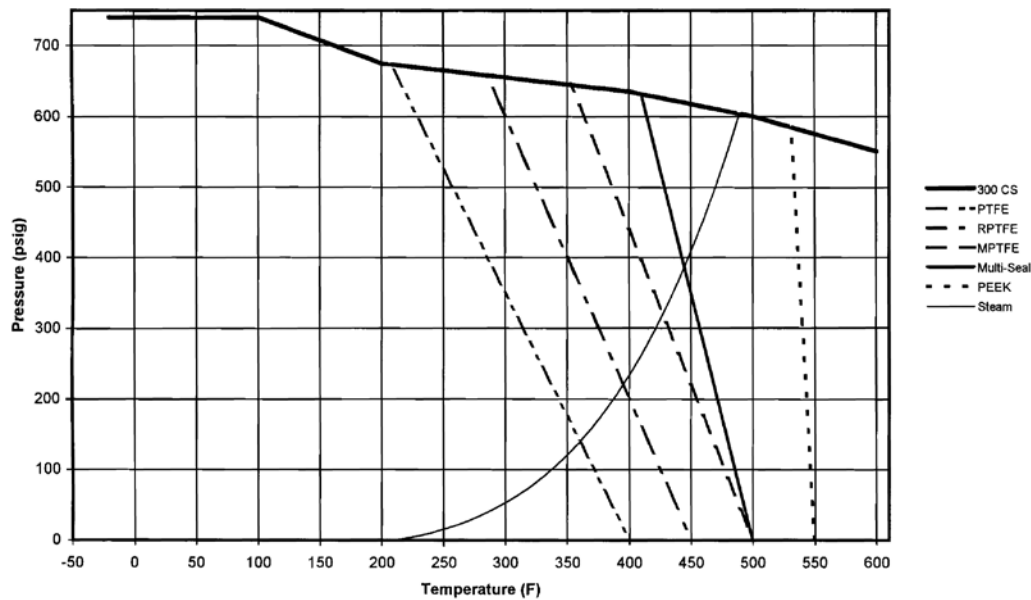
## For Apollo® Ball Valves

### 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

## Class 300 CS (GRAPH 5)



## Class 300 SS (GRAPH 6)

