# Model 350, 350A (R), 350DA & 350ADA (R)

Double Check Valve Assembly (2-1/2", 3", 4" & 6")

# Model 450

Double Check Valve Assembly (2-1/2" & 3")

**LEAD-FREE***

(Patent No. 8,997,772)

*This product contains a weighted average lead content less than 0.25% for wetted surfaces.

## ❑ Installation ❑ Testing ❑ Maintenance Instructions

### INSTALLATION INSTRUCTIONS

**CAUTION:** Installation of Backflow Preventers must be performed by qualified, licensed personnel. The installer should be sure the proper device has been selected for the particular installation. Faulty installation could result in an improperly functioning device.

ZURN WILKINS Model 350/450 Series Assemblies are for use on potable water lines where a health hazard does not exist in the event of a backflow situation.

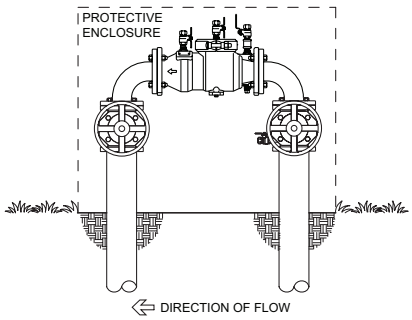
Damage to the device could result wherever water hammer and/or water thermal expansion could create excessive line pressure. Where this could occur, shock arrestors, check valves and/or pressure relief valves should be installed downstream of the device.

If installation is in a pit or vault, the Backflow Preventer must never be submerged in water because this could cause a cross-connection. Make sure that the pit or vault always remains dry by providing ample drainage.

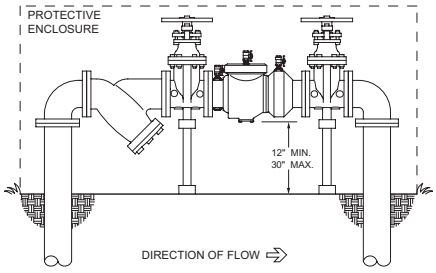
1. Before installing a Model 350/450 Series Backflow Preventer, flush the line thoroughly to remove all debris, chips and other foreign matter. If required, a strainer should be placed upstream of the Backflow Preventer. **CAUTION:** Do not use a strainer in seldom used emergency waterlines such as fire lines.
2. Provide adequate space around the installed unit so that the test cocks will be accessible for testing and servicing.
3. Install valve at least 12 inches above surrounding flood level.
4. Always consult local codes for installation methods, approvals and guidance.

### PLACING THE DEVICE IN SERVICE

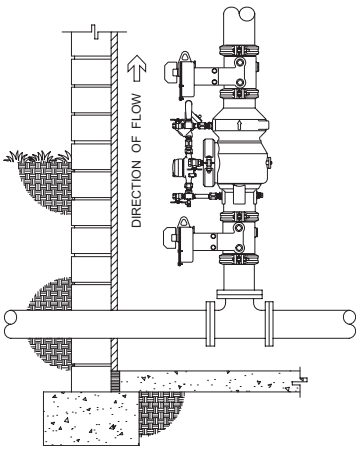
1. Start with both shut-off valves closed. Slowly open the inlet shut-off valve until the backflow preventer is completely pressurized.
2. When the unit has been pressurized, vent any trapped air by slightly opening each of the four test cocks.
3. Slowly open the downstream shut-off valve. The Model 350/450 Series Assembly is now in service.
4. After the Model 350/450 Series has been properly installed, test the device (see “TEST PROCEDURES”). If the device fails the test, remove the first and second check valves and thoroughly flush the device. Clean rubber and seats of all debris and place unit back in service.




**OUTDOOR INSTALLATION**
**Model 450 (2 1/2” & 3”)**




**OUTDOOR INSTALLATION**
**Model 350**




**INDOOR INSTALLATION**
**Model 350ADABGVIC**

### OUTDOOR INSTALLATION

The Model 350/450 Series Backflow Preventer may be installed outdoors only if the device is protected against freezing conditions. Exposure to freezing conditions will result in improper function or damage to the device. The installation location must be kept above 32°F. All the basic installation instructions apply.

### INDOOR INSTALLATION

Indoor installation is preferred in areas that are subject to freezing conditions. All the basic installation instructions apply to such installations.

### VERTICAL INSTALLATION

Vertical installation is acceptable in applications where inlet and outlet piping are flowing vertically upwards. All the basic installation instructions apply to such installations. Consult factory for approval status.

⚠ **WARNING:** Cancer and Reproductive Harm - www.P65Warnings.ca.gov
⚠ **ADVERTENCIA:** Cáncer y daño reproductivo - www.P65Warnings.ca.gov
⚠ **AVERTISSEMENT:** Cancer et néfastes sur la reproduction - www.P65Warnings.ca.gov

# Testing Procedures

## MODEL 350/450 SERIES ASSEMBLY

*Equipment Required: Differential pressure gauge test kit.*

**TEST NO. 1 - TIGHTNESS OF #1 CHECK VALVE**

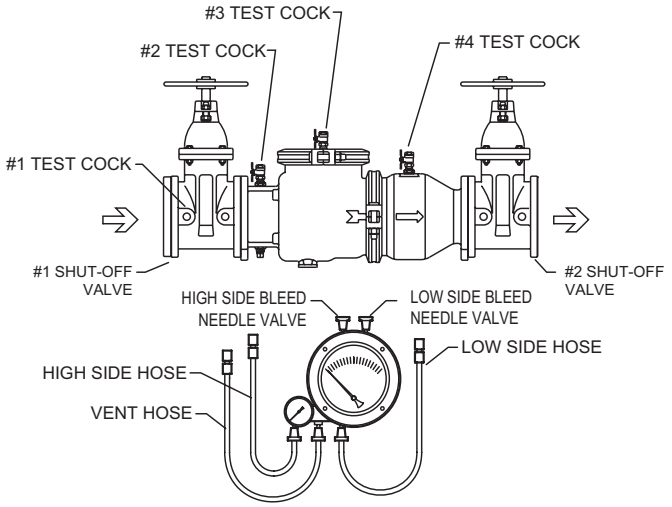
REQUIREMENT:

The static pressure drop across check valve #1 shall be at least 1.0 psid. If test cock #3 is not at the highest point of the check valve body, then a vertical tube must be installed on test cock #3 so that it rises to the top of the check valve body.

PROCEDURE:

1. Slowly open all 4 test cocks to remove any foreign material and attach fittings.
2. Attach hose from the high side of the test kit to the #2 test cock.
3. Open test cock #2 and bleed all air from the hose and gauge by opening the high side bleed needle valve. Close high side bleed needle valve. If a tube is attached to test cock #3, open test cock #3 to fill the tube. Close test cock #3. Close #2 shut-off valve then close the #1 shut-off valve.
4. Hold gauge at same level as test cock #3 or water level in tube. Slowly open test cock #3. Record the static pressure drop across check valve #1 after gauge reading stabilizes and water stops running out of test cock #3.
5. Close all test cocks, open shut-off valve #1 and remove test equipment.

Note: If you are using the duplex gauge method to test the valve, you may see both needles drop simultaneously during test due to disc compression. The high side needle should eventually hold 2 psi below low side needle if check in not fouled.




| Capacity thru Schedule 40 Pipe (GPM) | | | | |
|---|---|---|---|---|
| Pipe size | 5 ft/sec | 7.5 ft/sec | 10 ft/sec | 15 ft/sec |
| 2-1/2" | 75 | 112 | 149 | 224 |
| 3" | 115 | 173 | 230 | 346 |
| 4" | 198 | 298 | 397 | 595 |
| 6" | 450 | 675 | 900 | 1351 |
| 8" | 780 | 1169 | 1559 | 2339 |
| 10" | 1129 | 1843 | 2458 | 3687 |

**TEST NO. 2 - TIGHTNESS OF #2 CHECK VALVE**

REQUIREMENT:

The static pressure drop across check valve #2 shall be at least 1.0 psid. If test cock #4 is not at the highest point of the check valve body, then a vertical tube must be installed on test cock #4 so that it rises to the top of the check valve body.

PROCEDURE:

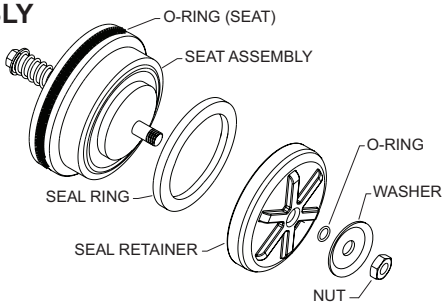
1. Attach hose from the high side of the test kit to the #3 test cock.
2. Open test cock #3 and bleed all air from the hose and gauge by opening the high side bleed needle valve. Close high side bleed needle valve. If a tube is attached to test cock #4, open test cock #4 to fill the tube. Close test cock #4. Close #1 shut-off valve.
3. Hold gauge at same level as test cock #4 or water level in tube. Slowly open test cock #4. Record the static pressure drop across check valve #2 after gauge reading stabilizes and water stops running out of test cock #4.
4. Close all test cocks, slowly open shut-off valve #1 & #2 and remove test equipment.

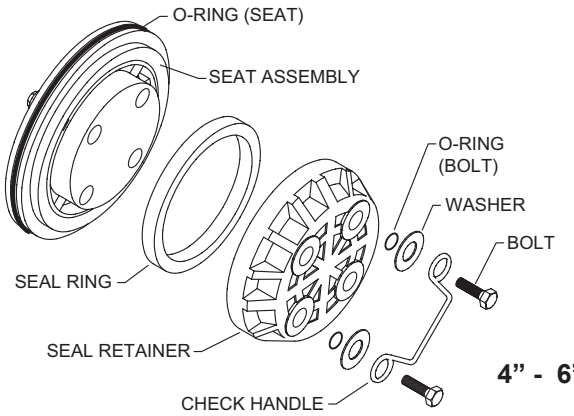
**SPECIFICATIONS**

| | |
|---|---|
| Maximum working water pressure: | 175 PSI |
| Maximum working water temperature: | 140°F |
| Hydrostatic test pressure: | 350 PSI |
| End connections: | Flanged ANSI B16.1 Class 125<br>Grooved AWWA C606 |

**CHECK ASSEMBLY**

**(2-1/2" - 3")**




**4" - 6"**

# Repair Kits

| SIZE | MODEL 350 RUBBER ONLY | MODEL 350DA RUBBER ONLY (includes by-pass parts) |
|---|---|---|
| 2-1/2" - 3" | RK212-350 | RK212-350DA |
| 4" | RK4-350 | RK4-350DA |
| 6" | RK6-350 | RK6-350DA |


**ZURN WILKINS**
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**www.zurn.com**

# Maintenance Instructions

All Model 350/450 Series Backflow Preventers must be inspected and maintained by licensed personnel at least once a year or more frequently as specified by local codes. Replacement of worn or damaged parts must only be made with genuine "ZURN WILKINS" parts.

**GENERAL MAINTENANCE**

1. Clean all parts thoroughly with water after disassembly.
2. Carefully inspect rubber seal rings and o-rings for damage.
3. Test unit after reassembly for proper operation (refer to "TESTING PROCEDURES").

NOTE: If any portion of the seat assembly is damaged or missing or if the seating surface is damaged in any way, do not attempt to field repair it. Contact your local ZURN WILKINS representative for assistance.

**SERVICING CHECK VALVES**

1. Close the outlet and then the inlet shut-off valves.
2. Open No. 2, 3 and 4 test cocks to release internal pressure. Leave them open during check removal and reinstallation.
3. Loosen and remove the two nuts, bolts and gasket from the grooved coupling around the access cover.
4. If the valve has a wire retainer on the #1 check assembly, pinch together the exposed ends, pull toward the #2 check and remove from valve.
5. If the valve has a plastic retainer on the #1 check, grasp one of the exposed ends, push down and then pull toward the #2 check. The retainer should "spiral" out of the groove around the check.
6. (2-1/2 – 3" Models) Remove the #2 retainer and check in the same manner as the #1.
7. (4 – 6" Models) Remove the #2 check by locating one of the two spring-loaded plate retainers around the face of the check. Pinch the sides of the spring together and rotate the plates out of the body groove one at a time. Remove the 2nd retainer the same way.
8. **Always service the checks one at a time to avoid mixing parts.** Start by removing the hardware and o-rings from the back of the check assembly (See "Check Assembly" illustration). Separate the seal retainer from the assembly to expose the seal ring.
9. Inspect the seal ring for cuts or embedded debris. If the reverse side of the seal is unused, the seal ring can be inverted and used temporarily until a new seal is obtained. (2 1/2" & 3" Models) Tighten check assembly nut between 20-25 ft/lbs of torque. Inspect seat o-ring and replace if cut or damaged in any way.
10. Inspect valve cavity and seating areas. Flush with water to remove any debris.
11. (Reassembly, 2-1/2 – 3" Models) Lubricate the #2 check o-ring, install in the body and close the #4 test cock to hold it in place. Install the plastic retainer by inserting one end into the body groove and then sliding your hand around the face of the retainer, pushing it into the groove as you go. The retainer will "snap" into place when fully seated. Install #1 check and retainer in the same way.
12. (Reassembly, 4 – 6" Models) Lubricate the #2 check o-ring, install in the body and close the #4 test cock. Install the #2 check retainers into the body groove one plate at a time, squeezing the spring ends together to clear the stops on the face of the seat. Lubricate and install the #1 check, close the #2 test cock and install:
    (A) wire retainer by pinching the ends together, placing the lower edge of the ring into the body groove below the check and rotating the top of the ring into the notch above the check.
    (B) plastic retainer as described above in the 2-1/2 – 3" Models Reassembly section.
13. Lubricate the outside surface of the grooved coupling gasket. Reassemble access cover and grooved coupling, making sure the ends of the coupling touch each other. Close any remaining open test cocks and place valve back in service.

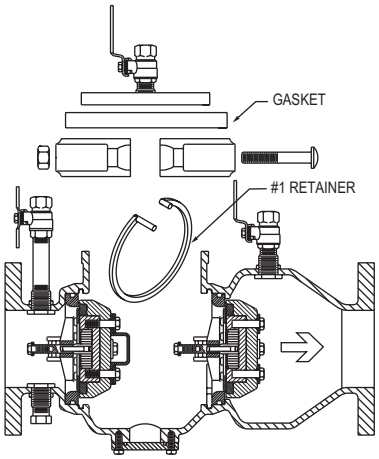



FIGURE 1

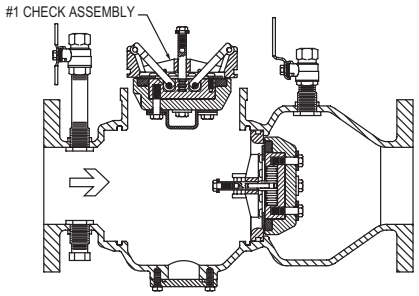



FIGURE 2

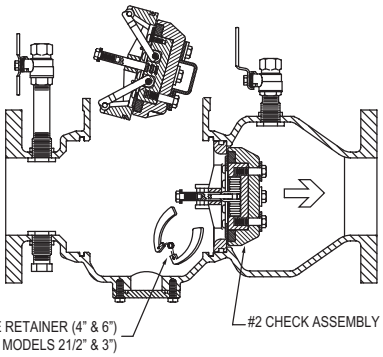



FIGURE 3

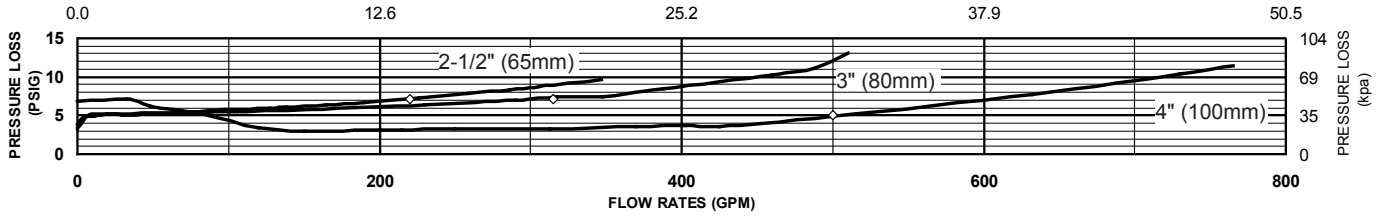
# Troubleshooting

| PROBLEM | POSSIBLE CAUSES | CORRECTIVE ACTION |
|---|---|---|
| 1. LEAKING CHECK VALVES | 1. Debris on seat or seal ring | 1. Clean seat area |
| | 2. Damaged seat area | 2. Replace check assembly |
| | 3. Damaged seat o-ring | 2. Replace seat o-ring |
| | 4. Damaged bolt o-ring (s) on check retainer | 4. Replace o-ring (s) |
| 2. LOW OR NO FLOW | 1. Device installed backwards | 1. Verify flow direction arrow |
| | 2. Gate valves not fully open | 2. Turn handles counterclockwise |
| | 3. Low supply pressure | 3. Attach pressure gauge to test cock #1 and verify pressure |

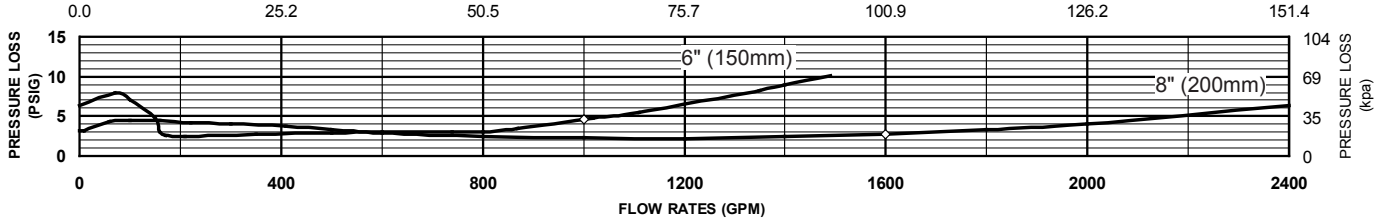
# Performance Characteristics

See spec sheet BF-450-212&3 for flow curves

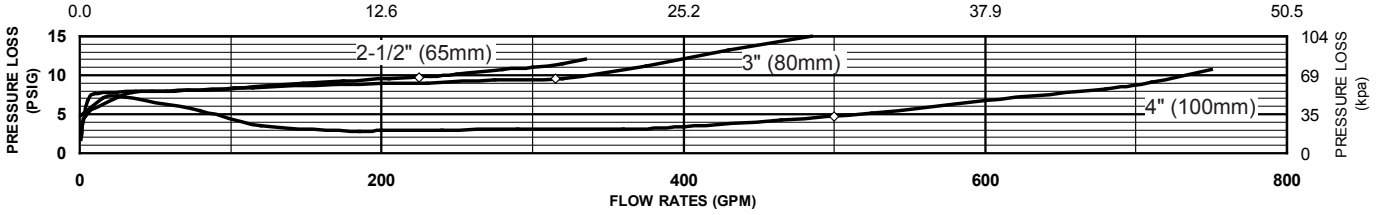
**MODEL 350 2 1/2", 3" & 4" (STANDARD & METRIC)**



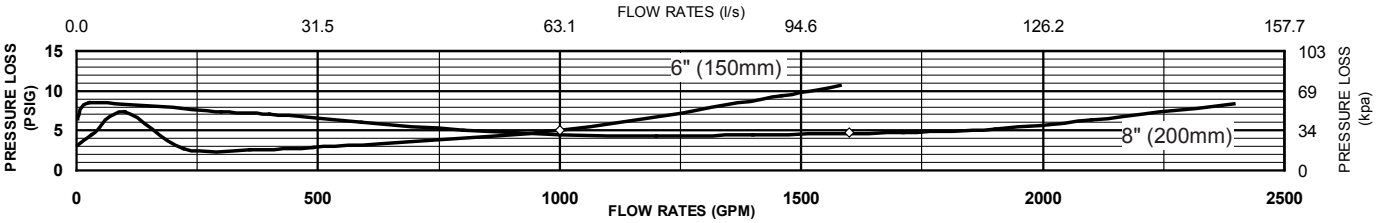

**MODEL 350 6" & 8" (STANDARD & METRIC)**



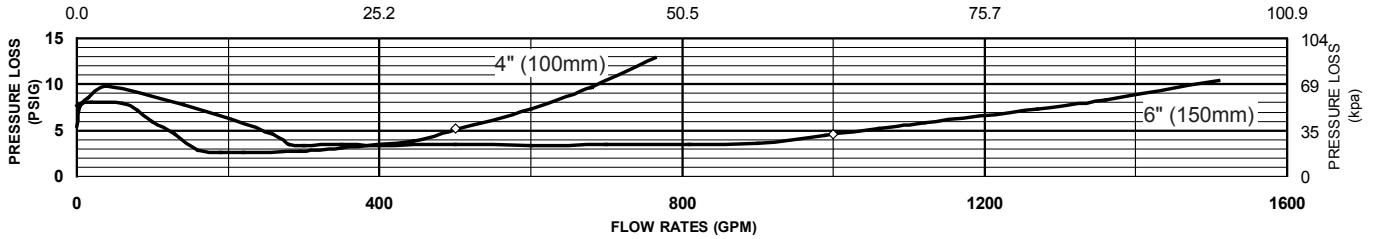

**MODEL 350DA 2 1/2", 3" & 4" (STANDARD & METRIC)**



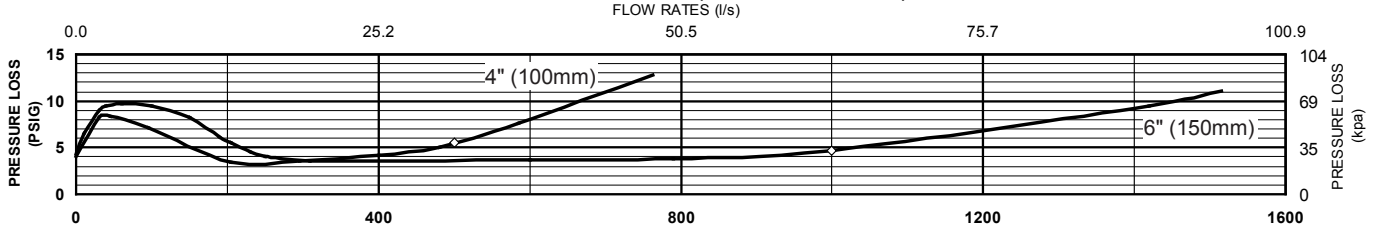

**MODEL 350DA 6" & 8" (STANDARD & METRIC)**




**MODEL 350A 4" & 6" (STANDARD & METRIC)**




**MODEL 350ADA 4" & 6" (STANDARD & METRIC)**




◇ Rated Flow (established by approval agencies)

Proper performance is dependent upon licensed, qualified personnel performing regular, periodic testing according to ZURN WILKINS' specifications and prevailing governmental & industry standards and codes and upon following these installation instructions. Failure to do so releases ZURN WILKINS of any liability that it might otherwise have with respect to that device. Such failure could also result in an improperly functioning device.

# GENERAL TERMS AND CONDITIONS

## PRICE AND TERMS OF PAYMENT

Terms are net, payable 30 days from date of invoice. All pricing in U.S. currency. The Buyer shall pay all sales, consumers, or other applicable taxes. A 1-1/2% monthly (18% annual) service charge will be added to the outstanding balance of all past due invoices.

Minimum invoice $250.00. Zurn Industries, LLC ("Zurn") reserves the right to apply a minimum order charge in order to meet the $250.00 minimum invoice requirement. All orders are subject to credit approval by the Zurn Credit Department prior to the acceptance of an order. Orders may be refused, delivery may be withheld, or shipment stopped in transit without any liability on Zurn's part at Zurn's sole discretion based upon Buyer's credit worthiness as determined by Zurn.

## FREIGHT

All sales are F.O.B. seller's location. Zurn will allow full freight allowance when any of the following conditions are met: 1) Plumbing fixture only orders totaling $10,000 or more; 2) Zurn One System orders of $7,500 or more; 3) Any combination of Specification Drainage, Commercial Drainage, Finish Plumbing, Zurn Wilkins, Linear Drainage and Chemical Drainage orders of $5,000 or more; 4) Commercial Drainage only orders totaling $3,500 or more; or 5) PEX only orders totaling $3,000 or more. This full freight allowance applies when the shipment is within the continental United States and has a single destination of a Buyer's standard address or job location. Routing of shipment shall be determined at the sole direction of Zurn. Shipping dates are estimates and time of delivery shall not be of the essence of this sale contract. Under no circumstances will the Seller have any responsibility on account of any delays in manufacture, transportation, or otherwise. Terms of Export Shipment on application.

**NOTE:** Shipments in excess of 90" long or 3,000 lbs may be subject to additional charges, and shall be defined as an oversized and/or overweight product and Zurn's standard FFA terms may not apply. Please contact our Customer Service Department for guidance on potential additional shipping charges. This new policy supersedes any existing agreements.

These charges and restrictions apply in addition to Zurn standard terms and conditions for sale unless otherwise agreed upon by the parties.

## LIMITED WARRANTY

Zurn goods sold hereunder are warranted to be free from defects in material and factory workmanship for the period of time from the date of purchase: AquaVantage® Flush Valves, AquaFlush® Flush Valves, Commercial Fixtures, Faucets, Showers, and Tubular Brass: three years; Chemical Drainage, Linear Drainage, Commercial Drainage, Specification Drainage, Zurn Wilkins, and Flush Valve, Faucets, and Tubular Brass decorative finishes: one year; PHIX® Cartridge: ten years; FOG-ceptor®: Lifetime. Where permitted by law, **THE IMPLIED WARRANTY OF MERCHANTABILITY IS LIMITED TO THE ABOVE IDENTIFIED PERIOD OF TIME AND SHALL BE LIMITED SOLELY TO THE REPLACEMENT OF THE DEFECTIVE GOODS.** A damaged/broken test cock or ball valve is not considered defective. Please contact Zurn Customer Care for assistance.

Zurn will replace goods at no cost that prove defective provided Zurn is notified in writing of such defect and the goods are returned prepaid at the specified Zurn location with evidence that they have been properly maintained and used in accordance with instructions. **ZURN SHALL NOT BE RESPONSIBLE FOR ANY LABOR CHARGES OR ANY LOSS, INJURY, OR DAMAGES WHATSOEVER, INCLUDING, BUT NOT LIMITED TO, INCIDENTAL OR CONSEQUENTIAL DAMAGES.** The sole and exclusive remedy shall be limited to the replacement of the defective goods. Before installation and use, the purchaser shall determine the suitability of the product for his intended use and the purchaser assumes all risk and liability whatever in the connection therewith. All weights stated in Zurn catalogs and lists are approximate and are not guaranteed.

## RETURNED GOODS

Standard cataloged material may be returned only with written permission of Zurn. Returned goods are subject to a 25% restocking charge of total saleable material returned, plus cost of reconditioning, if necessary, to make material sellable. Transportation charges are the responsibility of the Buyer. Credit allowance will be in the form of merchandise credit only – not cash credit. The value of the return must total at least $100.00 to qualify for credit allowance. No credit will be allowed for parts unless originally ordered and invoiced as parts. No credit will be allowed for discontinued or made-toorder items. Items that have been specially made are not subject to return or cancellation except by special negotiation. Material must be returned within one year of invoice date for credit to be issued for Chemical Drainage, Linear Drainage, and Commercial Drainage. Material must be returned within two years of invoice date for credit to be issued for Commercial Fixtures, Flush Valve Products, Specification Drainage, Tubular Brass, and Zurn Wilkins. No credit is allowed for Linear Drainage products that have been cut and Specification Drainage product with auxiliary tappings. Flush Valve material over two years old will be subject to a 50% handling charge. Flush Valve material over five years old will not be accepted. Commercial Drainage and Specification Drainage galvanized material will be credited at value of Dura-Coated cast iron, and chrome plated at value of bronze. Zurn Wilkins damaged/broken test cocks or ball valves are not considered defective.

## ILLUSTRATIONS OF TYPICAL INSTALLATIONS

The typical installations for various products found in each product section are intended to illustrate the products and potential options for the use of these products. Under no circumstances are they to be construed as recommended installation procedures. Consult local codes and project specifications for proper installation instructions.

## SHORTAGE/DAMAGE CLAIMS

Notification of material shortages or incorrect filling of orders must be made to Zurn within 10 days of receipt. No claims over three months old will be honored. Buyer agrees to make all complaints for damage in transit or "short count" directly to the carrier; before the contents are unloaded have the carrier agent's acknowledgment of such damage noted on the bill of lading and to present to the carrier its agent's acknowledgment of such damaged material with formal claim covering said damage.

## GENERAL

Zurn reserves the right to make changes in design or equipment of any item or product without incurring any obligation on previously sold items, and to discontinue items at any time, without notice. Possession of this Catalog or other sales literature is not to be construed as an offer to sell. All orders are subject to acceptance by Zurn. Catalog printed in U.S.A.

Zurn flush valves are designed to comply with Army Corp of Engineers and Naval guide specifications, Military Specification MIL.V.29193 and Federal Specification WWP541.

Zurn flush valves comply with the following standards: ASME A112.18.1/CSA B125.1, A112.19.5, A112.19.2, A112.19.6, ASSE 1037 and 101 are listed by the following agencies: Canadian Standards, IAPMO/UPC/CUPC, and CSA 125.3. Zurn flush valves are manufactured from dezincification resistant alloys. For additional compliances, contact Zurn Industries, LLC, Finish Plumbing Operation, or 1-800-997-3876.

Zurn is not responsible for typographical errors. The contents of this guide are subject to revision without notice.

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