



**WATER PRESSURE  
REDUCING VALVES**



## WATER PRESSURE REDUCING VALVES



## **AUTOMATIC PRESSURE REDUCTION**

Pressure reducing valves are designed to automatically reduce a high inlet supply pressure to a lower outlet pressure. In most plumbing code jurisdictions, pressure reducing valves are mandated whenever the supply water pressure exceeds 80 PSI. Excessive pressure can waste as much as 40,000 gallons of water in an average home every year.

## **THE VALUE OF ECONOMIZING**

Cutting costs by specifying undersized piping often results in water hammer and other undesirable pipe noises. When correctly designed into an entire supply system, Apollo® pressure reducing valves will efficiently control overpressure conditions.

Once installed, Apollo® pressure reducing valves are engineered to provide years of reliable service. Installing a shut-off valve upstream from the pressure reducing valve makes maintenance and repair easier. In commercial applications, a second shut-off valve and gauge or tapping downstream from the regulator is also suggested.

## **SOLVING OVERPRESSURE PROBLEMS**

Apollo® water pressure reducing valves provide reliable protection from excessive pressure for a wide range of residential, commercial and industrial applications.

By eliminating wasteful overpressure, water pressure reducing valves conserve water, reduce related energy costs – including the costs of waste water treatment, and extend the life of piping and fixtures while minimizing water hammer shock.

## **LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED)**

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ is the nationally accepted benchmark for the design, construction, and operation of high performance buildings. The Apollo pressure reducing valves can be accepted and used to acquire LEED certification. Common practice and analysis shows that 50 psi or lower is sufficient pressure for most homes and commercial buildings. Apollo water pressure reducing valves can help limit the incoming pressure to 50 psi or less to reduce the water being used and to reduce the amount of wastewater returned to the environment.



## HOW PRESSURE REDUCING VALVES WORK

### OPERATION

Apollo® pressure reducing valves are shipped in the OPEN position. Their internal seat is held open by a compression spring.

Compression is applied to the spring by an adjusting screw working on a spring button. The amount of force on the diaphragm by the valve spring determines the reduced pressure downstream of the regulating valve. The standard setting is 50 psig.

During static (no-flow) conditions, the valve is closed because the diaphragm force is greater than the valve spring force. Outlet pressure drops once flow downstream begins and force from the spring begins opening the valve.

Apollo's integral design enables the valve to react smoothly and quickly to changing flow demands, while protecting against inlet pressure change. As water enters the valve it flows past the open seat, under the diaphragm and through to the outlet pipe, stopping at the closed fixtures until diaphragm force overcomes spring force to close the valve.

Under flow conditions (when the faucet is opened), the captive 50 psig water begins to flow out. Once flow starts, pressure under the diaphragm starts to fall off to below 50 PSI, causing the compression spring to open the seat and allowing more water to enter. Our regulating valve opens, passing only the amount of water flowing out through the faucet at a pressure below the "set" pressure.

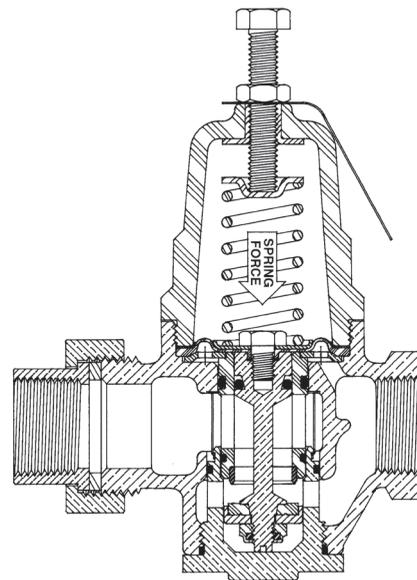
### REDUCED PRESSURE FALLOFF

Falloff is the reduced pressure change that results when a valve opens: the difference between the static (closed) pressure and residual (flowing) pressure downstream of the regulating valve. Inherent in the direct-acting design, fall-off is an important factor when choosing a valve size and type.

Most often, the regulating valve supplies many fixtures (i.e. toilets, tubs, showers, sinks, etc.) or many industrial applications. Intermittent water demands will vary the flow requirements to the regulating valve widely, from a small trickle to a large volume under peak load. So outlet or downstream pressure from the regulator also varies. Which reducing valve you need depends on the flow rate – or capacity – required.

Pressure reducing valve sizing and selection are important to a successful application. Remember to find out what the MINIMUM inlet pressure is AT THE VALVE.

When the reduced pressure on the outlet of a regulator drops too low during flow conditions, the valve or line size is too small for the job.



# WATER PRESSURE REDUCING VALVES



"Apollo" COMMERCIAL PRODUCTS

## PR SERIES (36LF)



Apollo® PR Series pressure reducing valves provide automatic control of excessive water pressure and problem supply fluctuations. These models are designed to reduce pressures of up to 300 PSI to a more manageable range.

Factory set at 50 PSI, they adjust with a turn of a screw. They feature a built-in bypass and strainer, and comply with ASSE 1003 and CSA B356 standards. They are listed with IAPMO and the City of Los Angeles.

PR Series valves are built for long, reliable service with an all-bronze body and cover and high-capacity stainless steel strainer. Available with or without optional pressure gauge on tapping.

### FEATURES

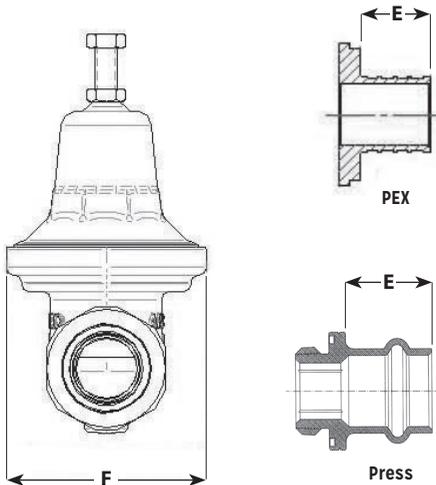
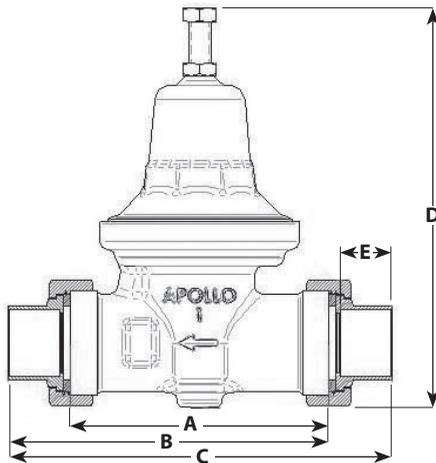
- All Bronze Body and Cover
- Suitable for Supply Pressures to 300 psi
- Every Valve is 100% Factory Set and Tested
- Standard Factory Setting: 50 psi
- High & Low Pressure Model Options
- Diaphragm Suitable for 33-180°F
- Solder, Threaded, PEX, CPVC, Press Connection Options
- Integral Thermal Expansion Bypass
- Integral Stainless Steel Strainer
- Single and Double Union Options
- In-Line Repairable
- USA Materials and Manufacture

### OPTIONS

- (-P) Tapped & Plugged
- (-G) With Pressure Gauge
- (-S) Sealed Cage with SS Adjusting Screw for Vault Installation
- 36 Non-LF Materials for Non-Potable Service, Such as Irrigation

### APPROVALS

- ASSE 1003
- CSA B356
- NSF/ANSI 372 Lead Free
- IAPMO



### DIMENSIONS

Pipe Thread Union x FNPT	Solder Joint Union x FNPT	CPVC Union x FNPT	Size (in.)	Dimensions (in.)			Wt./100 (lbs.)
				A	B	C	
36LF-103-01	36LF-303-01		1/2	5.88	4.88	1.00	350
36LF-104-01	36LF-304-01	36LF-3C4-01	3/4	5.88	4.88	1.00	340
36LF-105-01	36LF-305-01	36LF-3C5-01	1	6.88	5.50	1.12	450
36LF-106-01	36LF-306-01		1-1/4	8.88	6.50/6.63	1.37	1020
36LF-107-01	36LF-307-01		1-1/2	8.88	6.63/6.75	1.37	1045
36LF-108-01	36LF-308-01		2	11.50	8.50/8.88	1.81	2250
<b>FNPT x FNPT (no union)</b>							
36LF-203-01			1/2	5.88	4.00	1.00	311
36LF-204-01			3/4	5.88	3.88	1.00	305
36LF-205-01			1	6.88	4.38	1.12	415
36LF-206-01			1-1/4	8.88	5.38	1.37	910
36LF-207-01			1-1/2	8.88	5.38	1.37	909
36LF-208-01			2	11.50	7.12	1.81	1880
<b>Double Union FNPT x FNPT</b>	<b>Double Union Solder x Solder</b>	<b>Double Union CPVC x CPVC</b>	<b>Size (in.)</b>	<b>Dimensions (in.)</b>			<b>Wt./100 (lbs.)</b>
				A	B	C	
36LF-403-01	36LF-503-01		1/2	5.88	5.63	1.00	389
36LF-404-01	36LF-504-01	36LF-5C4-01	3/4	5.88	5.63	1.00	372
36LF-405-01	36LF-505-01		1	6.88	6.38	1.12	495
36LF-406-01	36LF-506-01		1-1/4	8.88	7.50/7.75	1.37	1090
36LF-407-01	36LF-507-01		1-1/2	8.88	7.88/8.00	1.37	1183
36LF-408-01	36LF-508-01		2	11.50	9.88/10.50	1.81	2472
36LF-904-01	PEX x PEX		3/4	6.12	5.81	1.00	372
36LF-9C4-01	Union CPVC	Pex Union	3/4	6.12	5.81	1.00	372

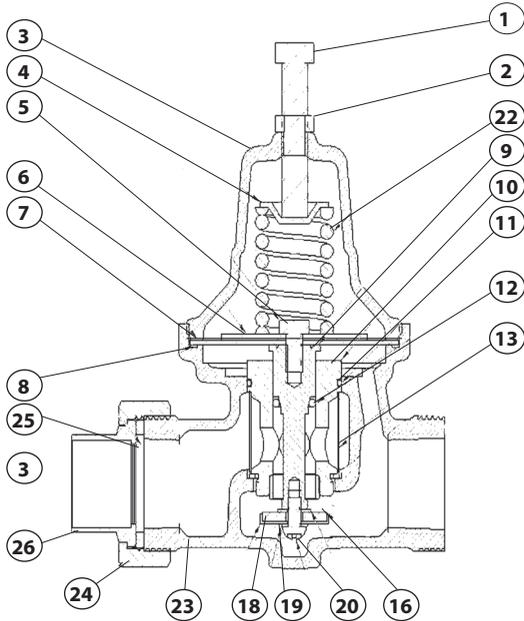
\*36 Series for non-potable water available.

Example: 36-103-01





## PR SERIES (36LF)



### STANDARD MATERIALS LIST

1	Adj. Screw (Zinc Plated Stl.)	14	Seal, Cartridge (Polypropylene)
2	Hex Nut (Zinc Plated Stl.)	15	Seat Ring (300 Series SS)
3	Cap (Cast Bronze)	16	Washer (LF Brass)
4	Spring Disc (Zinc Plated Steel)	17	Seat Disc (FDA EPDM)
5	Cartridge Bolt	18	Seat Holder (LF Brass)
6	Pressure Plate (Zinc Plated Steel)	19	Washer (Polypropylene)
7	Friction Ring (Zinc Plated Steel)	20	Seat Screw (300 Series SS)
8	Diaphragm (FDA Nitrile)	21	Nameplate (Aluminum)
9	Stem (Brass)	22	Spring (ASTM 228 Music Wire)
10	Cartridge Housing (LF Brass)	23	Body, Machined (Cast LF Bronze)
11	O-Ring (FDA Nitrile)	24	Union Nut (Cast Bronze)
12	O-Ring (FDA Nitrile)	25	Union Washer (FDA Nitrile)
13	Screen (300 Series SS)	26	Union Tail Piece (LF Brass)

### PART NUMBER MATRIX

36LF						
36	X	X	X	X	X	X
	CONNECTION	OPTION	SIZE	GAUGE	PRESSURE (ADJUSTABLE)	OPTION
36 Lead Free	1 - Single Union NPT	0 - No Option	03 - 1/2"	0 - No Gauge	1 - 25-75 psig	PR - Press
36	2 - No Union NPT	C - CPVC Tailpiece	04 - 3/4"	P - With Gauge Port	2 - 10-35 psig	(applies to models 36-20x and 36LF20x only)
	3 - Single Union Solder x NPT	S - Sealed Cage*	05 - 1"	G - With Gauge	3 - 75-125 psig	
	4 - Double Union NPT	X - Pex Tailpiece	06 - 1-1/4"			
	5 - Double Union Solder		07 - 1-1/2"			
	6 - Single Union Meter x NPT		08 - 2"			
	8 - Double Union CPVC					
	9 - Double Union Pex					

\* S option = Sealed cage with stainless steel adjusting screw for vault installation.

### MODEL NUMBER MATRIX

PR	X	X	X	X	X	X
UNION	GAUGE	PRESSURE SETTING	MISCELLANEOUS	SIZE	CONNECTION	LEAD FREE
Blank - Single Union	Blank - No Gauge	Blank - 25-75 psig	Blank - No Option	12 - 1/2"	Blank - FNPT x FNPT	LF - Lead Free
D - Double Union	P - With Gauge Port	L - 10-35 psig	A - Sealed Cage	34 - 3/4"	<b>SINGLE UNION ONLY</b>	Blank-
T - No Union	G - With Gauge	H - 75-125 psig		1 - 1"	Blank - FNPT x FNPT	Non-Lead Free
				114 - 1-1/4"	S - Solder x FNPT	
				112 - 1-1/2"	C - CPVC x FNPT	
				2 - 2"	X - PEX x FNPT	
					PR - Press x FNPT	
					<b>DOUBLE UNION ONLY</b>	
					S - Solder x Solder	
					C - CPVC x CPVC	
					X - PEX x PEX	
					B - BSPT x BSPT	
					SC - Solder x CPVC	
					SX - Solder x PEX	
					CX - CPVC x PEX	
					PR - Press x Press	

# WATER PRESSURE REDUCING VALVES



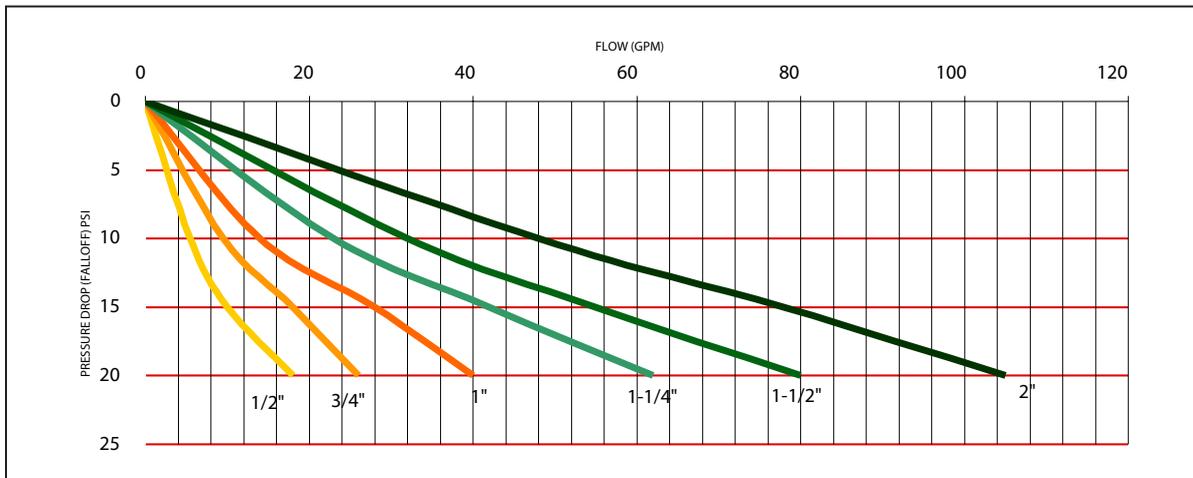
"Apollo" COMMERCIAL PRODUCTS

## PR SERIES (36LF)

PIPE SIZE	*FALLOFF (PSI)	PRESSURE DIFFERENTIAL (PSI)		
		25	50	75
1/2"	5	1.7	2.0	2.3
	10	4.3	5.0	5.8
	15	8.5	10.0	11.5
	20	15.3	18.0	20.7
3/4"	5	3.4	4.0	4.6
	10	7.7	9.0	10.4
	15	14.5	17.0	19.6
	20	22.1	26.0	29.9
1"	5	5.1	6.0	6.9
	10	11.9	14.0	16.1
	15	22.1	26.0	29.9
	20	34.0	40.0	46.0
1 1/4"	5	8.5	10.0	11.5
	10	19.6	23.0	26.5
	15	35.7	42.0	48.3
	20	52.7	62.0	71.3
1 1/2"	5	11.9	14.0	16.1
	10	27.2	32.0	36.8
	15	47.6	56.0	64.4
	20	68.0	80.0	92.0
2"	5	15.3	18.0	20.7
	10	39.1	46.0	52.9
	15	66.3	78.0	89.7
	20	93.5	110.0	126.5

\*Falloff is the difference between the PRV's set pressure and the flowing pressure at any given demand

### FLOW CURVE



**Pressure Differential** is the difference between the inlet supply pressure and the adjusted outlet pressure.

**Pressure Falloff** is the reduction in downstream pressure from the static (set) pressure as the flow increases through the valve.



## PRC SERIES (36CLF)



Versatile, all-purpose Apollo® PRC Series pressure reducing valves handle pressures up to 400 PSI. Compact and with a built-in thermal expansion by-pass, they're designed to protect residential and commercial water distribution systems from excessive pressures.

The valves' integral thermoplastic cage helps protect the inner adjusting spring from galvanic corrosion. Built for reliable, long-term service, PRC valves offer an all-bronze body, stainless steel strainer and seat. They comply with ASSE 1003 and CSA B356 standards. They are listed with IAPMO and City of Los Angeles.

Designed for easy in-line servicing, PRC models come standard with a clean-out plug on the housing's bottom. Both seat disc and strainer can be maintained via the clean-out plug using a 1/2" hex socket. Available with or without gauge tapping and gauge.

### FEATURES

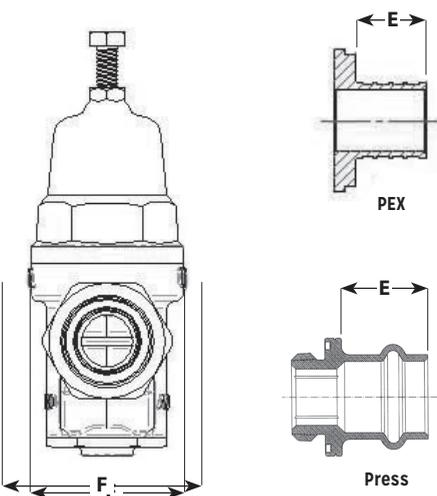
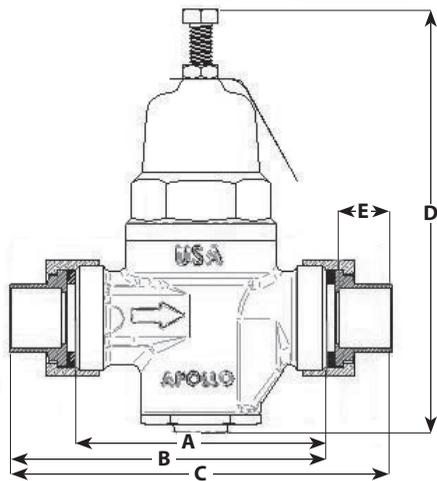
- Dependable Cast Bronze Body
- Suitable for Supply Pressures to 400 psi
- Every Valve is 100% Factory Set and Tested
- Standard factory setting is 50 psi
- High and Low Pressure Model options
- Diaphragm Suitable for 33 - 180°F
- Solder, Threaded, PEX, CPVC, and Press Connection Options
- Sealed Cage with SS Adjusting Screw for Vault Installation
- Integral Thermal Expansion Bypass
- Integral Stainless Steel Strainer
- Single and Double Union Options
- In-Line Repairable, Bottom Access
- USA Materials and Manufacture

### OPTIONS

- (-P) Tapped 1/4" & Plugged
- (-G) With Pressure Gauge
- (-02) 10-35 psig
- (-03) 75-125 psig
- 36C Non-LF Materials for Non-Potable Service, Such as Irrigation

### APPROVALS

- ASSE 1003
- CSA B356
- NSF/ANSI 372 Lead Free
- City of Los Angeles
- IAPMO



### DIMENSIONS

LF Series Number	Series Number	Size (in.)	Dimensions (in.)		Wt./100 (lbs.)
			Length	A	
<b>FNPT Inlet x Outlet (no union)</b>					
36CLF-203-01	36C-203-01	1/2	3.63	1.62	200
36CLF-204-01	36C-204-01	3/4	3.63	1.62	200
36CLF-205-01	36C-205-01	1	3.75	1.50	225
<b>FNPT Union Inlet x FNPT Outlet</b>					
36CLF-103-01	36C-103-01	1/2	4.50	1.62	240
36CLF-104-01	36C-104-01	3/4	4.50	1.62	240
36CLF-105-01	36C-105-01	1	4.63	1.50	270
<b>Sweat Union Inlet x FNPT Outlet</b>					
36CLF-303-01	36C-303-01	1/2	4.50	1.62	240
36CLF-304-01	36C-304-01	3/4	4.50	1.62	240
36CLF-305-01	36C-305-01	1	4.63	1.50	270
<b>CPVC Union Inlet x FNPT Outlet</b>					
36CLF-304-01C	36C-304-01C	3/4	4.75	1.62	240
36CLF-305-01C	36C-305-01C	1	4.41	1.50	270
<b>Double Union/Threaded Inlet x Threaded Outlet</b>					
36CLF-403-01	36C-403-01	1/2	5.50	1.62	280
36CLF-404-01	36C-404-01	3/4	5.50	1.62	280
36CLF-405-01	36C-405-01	1	5.75	1.50	310
<b>Double Union/Sweat Inlet x Sweat Outlet</b>					
36CLF-503-01	36C-503-01	1/2	5.50	1.62	280
36CLF-504-01	36C-504-01	3/4	5.50	1.62	280
36CLF-505-01	36C-505-01	1	5.75	1.50	310
<b>Double Union/CPVC Inlet x CPVC Outlet</b>					
36CLF-504-01C	36C-504-01C	3/4	5.37	1.62	280
36CLF-505-01C	36C-505-01C	1	5.87	1.50	310
<b>Double Union/PEX Inlet x PEX Outlet</b>					
36CLF-903-01	36C-903-01	1/2	5.625	1.62	280
36CLF-904-01	36C-904-01	3/4	5.625	1.62	280
36CLF-905-01	36C-905-01	1	6.125	1.62	285

\*36C Series for non-potable water available.

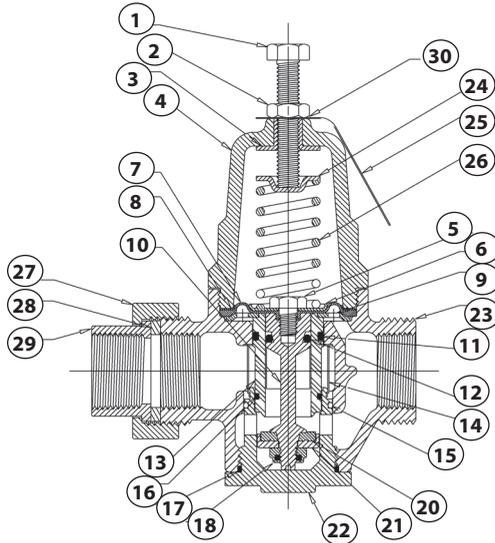
Example: 36C-203-01

# WATER PRESSURE REDUCING VALVES



"Apollo" COMMERCIAL PRODUCTS

## PRC SERIES (36CLF)



### STANDARD MATERIALS LIST

1	Adjusting Bolt (Stainless Steel)	16	O-Ring (FDA Nitrile)
2	Nut (Stainless Steel)	17	O-Ring (FDA Nitrile)
3	Tee Nut (Zinc Plated Steel)	18	Lock Nut (300 Series SS)
4	Cap (Noryl™)	19	Seat Ring (300 Series SS)
5	Hex Bolt (300 Series SS)	20	Seat Disc (FDA EPDM)
6	Pressure Plate (Brass)	21	Disc Holder (LF Brass)
7	Diaphragm (FDA EPDM w/Polyester)	22	Clean-Out Plug (LF Brass)
8	Friction Ring (Brass)	23	Body, Machined (LF Cast Bronze)
9	Cartridge Ret. Washer (Brass)	24	Spring Washer (Zinc Plated Steel)
10	Stem (LF Brass)	25	Nameplate (Aluminum)
11	O-Ring (FDA Nitrile)	26	Spring (Zinc Plated Music Wire)
12	O-Ring (FDA Nitrile)	27	Union Nut (Brass)
13	Cartridge Housing (G.F. Noryl)	28	Union Washer (FDA Nitrile)
14	Screen (300 Series SS)	29	Union Tail Piece (LF Brass)
15	O-Ring (FDA Nitrile)	30	Cage Seal (Stainless Steel)

### Model Number Matrix

PRC	X	X	X	X	LF
UNION	GAUGE	PRESSURE RANGE	SIZE	END CONNECTION*	
<b>blank</b> - Single Union	<b>blank</b> - No Gauge Port	<b>blank</b> - 25 - 75 PSIG range	<b>12</b> - 1/2"	<b>blank</b> - FNPT x FNPT	
<b>E</b> - Extended Union	<b>P</b> - w/Gauge Port Plugged	<b>L</b> - 10 - 35 PSIG range	<b>34</b> - 3/4"	<b>Single Union</b>	
<b>D</b> - Double Union	<b>G</b> - w/Pressure Gauge	<b>H</b> - 75 - 125 PSIG range	<b>1</b> - 1"	<b>S</b> - Solder x FNPT	
<b>T</b> - No Union (Threaded Only)				<b>C</b> - CPVC x FNPT	
				<b>X</b> - PEX x FNPT	
				<b>Double Union</b>	
				<b>S</b> - Solder x Solder	
				<b>C</b> - CPVC x CPVC	
				<b>X</b> - PEX x PEX	
				<b>B</b> - BSPT x BSPT	
				<b>SC</b> - Solder x CPVC	
				<b>SX</b> - Solder x PEX	
				<b>CX</b> - CPVC x PEX	
				<b>PR</b> - Press x Press	

Note: Two letter union type offered in double union connection only.  
Union connections are shipped loose.

### Part Number Matrix

36CLF	X	XX	X	X	X
SERIES	CONNECTION	SIZE	GAUGE	PRESSURE	OPTION
36CLF	1 - Single Union NPT	03 - 1/2"	0 - Without Gauge	1 - 25 - 75 PSIG range	C - CPVC Tailpiece
36C (non potable)	2 - No Union NPT	04 - 3/4"	P - w/Gauge Port Plugged	2 - 10 - 35 PSIG range	PR - Press
	3 - Single Union Solder x NPT	05 - 1"	G - w/Gauge	3 - 75 - 125 PSIG range	
	4 - Double Union NPT				
	5 - Double Union Solder				
	9 - Double Union PEX				



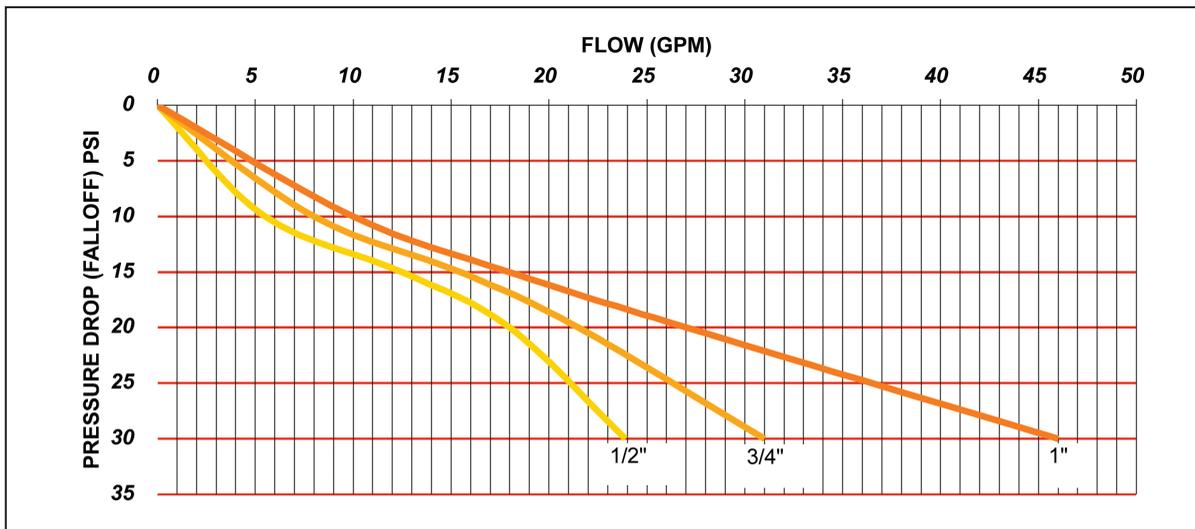
# WATER PRESSURE REDUCING VALVES

## PRC SERIES (36CLF)

PIPE SIZE	*FALLOFF (PSI)	PRESSURE DIFFERENTIAL (PSI)		
		25	50	75
1/2"	5	1.3	1.5	1.7
	10	4.7	5.5	6.3
	15	10.6	12.5	14.4
	20	15.3	18.0	20.7
	30	20	24	27
3/4"	5	2.1	2.5	2.9
	10	6.8	8.0	9.2
	15	13.2	15.5	17.8
	20	18.3	21.5	24.7
	30	27	31	35
1"	5	2.8	3.3	3.7
	10	8.5	10.0	11.5
	15	15.3	18.0	20.7
	20	21.3	25.0	28.8
	30	40	46	51

\*Falloff is the difference between the PRV's set pressure and the flowing pressure at any given demand

### FLOW CURVE



**Pressure Differential** is the difference between the inlet supply pressure and the adjusted outlet pressure.

**Pressure Falloff** is the reduction in downstream pressure from the static (set) pressure as the flow increases through the valve.

# WATER PRESSURE REDUCING VALVES



"Apollo" COMMERCIAL PRODUCTS

## PRE SERIES (36ELF)



Designed for residential and commercial applications to protect water supplies from excessive pressure. Excellent flow performance at low pressure drop. The dezincification resistant bronze body and dielectric polymer cage provide maximum corrosion resistance. Designed for easy in-line servicing with simple cartridge removal. They meet ASSE 1003 and CSA B356 standards. They are listed with IAPMO and the city of Los Angeles.

### FEATURES

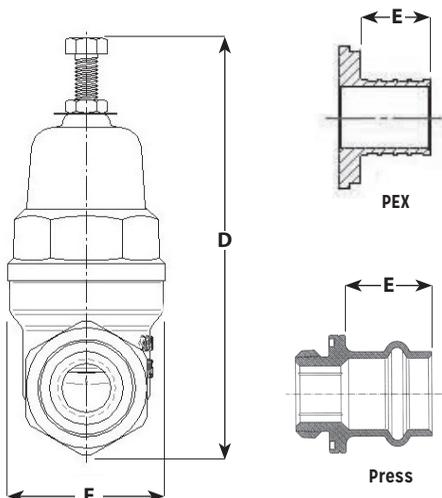
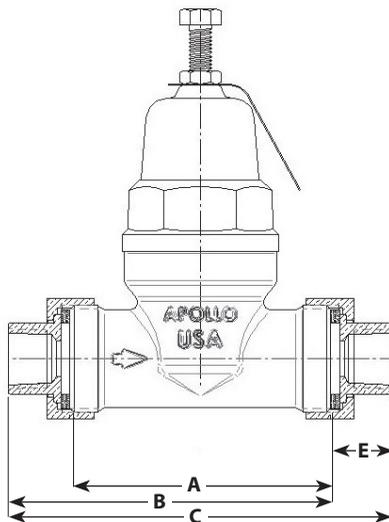
- Balanced Piston Design
- Sealed Cage for Vault Installations
- Built-In Thermal Expansion Bypass
- Integral Stainless Steel Strainer
- Modular Seat Disc and Strainer Cartridge
- Control Pressure Ranges: 15-75 psi and 75-150 psi
- NPT, Solder, PEX, CPVC and Press and Push Connections
- Maximum Supply Pressure: 400 psig
- Working Temperature Range: 33°F-180°F
- **100% Manufactured in USA**

### OPTIONS

- (-B) Bronze Cap *Now!*
- 36E Non-LF Materials for Non-Potable Service, Such as Irrigation

### APPROVALS

- ASSE 1003
- CSA B356
- NSF/ANSI 372 Lead Free
- NSF/ANSI 61 Water Quality
- IAPMO

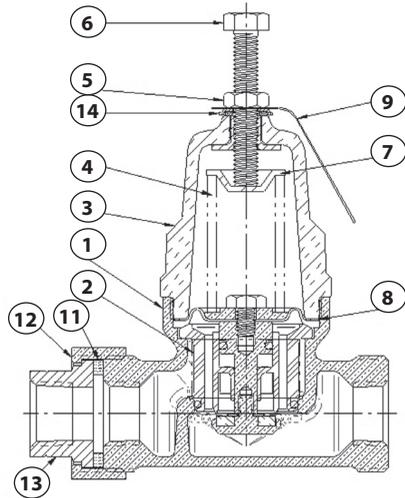


### DIMENSIONS

Size	Connection	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	WT. (Union) (lbs)
1/2	Thread	3.62	4.50	5.50	6.00	0.63	2.75	2.4
	Solder	3.62	4.50	5.50	6.00	0.50	2.75	2.4
	PEX	3.62	4.50	5.50	6.00	0.63	2.75	2.4
	CPVC	3.62	4.25	5.00	6.00	0.50	2.75	2.4
	Press	N/A	N/A	5.48	6.00	0.74	2.75	2.4
3/4	Thread	3.62	4.50	5.50	6.00	0.63	2.75	2.4
	Solder	3.62	4.50	5.50	6.00	0.75	2.75	2.4
	PEX	3.62	4.63	5.63	6.00	0.63	2.75	2.4
	CPVC	3.62	4.50	5.50	6.00	0.63	2.75	2.4
	Press	N/A	N/A	5.79	6.00	0.88	2.75	2.4
1	Thread	3.62	4.63	5.75	6.00	0.63	3.38	2.7
	Solder	3.62	4.63	5.75	6.00	0.88	3.38	2.7
	PEX	3.62	4.75	6.00	6.00	0.75	3.38	2.7
	CPVC	3.62	4.75	6.00	6.00	0.94	3.38	2.7
	Press	N/A	N/A	5.91	6.00	0.88	3.38	2.7



## PRE SERIES (36ELF)



### STANDARD MATERIALS LIST

1	LF Body (Bronze, ASTM B584-C84400)
2	Assy, Cartridge (Noryl™/LF Brass/EPDM)
3	Assy, Cap (Noryl™)
4	Spring (Music Wire ASTM A228)
5	Nut 5/16-18 (Stainless Steel)
6	Bolt, 5/16-18 x 2 (Stainless Steel)
7	Washer, Spring (Steel Plated)
8	Friction Ring (LF Brass)
9	Nameplate (Aluminum)
11	Washer (BUNA-N)
12	LF Nut, Union (Brass)
13	LF Tailpiece (Brass)
14	Cage Seal (Nitrile)

### TAILPIECE KITS (TPK)

Size	Lead Free Tailpiece Kits	Standard Brass Tailpiece Kits	Connection
1/2"	TPK12TLF	TPK12T	NPT
1/2"	TPK12SLF	TPK12S	SOLDER
1/2"	TPK12C	TPK12C	CPVC
1/2"	TPK12XLF	TPK12X	PEX
1/2"	TPK12PRLF	TPK12PR	PRESS
3/4"	TPK34TLF	TPK34T	NPT
3/4"	TPK34SLF	TPK34S	SOLDER
3/4"	TPK34C	TPK34C	CPVC
3/4"	TPK34XLF	TPK34X	PEX
3/4"	TPK34PRLF	TPK34PR	PRESS
1"	TPK1TLF	TPK1T	NPT
1"	TPK1SLF	TPK1S	SOLDER
1"	TPK1C	TPK1C	CPVC
1"	TPK1XLF	TPK1X	PEX
1"	TPK1PRLF	TPK1PR	PRESS

36ELF bodies are threaded to accept unions. TPK Tailpiece Kits allow for customization of the end connection configurations in the field. Union connections can easily be added and tailpieces can be mixed to match the requirements at the jobsite. NPT x Solder? PEX x Press? - no problem!

Each TPK includes one each tailpiece, union nut and washer.

### MODEL NUMBER MATRIX

PRE	X	X	X	X
UNION	PRESSURE SETTING (ADJ)	SIZE	CONNECTION	LEAD FREE
Blank - Single Union x NPT	Blank - 15-75 psig	12 - 1/2"	Blank - FNPT	LF - Lead Free
D - Double Union	H - 75-125 psig	34 - 3/4"	S - Solder	
T - No Union		1 - 1"	C - CPVC	
			P - PUSH	
			X - PEX	
			PR - Press	

### PART NUMBER MATRIX

36ELF	36E -	1	X	X	X	X	X
	STYLE	UNION	SIZE	PRESSURE	CONNECTION	CAP	
36ELF - Lead Free		0 - No Union NPT	3 - 1/2"	01 - 15-75 psig	T - FNPT Thread	Blank - Standard Polymer	
36E - Non Lead Free		1 - Single Union	4 - 3/4"	03 - 75-150 psig	S - Solder	B - Bronze	
		2 - Double Union	5 - 1"		C - CPVC		
					P - Push		
					X - PEX		
					PR - Press		

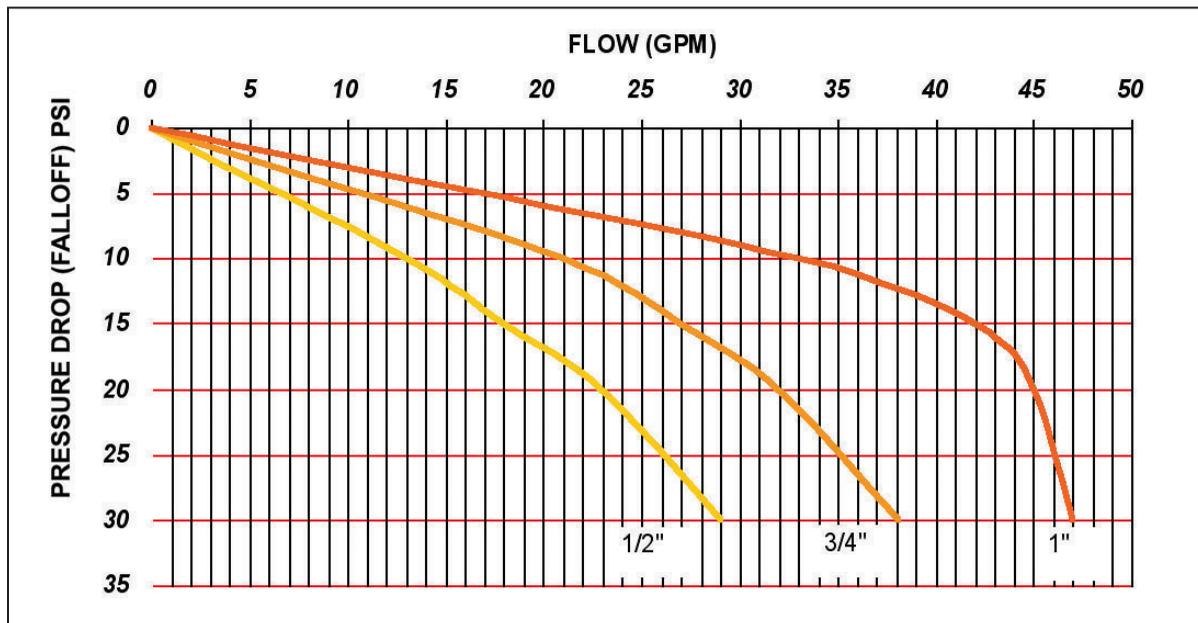


## PRE SERIES (36ELF)

PIPE SIZE	*FALLOFF (PSI)	PRESSURE DIFFERENTIAL (PSI)		
		25	50	75
1/2"	10	10	13	16
	15	13	18	22
	20	17	23	29
	30	22	29	36
3/4"	10	16	21	26
	15	20	27	32
	20	24	32	40
	30	29	38	48
1"	10	25	33	41
	15	30	42	52
	20	34	45	56
	30	35	47	59

\*Falloff is the difference between the PRV's set pressure and the flowing pressure at any given demand

### FLOW CURVE



**Pressure Differential** is the difference between the inlet supply pressure and the adjusted outlet pressure.

**Pressure Falloff** is the reduction in downstream pressure from the static (set) pressure as the flow increases through the valve.

**NOW AVAILABLE**

## Spacers Designed to Allow System Flush Prior to Installing WPRV

36ESPI - 1" Connections  
36ESPII4 - 1 1/4" Connections



## PRE SERIES (36ELF)

## LARGE DIAMETER



The new large diameter Apollo<sup>®</sup> Lead Free Pressure Reducing Valve Model PRE (36ELF Series) is designed to conserve water and protect water distribution systems by automatically reducing elevated supply pressures. The dezincification resistant bronze body, stainless steel adjusting screw and dielectric polymer cage provide maximum corrosion resistance. Designed for easy in-line servicing with simple cartridge removal.

### FEATURES

- Balanced Piston Design
- SS Adjusting Screw & Nut
- Sealed Cage for Vault Installations
- Built-In Thermal Expansion Bypass
- Large Area Integral Stainless Steel Strainer
- Modular Seat Disc and Strainer Cartridge
- Control Pressure Ranges: 15-75 psi and 75-150 psi
- High Flow / High Efficiency Design
- NPT and Solder Connections
- Factory Tested and Preset at 60 psi
- Single Union, Double Union and Less Union Configurations Available
- **100% Manufactured in USA - ARRA Compliant**

### OPTIONS

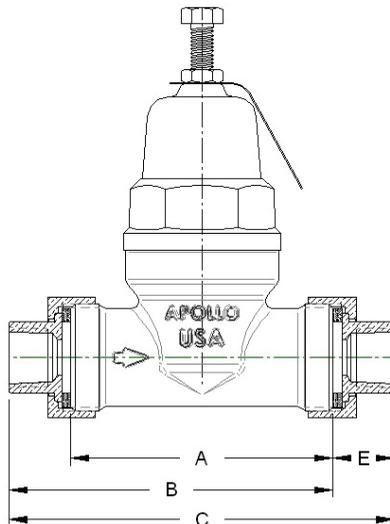
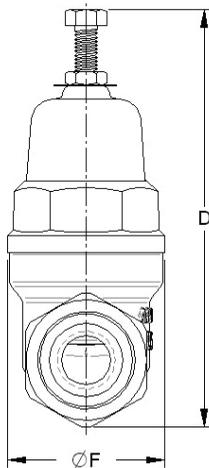
- (-B) Bronze Cap
- (-P) Tapped 1/4" & Plugged
- (-G) With Pressure Gauge

### APPROVALS

- ASSE 1003
- CSA B356
- IAPMO/UPC
- NSF/ANSI 372 Lead Free
- NSF/ANSI 61 Water Quality

### DIMENSIONS

Connect Type	Size (in.)	Dimensions (in.)						Single Union Wt.	Double Union Wt.
		A	B	C	D	E	F		
THREAD	1-1/4"	5.5	6.62	7.74	10	1.12	3.375	7.22	8.34
SOLDER	1-1/4"	5.5	6.62	7.74	10	1.12	3.375	7.22	8.34
THREAD	1-1/2"	5.5	6.80	8.1	10	1.30	3.375	7.61	8.92
SOLDER	1-1/2"	5.5	6.80	8.1	10	1.30	3.375	7.61	8.92
THREAD	2"	5.5	6.93	8.36	10	1.43	3.375	9.2	11.6
SOLDER	2"	5.5	6.93	8.36	10	1.43	3.375	9.2	11.6



# WATER PRESSURE REDUCING VALVES



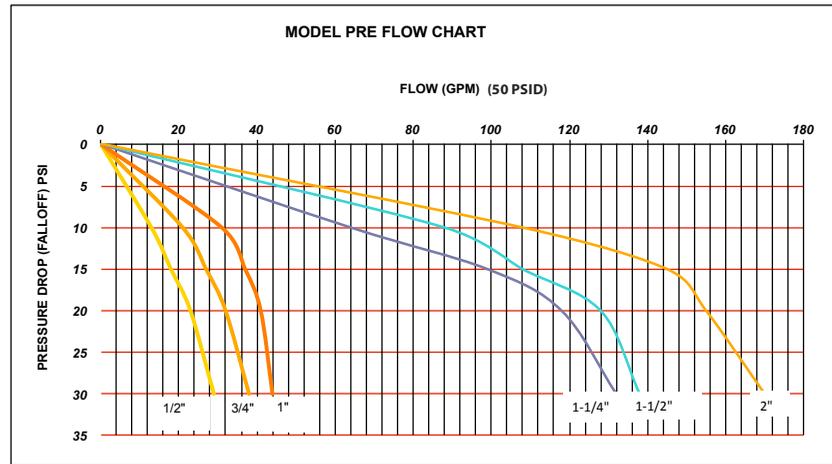
"Apollo" COMMERCIAL PRODUCTS

## PRE SERIES (36ELF)

## LARGE DIAMETER

### FLOW CURVE

Pipe Size	Fall-Off (PSI)	Pressure Differential (PSI)		
		25	50	75
GPM				
1-1/4"	10	35	47	59
	15	58	77	96
	20	85	113	141
	30	99	132	165
1-1/2"	10	66	88	110
	15	81	108	135
	20	96	128	160
	30	104	138	172
2"	10	81	108	135
	15	109	145	181
	20	116	155	194
	30	128	170	212

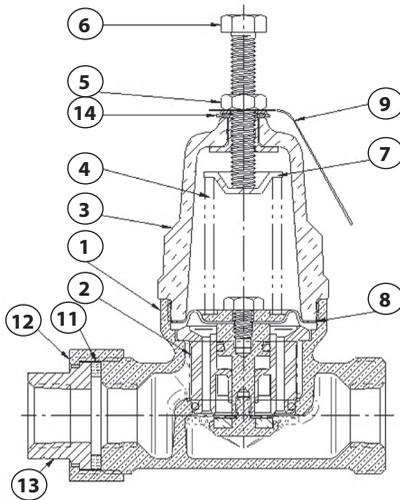


**Pressure Differential** is the difference between the inlet supply pressure and the adjusted outlet pressure.

**Pressure Falloff** is the reduction in downstream pressure from the static (set) pressure as the flow increases through the valve.

### STANDARD MATERIALS LIST

1	LF Body (Bronze, ASTM B584-C89836)
2	Assy, Cartridge (Noryl™/LF Brass/EPDM)
3	Cap (Noryl™)
4	Spring (Music Wire ASTM A228)
5	Nut (Stainless Steel)
6	Bolt (Stainless Steel)
7	Washer, Spring (Steel Plated)
8	Friction Ring (Lead Free Brass)
9	Nameplate (Aluminum)
11	Washer (BUNA-N)
12	Nut, Union (Brass)
13	Tailpiece (Lead Free Brass)
14	Cage Seal (Nitrile)



### PART NUMBER MATRIX

36ELF -	1	X	X	X	X	X
	STYLE	UNION	SIZE	PRESSURE	CONNECTION	OPTION
36ELF - Lead Free	1	0 - No Union (NPT)	6 - 1-1/4"	01 - 15-75 psig	T - FNPT Thread	Blank - Standard Polymer
36E - Non Lead Free		1 - Single Union	7 - 1-1/2"	03 - 75-150 psig	S - Solder	B - Bronze Cap
		2 - Double Union	8 - 2"			G - Tapped w/ Gauge
						P - Tapped w/ Plug



## PRH SERIES (36HLF)



Apollo® PRH Series pressure reducing valves offer high performance in heavy-duty applications. They're designed with a larger diaphragm and orifice area to yield the highest water flow water capacities in the industry.

PRH pressure reducing valves' integral bypass protects against thermal expansion. Built for extended service, these models include bronze body construction and stainless steel replaceable seat. They meet ASSE 1003 and CSA B356 standards. They are listed with IAMPO and city of Los Angeles.

These heavy-duty valves are available with optional in-line strainer and 150 lb. ANSI B16.24 integral bronze flange connections. (2-1/2" and 3" only)

### FEATURES

- Bronze Body and Spring Cage for Superior Corrosion Resistance and Dependability
- SS Fasteners, Spring, Seat, and Adjustment Screw
- Standard Factory Setting is 50 psi
- Operating Temperature: 33 - 180°F
- Suitable for Supply Pressures to 400 psi
- Every Valve is 100% Factory Set and Tested
- Integral Thermal Expansion Bypass
- In-line Repairable, Bottom Access
- USA Materials and Manufacture

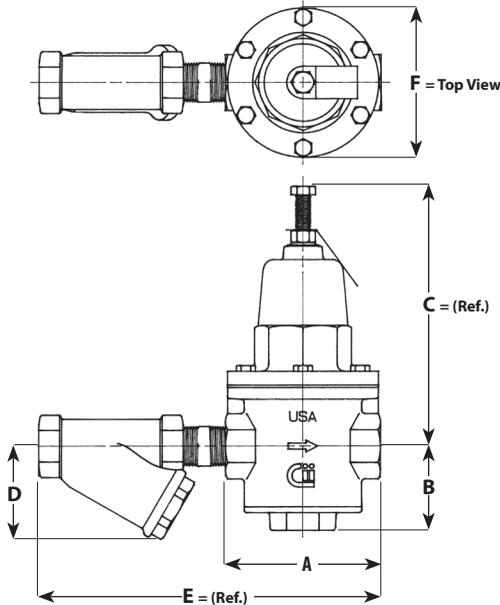
### OPTIONS

- (-02) Low Pressure 10-35 psi
- (-03) High Pressure 75-125 psi
- Bronze Strainer
- 36HLF700 Series w/ 150# ANSI Flanges

### APPROVALS

- ASSE 1003
- CSA B356
- NSF/ANSI 372 Lead Free
- IAPMO

### DIMENSIONS



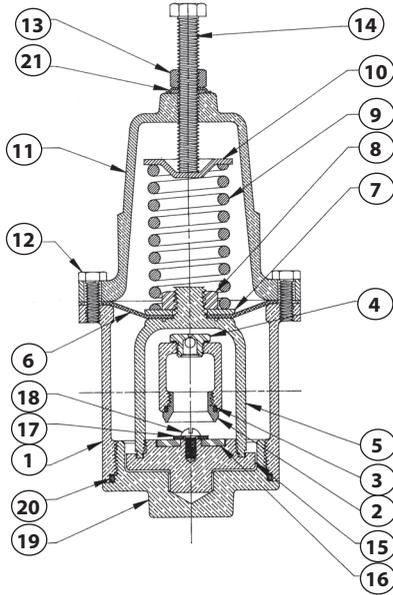
Size (in.)	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	Wt. w Strainer	Wt. w/o Strainer
<b>NPT</b>								
1/2"	4.13	2.25	7.00	1.88	8.38	4.00	7.0	6.00
3/4"	4.13	2.25	7.00	2.44	9.00	4.00	8.0	6.00
1"	4.81	2.31	7.50	4.00	10.25	4.69	12.0	8.00
1-1/4"	6.75	3.81	10.00	3.38	12.50	6.50	29.0	24.00
1-1/2"	6.75	3.19	10.00	3.88	13.13	6.50	29.0	23.00
2"	8.13	3.50	12.50	4.63	16.00	7.63	47.0	38.00
2-1/2"	8.13	3.50	12.50	5.94	16.69	7.63	49.0	37.00
3"	10.38	3.94	15.13	6.94	20.50	9.75	87.0	70.00
<b>Flanged</b>								
2-1/2"	10.38	3.50	12.50	7.13	21.69	7.63	105.0	55.00
3"	12.50	3.94	15.13	8.13	24.50	9.75	136.0	92.00

# WATER PRESSURE REDUCING VALVES



"Apollo" COMMERCIAL PRODUCTS

## PRH SERIES (36HLF)



### STANDARD MATERIALS LIST

1	Body (LF Bronze)	11	Cap (Bronze)
2	Seat (SS)	12	Cap Bolts (SS)
3	Seat O-Ring (Nitrile)	13	Lock Nut (SS)
4	Bypass Assembly	14	Adjustment Screw (SS)
5	Yoke (LF Bronze)	15	Seat Disc Holder (LF Bronze)
6	Diaphragm (Nitrile w/Nylon Reinforcement)	16	Seat Disc (EPDM)
7	Diaphragm Washer (SS)	17	Seat Disc Washer (SS)
8	Diaphragm Nut (SS)	18	Seat Screw (SS)
9	Spring (SS)	19	Bottom Cover (LF Bronze)
10	Spring Retainer (SS)	20	Bottom Cover O-Ring (Nitrile)
		21	Cage-Sealing Washer (SS)

### MODEL NUMBER MATRIX

PRH - X	X	X	X	
CONNECTIONS	MISCELLANEOUS	PRESSURE SETTING	SIZE	LEAD FREE
T - FNPT x FNPT	Blank - No Strainer	Blank - 25-75 psig	12 - 1/2"	LF - Lead Free
F - Flanged	Y - With Strainer	L - 10-35 psig	34 - 3/4"	Blank - Non-Lead Free
		H - 75-125 psig	1 - 1"	
			114 - 1-1/4"	
			112 - 1-1/2"	
			2 - 2"	
			212 - 2-1/2"	
			3 - 3"	

*ANSI 150 lb. flange connection for 2-1/2" and 3" only.  
Not all variations are available in each size.  
Check with customer service.*

### PART NUMBER MATRIX

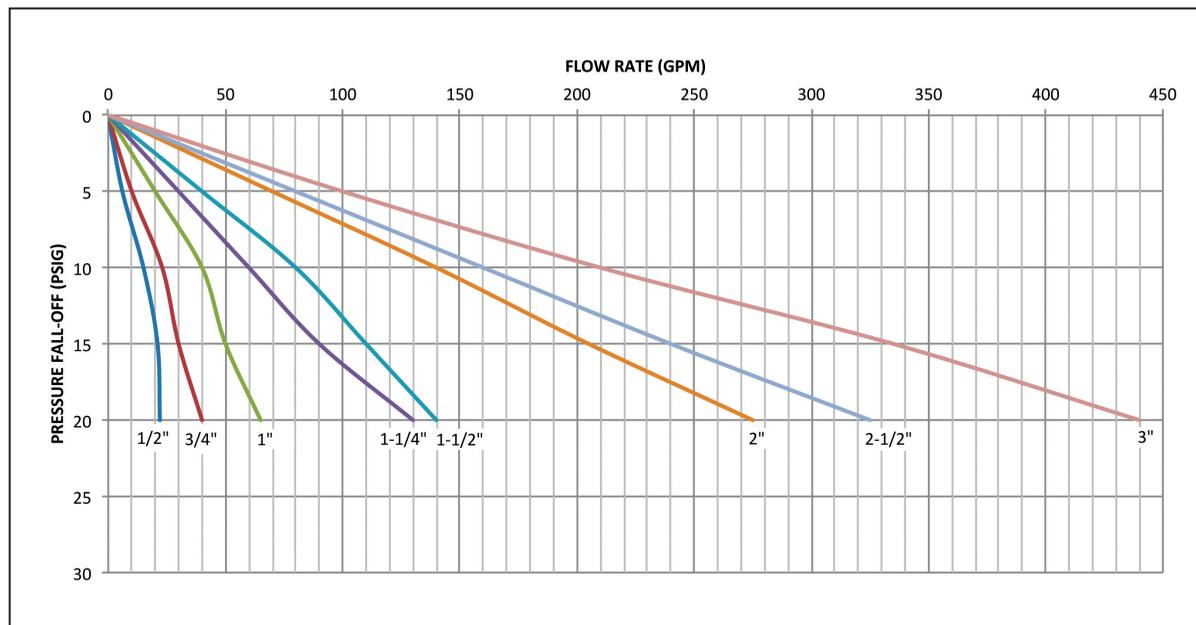
36HLF	X	X	X	- OX
36H - X	END CONNECTIONS	OPTIONS	SIZE	PRESSURE RANGE
36HLF-	2 - FNPT x FNPT (Standard)	0 - Standard	3 - 1/2"	01 - 25-75
36H-	7 - Flanged (2-1/2" - 3" only)	1 - With Y-Strainer	4 - 3/4"	02 - 10-35
			5 - 1"	03 - 75-125
			6 - 1-1/4"	
			7 - 1-1/2"	
			8 - 2"	
			9 - 2-1/2"	
			0 - 3"	



## PRH SERIES (36HLF)

PIPE SIZE	*FALLOFF (PSI)	PRESSURE DIFFERENTIAL (PSI)		
		25	50	75
		Water Capacity (GPM)		
1/2"	5	8.5	10.0	11.5
	10	13.6	16.0	18.4
	15	17.9	21.0	24.2
	20	21.3	25.0	28.8
3/4"	5	10.6	12.5	14.4
	10	20.4	24.0	27.6
	15	28.1	33.0	38.0
	20	34.0	40.0	46.0
1"	5	17.0	20.0	23.0
	10	29.8	35.0	40.3
	15	40.8	48.0	55.2
	20	51.0	60.0	69.0
1-1/4"	5	21.3	25.0	28.8
	10	51.9	61.0	70.2
	15	80.8	95.0	109.3
	20	113.1	125.0	143.8
1-1/2"	5	29.8	35.0	40.3
	10	61.5	72.3	83.1
	15	90.1	106.0	121.0
	20	113.1	133.0	153.0
2"	5	55.3	65.0	74.8
	10	126.7	149.0	171.4
	15	174.3	205.0	235.8
	20	231.20	272.0	312.80
2-1/2"	5	58.7	69.0	79.4
	10	132.6	156.0	179.4
	15	200.6	236.0	271.40
	20	271.20	319.0	366.9
3"	5	80.8	95.0	109.3
	10	176	207	238.1
	15	282.5	332.4	382.3
	20	365.5	430.0	494.5

### FLOW CURVE



**Pressure Differential** is the difference between the inlet supply pressure and the adjusted outlet pressure.

**Pressure Falloff** is the reduction in downstream pressure from the static (set) pressure as the flow increases through the valve.

# WATER PRESSURE REDUCING VALVES



"Apollo" COMMERCIAL PRODUCTS

## A127 SERIES



Apollo® pilot control valves are ideal for a wide range of commercial and industrial applications, wherever the supply pressure needs to be reduced to a lower constant pressure.

Hydraulically operated diaphragm main valve automatically controls non-corrosive, non-abrasive fluids by means of a wide range of pilots.

### FEATURES

- Ductile Iron Body & Bonnet, ASTM A536 Grade 65-45-12
- NSF Epoxy Coated
- Bronze / Stainless Steel Internals
- EPDM Elastomers 40°F - 180°F
- Lead Free Components Used Throughout
- Lead Free Wye Strainer Protects Pilot System from Debris
- Isolation Ball Valves Simplify Maintenance and Troubleshooting
- Each Valve is 100% Factory Tested and Can be Set to Your Requirements
- Wide Range of Control Pilots and Functions
- Opening Speed Control is Standard
- Automatically Reduces a Higher Upstream Pressure to a Constant Lower Downstream Pressure
- Constant Outlet Pressure Regardless of Variations in Upstream Pressure or Flow
- Pilot Operated Main Valve is Not Subject to Pressure falloff
- Outlet Pressure is Adjustable with a Single Screw
- Optional Low-Flow Bypass, Model A127-LF When Wide Extremes in Flow Demand are Anticipated

Valve Sizes	
Globe Flanged	1 1/4" - 24"
Angle Flanged	1 1/4" - 16"
Globe / Angle Threaded	1 1/4" - 3"
Globe / Angle Grooved	1 1/2" - 6"*
Service Ratings - Ductile Iron	
150# Flanged	250 psi MAWP
300# Flanged	640 psi MAWP
Threaded	640 psi MAWP
Grooved	300 psi MAWP

\*6" grooved globe style only

### APPROVALS

- NSF/ANSI 372 Lead Free
- NSF/ANSI 61 Water Quality

### MATERIAL OPTIONS

- Body: Ductile Iron (NSF 61 Epoxy Coated), Cast Steel, Stainless Steel, Bronze
- Pilot/Fittings: Bronze/Brass, Stainless Steel
- Tubing: Copper, Stainless Steel
- Elastomers: EPDM, Buna N, Viton

\*For use with potable water, use ductile iron (NSF 61 epoxy coated) body, lead free bronze/brass pilot and fittings, copper tubing and EPDM elastomers.

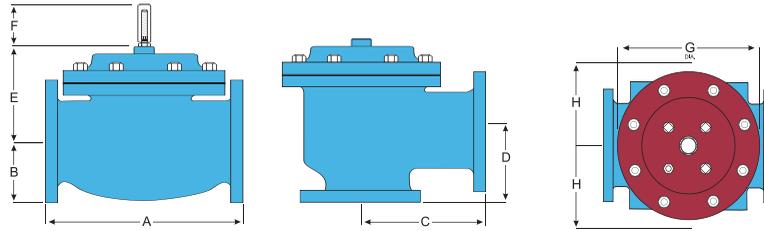
### OTHER CONTROL FUNCTIONS

A94	Diaphragm Check Valve
A108-2	Pressure Relief/Pressure Sustaining
A110	Differential Control
A115-2	Solenoid Control
A115-4	Solenoid Control/high capacity pilot
A120	Rate of Flow Control
A127LF/727LF	Low flow bypass
A800	Float Controlled On/Off Service
A810	Float Controlled, Modulating
A22 / A88	Digital Electronic Control, regulates pressure, flow or level

\*Contact customer service for assistance with sizing, selection and model numbers



## A127 SERIES



### DIMENSIONS

Size (in.)	End Connections A				End Connections C				End Connections D				E	H
	Screwed	Grooved	150# FLGD	300# FLGD	Screwed	Grooved	150# FLGD	300# FLGD	Screwed	Grooved	150# FLGD	300# FLGD	All	All
1-1/4 - 1-1/2	8-3/4	8-3/4	8-1/2	8-3/4	4-3/8	4-3/8*	4-1/4	4-3/8	3-1/8	3-1/8*	3	3-1/8	6	10
2	9-7/8	9-7/8	9-3/8	9-7/8	4-3/4	4-3/4	4-3/4	5	3-7/8	3-7/8	3-7/8	4-1/8	6	11
2-1/2	10-1/2	10-1/2	10-1/2	11-1/8	6	6	6	6-3/8	4	4	4	4-3/8	7	11
3	13	13	12	12-3/4	6-1/2	6-1/2	6	6-3/8	4-1/2	4-1/2	4	4-3/8	6 1/2	11
4	—	15 1/4	15	15-5/8	—	7-5/8	7-1/2	7-13/16	—	5-5/8	5-1/2	5-13/16	8	12
6	—	20	17-3/4	18-5/8	—	—	10	10-1/2	—	—	6	6-1/2	10	13
8	—	—	25-3/8	26-3/8	—	—	12-11/16	13-3/16	—	—	8	8-1/2	11 7/8	14
10	—	—	29-3/4	31-1/8	—	—	14-7/8	15-9/16	—	—	11-3/8	12-1/16	15 3/8	17
12	—	—	34	35-1/2	—	—	17	17-3/4	—	—	11	11-3/4	17	18
14	—	—	39	40-1/2	—	—	—	—	—	—	—	—	18	20
16	—	—	40-3/8	42	—	—	20-13/16	21-5/8	—	—	15-11/16	16-1/2	19	20
24	—	—	62	63-3/4	—	—	—	—	—	—	—	—	27	28-1/2

\*Grooved End Not Available in 1-1/4"

## W-8078-00 SERIES



W-8078-00



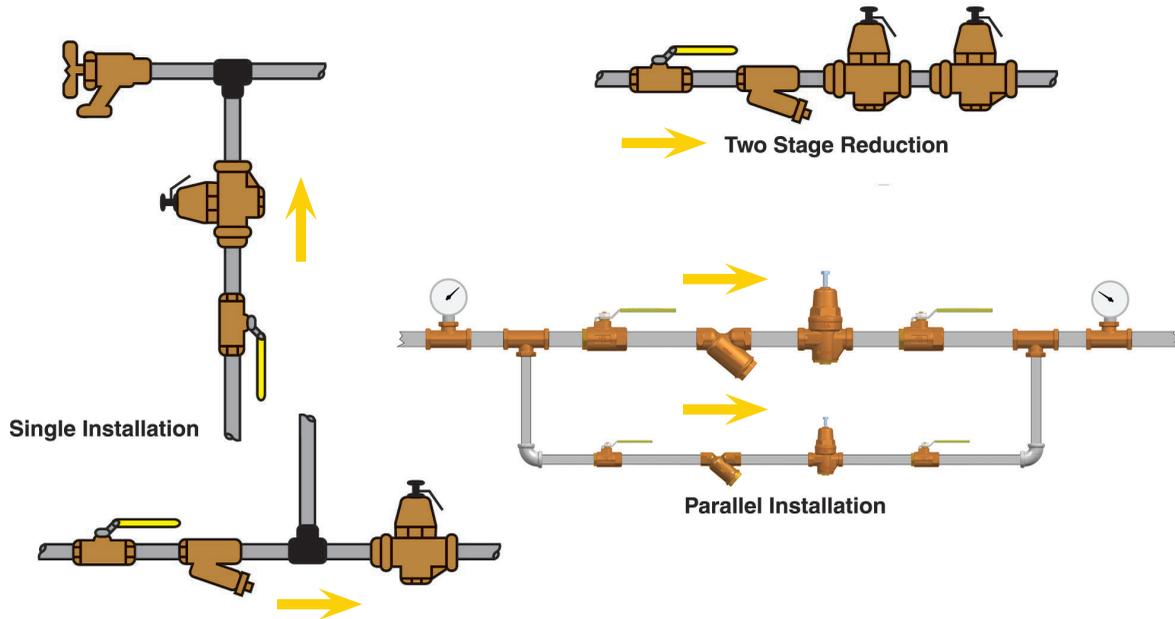
W-2799-00

These pressure gauges are used for testing water pressure. Temp. Range: 50°-130° F - P/N W807800. Includes a high-pressure indicator.

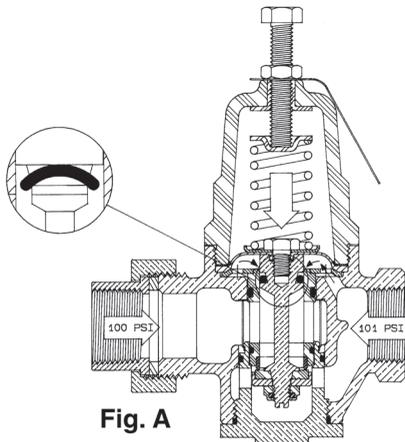
Model Number	LF Model Number	Connection	Pressure Range	Net Wt. (lbs.)
W-8078-00	—	3/4" hose thread	0-300 psig	.46
	W-2799-00	1/4" NPT	0-160 psig	.70



## INSTALLATION CONFIGURATIONS



## SIZING



1. WHAT IS THE SUPPLY PRESSURE?
2. WHAT IS THE DESIRED REDUCED DOWNSTREAM PRESSURE?

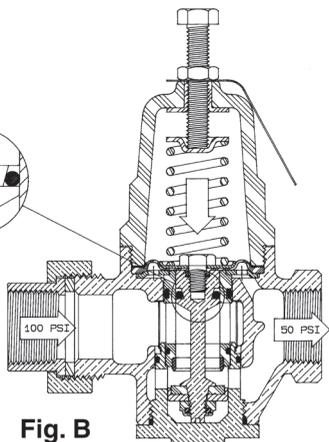
The reduced pressure prevents damage to water fixtures and downstream piping and conserves water. Optimal performance is achieved at a 2:1 ratio. Example: 100 psi supply pressure, 50 psi static downstream pressure. 50 psi is the default factory setting.

Multiple valves should be used for large pressure drop requirements.

3. WHAT IS THE CALCULATED FLOW REQUIREMENT MINIMUM & MAXIMUM?

Do not size for maximum flow requirement. An over sized valve will operate in a nearly closed position causing premature wear and undesirable noise.

If normal flow requires a line size regulator, a smaller regulator, piped parallel to the main regulator should be considered. Adjusting the smaller bypass regulator at 5-10 psi higher than the main regulator will help prevent premature wear and noise.



4. SIZE FOR 10-20 PSI FALL OFF (EXAMPLES CAN BE FOUND IN CHART)

Falloff is simply the difference between flow increase and pressure decrease. As flow decreases, pressure increases. Low flow at high pressure forces the valve to operate in a near closed position. Sizing at 10-15 psi falloff will allow the valve to operate nearer the middle of its operating range. Mid range improves performance and durability.

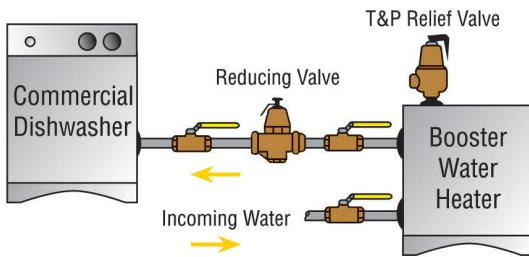
### Thermal Expansion Considerations

Installing a pressure reducing valve creates a closed water system. Thermal expansion occurs in a closed system when water is heated and pressure builds up. A thermal by-pass designed into the reducing valve can dissipate the expanded pressure back to the service main.

When the system pressure in a closed system increases to a pressure greater than the supply pressure by just one pound, the o-ring on the stem will flex (see Fig. A) and allow the excess pressure to be relieved to the supply side until pressures on both the system and supply sides are equal. When a faucet on the system side is used, thus lowering the pressure, the valve opens as soon as the system pressure falls below the set outlet pressure, typically 50 psi. The valve and the system then return to normal as shown in Fig. B. The PRH features a ball and seat type of check valve as a thermal by-pass but the principle is similar.



## ADDITIONAL INFORMATION



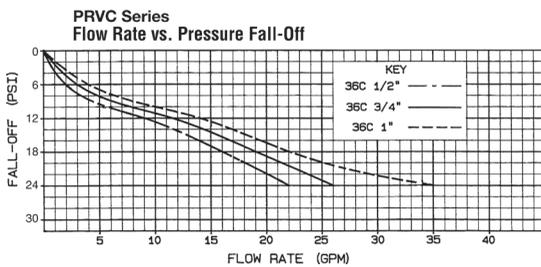
### SPECIALLY DESIGNED LOW PRESSURE MODELS

Apollo's low pressure reducing valves are designed to provide optimal performance low pressure (10 to 35 PSI) for residential and commercial applications.

### FLOW/PERFORMANCE CURVES

Apollo offers performance curves for every version of its PR Series pressure reducing valves. All curves plot the rate of flow against the reduced pressure fall-off.

In all charts, zero (0) indicates a no-flow condition. Figures below zero on the flow curve chart show the pressure change or fall-off needed to produce the flows indicated by the curves for valves of different sizes. It is important to allow for some fall-off from the set pressure downstream during flow conditions.



Example:

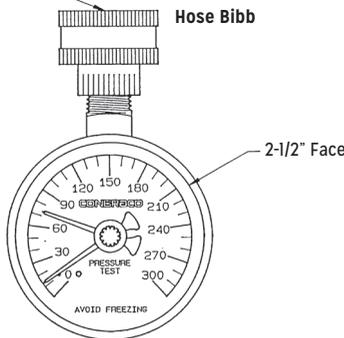
A PRC 3/4" with an inlet pressure of 100 psi is set to an outlet pressure of 50 psi in the static, no-flow condition. The flow demand through the valve is expected to be 19 gpm. The chart below shows that the fall-off at that flow rate is 18 psi, so the pressure will drop from 50 psi to about 32 psi at 19 gpm.

Although this chart shows curves at a 50 psi differential, curves for other settings are similar. The curve shifts slightly to the left for a smaller differential and to the right for a greater differential.

For every model and size, the amount of water passed through the valve depends on the difference between the inlet pressure and the outlet pressure. As the pressure differential increases, the volume of water increases.

### Gauge #W-8078-00

3/4" Female Hose Bib Connection Swivel Type with Washer



Reduced pressures must drop off slightly from the setting of the valve as flow starts. As flow increases, the pressure must continue to fall.

Required capacity depends entirely on where and how the valve is used. In typical systems where water is supplied to lavatories, toilets, bath tubs and showers in homes, schools, apartments hospitals, a 25 to 30 percent pressure drop-off is satisfactory.

In laundries, car washes, commercial dishwashers and other industrial and commercial applications, a 10 to 15 percent pressure drop-off may be preferred.

Generally, the greater the output variation, the higher the valve's capacity. A larger valve will offer more capacity with less pressure fall-off than a smaller valve of the same model. Also valve capacities can vary depending on the size of the piping. Apollo<sup>®</sup> pressure reducing valves offer a wide range of performance; selecting the best valve for the application depends on more than pipe size alone. The Apollo<sup>®</sup> technical staff is available to assist you.

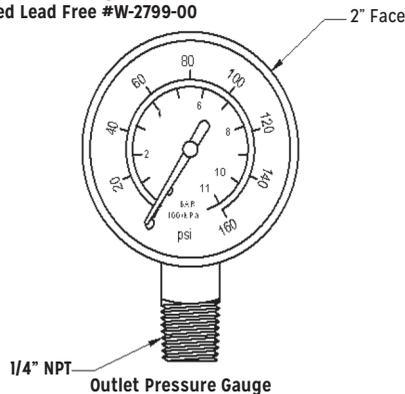
### GAUGES

Apollo<sup>®</sup> offers the gauges necessary for proper selection, use and maintenance of pressure reducing valves.

The hose bibb maximum pressure indicator gauge or pressure test gauge is used in determining the need for pressure reducing valves and the amount of reduction necessary. This gauge is attached to a hose bibb or sill cock which is then turned to full open position. The gauge is left in place for a period of time, usually over night, to record the maximum pressure level at that location.

An outlet pressure gauge allows a quick visual check of outlet water pressure. These gauges are often installed permanently so that any unexpected increase or decrease in pressure can be detected and dealt with before it results in damage to the system. Apollo<sup>®</sup> offers a 2" outlet pressure gauge as an option on the PRC. Both types of gauges are available from your Apollo<sup>®</sup> distributor.

### Standard Brass Gauge #W-7793-00 Certified Lead Free #W-2799-00



### REPAIR KITS AVAILABLE

Repair parts are available for all Apollo<sup>®</sup> pressure reducing valves. Convenient pre-packaged repair kits for each model are also available.

WATER PRESSURE  
REDUCING VALVES



*"Apollo"* **COMMERCIAL**  
PRODUCTS



## WATER PRESSURE REDUCING VALVES