

# 87A-700 SERIES

## Stainless Steel ASME Class 300 Flanged Std. Port Ball Valve - 1.5" through 2"

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 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 & 304 SS                 |
| 10 | Stem Nut         | 316 SS                       |
| 11 | Lever            | 302 & 304 SS 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                           |

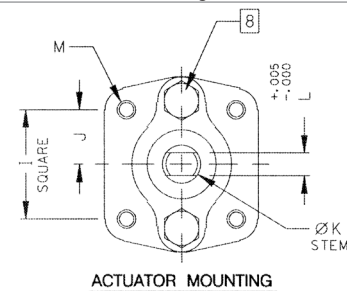
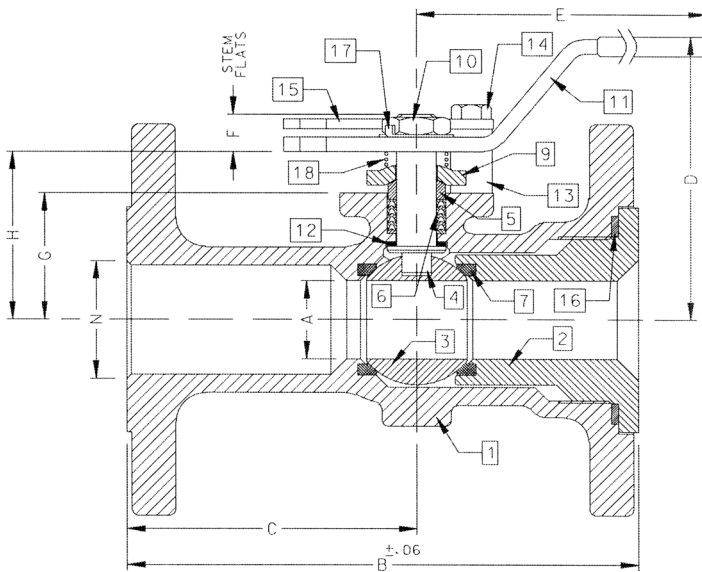
### VARIATIONS AVAILABLE:

87H - Hastelloy  
87M - Monel  
87N - Nickel  
87S - 304L SS

### 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)                                                        |
| -14 -    | Side Vented Ball (See Page J-2)                                                                         |
| -15-     | Wheel Handle, Steel                                                                                     |
| -21 -    | UHMWPE Seats                                                                                            |
| -24-     | Graphite packing, spiral wound graphite body seal, RPTFE bearing (API 607, 6th edition, ISO 10497:2010) |
| -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 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                                                   |
| -EP-     | Garlock EVSP Stem Packing w/Spiral Wound Graphite Gasket (Fire Safe by Design)                          |
| -KF-     | PCTFE Stem Bearing                                                                                      |
| -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       | N    | WT.  |
|----------------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|---------|------|------|
| 87A-707-01A    | 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 | 15.7 |
| 87A-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 | 24.0 |



# 87A-700 SERIES

## Stainless Steel ASME Class 300 Flanged Std. Port Ball Valve - 2.5" through 3"

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 with Vinyl Grip             |
| 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                   |

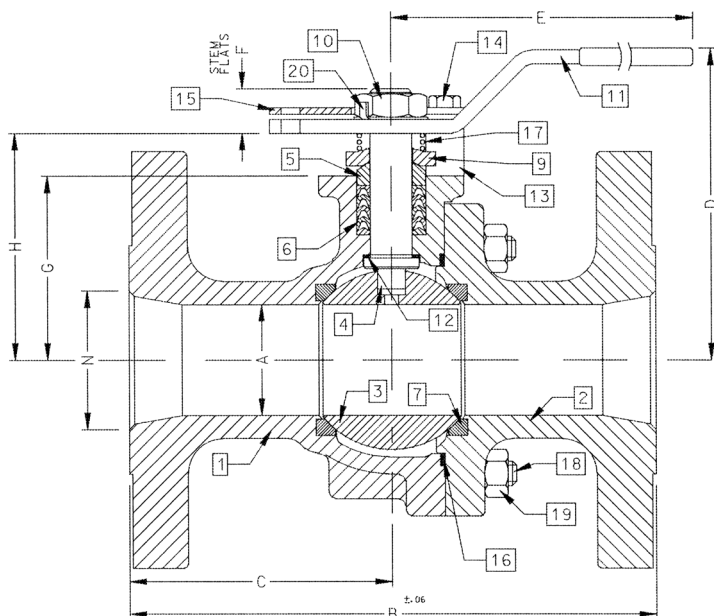
### VARIATIONS AVAILABLE:

87H - Hastelloy  
87N - Nickel  
87S - 304L SS

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

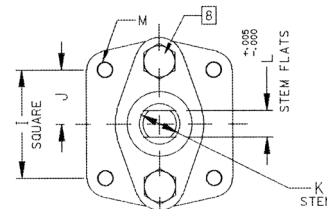
- Minimum quantities apply
- To specify an option, replace the "01" standard suffix with the suffix of the option.
- To specify multiple options, replace the "01" suffix with the desired suffixes in the numerical order shown below. NOTE: Not all suffixes can be combined together.

| (SUFFIX) | OPTION                                                                                                  |
|----------|---------------------------------------------------------------------------------------------------------|
| -01      | Standard Configuration                                                                                  |
| -04-     | 2.25" Stem Extension (Carbon Steel, Zinc Plated) (2.5" only)                                            |
| -14-     | Side Vented Ball (Uni-Directional)                                                                      |
| -21-     | UHMWPE Seats                                                                                            |
| -24-     | Graphite packing, spiral wound graphite body seal, RPTFE bearing (API 607, 6th edition, ISO 10497:2010) |
| -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 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                                                   |
| -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                                                  |
| -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       | N    | WT. |
|----------------|------|------|-------|------|------|------|------|------|------|-------|-------|-------|-------|---------|------|-----|
| 87A-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  |
| 87A-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  |



ACTUATOR MOUNTING

# 87A-700 SERIES

## Stainless Steel ASME Class 300 Flanged Std. Port Ball Valve - 4" through 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 A276 Type 316              |
| 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 | Adapter Screw    | 18-8 SS                         |
| 21 | Pipe Handle      | Galvanized Steel (not shown)    |

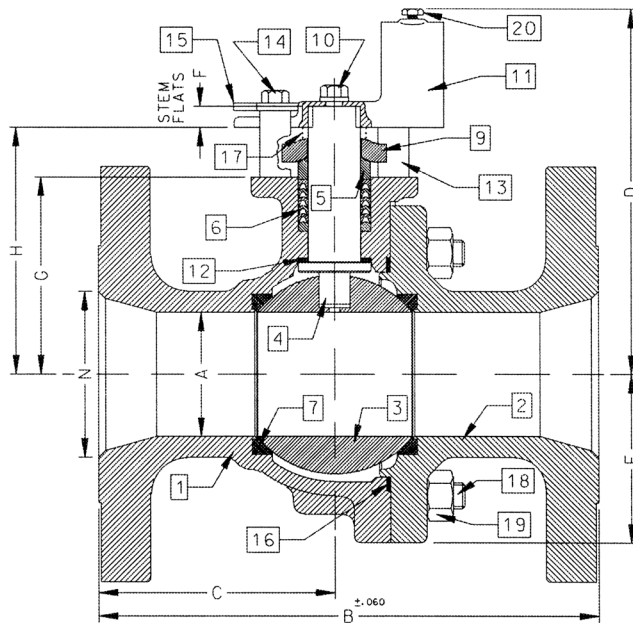
### VARIATIONS AVAILABLE:

87H - Hastelloy  
87N - Nickel  
87S - 304L SS

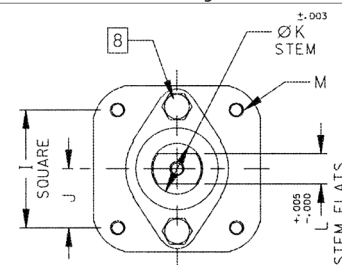
### OPTIONS AVAILABLE: (More information in Section J)

- 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                                                                                  |
| -14-     | Side Vented Ball (Uni-Directional)                                                                      |
| -21-     | UHMWPE Seats                                                                                            |
| -24-     | Graphite packing, spiral wound graphite body seal, RPTFE bearing (API 607, 6th edition, ISO 10497:2010) |
| -35-     | PTFE Seats and Seals                                                                                    |
| -49-     | No Lubrication. Assembled Dry.                                                                          |
| -57-     | Oxygen Cleaned                                                                                          |
| -65-     | MPTEF 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)                                                                                  |
| -82-     | Flat Face Flanges                                                                                       |
| -90-     | Double Packed 4" Extended Bonnet                                                                        |
| -9P-     | Double Packed 4" Extended Bonnet with Monitoring Port                                                   |
| -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                                                  |
| -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



ACTUATOR MOUNTING

| PRODUCT NUMBER | SIZE | A    | B     | C    | D     | E    | F    | G    | H    | I     | J     | K     | L     | M      | N    | WT. |
|----------------|------|------|-------|------|-------|------|------|------|------|-------|-------|-------|-------|--------|------|-----|
| 87A-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  |
| 87A-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 |
| 87A-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 |



# 87A-700 SERIES

## Stainless Steel ASME Class 300 Flanged Standard Port Ball Valve - 10"

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               |

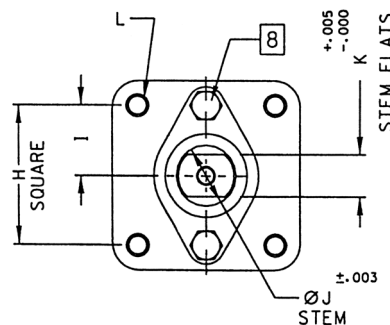
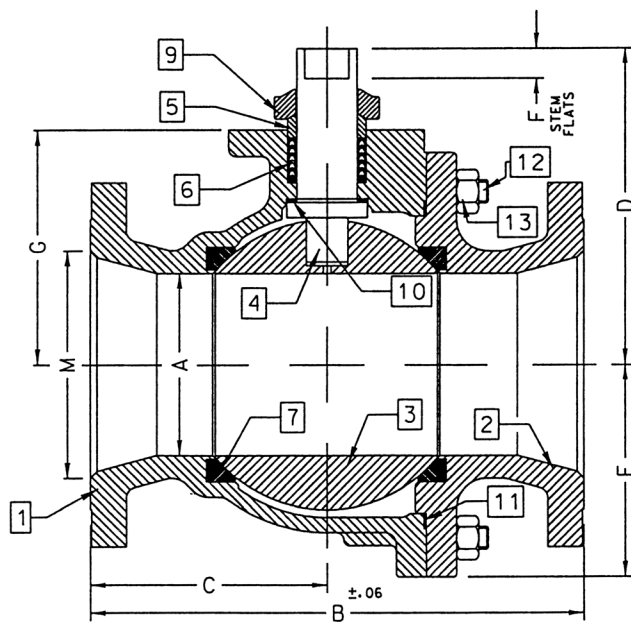
### VARIATIONS AVAILABLE:

87H - Hastelloy  
87N - Nickel  
87S - 304L SS

### 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 (Less Gear Operator)                                                             |
| -14-     | Side Vented Ball (See Page J2)                                                                          |
| -21-     | UHMWPE Seats                                                                                            |
| -24-     | Graphite packing, spiral wound graphite body seal, RPTFE bearing (API 607, 6th edition, ISO 10497:2010) |
| -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                                                                                      |
| -77-     | Live Loaded 87A/88A Series (Gear, Actuator)                                                             |
| -80-     | Multi-Seal (Super TFE) 87A/88A Series                                                                   |
| -82-     | Flat Face Flanges                                                                                       |
| -90-     | Double Packed 4" Extended Bonnet                                                                        |
| -9P-     | Double Packed 4" Extended Bonnet with Monitoring Port                                                   |
| -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                                                  |
| -MP-     | 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     |
|----------------|------|------|-------|-------|-------|------|------|-------|-------|-------|-------|-------|--------|-------|
| 87A-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 |

# ASME FLANGED BALL VALVES

## Features and Benefits

**87A, 87A-F, 87B, 88A, 88A-F, 88B, 88L, & 88L-F Series**



### STANDARDS COMPLIANCE:

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

|                    |                                                                                                                      |
|--------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>ASME B16.5</b>  | "Pipe Flanges and Flanged Fittings"                                                                                  |
| <b>ASME B16.10</b> | "Face to Face Dimensions of Valves"                                                                                  |
| <b>ASME B16.34</b> | "Valves - Flanged, Threaded, and Welding End"                                                                        |
| <b>ASME B16.33</b> | "Manual Operated Metallic Gas Valves for Use in Gas Piping Systems up to 125 psig"                                   |
| <b>ASME B16.38</b> | "Large Metallic Valves for Gas Distribution (Manually Operated NPS 2.5" to 12", 125 psig)"                           |
| <b>ASME B31.1</b>  | "Power Piping"                                                                                                       |
| <b>ASME B31.3</b>  | "Chemical Plant and Petroleum Refinery Piping"                                                                       |
| <b>ASME B31.8</b>  | "Gas Transmission and Distribution Piping Systems"                                                                   |
| <b>API 607</b>     | "Fire Test - Soft Seated Quarter Turn Valves" (-24 Option Required). See specific tech sheet for 5th or 6th edition. |
| <b>API 608</b>     | "Ball Valves - Flanged, Threaded, and Welding End"                                                                   |
| <b>MSS SP-25</b>   | "Standard Marking System for Valves"                                                                                 |
| <b>MSS SP-61</b>   | "Pressure Testing of Steel Valves"                                                                                   |
| <b>MSS SP-72</b>   | "Ball Valves with Flanged or Buttweld Ends"                                                                          |
| <b>UL 125</b>      | "Valves for Anhydrous Ammonia and LP-Gas (Other than Safety Relief)"                                                 |
| <b>NSF/ANSI 61</b> | Section 8, Annex G (1/2" to 4" 87A Series)                                                                           |
| <b>NSF-372</b>     | Drinking Water System Components - Lead Content (1/2" to 4" 87A Series)                                              |

### STANDARD FEATURES:

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

- Two Position Locking Device (Valves 6" Full Port, 8" Standard Port and smaller)
- Chevron Style Adjustable Stem Seals
- ISO 5211 Mounting Pad Bolt Pattern
- Slot Vented Ball for Thermal Expansion
- Rated up to 150 psig Saturated Steam
  - ASME Class 150, 300, & 600 Valves
- Rated up to 250 psig Saturated Steam
  - ASME Class 300 Valves Require the -65 Option
  - ASME Class 600 Valves Require the -24-80 Options or -38 Option
- 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/88A/88B/88L Valves with SS Ball & Stem
- NACE MR0103 (2003) Compliance on all 87A/87B/88A/88B/88L Valves with SS Ball & Stem

### PRODUCT APPROVALS:

|                  |                                                                |
|------------------|----------------------------------------------------------------|
| <b>CSA*</b>      | (Reference: ASME B16.33 & B16.38)<br>ASME Class 150 & 300 only |
| <b>UL*</b>       | (Reference: Control Number 195H)<br>ASME Class 150 & 300 only  |
| <b>UL (YSDT)</b> | LP-Gas Shut-Off Valves                                         |
| <b>UL (MHKZ)</b> | Manual Valves                                                  |
| <b>UL (YRBX)</b> | Flammable Liquid Shut-Off Valves                               |
| <b>UL (YRPV)</b> | Gas Shut-Off Valves                                            |
| <b>UL (YQNZ)</b> | Compressed Gas Shut-Off Valves                                 |
| <b>UL (YQAR)</b> | Anhydrous Ammonia Shut-Off Valves                              |

\* Requires "UL" suffix for markings.



# 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

**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 (P<sub>1</sub>) exceeds 0.02.

**NOTE:** Only use the gas equation shown if (P<sub>1</sub>-P<sub>2</sub>)/P<sub>1</sub> is less than 0.02.

### Cv FACTORS FOR APOLLO VALVES

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

continued on next page

# FLOW DATA

## For Apollo® Ball Valves

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

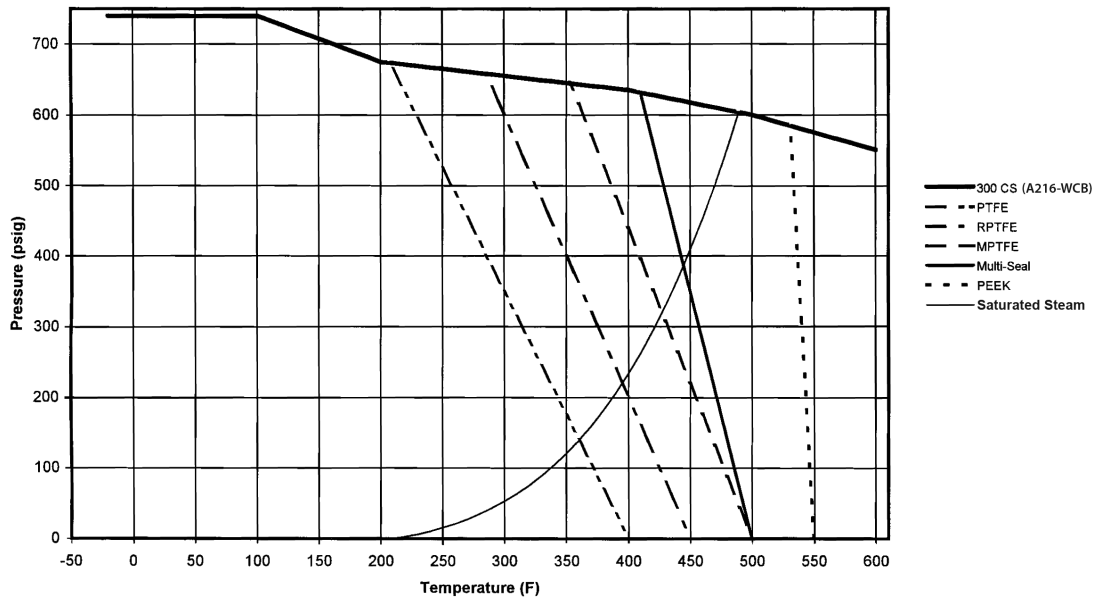
| VALVE              | SIZE (IN.) |     |     |     |    |      |     |     |     |      |      |      |      |       |       |
|--------------------|------------|-----|-----|-----|----|------|-----|-----|-----|------|------|------|------|-------|-------|
|                    | 1/4        | 3/8 | 1/2 | 3/4 | 1  | 1.25 | 1.5 | 2   | 2.5 | 3    | 4    | 6    | 8    | 10    | 12    |
| 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  | --   | --   | --   | --    | --    |

# PRESSURE TEMPERATURE RATINGS

**Class 300**

**(CS) ASTM A216-WCB**

**(GRAPH 5)**



**Class 300**

**(SS) ASTM A351-CF8M**

**(GRAPH 6)**

