

# **R&M ENERGY SYSTEMS**

A Unit of Robbins & Myers, Inc.



- **HAND**
- **ANGLE**
- **GAUGE**
- **MINI**
- **BLEED**

**MAGNUM<sup>®</sup>**  
**HAND VALVES**



A Unit of Robbins & Myers, Inc.

R&M Energy Systems offers a broad line of quality hand valves under the Magnum brand in both carbon steel and stainless steel materials. Magnum *hand*, *angle*, *gauge* and *bleed* valves are available in metal seat (Viton, PTFE or Grafoil stem seals) or soft seat (Viton or PTFE stem seals) with NACE trim available. Magnum also offers a hard seat *mini* valve 1/8" and 1/4" sizes.

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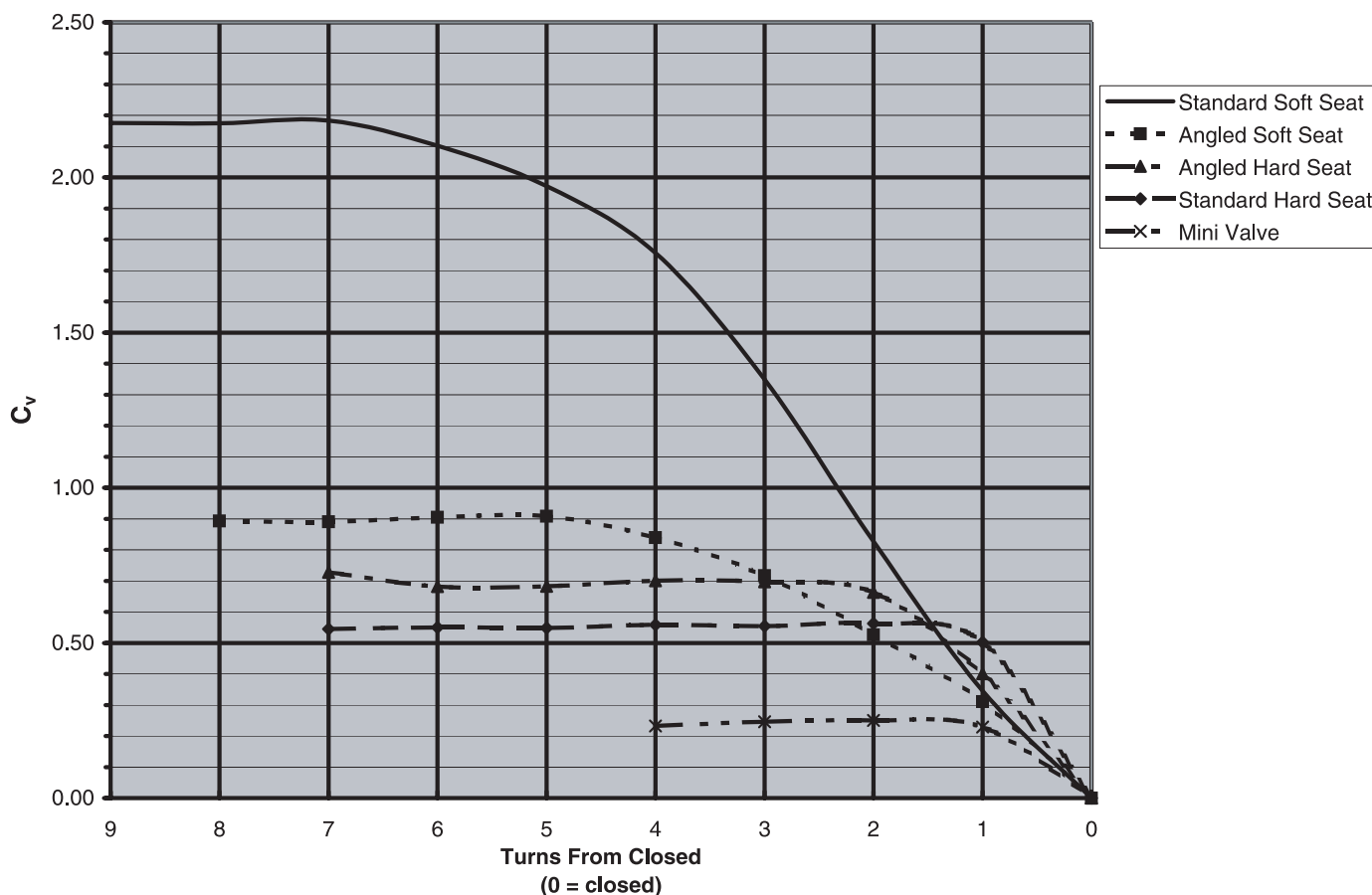


### NACE

Magnum’s soft seat needle valves have a 316 SS construction that is recognized in NACE MR0175 for sour service. Magnum’s hard seat needle valves are constructed of 316 SS with Nitronic 60 stem. The Nitronic 60 material has passed the NACE TM-01-77 test using Cortest Proof Rings. Because of its excellent resistance to galling, Nitronic 60 is one of, if not the best material for hard seat needle valves. Due to its performance and the fact that the material has passed NACE TM-01-77, R&M Energy Systems recommends the Magnum hard seat or soft seat stainless steel needle valves for sour service.

### FLOW RATES

**Cv Values per Handle Turns**



**Cv FOR FULLY OPEN VALVE**

Hard Seat	Soft Seat	Angle Soft Seat	Angle Hard Seat	Mini Valve
.545	2.176	.893	.728	.232

**FORMULAS**

**Liquids**

$$Q_L = C_V \sqrt{\frac{(P_1 - P_2) (62.4)}{\rho}}$$

**Gases (Where  $P_2 > .5P_1$ )**

$$Q_V = (23.18) C_V \sqrt{\frac{(P_1 - P_2) P_2}{(S.G.) T}}$$

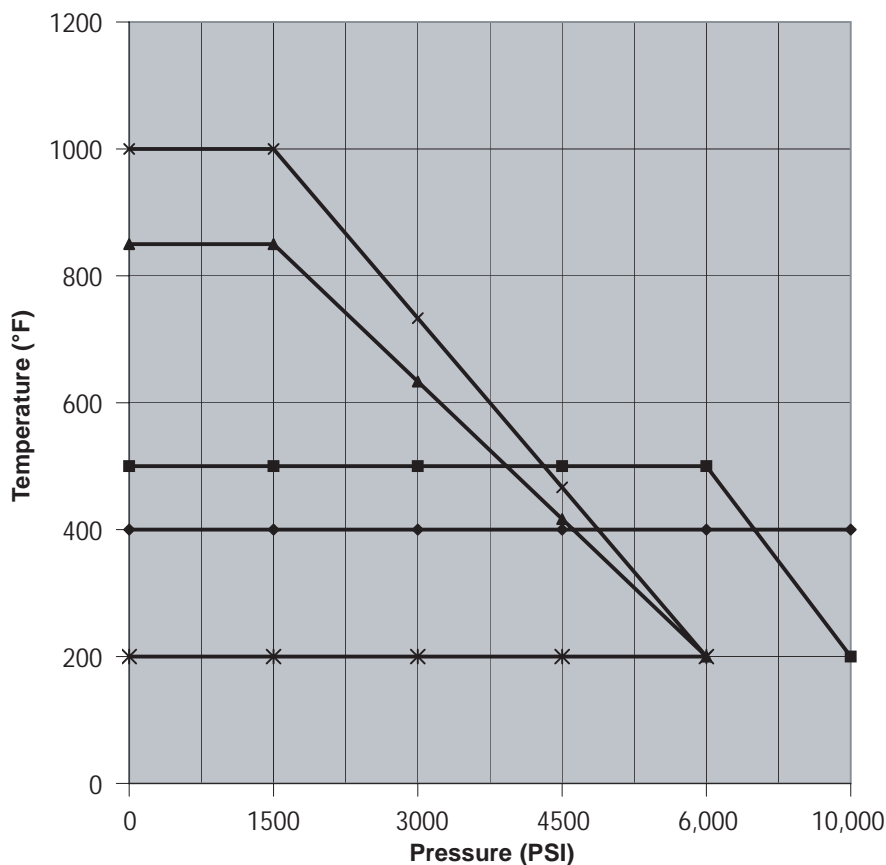
**Gases (Where  $P_2 < .5P_1$ )**

$$Q_V = (11.59) P_1 C_V \sqrt{S.G. (T)}$$

**Where:**

- $Q_L$  = Flow (gpm)
- $Q_V$  = Flow (scfm)
- $\rho$  = Density of Liquid (lb/ft<sup>3</sup>)
- $P_1$  = Upstream Pressure (psia)
- $P_2$  = Downstream Pressure (psia)
- T = Flowing Temperature (°R)  
(°R = °F + 460)
- $\rho$  (Water) = 62.4 (lb/ft<sup>3</sup> @ 60°F [16°])
- S.G. = Specific Gravity of Gas  
(M.W. of Air/28.96)
- S.G. Air = 1.000
- S.G. Nitrogen = 0.967
- S.G. Oxygen = 1.105
- S.G. Helium = 0.138
- S.G. Hydrogen = 0.0696

**PRESSURE VERSUS TEMPERATURE**

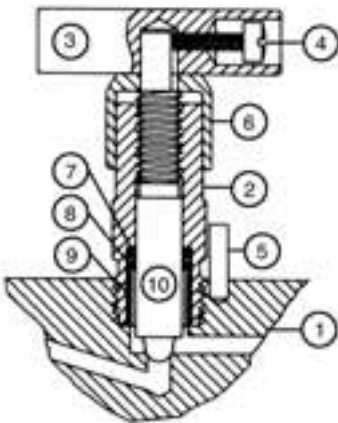
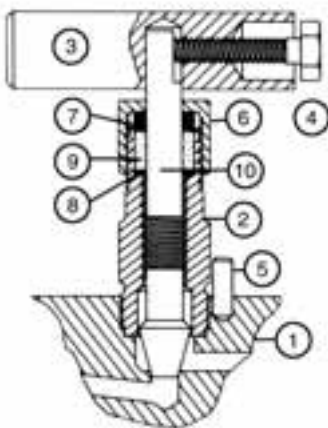
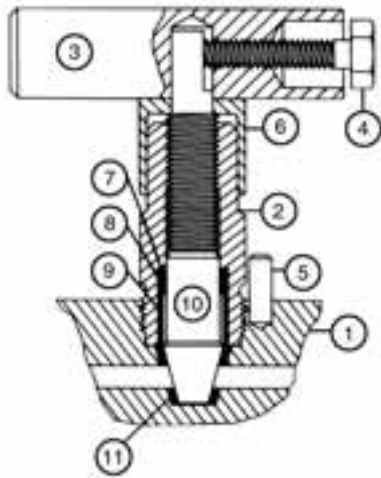


- CS/SS Hard Seat Viton
- CS/SS Hard Seat PTFE
- CS Hard Seat Grafoil
- SS Hard Seat Grafoil
- CS/SS Soft Seat Viton

*This chart represents the maximum pressure at the given temperature. The following information is for minimum temperatures. Pressures for minimum temperatures are the maximum for the valve.*

- All Carbon Steel Needle Valves: -20°F
- Stainless Steel, o-ring seal, hard or soft seat: -20°F
- Stainless Steel, Grafoil Packed, hard or soft seat: -40°F
- Stainless Steel, Teflon Packed, hard seat: -325°F

**MATERIALS OF CONSTRUCTION**



**PRESSURE ACTIVATED SEAL**

Part	Carbon Steel	Stainless Steel
1. Body	C.S.	316 S.S.
2. Bonnet	C.S.	316 S.S.
3. Handle	C.S.	303 S.S.
4. Bolt	C.S.	303 S.S.
5. Lock Pin	300 Series S.S.	300 Series S.S.
6. Cap	Delrin	Delrin
7. Back-up-ring	PTFE	PTFE
8. O-Ring	Viton	Viton
9. Retainer	Nylon	Nylon

**Soft Seated Valves**

10. Stem	316 S.S.	316 S.S.
11. Seat	Delrin	Delrin

**Metal Seated Valves**

10. Stem	316 S.S.	Nitronic 60
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**COMPRESSION PACKED SEAL**

Part	Carbon Steel	Stainless Steel
1. Body	C.S.	316 S.S.
2. Bonnet	C.S.	316 S.S.
3. Handle	C.S.	303 S.S.
4. Bolt	C.S.	303 S.S.
5. Lock Pin	300 Series S.S.	300 Series S.S.
6. Packing Nut	C.S.	316 S.S.
7. Follower	316 S.S.	316 S.S.
8. Washer	316 S.S.	316 S.S.
9. Packing	Soft Seated with PTFE Packing	
10. Stem	316 S.S.	316 S.S.
11. Seat	Delrin	Delrin
9. Packing	Metal Seated with PTFE Packing	
10. Stem	316 S.S.	Nitronic 60
9. Packing	Metal Seated with Grafoil Packing	
10. Stem	Nitronic 60	Nitronic 60

**“MINI” SERIES (PRESSURE ACTIVATED)**

Part	Carbon Steel	Stainless Steel
1. Body	C.S.	316 S.S.
2. Bonnet	C.S.	316 S.S.
3. Handle	C.S.	303 S.S.
4. Set Screw	C.S.	303 S.S.
5. Lock Pin	300 Series S.S.	300 Series S.S.
6. Cap	Delrin	Delrin
7. Back-up-ring	PTFE	PTFE
8. O-Ring	Viton	Viton
9. Retainer	Delrin	Delrin
10. Stem	316 S.S.	316 S.S.

## SOFT SEATED VALVES



$C_v (max) = 2.2$

### Straight Pattern

The straight through flow passage, soft seat design provides the user with high flow capacity and bubble-tight shut-off. The Delrin replaceable seat is roddable and has an extra large locking side tab to protect against seat rotation. The valve design also positions the pressure activated stem seal to exclude media contact from the stem threads.



$C_v (max) = .89$

### Angle Pattern

The 90° soft seat valve offers the same premium seat locking system and pressure activated stem sealing as the straight pattern valve. The replaceable Delrin seat provides bubble-tight service for applications, from natural gas service to fluids that contain small solid particles.



### Gauge Valves

This series is ideally suited for gauge and instrumentation applications where bubble-tight shut-off is a must. The M x (3)F multi-port style allows orientation of gauges and handles to meet the user's need. The F x (3)F is a standard in fabricating double block and bleed assemblies used for flow recorder measurements.

## FEATURES

### Body

- Replaceable Delrin seat
- 5/16" Porting
- 3/16" Side seat locking tab
- F x F or M x F connections
- Carbon or stainless steel

### Stem & Bonnet

- PTFE coated stem threads
- Choice of stem seal
  - Viton o-ring (pressure activated)
  - PTFE packing
- Back seated stem
- SS bonnet locking pin
- Extra large handle for ease of operation

### Working Pressure

- 6,000 PSI @ 200°F

### NACE

- See page 3

## STRAIGHT PATTERN

NPT Connection	Description	Part # (Viton O-Ring*)		Approx. Weight (lbs.)	Dimensions	
		Carbon Steel	Stainless Steel		End to End	Center Line to Top (Open)
1/4"F x 1/4"F	FF 25	B00112	B00212	1.5	2-1/2"	3-1/2"
1/4"M x 1/4"F	MF 25	B00122	B00222	1.5	3"	3-1/2"
3/8"F x 3/8"F	FF 37	B00113	B00213	1.5	2-5/8"	3-1/2"
3/8"M x 3/8"F	MF 37	B00123	B00223	1.5	3-1/16"	3-1/2"
1/2"F x 1/2"F	FF 50	B00114	B00214	1.6	2-7/8"	3-1/2"
1/2"M x 1/2"F	MF 50	B00124	B00224	1.6	3-1/2"	3-1/2"
3/4"F x 3/4"F	FF 75	B00115	B00215	3.5	4"	3-3/4"
3/4"M x 3/4"F	MF 75	B00125	B00225	3.5	5"	3-3/4"
1"F x 1"F	FF 10	B00116	B00216	3.0	4"	3-3/4"
1"M x 1"F	MF 10	B00126	B00226	3.0	5"	3-3/4"
1/2"M x 1/2"F	MF 50-L	B20124	B20224	2.3	5-1/2"	3-1/2"

\*To order PTFE Packed Stem: Change the first three characters of the part number from B00 to B01.

## ANGLE PATTERN

NPT Connection	Description	Part # (Viton O-Ring*)		Approx. Weight (lbs.)	Dimensions	
		Carbon Steel	Stainless Steel		End to End	Center Line to Top (Open)
1/4"F x 1/4"F	FFA 025	B10112	B10212	2.0	2"	3-1/2"
1/4"M x 1/4"F	MFA 025	B10122	B10222	1.5	2"	3-1/2"
3/8"F x 3/8"F	FFA 037	B10113	B10213	1.9	2"	3-1/2"
3/8"M x 3/8"F	MFA 037	B10123	B10223	1.5	2"	3-1/2"
1/2"F x 1/2"F	FFA 050	B10114	B10214	1.8	2"	3-1/2"
1/2"M x 1/2"F	MFA 050	B10124	B10224	1.5	2"	3-1/2"

\*To order PTFE Packed Stem: Change the first three characters of the part number from B10 to B11.

## GAUGE VALVES

NPT Connection	Description	Part # (Viton O-Ring*)		Approx. Weight (lbs.)	Dimensions	
		Carbon Steel	Stainless Steel		End to End	Center Line to Top (Open)
1/4"F x (3) 1/4"F	FF 253	B20152	B20252	1.5	2-1/2"	3-1/2"
1/2"M x (3) 1/2"F	MF 53	B20144	B20244	2.3	5-1/2"	3-1/2"
1/2"M x (3) 1/2"F	MF 53-L	B20164	B20264	3.0	7-1/2"	3-1/2"
3/4"M x (3) 1/2"F	M75 F53	B20148	B20248	2.5	5-1/2"	3-1/2"

\*To order PTFE Packed Stem: Change the first three characters of the part number from B20 to B21.

## METAL SEATED HAND VALVES



$C_v (max) = .55$

### Straight Pattern

The globe pattern's rugged construction and choice of pressure activated Viton, compression packed PTFE or compression packed Grafoil stem seal provides the user a broad selection for high pressure and/or temperature application. The designed differential hardness (316 SS vs CS; Nitronic 60 vs 316 SS) between the stem and the bonnet/body produces unsurpassed gall resistance in bonnet to stem threads and the valve's metal to metal seating.



$C_v (max) = .73$

### Angle Pattern

The 90° metal to metal seated valve offers the same premium designed differential hardness between the stem and the bonnet/body as the straight pattern valve. The choice of pressure activated or compression stem packing provides the user with unparalleled selection for pressure and/or temperature application.



### Gauge Valves

The M x (3)F multi-port style allows user freedom in gauge and handle orientation. A "long neck" option is available where piping insulation prevents use of the standard length gauge valve. Pressure activated or compression stem seal adds to the list of user options.

## FEATURES

### Body

- Metal seat
- 3/16" Porting
- F x F or M x F connections
- Carbon or stainless steel

### Stem & Bonnet

- *Differential Hardness in Seating*
- *Choice of stem seal*
  - Viton O-ring (pressure activated)
  - PTFE packing
  - Grafoil packing
- Back-seated stem
- SS bonnet locking pin
- Extra large handle for ease of operation

### Working Pressure

- Viton: 10,000 PSI @ 400°F
- PTFE: 10,000 PSI @ 200°F  
6,000 PSI @ 500°F
- Grafoil
  - Carbon Steel Valve:
    - 6,000 PSI @ 200°F
    - 1,500 PSI @ 850°F
  - Stainless Steel Valve:
    - 6,000 PSI @ 200°F
    - 1,500 PSI @ 1000°F

### NACE

- See page 3



## STRAIGHT PATTERN

NPT Connection	Description	Part # (Viton O-Ring*)		Approx. Weight (lbs.)	Dimensions		
		Carbon Steel	Stainless Steel		End to End	Center Line to Top (Open)	
						O-Ring	Packed
1/4"F x 1/4"F	FF 250	A00112	A00212	1.5	2-1/2"	3-1/2"	3-7/8"
1/4"M x 1/4"F	MF 250	A00122	A00222	1.5	3"	3-1/2"	3-7/8"
3/8"F x 3/8"F	FF 370	A00113	A00213	1.5	2-5/8"	3-1/2"	3-7/8"
3/8"M x 3/8"F	MF 370	A00123	A00223	1.5	3"	3-1/2"	3-7/8"
1/2"F x 1/2"F	FF 500	A00114	A00214	1.6	2-7/8"	3-1/2"	3-7/8"
1/2"M x 1/2"F	MF 500	A00124	A00224	1.6	3-1/2"	3-1/2"	3-7/8"
1/2"M x 1/4"F	M500 F250	A00127	A00227	1.6	3-1/2"	3-1/2"	3-7/8"
3/4"F x 3/4"F	FF 750	A00115	A00215	3.5	4"	3-3/4"	4-1/8"
3/4"M x 3/4"F	MF 750	A00125	A00225	3.5	5"	3-3/4"	4-1/8"
1"F x 1"F	FF 100	A00116	A00216	4.8	4"	3-3/4"	4-1/8"
1"M x 1"F	MF 100	A00126	A00226	5.3	5"	3-3/4"	4-1/8"
1/2"M x 1/2"F	MF 500-L	A20124	A20224	2.3	5-1/2"	3-1/2"	3-7/8"

\*To order PTFE Packed Stem: Change the first three characters of the part number from A00 to A01.

\*To order Grafoil Packed Stem: Change the first three characters of the part number from A00 to A02.

## ANGLE PATTERN

NPT Connection	Description	Part # (Viton O-Ring*)		Approx. Weight (lbs.)	Dimensions		
		Carbon Steel	Stainless Steel		End to End	Center Line to Top (Open)	
						O-Ring	Packed
1/4"F x 1/4"F	FFA 251	A10112	A10212	2.0	2"	3-1/2"	3-7/8"
1/4"M x 1/4"F	MFA 251	A10122	A10222	1.5	2"	3-1/2"	3-7/8"
3/8"F x 3/8"F	FFA 371	A10113	A10213	1.9	2"	3-1/2"	3-7/8"
3/8"M x 3/8"F	MFA 371	A10123	A10223	1.5	2"	3-1/2"	3-7/8"
1/2"F x 1/2"F	FFA 501	A10114	A10214	1.8	2"	3-1/2"	3-7/8"
1/2"M x 1/2"F	MFA 501	A10124	A10224	1.5	2"	3-1/2"	3-7/8"

\*To order PTFE Packed Stem: Change the first three characters of the part number from A10 to A11.

\*To order Grafoil Packed Stem: Change the first three characters of the part number from A10 to A12.

## GAUGE VALVES

NPT Connection	Description	Part # (Viton O-Ring*)		Approx. Weight (lbs.)	Dimensions		
		Carbon Steel	Stainless Steel		End to End	Center Line to Top (Open)	
						O-Ring	Packed
1/2"M x (3) 1/2"F	MF 530	A20144	A20244	2.3	5-1/2"	3-1/2"	3-7/8"
1/2"M x (3) 1/2"F	MF 530-L	A20164	A20264	3.0	7-1/2"	3-1/2"	3-7/8"
3/4"M x (3) 1/2"F	M750 F530	A20148	A20248	2.3	5-1/2"	3-1/2"	3-7/8"
3/4"M x (3) 1/2"F	M750 F530-L	A20168	A20268	2.5	7-1/2"	3-1/2"	3-7/8"

\*To order PTFE Packed Stem: Change the first three characters of the part number from A20 to A21.

\*To order Grafoil Packed Stem: Change the first three characters of the part number from A20 to A22.

### MINI VALVES

The mini series design is for user applications with small diameter piping systems. The Viton seal below the stem threads provides almost limitless media coverage and the choice of F x F, M x F and M x M NPT connections adds to the versatility of the series. Working pressure is 6,000 PSI @ 200°F. Also available in 1/4" M x 1/4" F carbon or stainless steel **angle** pattern valve.



$C_V (max) = .23$

### FEATURES

- 1/8" Porting
- Differential hardness in seating
- PTFE coated stems
- Viton O-ring
- Threads above seal
- SS bonnet locking pin
- Cap rises with stem for visual open/close

*PTFE compression seal on special order—contact factory.*

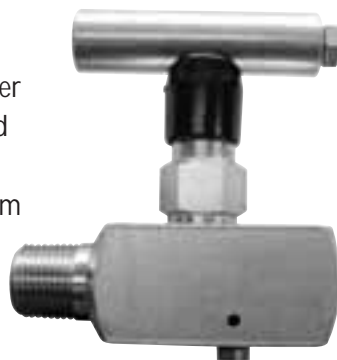
### MINI VALVES

NPT Connection	Description	Part # (Viton O-Ring*)		Approx. Weight (lbs.)	Dimensions		
		Carbon Steel	Stainless Steel		End to End	Center Line to Top (Open)	
						O-Ring	Packed
1/8"F x 1/8"F	FF 1250	A50111	A50211	0.6	2"	2-1/2"	2-5/8"
1/8"M x 1/8"F	MF 1250	A50121	A50221	0.6	2"	2-1/2"	2-5/8"
1/4"F x 1/4"F	FF 2500	A50112	A50212	0.6	2"	2-1/2"	2-5/8"
1/4"M x 1/4"F	MF 2500	A50122	A50222	0.6	2"	2-1/2"	2-5/8"
1/4"M x 1/4"M	MM 2500	A50132	A50232	0.6	2"	2-1/2"	2-5/8"

\*To order PTFE Packed Stem: Change the first three characters of the part number from A50 to A51.

### GAUGE VALVES WITH BLEED

The gauge valve with bleed is a specialty gauge mounting valve with an integral bleed valve which provides the user a convenient means to bleed pressure off the gauge. The Viton pressure activated stem seal in a metal seated body is rated at a working pressure of 10,000 PSI @ 400°F. Available in 3/4" or 1/2" M x 1/2" F connections with choice of carbon or stainless steel valves.



*Gauge Valve with Bleed*



*Bonnet Packed Bleed Valve*

### BLEED VALVES

Bleed valves are available in carbon steel or stainless steel with the same bonnet and stem construction used in the mini valve series. The valve is rated at 6,000 PSI working pressure at a maximum temperature of 400°F.



*Standard Bleed Valve*

**QT™ BALL VALVES****QT™ Series 37-100**

- 2 Piece Bronze Valve
- 1/4" - 1" Full Port, 1-1/4" - 2" Reg. Port
- Blow-Out Proof Stem
- Chrome Plated Brass Ball
- Reinforced PTFE Seat
- 1/4" - 2" 600 psig, 2-1/2" - 3" 400 psig

**QT™ Series 37-300**

- 2 Piece 316 SS Investment Cast
- Fully Seal Welded
- Blow-Out Proof Stem
- 316 Stainless Steel Ball
- Reinforced PTFE Seat
- Standard Sliding Lock Handle
- NACE Approved
- 1/4" - 2" 2000 psig
- 1/4" - 1/2" Full Port, 3/4" - 2" Reg. Port

**QT™ Magnum® Series 37-200**

- 2 Piece Carbon Steel
- Blow-Out Proof Stem
- 316 Stainless Steel Ball
- Reinforced PTFE Seat
- 1/4" - 1" 2000 psig, 1-1/2" - 2" 1500 psig
- 1/4" - 1/2" Full Port, 3/4" - 2" Reg. Port

**QT™ Magnum® Series 37-210**

- 1 Piece Carbon Steel, Reg. Port
- Blow-Out Proof Stem
- 316 Stainless Steel Ball
- Reinforced PTFE Seat
- 1/2" - 1" 2000 psig, 1-1/2" - 2" 1500 psig

**QT™ Series 37-330 & 37-350**

- 3 Piece Carbon Steel or Stainless Steel
- Blow-Out Proof Stem
- 316 Stainless Steel Ball
- Reinforced PTFE Seat
- Standard Sliding Lock Handle
- NACE Approved, Firesafe Approved
- 1/4" - 2" 3000 psig (37-330)
- 1/4" - 2" 5000 psig (37-350)

**QT™ Flanged Series 37-400**

- 2 Piece Carbon Steel with Stainless Trim
- Blow-Out Proof Stem
- 316 Stainless Steel Ball
- NACE approved, Firesafe Approved
- 1" - 6" ANSI 150, 300, 600
- 2-1/2" and 6" are Reg. Port, All Others Full Port

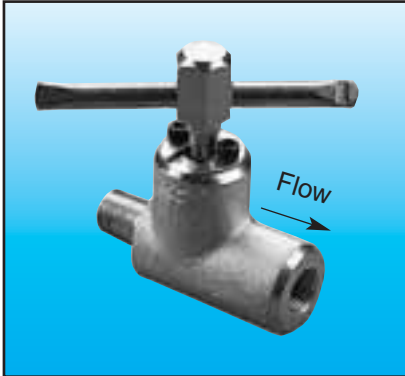
**QT™ Wildcat'r® Series 37-500 (Ductile Iron) & 37-550 (Carbon Steel)**

- Zinc Phosphate Coated
- Blow-Out Proof Stem
- CS or SS (NACE) Trim Available
- Lock Plate is Standard
- 1" Full port 2500 psig, 2" Reg. Port 2000 psig (37-500)
- 2" Full port 1500 psig, 3" Reg. Port 1500 psig (37-500)
- 1" Full port 2500 psig, 2" Reg. Port 2500 psig (37-550)
- 2" Full port 2300 psig, 3" Reg. Port 2300 psig (37-550)

**QT™ Wildcat'r® Series 37-750**

- 2 Piece ASTM A395 Ductile Iron
- Zinc Phosphate Coated
- Blow-Out Proof Stem
- CS or SS (NACE) Trim Available
- Integral Locking Plate
- Standard Grease Fitting
- 2" - 4" 1000 psig

## NEEDLE VALVES



### 1205 Needle Valve

- 10,000 PSI working pressure
- Rugged design for the toughest jobs
- Blow-out proof stem with O-ring
- AISI 4130 hardened stem (23-35 Rc) provides unique reseating capability
- SA105 forged steel body, cadmium plated
- Metal-to-metal seal
- 1/2" female x 1/2" male
- Directional flow



A Unit of Robbins & Myers, Inc.

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