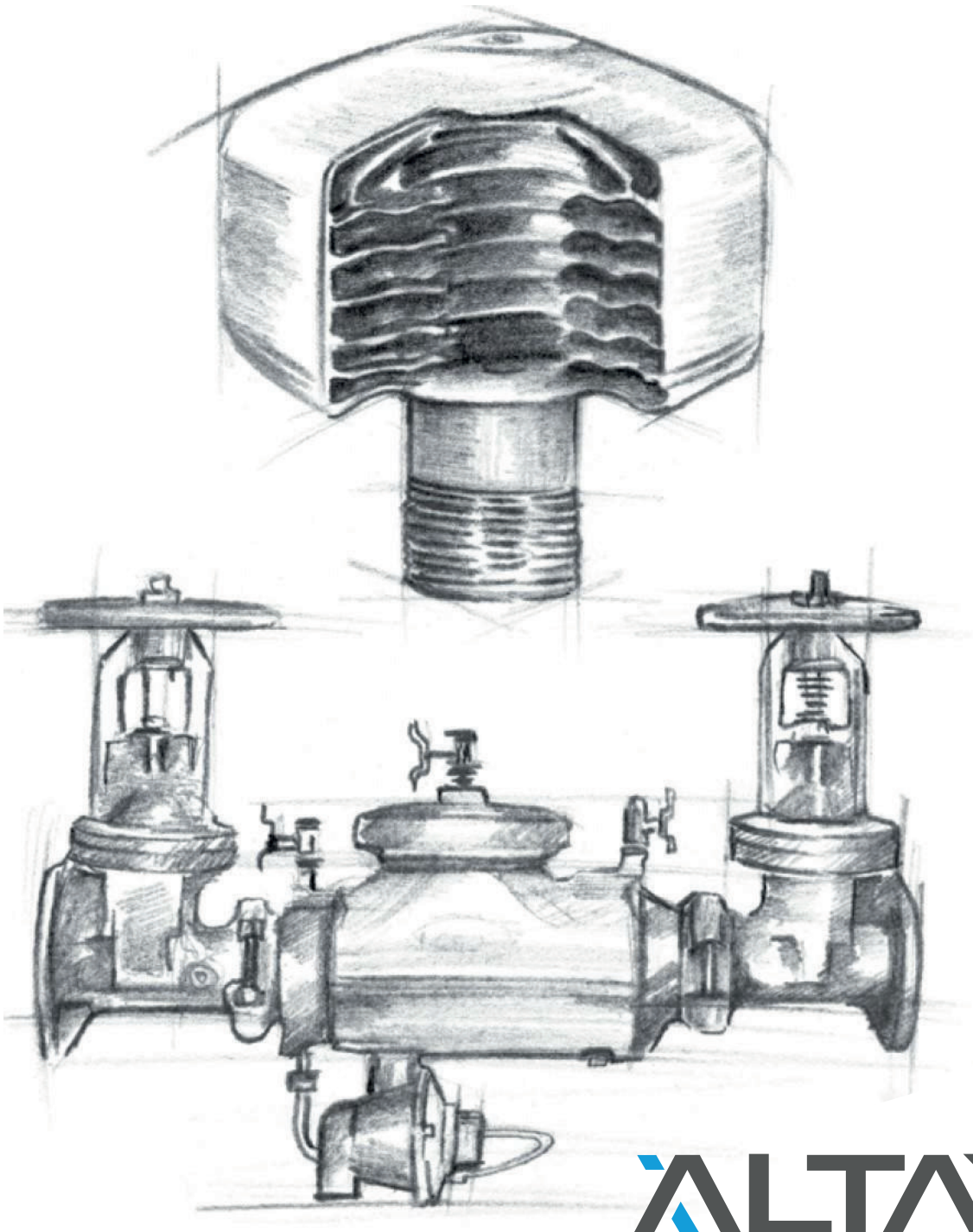
MIFAB®

WATER HAMMER ARRESTORS & BACKFLOW PREVENTERS



ALTAY PLUMBING

STAINLESS STEEL BELLOWS WATER HAMMER ARRESTORS

WHB

DESIGN CONSTRUCTION OPERATION

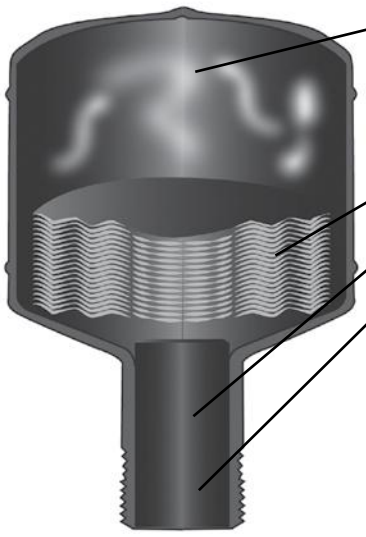
Built to last without mechanical failure or material deterioration, the unit is constructed entirely of stainless steel.

Heavy duty balanced expansion bellows to internally absorb the hydrostatic shock pressure occurring in water lines. These bellows are both pneumatically and hydraulically controlled in a pressurized expansion chamber so that they never come into metal to metal contact with other parts of the unit, and cannot be subjected to excessive stresses or strains which might cause metal fatigue and bellows failure.

Stainless steel construction combined with unique engineered design make;

- Compact in size
- Big in performance
- Maximum capacity
- Light-weight - needs no support straps
- Requires no service or maintenance
- Extremely durable - May be installed in concealed areas

BELOWS IN NORMAL POSITION



- Pressurized compression chamber charged and factory sealed . Controls bellows expansion under normal water-line pressure so that full expansion capacity is available to control shock.
- Welded Nesting-Type Expansion Bellows
- In-Line Design-Direct action type bellows respond instantly to control shock pressure
- Threaded Nipple Connection-Threads directly into tee.

With in-line design, expansion bellows are an integral part of the waterline , so that they respond instantaneously in absorbing and controlling hydrostatic shock.

A pressurized compression chamber provides a pneumatic cushion that governs the bellows expansion under normal waterline pressure, so that the full bellows expansion capacity is available for controlling hydrostalic shock.

The bellows are of balanced design and construction with heavier and stronger convolutions positioned in the bellows assembly to insure each convolution expanding evenly and equally, thereby providing the maximum surface area for absorbing and dissipating the shock pressure into the pneumatic cushion.

UNIT ABSORBING SHOCK

- As shock occurs , bellows expand, creating a pneumatic pressure cushion which absorbs and controls shock.
- Beflows in expanded position due to the hydrostatic shock in the system

As hydrostatic shock occurs, these pressures cause the bellows to expand into the pneumatic cushion of the compression chamber. This expanding movement of the bellows provides the displacement required to absorb and control the shock pressure generated in the line. The force of the shock expanding the bellows creates a self-energizing pneumatic pressure, which prevents the bellows from over-expanding and coming into contact with the top of the compression chamber.

The combined cushioning effect of both the pneumatic and hydraulic pressures governs the bellows action, so that shock waves do not bounce back into the piping system and acts to quickly stabilize the water and piping system

STAINLESS STEEL BELLOWS WATER HAMMER ARRESTORS

WHB

ALL STAINLESS STELL

Bellows arresters are constructed entirely of 304 stainless steel for maximum corrosion resistance and decades of reliable operation. This construction eliminates the possibility of galvanic corrosion between dissimilar materials within the structure of the arrester.

ALL-WELDED CONSTRUCTION

There are no o-ring seals, crimp joints, or other "weaklinks" in the structure. All joints are gas-tungsten arc welded (GTAW) or resistance welded stainless steel to stainless steel. This construction results in a burst pressure greater than 2000 psi , giving a margin of safety over 13 times the maximum operating pressure of a typical 150 psi water system

TOTALLY METALLIC, WELDED STAINLESS STEEL GAS CHARGE CONTAINMENT

The goal of an engineered water hammer arrestor is long life, and this can only be achieved by absolute containment of the gas charge, In the arrester, the gas charge is completely enveloped in stainless steel. From the outer containment to the highly flexible, edge welded bellows, the gas charge is confined in an impermeable metallic enclosure.

BELLOWS EMPLOYS CONICAL ID/OD DESIGN DEVELOPED BY BATTELLE LABORATORY FOR MINIMUM OPERATING STRESS, ULTRA LONG LIFE

The bellows in a water hammer arrestor provides a flexible barrier between the water system and the gas charge. In arrestors, the bellows is unique: It employs a design that was developed by Battelle Laboratories in which the inner and outer edges are tilted into a conical shape . This contour distributes stresses throughout the entire bellows diaphragm, While this gets deep into the engineering of the arrestor, it points to a highly advanced configuration not used by other bellows designs-one that assures reliable life measured in decades. It also provides the most compact design available.

WELDED GAS CHARGE SEAL

As with all other aspects of the design, the fill point is also welded closed with stainless steel for permanency.

100 PERCENT TESTED ON HELIUM MASS SPECTROMETER 10,000 TIMES MORE SENSITIVE THAN A BUBLE TEST-MEANS PERMANENT GAS CHARGE, NO LEAK DOWN, EVERY WELD AND EVERY SURFACE OF GAS CONTAINMENT IS LEAK TESTED.

To assure that every inch of weld and every surface of bellows and outer containment is leak-free , bellows arrestors are tested with the most sensitive leak detection method possible- the helium-sensitive mass spectrometer. The mass spectrometer can detect a leak so small that it would take ten years to form a bubble the size of a pea. This technique, used on aerospace products, gives the maximum assurance possible of leak-free gas charge containment.

GAS CHARGE INERT DRY NITROGEN AND DRY HELIUM MIX FOR MAXIMUM STABILITY

While other arresters are charged with air, bellows arresters are charged with a dry nitrogen/dry helium m ix. This affords maximum stability in surge absorption under all operating conditions, and gives us a small trace of helium to perform our leak test.

TOTALLY DRY DESIGN; NO OIL IN GAS CHARGE-NO POSSIBLE CONTAMINATION

Early arrestor designs incorporated mineral oil in with the gas charge to fill up excess volume , Without this, the older arresters had very limited surge absorption. Through a highly efficient design, arrestors are "dry," in that they contain no oil.
This is significant in that should a bellows fail , there is no oil to escape and contaminate a drinking water system. In a hospital or apartment , this could be devastating, Arresters will help keep potable water systems potable.

BURST PRESSURE IN EXCESS OF 2000 PSI

Discussed above

ONE OF THE SMALLEST ARESTORS AVAILABLE IN STANDARD PDI SIZES

The advanced engineering of arresters allows physical size to be reduced considerably below older competitor units-as much as 25% smaller. They are less expensive to ship and will fit into tight plumbing spaces that would exclude competitor units.

PDI TESTED AND CERTIFIED

Water Hammer Arrestor Sizing

WHB

Single and Multiple Fixture Branch Lines

The water hammer arrestor sizing procedure for single and multiple fixtures described below conforms to that established by the American Society of Sanitary Engineers in their Standard ASSE-1010 . Selection of the water hammer arrestor is based upon the total quantity of Fixture-Units on each cold and hot water branch line.

Fixture-Unit Listing

Determine the total number of Fixture-Units on each branch line by referring to the list of fixtures in Table One.

Water Hammer Arrestors Selection

Refer to Table Two and select the water hammer arrestor model with proper Fixture-Unit capacity. In long batteries of fixtures over 20 feet in length, more than one water hammer arrestor will be required.(See placement data shown below.)

Water Hammer Arrestors Placement Data

On multiple fixture branch lines up to 6 m in length, the water hammer arrestors should be installed on the branch line between the last two fixtures being served. The water hammer arrestors should have a Fixture Unit rating equal to or greater than the total Fixture Units connected to the branch line. On multiple fixture branch lines over 6 m in length, two water hammer arrestors should be used on each line with the second unit placed at the approximate midpoint of the line. The sum of the Fixture Unit ratings of the water hammer arrestors on each branch should be equal to or greater than the total Fixture Units connected to the branch line.

WATER HAMMER ARRESTOR SIZING

WHB

TABLE 1

Fixture	Type of Supply control	Weight in Fixture Units			
		Public		Private	
		Cold Water	Hot Water	Cold Water	Hot Water
Water Closet	Flush Valve	10	-	6	-
Water Closet	Flush Tank	5	-	3	-
Pedestrial Urinal	Flush Valve	10	-	-	-
Stall or Wall Urinal	Flush Valve	5	-	-	-
Stall or Wall Urinal	Flush Tank	3	-	-	-
Lavatory	Faucet	1 1/2	1 1/2	1	1
Bathtub	Faucet	2	2	1 1/2	1 1/2
Shower Head	Mixing Valve	2	2	1	2
Bathroom Group	Flush Valve Closet	-	-	8	3
Bathroom Group	Flush Tank Closet	-	-	6	3
Separate Shower	Mixing Valve	-	-	1	2
Service Sink	Faucet	3	3	-	-
Laundry Tubs (1-3)	Faucet	-	-	3	3
Combination Fixture	Faucet	-	-	3	3

TABLE 2

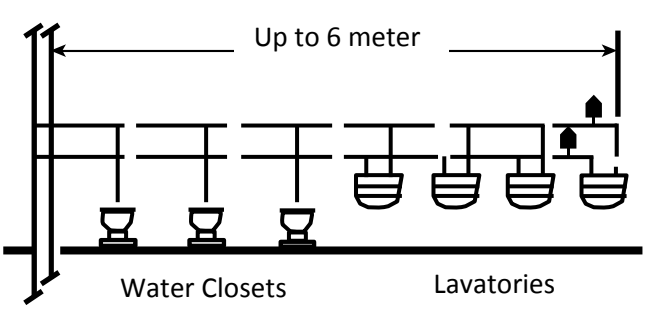
Water Hammer Arrestor Model No.	A	B	C	D	E	F
Fixture Unit Capacity	1-11	12-32	33-60	61-113	114-154	155-330

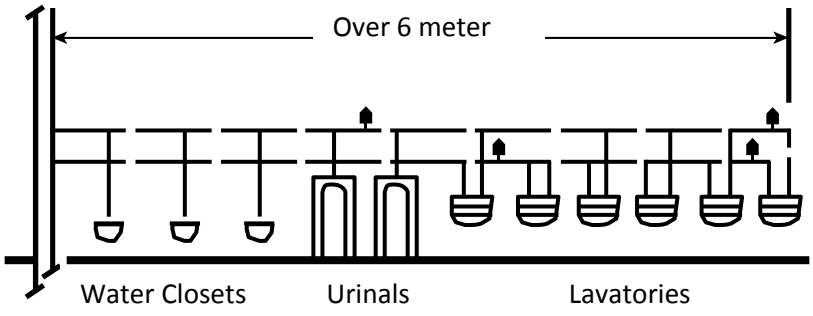
NOTES:

1) All sizing data in this book are based on flow velocities of 3 meter per second or less..

2) When the static water pressure in the line exceeds 65 psig (4,5 bar), contact the MIFAB Engineer Department.

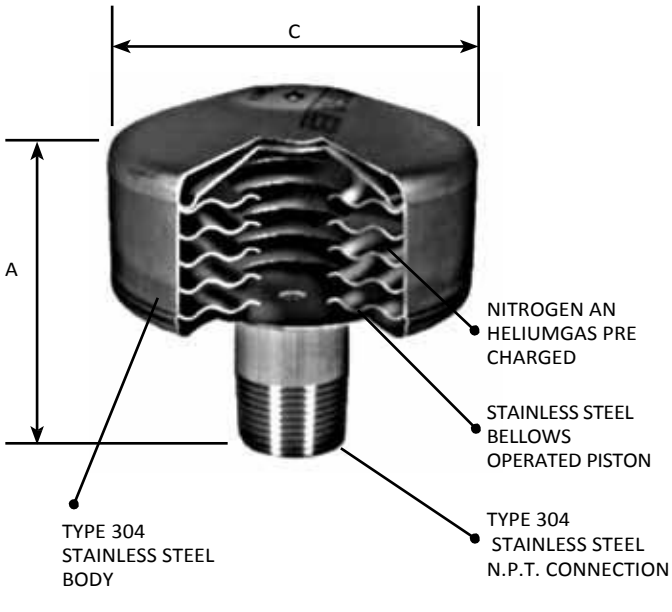
3) If the fixture unit total has 1/2" fraction, it is to be "rounded up" to next larger whole number.





Specification: MIFAB, WHB Series (specify size) nesting type bellows operated water hammer arrestor with male N.P.T. connection. Bellows and body casing made of Type 304 stainless steel. WHB Series is certified to the PDI WH-201 Standard. Engineered to limit line system surge pressure up to 1500 P.S.I.G. Shall be sized and located in accordance with manufacturer's instructions.

Function: Installed in commercial, institutional and residential applications on water supply lines to reduce water hammer caused by the quick opening and closing of valves within the piping system. The resulting hydraulic shock waves can lead to broken pipes and effect valves in appliances if not reduced with the use of the water hammer arrestor. Stainless steel bellows operated piston ensures long life tor performance and maximum operating efficiency.



MIFAB®WHB Series Features

- **STAINLESS STEEL BODY** Prevents corrosion.
- **STAINLESS STEEL BELLOWS OPERATED PISTON** improves operating efficiency.
- **TESTED AND CERTIFIED** to the PDI WH-201 Standard
- **OPERATING PRESSURE** Up to 350 P.S.I.G. (24 bar) for effective and safe operation.
- **TEMPERATURE RANGE** Maximum working temperature is 250'F (121'C)

Model No.	Size Type	FIXTURE UNIT CAPACITY	A (LENGTH)	B N.P.T. CONNECTION	C (DIA METER)
WHB-A	A	1-11	3 3/8"	3/4"	3 3/8"
WHB-B	B	12-32	4"	1"	3 3/8"
WHB-C	C	33-60	4 3/8"	1"	3 3/8"
WHB-D	D	61-113	5 3/8"	1"	3 3/8"
WHB-E	E	114-154	7 1/4"	1"	3 3/8"
WHB-F	F	155-330	7 1/4"	1"	3 3/8

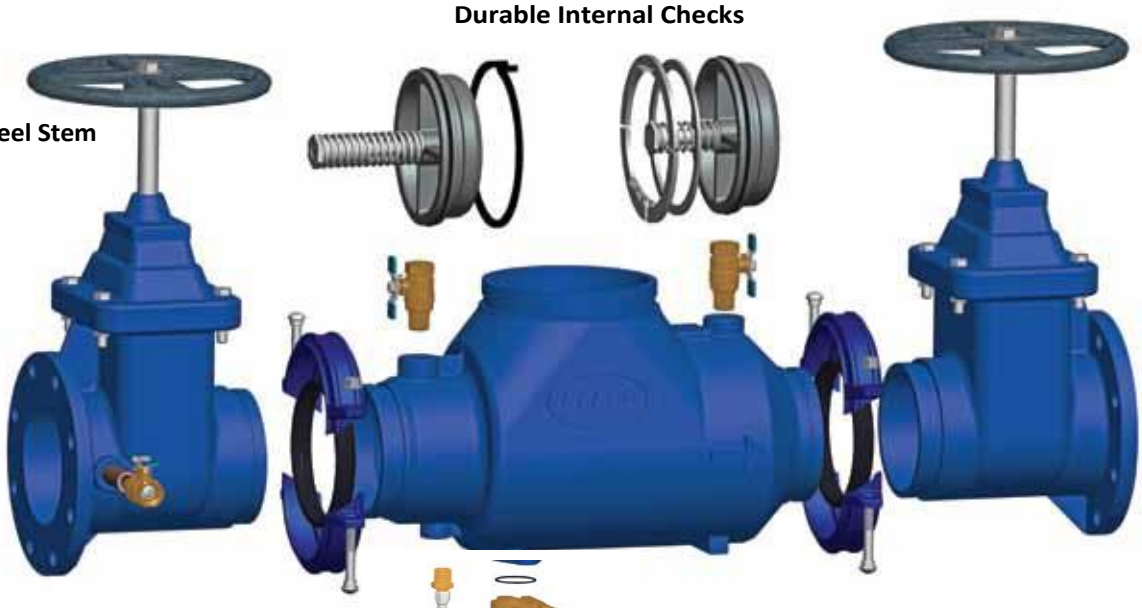
Backflow Preventer FRP

Easy One Clamp Access Design

NRS, OSY& UL Flanged and Grooved Options

Easily Maintained Strong Durable Internal Checks

Stainless Steel Stem



One Relief Valve Fits All Size $2^{1/2}$" Up to 6"

Fused Bonded Epoxy Coating

Easily Repairable Seat And Diaphragm

PURPOSE: The BEECO FRP is designed to eliminate contamination from cross connections in a potable water system. A cross connection is any physical connection between two separate systems, one of which contains drinking water and the other polluted or contaminated fluids, chemicals or sewage. Contaminated water may flow through cross connections and between connected systems as the direction of flow can reverse depending on the pressure differential of each system. The BEECO Friendly Reduced Pressure Zone Device is designed to protect against backpressure and back-siphonage and is designed for maximum protection in high hazard applications.

SIZING AND INSTALLATION GUIDE:

The Beeco Reduced Pressure Zone Device is made to fit all standard pipe sizes from a 1/2" supply line up to a 10" main supply line. These valves can be installed in either indoor or outdoor applications but need to be protected against freezing in cold weather climates. All backflow devices must be installed by a licensed plumbing professional and must be installed according to your local and state plumbing codes.

HOW IT WORKS:

A method to provide maximum protection to you drinking water is the BEECO Friendly Reduced Pressure Backflow Device. It protects your potable water supply without the need to re-establish pressure by means of pumps or towers, and it comes with both two internal checks and a relief valve that will dump all fluids. The checks are spring loaded with the first check being stronger than the second check allowing the relief valve to dump contaminated fluid. Should a backpressure or back-siphonage occur in the system and start the flow of water in a reverse direction and the second check fails for any reason the relief valve will open while the first check continues to protect your water supply.

FEATURES AND BENEFITS:

The new modern redesigned BEECO Reduced Pressure Zone Device was designed with input from hundreds of plumbers and many backflow specialists were involved. It was designed with ease of access and a dramatic reduction in the number of spare parts needed. The light weight, short lay length modular design makes this valve the easiest and quickest valve to perform your mandatory yearly recertification on.

FRP

Friendly Reduced Pressure Zone Backflow 1/2” To 2”

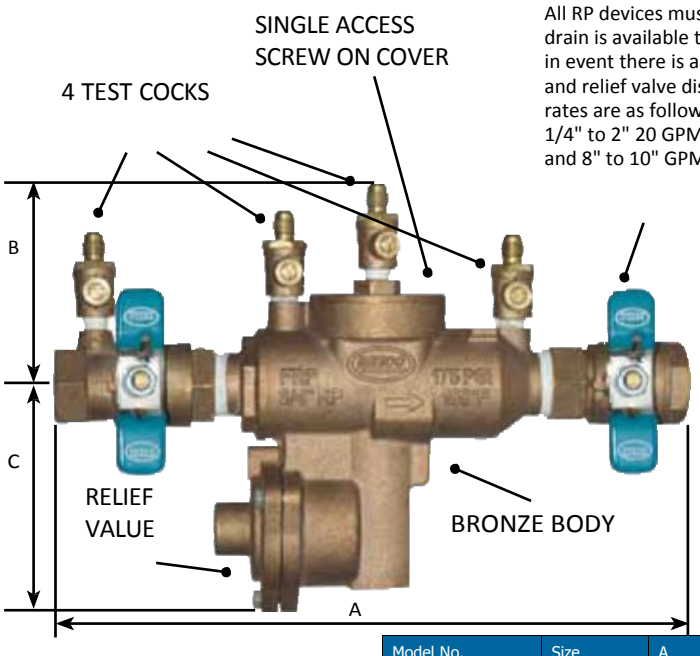
Specification: The BEECO Friendly Reduced Pressure Zone Backflow Preventer is designed to stop the reverse flow of a liquid into a potable water system. The proper installation of a backflow preventer must be done by a certified expert under local codes and guidelines to assure the protection of the drinking water system. The Valve shall be certified to ASSE 1013, CSA B64.4 and IAPMO listed.

Function: The assembly shall consist of two repairable positive seating check modules with captured springs and rubber seat discs. Service of all internal check components shall be through a single screwed in cover and designed for ease of access. The valve shall be equipped with a serviceable and replaceable relief valve with easy access repair and replacement while in line.

Features: The checks are designed with a unique thumb screw holding in the disc to allow for easy removal of the check with a simple pair of pliers dramatically reducing part breakage during repair. The single threaded cover makes for the quickest access inside the valve in the industry. Repair parts are so modular it only takes two relief valve kits and three check repair kits to cover all sizes 1/2" through 2.

Ratings: Maximum Working Pressure 175 psi, Hydrostatic Test Pressure 350 psi ,Temperature Range 33° F-180° F. Tested and approved to ASSE 1013 and CSA B64.4, and is IAPMO listed.

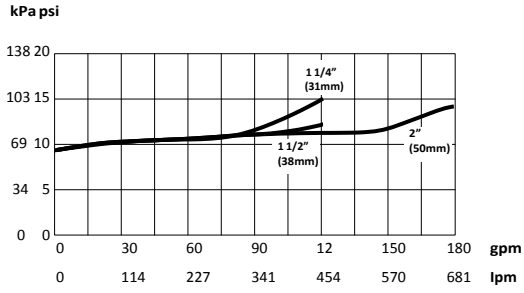
Complies with AWWA-C511



2 SHUT OFF VALVES

All RP devices must be installed where a drain is available to cover the discharge in event there is a backflow condition and relief valve discharges. Discharge rates are as follows: 1/2" to 1"5 GPM,1 1/4" to 2" 20 GPM, 2 1/2" to 6" 20 GPM, and 8" to 10" GPM.

Head Less



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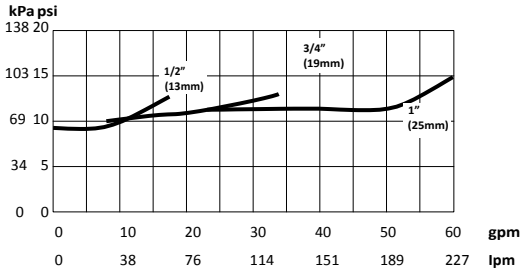


Model No.	Size	A	B	C	D	E	Weight
o FRP.0.50-QT/LF*	1/2”(13)	10 1/2”(260)	3 3/8”(86)	4”(102)	2”(51)	1 1/4”(32)	5.5 (2.5)
o FRP.0.75-QT/LF*	3/4”(19)	11 1/8”(280)	3 3/8”(86)	4”(102)	2 1/2”(64)	1 1/4”(32)	6(2.7)
o FRP.1.00-QT/LF*	1”(25)	12 3/4”(320)	3 1/2”(89)	4 1/8”(105)	2 1/2”(64)	1 1/2”(38)	9(4.1)
o FRP.1.25-QT/LF*	1 1/4”(32)	16 1/4”(610)	4 3/8”(111)	6 5/8”(168)	2 3/4”(70)	1 3/4”(44)	13(5.9)
o FRP.1.50-QT/LF*	1 1/2”(38)	16 3/4”(625)	4 3/8”(111)	6 5/8”(168)	3 3/8”(86)	1 3/4”(44)	17(7.7)
o FRP.2.00-QT/LF*	2”(51)	17 1/2”(445)	4 7/8”(124)	6 5/8”(168)	3 5/8”(86)	2 1/4”(57)	26(11.8)

* QT: Quarter Turn Ball Valve - LF: No Gate Valves

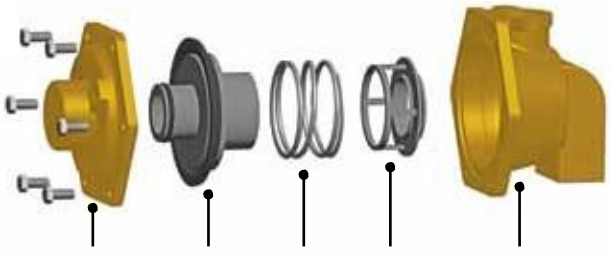
FRP

$2^{1/2}$" Thru 10" Reduced Pressure Zone Backflow Assemblies

Specification: The BEECO Friendly Reduced Pressure Zone Backflow Preventer Valve is designed to stop the reverse of flow of a liquid into a potable water system . The proper installation of a backflow preventer must be done by a certified expert under local codes and guidelines to assure the protection of the drinking water system. The Valve shall be certified to ASSE 1013. Is Certified to cUPC and IAPMO listed.

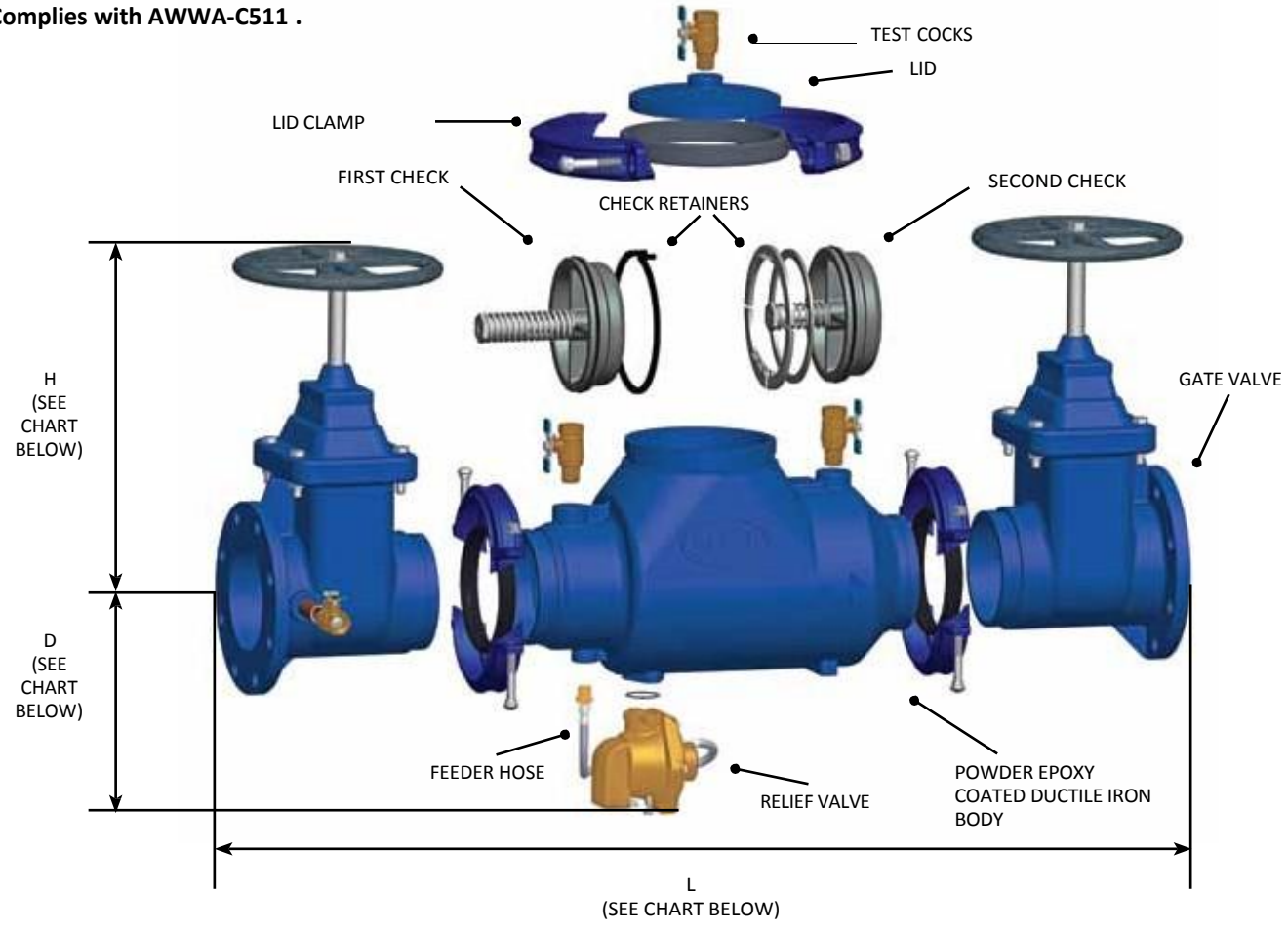
Function: The assembly shall consist of two repairable positive seating check modules with captured springs and rubber seat discs . Service of all internal components shall be through a single easily removable cover and designed for ease of access. The valve shall have a relief valve to atmosphere.

Features: Single access cover for fast service, Swing away clamp for ease of removing checks, Modular design reducing number of spare parts, Self contained check so there is no pressure to relieve when changing the seats. The relief valve like the checks are easily repairable in line and is positioned for maximum protection in the vertical up position.



Ratings: Maximum working water pressure 175 PSI, Maximum working temperature 140° F, Hydrostatic test pressure 350 PSI, Flanged end connection meet ANSI B16.1 and all grooved dimensions comply with AWWA C606.

Complies with AWWA-C511 .



Model No.	Size	L	H.OSY Open	H. NRS	D
o FRP 2.50-NRS/LF*	2 1/2"	33.5	18.88	16.38	9.75
o FRP 3.00-NRS/LF*	3"	34.5	21.88	18.88	9.75
o FRP 4.00-NRS/LF*	4"	40.8	25.63	21.63	9.75
o FRP 6.00-NRS/LF*	6"	43.8	35.13	29.13	11.25
o FRP 8.00-NRS/LF*	8"	56.5	44.63	36.63	15.75
o FRP 10.00-NRS/LF*	10"	59.5	54.50	44.50	15.75

*

NRS: Non Rising Stem Gate Valve - LF: No Gate Valves

All RP devices must be installed where a drain is available to cover the discharge in event there is a backflow condition and the relief valve discharges Discharge rates are as follow: 1/2" to 1" 5 GPM, 1 1/4" to2" 20 GPM, $2^{1/2}$" to 6" 20 GPM and 8" to 10" 60 GPM.

ALTAY
PLUMBING

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