



NOTE:

This waiver submission may include references to proprietary items and brand name products. These references have been retained to provide context for the waiver submission. EPA does not evaluate a waiver based on a proprietary item but reviews the performance-based specifications for the project/products. As such, any references to brand or proprietary items are reviewed on an "or equal" basis by EPA.

April 4, 2024

Items and pages may have been intentionally redacted or excluded by the EPA. Contact WIFIAWaiver@epa.gov for more information if necessary.

Ms. Dan-Tam Nguyen
United States Environmental Protection Agency
William Jefferson Clinton East Building
1201 Constitution Ave. NW, Room 7334E
Washington, D.C. 20004

Subject: Request for Waiver of AIS provisions for Flanged Backflow Preventer for T.E. Maxson WWTP Biosolids Lagoon 2A Renovation

Dear Ms. Nguyen,


CDM Constructors Inc. is requesting a product specific project waiver for:

4" Flanged Backflow Preventer

Please find attached a form along with documentation supporting the request. The documentation from the material supplier provides a consistent explanation for the lack of product availability. Such low product availability will have a substantial impact on the project completion. Currently, CCI has no knowledge of any domestic manufacturers/suppliers who have this product. Attached is a copy of the specifications for the backflow preventer and the initial model chosen. In accordance with CFR 40, Chapter 1, Subchapter B, Part 35, Subpart Q § 35.10030.c, we hereby request a waiver of the AIS Buy American requirement of the WIFIA provisions (SECTION 14.i.i) to facilitated and expedite the project schedule.

CDM Constructors Inc. is aware of other waiver requests granted within the last four years concerning backflow preventers for product availability challenges (i.e., 2-Inch Backflow Preventers for Fairbury, Nebraska, Backflow Preventers for East County Advanced Water Purification Joint Power Authority in Santee, California). Therefore, we request a waiver be provided for this product to avoid further delays.

Sincerely,


Thomas E. Dunn
DN: CN=US,
E=tdunn@cdmsmith.com,
CN=Thomas E. Dunn *
Date: 2024.04.04
14:41:56-05'00'

Tommy Dunn
Project Manager IV
CDM Constructors Inc



List of Attached Documents:

- AIS Waiver Form
- Email from Zurn
- Email from Watts
- Call List
- Construction Specifications
- Model Information



AIS/BABA Waiver Request Form Instructions

WIFIA borrowers seeking a waiver to American Iron and Steel (AIS) or the Build America Buy America (BABA) requirements should complete and submit this form and provide requested attachments to the WIFIA Program. Waivers should only be sought when all avenues of procuring AIS-compliant or BABA-compliant products have been exhausted. In many cases, a borrower may find that an availability waiver is not needed.

WIFIA borrowers must comply with either the AIS or BABA requirements. Under the AIS requirements, borrowers must install iron and steel products that are produced in the U.S. for the project. Under the BABA requirements, borrowers must install iron and steel products, manufactured products and construction materials that are produced in the U.S. for the project. The WIFIA statute allows the EPA to grant project waivers in specific circumstances: (1) if the requirement is inconsistent with the public interest; (2) if the products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or (3) if the products will increase the cost of the project by 25% or more.

Borrowers may submit a request for a public interest, product availability or cost waiver from either the AIS or BABA requirements. Borrowers should answer all the questions in this form and submit all required attachments pertaining to the type of waiver request they are submitting (i.e. public interest, product availability, or cost). The borrower's authorized representative must sign the form. Borrowers do not need to submit this waiver request form for approved program waivers, national waivers or EPA agency-wide waivers. This waiver request form applies to project-specific waiver requests only.

When finished, this waiver request form and attachments may be submitted by emailing the form to WIFIA_portfolio@epa.gov with the subject line "[NAME OF BORROWER/PROSPECTIVE BORROWER] – [NAME OF PROJECT] – AIS/BABA Waiver Request Form". Upon receipt of the form, the WIFIA program will provide a confirmation email to the contacts listed in the form.

More information about the AIS and BABA requirements are available in the Borrower Guide to Federal Requirements.

Burden

The public reporting and recordkeeping burden for this collection of information is estimated to average 15 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, included through the use of automated collection techniques to the Director, Regulatory Support Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.



Warning

Falsification or misrepresentation of information or failure to file or report information required to be reported may be the basis for denial of financial assistance by EPA. Knowing and willful falsification of information required to be submitted and false statements to a Federal Agency may also subject you to criminal prosecution. See, for example, 18 U.S.C. §1001.

Additional information about the WIFIA program and the letter of interest form is available at <https://epa.gov/wifia> and by contacting wifia@epa.gov.



AIS/BABA Waiver Request Form

Provide the following information in this form or as an attachment.

Borrower and Project Information

1. Legal name of borrower or prospective borrower and WIFIA Loan ID (if available):

City of Memphis

2. WIFIA Project name:

T.E. Maxson WWTF Biosolids Lagoon 2A Renovation – Package 2

3. Waiver Request Contact List. Provide the names and email addresses of all person(s) who should be contacted in regards to this waiver request:

Yaribell Hernandez - hernandezy@cdmsmith.com; Tommy Dunn dunnte@cdmsmith.com; Gary Vaden gary.vaden@memphistn.gov; Jessica Shappley shappleyje@cdmsmith.com

Waiver Request Information

1. Under which domestic preference requirements is the waiver being requested? **Please select only one.** If applying for a waiver under BABA, there is no need to apply for a separate waiver under AIS.

AIS

BABA

2. Type of waiver being requested:

Product Availability

Public Interest

Cost

3. Provide a brief explanation of the need for a waiver:

AIS compliant backflow preventers are not commercially available. CDM Constructors Inc (CCI) researched and other companies stated the same information. Non-AIS compliant backflow



preventers readily available. Therefore, we are requesting a waiver due to availability of the backflow preventer. Please see attached correspondence from vendor and their supplier.

4. For **product availability** waiver requests, complete the following table to provide information about the product(s) for which the waiver is being requested. **For each product listed, attach a copy of the relevant technical specifications of the product to this form.**

Product Name	Brief description (include material type and size)	Unit Cost of non-domestic product	Unit Cost of domestic product *	Quantity Needed	Date product is needed
Backflow Preventer Model 375AST	4" Backflow Preventer 304L Stainless Steel	REDACTED	Lack of product availability	1	04/15/24

*Complete this column only if domestic products are available.

5. For **product availability** waiver requests, describe the efforts made to source products compliant with AIS or BABA. The narrative may include a list of manufacturers or suppliers contacted and responses received. Include any email correspondence with manufacturers or suppliers as an attachment to this form.

Please see attached correspondence about the lack of availability of 4" flanged backflow preventer.

6. For **public interest** waiver requests, please provide a brief explanation why compliance with AIS or BABA is not in the public's interest. Public interest waivers may be requested for the entire project or for specific products. If the waiver is being requested for specific products, please include a list of the products in the narrative.



7. For **cost** waiver requests, identify the total project cost without AIS or BABA requirements and demonstrate that the total project cost increases by more than 25 percent with the requirements. Include supporting costs documentation, such as itemized cost estimates comparing projects costs with either AIS or BABA requirements versus without the requirements, as an attachment to this form.
-

8. **For all waiver requests**, identify the total estimated material cost of the project:

The total contract value of the project is \$ **REDACTED** (this includes all work to be performed under the contract)

Signature: The undersigned is an authorized representative of the (prospective) borrower. By signing below the undersigned is certifying that the borrower or prospective borrower made a good faith effort to solicit bids for domestic products supported by terms included in requests for proposals, contracts, and nonproprietary communications with the prime contractor.

Signature: *Thomas E Dunn*

Date Signed: 04/4/2024

Name: Tommy Dunn
Title: Project Manager IV
Organization: CDM Constructors Inc.
Phone: 225-937-0477
E-mail: dunnte@cdmsmith.com

Shappley, Jessica E.

From: James Cruz <James.Cruz@zurn.com> on behalf of Wilkins - SustainingEngineering <Wilkins-SustainingEngineering@Zurn.com>
Sent: Monday, March 25, 2024 4:47 PM
To: Dunn, Thomas E.
Cc: Hernandez, Yaribell; Shappley, Jessica E.; Wise, David P.
Subject: FW: RE: 01315161 - PN:375AST

Categories: Lagoon 2A

Hi Tommy,

You are correct, the 375AST does not meet AIS requirements.

Our backflow preventers are not covered by any waiver under WIFIA. Our understanding is that the customer or contractor is typically responsible for obtaining a waiver from the government agency providing funding (in this case, the EPA) allowing them to use a non-compliant product where compliant alternatives are not available on the market. We, the manufacturer, do not have further visibility on this process.

Please let us know if you have further questions.

Thank you,



James Cruz
Product Compliance Engineer
Zurn Wilkins Water Safety & Water Control
[Zurn Water, LLC - Wilkins](#) | Paso Robles, CA
Office: (805) 536-3054 | **Email:** James.Cruz@Zurn.com



----- Forwarded Message -----

From: Dunn, Thomas E. [dunnte@cdmsmith.com]
Sent: 3/22/2024 1:17 PM
To: wilkinscs@zurn.com
Cc: hernandezy@cdmsmith.com; shappleyje@cdmsmith.com; wisdep@cdmsmith.com
Subject: RE: 01315161 - PN:375AST

Caution External email. Confirm links and attachments before opening.

Jeanie,

Shappley, Jessica E.

From: Sylvain, Mark <Mark.Sylvain@wattswater.com>
Sent: Tuesday, April 2, 2024 3:32 PM
To: Shappley, Jessica E.
Subject: RE: *AIS* compliant 4" flanged backflow preventer assembly

Hi Jessica,

I have reviewed many items for AIS certification and almost nothing qualifies.

The standard is so stringent that almost nothing we make qualifies on it's own. <5% of the total material cost of the item can be made up of foreign steel.

I hope this helps.

[Click Here to Take our Customer Survey!](#)

Mark Sylvain
Technical Support

WATTS®



815 Chestnut Street, North Andover, MA. 01845

T: 978.379.9056

mark.sylvain@wattswater.com

www.Watts.com

Follow Us @WattsWater



This email is confidential. If you are not the intended recipient, please notify the sender and delete this email. This email does not comprise a binding agreement, and our company cannot accept any liability arising from the use of this email or attachments.

**LEARN, EARN
& WIN BIG!**

Make your backyard dreams come true
by entering our anniversary sweepstakes
for a chance at amazing prizes!

[▶ training.watts.com](https://training.watts.com)

From: Shappley, Jessica E. <shappleyje@cdmsmith.com>
Sent: Tuesday, April 2, 2024 4:14 PM
To: Sylvain, Mark <Mark.Sylvain@wattswater.com>
Subject: *AIS* compliant 4" flanged backflow preventer assembly

Document 4- Call List showing CCI's research

Attached is call list accounting for various companies CDM Constructors Inc. reached out to in order to confirm lack of product availability for backflow preventers.

Call List		
*all companies reached out to during research and did not respond		
Name	Phone	Date
Apollo/Conbraco	704-841-6000	4/1/2024
Ames Fire and Waterworks	530-666-2493	4/2/2024
Deringer	800-448-8108	4/1/2024
Honeywell International	800-468-1502	3/29/2024
American Backflow	800-575-9618	3/29/2024
Bavco	310-639-5231	3/29/2024

Document 5- Construction Specifications

- E. Solenoid valves shall be normally closed or normally open when energized as indicated on Contract Drawings. If no indication is provided, Contractor shall consult with Engineer prior to purchase of valves.
- F. Valves shall be suitable for operation on 120 volt, a-c, single phase, 60 Hertz.
- G. Solenoid valves shall be Model WP 8210 (waterproof) and Model 8211 (explosion-proof) as manufactured by Automatic Switch Company; Skinner; or equal, and shall be preceded with a bronze-bodied Monel metal element strainer equal to Automatic Switch Company Bulletin 8600.

2.09 NEEDLE VALVES

- A. Conform to Article 2.01 as applicable.
- B. Needle valves shall be bronzed bodied, sized, and located as shown on Contract Drawings. Needle valves shall be of globe type as manufactured by Powell, Crane, or equal.

2.10 BACKFLOW PREVENTERS

- A. Conform to Article 2.01 as applicable.
- B. Reduced pressure backflow preventers shall be supplied where shown on Contract Drawings.
- C. Backflow preventers shall consist of two spring-loaded check valves and a spring-loaded diaphragm-actuated, differential pressure relief valve located in zone between check valves.
- D. Unit shall include properly located test cocks and operation shall be completely automatic. Total headloss shall not exceed 10 psi at AWWA rated flow.
- E. All parts are to be manufactured from corrosion-resistant materials.
- F. A continuous discharge from relief valve opening shall provide a visual inspection of need of repair.
- G. Submit all test reports to local water supply official and Tennessee Department of Environment and Conservation, as required.
- H. Manufacturers - Units shall be manufacturers and models approved for use by Tennessee Department of Environment and Conservation. Contractor shall provide all units from single manufacturer. Model of units shall be same whenever possible. Multiple models from same manufacturer shall be permitted only with written permission of Engineer and Owner.

2.11 GLOBE VALVES

- A. Conform to Article 2.01 as applicable.
- B. All globe valves shall be of suitable design to provide full pipe opening and to operate with full pressure on either side of seat.
- C. Valves shall be of inside screw type seat with yoke to insure square seating of disc.
- D. Globe valves shall be provided with normal composition disc of a material suitable for use of which valves are put.
- E. Metallic Valves (GLV-M)
 - 1. Shall be equipped with cast iron handwheels and shall be packed ready for use.



Document 6- Model Selected
Model 375AST
 Reduced Pressure Principle Assembly

Application

Designed for installation on potable water lines to protect against both backsiphonage and backpressure of contaminated water into the potable water supply. The Model 375AST provides protection where a potential health hazard exists. Ideal for use where lead-free* valves are required.

Standards Compliance

- ASSE® Listed 1013
- AWWA Compliant C511 (with gates only), and C550
- FM® Approved
- UL® Classified
- C-UL® Classified
- CSA® Certified
- IAPMO® Listed
- Approved by the Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California
- Meets the requirements of NSF/ANSI/CAN 61*
 *(0.25% MAX. WEIGHTED AVERAGE LEAD CONTENT)

Materials

Main Valve Body	304L Stainless steel
Access covers	304L Stainless steel
Coatings	FDA Approved electrostatic epoxy finish
Internals	Stainless steel, 300 Series NORYL™
Fasteners & Springs	Stainless Steel, 300 Series
Seal rings	EPDM (FDA approved)
O-rings	Buna Nitrile (FDA approved)
Sensing line	Stainless Steel, braided hose

Features

Sizes:	2 1/2", 3", 4", 6", 8", 10"
Maximum working water pressure	175 PSI
Maximum working water temperature	140°F
Hydrostatic test pressure	350 PSI
End connections	
(Grooved for steel pipe)	AWWA C606
(Flanged bolt pattern)	ASME B16.42 Class 150

Dimensions & Weights (do not include pkg.)

MODEL 375AST SIZE	WEIGHT														
	WITH-OUT GATES		WITH NRS GATES (GXF)		WITH OS&Y GATES (GXF)		WITH NRS GATES (GXG)		WITH OS&Y GATES (GXG)		WITH BUTTERFLY VALVES (GXG)		WITH BUTTERFLY VALVES (GXF)		
	in.	mm	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	
2 1/2	65	41	19	102	46	120	54	92	42	110	50	87	39	97	44
3	80	42	19	119	54	137	62	107	49	125	57	91	41	104	47
4	100	43	20	176	80	212	96	156	71	192	87	95	43	117	53
6	150	71	32	288	130	346	157	258	117	316	143	158	71	188	85
8	200	177	80	579	263	661	300	539	244	607	275	361	164	407	185
10	250	177	80	784	356	880	399	732	332	822	373	458	208	516	234

MODEL 375AST SIZE	DIMENSION (approximate)																								
	A		A WITH BUTTERFLY VALVES		B LESS GATE VALVES		C		D		E NRS GATE		E OS&Y OPEN		E OS&Y CLOSED		E WITH BUTTERFLY VALVES		F		G		H		
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	
2 1/2	65	31 7/8	810	28 3/4	730	16 5/8	422	4 1/2	114	7 1/4	184	11 1/2	292	17 3/4	451	15 3/8	391	8 1/4	210	9 3/4	248	8 5/8	219	42	1067
3	80	32 7/8	835	29 3/8	746	16 5/8	422	4 1/2	114	7 1/4	184	12 3/4	324	20 1/4	514	17	432	8 1/4	210	9 3/4	248	8 5/8	219	43 1/2	1105
4	100	34 7/8	886	30 1/4	768	16 5/8	422	4 1/2	114	8	203	14 1/2	368	22 1/2	572	18 1/4	464	9	229	9 3/4	248	8 5/8	219	50	1270
6	150	43 1/2	1105	36 1/2	927	22 1/4	565	5 1/2	140	10	254	18	457	30 1/2	775	24 1/4	616	10 1/4	260	10 3/4	273	11 1/4	286	61 5/8	1565
8	200	52 3/4	1340	45 3/4	1162	29 1/2	749	9 1/4	235	11	279	21 1/8	537	37	940	28 1/2	724	18 1/2	470	15 5/8	397	13 1/4	337	77 1/8	1959
10	250	55 3/4	1416	49 3/4	1264	29 1/2	749	9 1/4	235	12	305	24 3/4	629	45 5/8	1159	34 3/4	883	18 1/2	470	15 5/8	397	13 1/2	343	85 3/8	2169



Options (Suffixes can be combined)

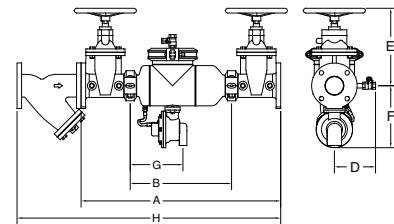
- with flanged end NRS gate valves (standard)
- FSG - with epoxy-coated wye type strainer (flanged only)
- G - with grooved end NRS gate valves
- GF - with grooved inlet gate connection and flanged outlet gate connection
- FG - with flanged inlet gate connection and grooved outlet gate connection
- OSY - with flanged end OS&Y gate valves
- OSYG - with grooved end OS&Y gate valves
- BG - with grooved end butterfly valves with integral supervisory switches
- BF - with flanged end butterfly valves with integral supervisory switches

*New Connected Products. Search ZCSM-PF on Zurn.com for details.

Accessories

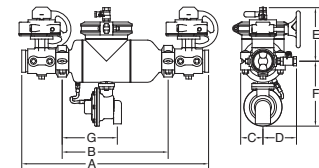
- Connected Pressure Monitor (Model ZCSM-PF)*
- Connected Flow Meter Option (Model ZCSM-BTM must be ordered with Model ZCSM-PF)*
- Repair kit (rubber only)
- Thermal expansion tank (Model XT)
- OS & Y Gate valve tamper switch (OSY-40)
- Air gap (Model AG)
- QT-SET Quick Test Fitting Set
- Wireless Monitor Retrofit Kit for conversion of existing model 375 (212-6-RFK-375W1, 8-10-RFK-375W1)

MODEL 375AST with NRS & FSC option

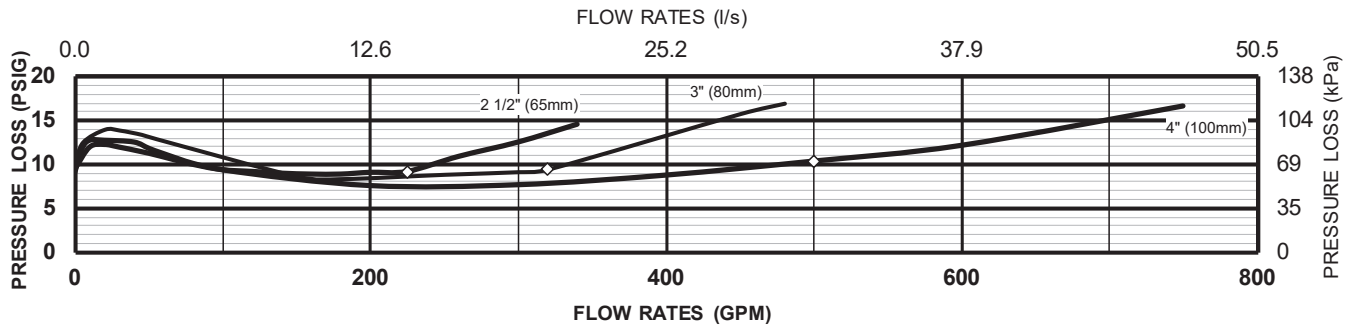


MODEL 375AST with BG option

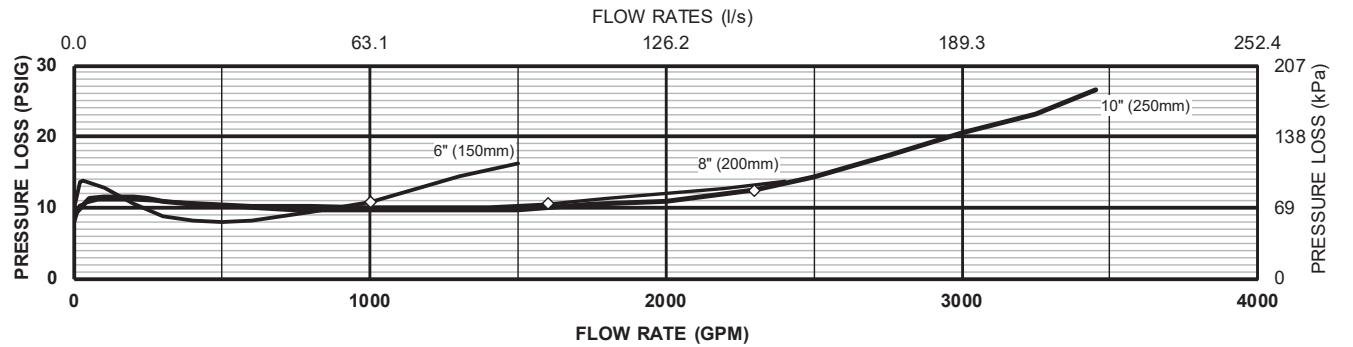
Relief Valve discharge port:
 2 1/2" - 6" - 2.75 sq. in.
 8" - 10" - 3.69 sq. in.



MODEL 375AST 2 1/2", 3" & 4" (STANDARD & METRIC)

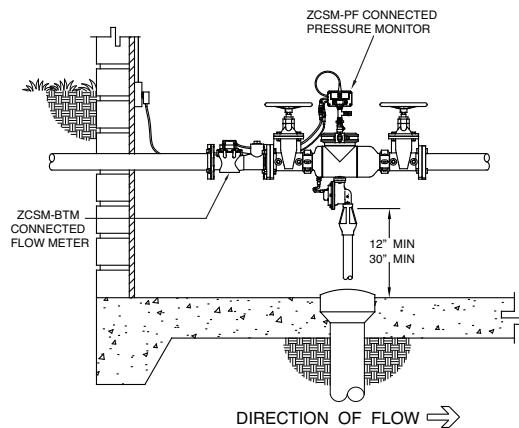


MODEL 375AST 6", 8" & 10" (STANDARD AND METRIC)

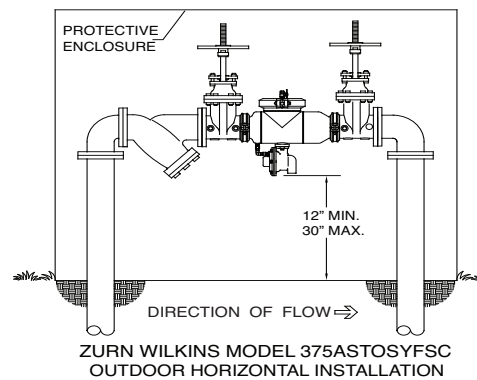


Typical Installation

Local codes shall govern installation requirements. Unless otherwise specified, the assembly shall be mounted at a minimum of 12" (305mm) and a maximum of 30" (762mm) above adequate drains with sufficient side clearance for testing and maintenance. The installation shall be made so that no part of the unit can be submerged.



INDOOR INSTALLATION
(375AST with ZCSM-PF Connected Pressure Monitor and ZCSM-BTM Connected Flow Meter accessories)



ZURN WILKINS MODEL 375ASTOSYFSC
OUTDOOR HORIZONTAL INSTALLATION

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"	1229	1843	2458	3687
12"	1763	2644	3525	5288

Specifications

The Reduced Pressure Principle Backflow Prevention Assembly shall be certified to NSF/ANSI/CAN 61, ASSE® Listed 1013, and supplied with full port gate valves. The main body and access cover shall be 304L Stainless Steel, the seat ring and check valve shall be NORYL™, the stem shall be stainless steel (ASTM A 276) and the seat disc elastomers shall be EPDM. The checks and the relief valve shall be accessible for maintenance without removing the device from the line. The Reduced Pressure Principle Backflow Prevention Assembly shall be a ZURN WILKINS Model 375AST.

Model 375AST(R) & 375ASTDA(R)

Reduced Pressure Principle Assembly (2 1/2", 3", 4" & 6")

Reduced Pressure Detector Assembly (2 1/2", 3", 4" & 6")

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

LEAD-FREE*

ZURN®
WILKINS

(Patent No. 8,997,772)

□ Installation □ Testing □ Maintenance Instructions

INSTALLATION INSTRUCTIONS

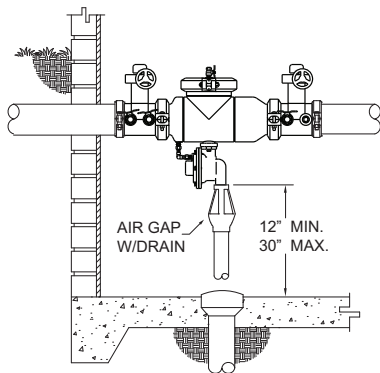
CAUTION: Installation of Backflow Preventers must be performed by qualified, licensed personnel. The installer should be sure the proper device has been selected for the particular installation. Faulty installation could result in an improperly functioning device.

ZURN WILKINS Model 375AST Series Assemblies are for use on potable water lines where a health hazard exists in the event of a backflow situation.

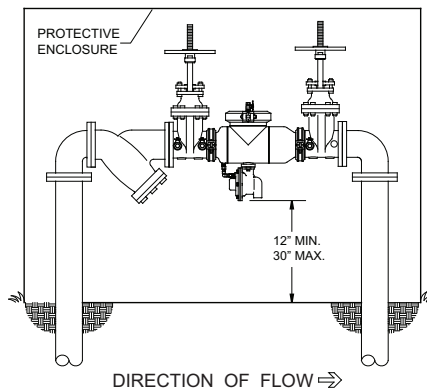
Damage to the device could result wherever water hammer and/or water thermal expansion could create excessive line pressure. Where this could occur, shock arrestors, check valves and/or pressure relief valves should be installed downstream of the device.

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. (Consult local codes.)

1. Before installing a Model 375AST 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. The Model 375 series has been tested and approved in the horizontal position. Contact factory before installing in other orientations.
5. Always consult local codes for installation methods, approvals and guidance.



DIRECTION OF FLOW ⇒
ZURN WILKINS MODEL 375ASTBG
INDOOR HORIZONTAL INSTALLATION



DIRECTION OF FLOW ⇒
ZURN WILKINS MODEL 375AST
OUTDOOR HORIZONTAL INSTALLATION

INDOOR INSTALLATION

Indoor installation is preferred in areas that are subject to freezing conditions. All the basic installation instructions apply to such installations. **CAUTION: An adequately sized drain is required to prevent possible water damage due to relief valve discharge.**

OUTDOOR INSTALLATION

The Model 375AST 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.

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. A brief discharge from the relief valve may occur while the device is pressurizing. The discharge should cease by the time the shut-off valve is fully open. If the discharge does not stop, refer to "MAINTENANCE INSTRUCTIONS" for repair procedures.
2. After the device has been pressurized, vent all trapped air by slightly opening each of the four test cocks.
3. Slowly open the downstream shut-off valve. The Model 375AST Series Backflow Preventer is now in service.
4. If spitting or intermittent discharges from the relief valve are noted, it could be a result of pressure fluctuation and/or a water hammer condition in the system. If such conditions exist, install water pressure reducing valves or water hammer shock arrestors in compliance with industry standards as needed.
5. After the Model 375AST 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. If the relief valve fails to operate properly, inspect the sensing passage for clogging (see "MAINTENANCE INSTRUCTIONS"). Clean rubber seals of all debris and place unit back in service.

⚠ **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

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.

Testing Procedures

MODEL 375AST SERIES ASSEMBLY

Equipment Required: Differential pressure gauge test kit.

TEST NO. 1 - RELIEF VALVE OPENING POINT

REQUIREMENT:

The differential pressure relief valve must operate to maintain the zone between the two check valves at least 2 psi less than the supply pressure.

PROCEDURE:

1. Flush water through test cocks #1, #2 (open #2 slowly), #3 and #4 by opening and closing each test cock one at a time, to eliminate foreign material.
2. Install appropriate fittings to test cocks. Attach hose from the high side of the differential pressure gauge to the #2 test cock then attach hose from the low side of the gauge to the #3 test cock. Open test cock #3 slowly and then bleed all air from the hose and gauge by opening the low side bleed needle valve.
3. Maintain the low side bleed needle valve in the open position while test cock #2 is opened slowly. Open the high side bleed needle valve to bleed all air from the hose and gauge. Close the high side bleed needle valve, then close the low side bleed needle valve after the gauge reading has reached the upper end of the scale.
4. Close the #2 shut-off valve. If the gauge reading drops to the low end of the gauge scale and the differential pressure relief valve discharges continuously, then the #1 check valve is leaking. If this occurs, Tests #1, #2 and #3 cannot be completed (See USC Maintenance Guide). However, should the gauge reading remain above the differential pressure relief valve opening point, then observe the gauge reading. This is the apparent pressure drop across the #1 check valve.
5. Open the high side control needle valve approximately one turn, and then open the low side control needle valve no more than 1/4 turn to by-pass water from the #2 test cock to the #3 test cock. Observe the differential pressure reading as it slowly drops to the relief valve opening point. Record this opening point value when the first discharge of water is detected. Close the low side needle valve.

TEST NO. 2 - TIGHTNESS OF #2 CHECK VALVE

REQUIREMENT:

The #2 check valve shall be tight against backpressure.

PROCEDURE:

1. Maintain the #2 shut-off valve in the closed position (from Test #1). Vent all air through the vent hose by opening the vent needle valve. Close the vent needle valve only (The high side control needle valve is to remain open).
2. Attach the vent hose from the gauge to the #4 test cock, then open the #4 test cock. Bleed water from the zone by opening the low side bleed needle valve on the gauge in order to re-establish the normal reduced pressure within the zone. Once the gauge reading reaches a value above the #1 check valve pressure drop, close the low side bleed needle valve.
3. Open the vent needle valve. If the indicated differential pressure reading remains steady then the #2 check valve

is reported as "closed tight." Go to Test #3. If the differential pressure reading falls to the relief valve opening point, bleed water through the low side bleed needle valve until the gauge reading reaches a value above the #1 check valve pressure drop. If the gauge reading settles above the relief valve opening point, record the #2 check valve as "closed tight," and proceed to Test #3. If the differential pressure reading falls to the relief valve opening point again, then the #2 check valve is noted as "leaking," and Test #3 cannot be completed. If the differential pressure reading drops, but stabilizes above the relief valve opening point, the #2 check valve can still be reported as "closed tight."

Note: Due to disc compression, you may need to bleed off water through low side bleed needle valve several times before the gauge reading will settle above relief valve opening point.

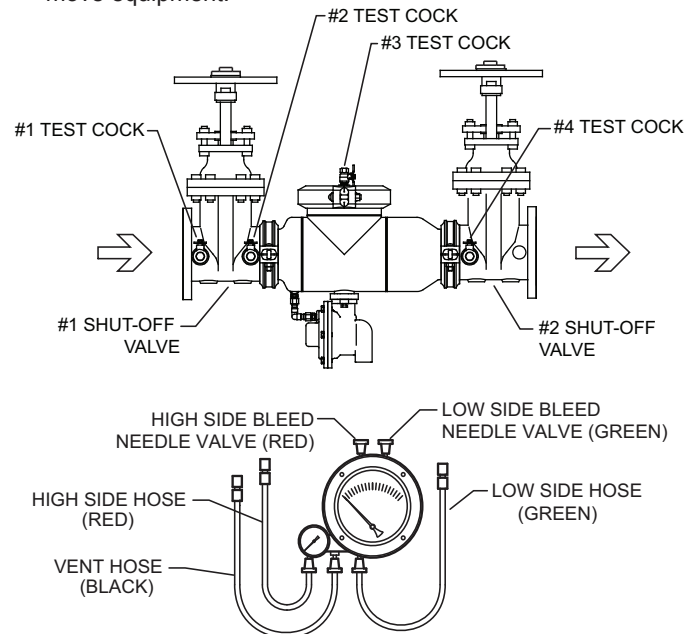
TEST NO.3 - TIGHTNESS OF #1 CHECK VALVE

REQUIREMENT:

The static pressure drop across #1 check valve shall be greater than the relief valve opening point (test #1), and at least 5.0 psid.

PROCEDURE:

1. With the vent hose connected to test cock #4 as in step 3 of Test #2, bleed water from the zone through the low side bleed needle valve on the gauge until the reading exceeds the #1 check valve pressure drop. Close the low side bleed needle valve. After the gauge reading settles, the steady state differential pressure reading indicated (reading is not falling on the gauge) is the actual static (i.e., no flow) pressure drop across check valve #1 and is to be recorded as such.
2. Close all test cocks, slowly open shutoff valve #2 and remove equipment.



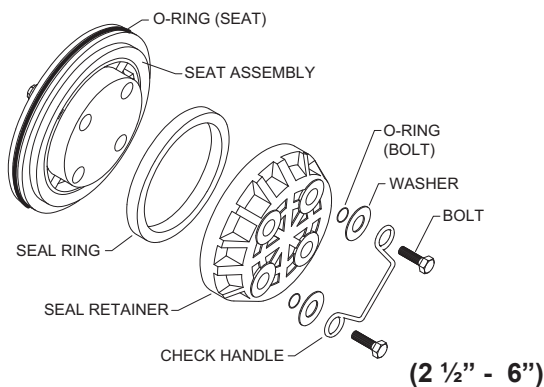
SPECIFICATIONS

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
 Grooved AWWA C606

Capacity thru Schedule 40 Pipe				
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"	1229	1843	2458	3687

Maintenance Instructions

CHECK ASSEMBLY



All Model 375AST 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").

SERVICING RELIEF VALVE

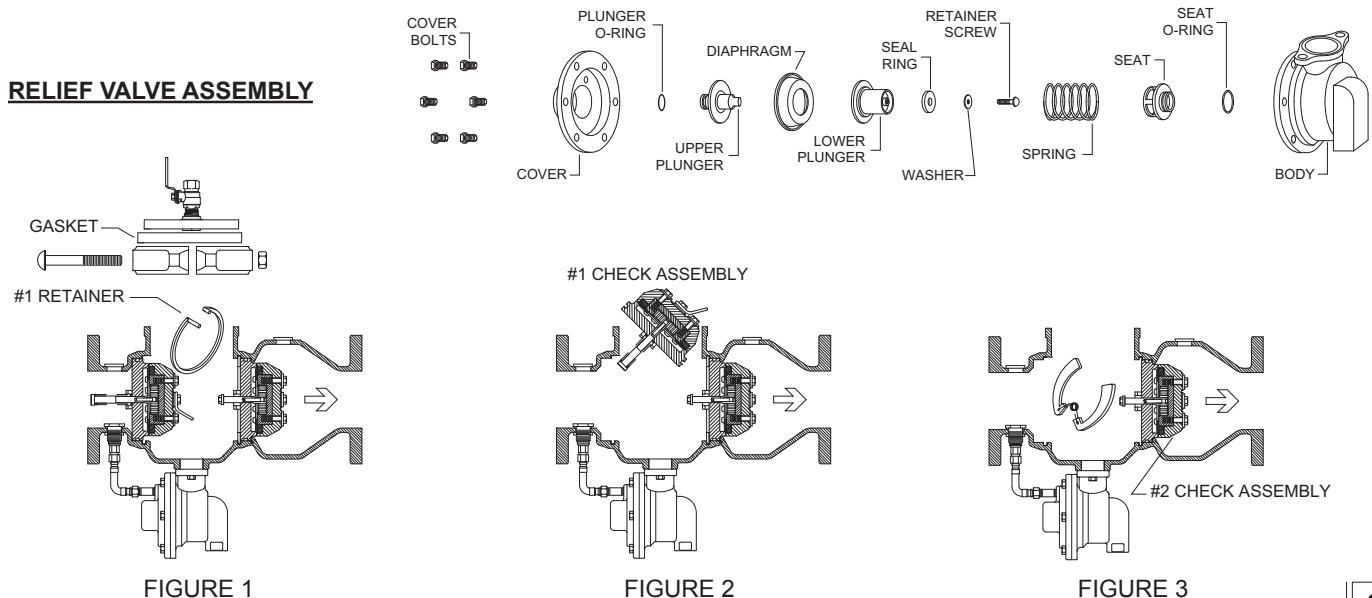
1. Remove relief valve cover bolts and cover. Gently pull on diaphragm to remove the cartridge assembly.
2. Inspect seal ring for cuts and embedded debris. Turn over or replace if required.
3. Disassemble cartridge by unscrewing relief valve retaining screw.
4. Inspect diaphragm and o-rings for damage. Replace required parts and apply a light coat of lubricant to plunger o-ring.
5. Carefully reassemble cartridge assembly. Tighten retainer screw to 13-17 in/lbs.
6. Inspect relief valve seat for wear on seating surface. If damaged, replace seat and seat o-ring. Install spring over seat guides.
7. Insert cartridge assembly into relief valve body.
8. Replace relief valve cover and cover bolts.
9. Place the device in service and test per "TESTING PROCEDURES" on page 2.

NOTE: Disassembly of the seat assembly is not recommended. If the seat assembly needs repair, please contact factory.

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 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.
5. 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.
6. **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.
7. 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. Inspect seat o-ring and replace if cut or damaged in any way.
8. Inspect valve cavity and seating areas. Flush with water to remove any debris.
9. Reassembly, 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.
10. Lubricate and install the #1 check. Close the #2 test cock. 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.
11. 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.

RELIEF VALVE ASSEMBLY



Troubleshooting

PROBLEM

- SUDDEN OR RAPID SPITTING
- LIGHT INTERMITTENT DRIP
- CONTINUOUS DISCHARGE

POSSIBLE CAUSES

- Drop in inlet pressure.
- Sudden increase in downstream pressure due to waterhammer from quick closing shut-off valve installed downstream.
- Slightly fouled #1 check.
- Slightly fouled relief valve seat.
- Fouled #1 check and/or #2 check.
- Fouled relief valve seat.

CORRECTIVE ACTION

- Install an in-line spring loaded check valve or pressure reducing valve upstream of Backflow Preventer.
- Install an in-line spring loaded check valve or pressure reducing valve downstream of Backflow Preventer.
- Clean #1 check and/or turn check valve seal ring over or replace.
- Clean relief valve seat and/or turn relief valve seal ring over or replace.
- Clean check valves and/or turn check valve seal ring over or replace.
- Clean relief valve seat and/or turn relief valve seal ring over or replace.

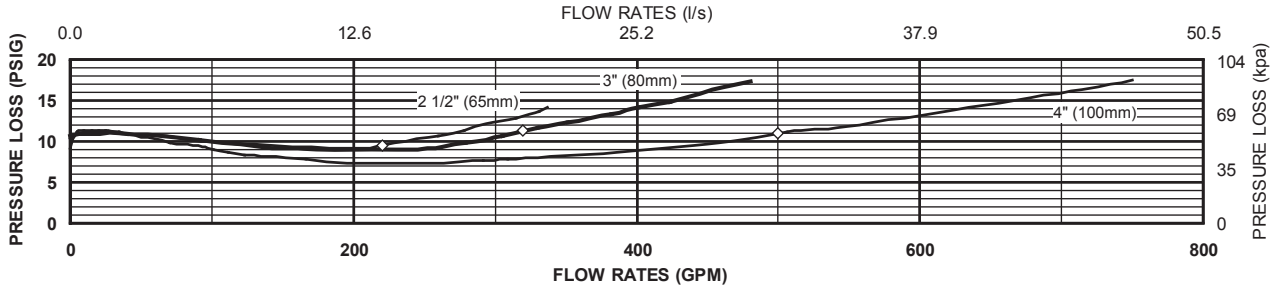
Repair Kits

SIZE	MODEL	MODEL 375 RELIEF RUBBER ONLY	MODEL 375 RELIEF COMPLETE	MODEL 375 CHECKS ONLY
2 1/2" - 4"	375AST/375ASTDA	RK212-375R	RK212-375	RK4-350ST
6"	375AST/375ASTDA	RK212-375R	RK212-375	RK6-350ST

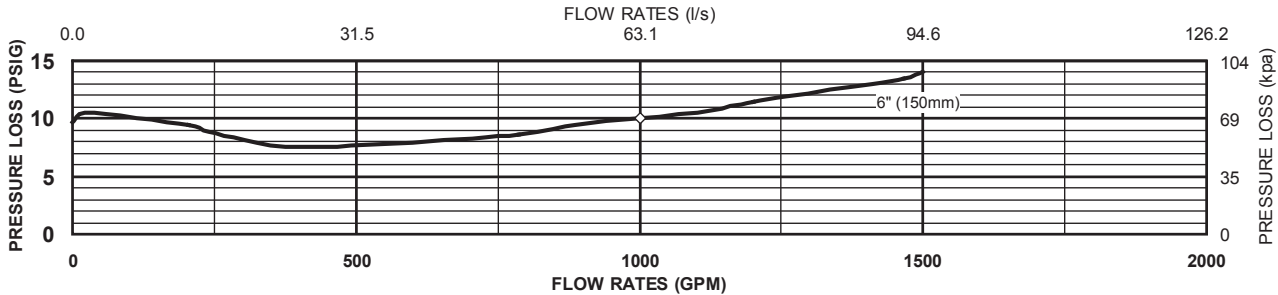
Performance Characteristics

FLOW CHARACTERISTICS

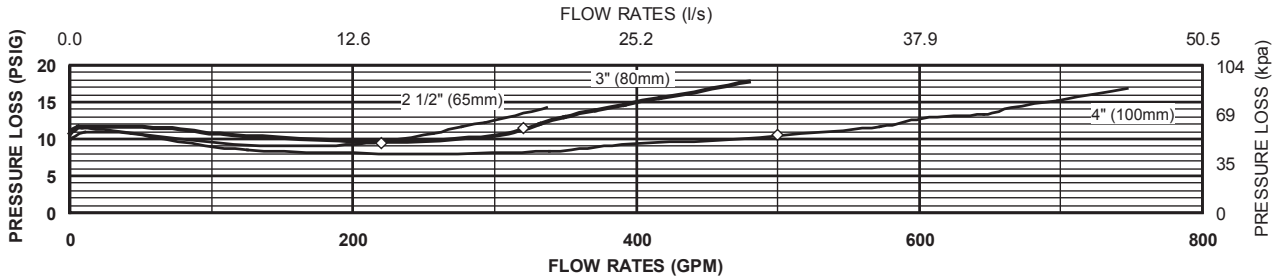
MODEL 375AST 2 1/2", 3" & 4" (STANDARD & METRIC)



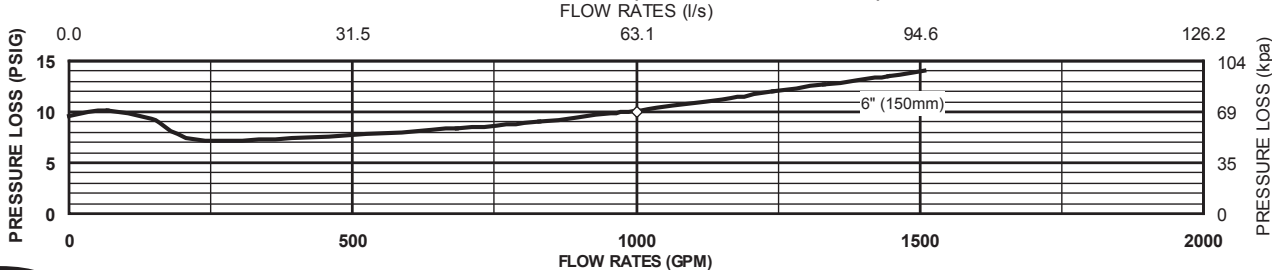
MODEL 375AST 6" (STANDARD & METRIC)



MODEL 375ASTDA 2 1/2", 3" & 4" (STANDARD & METRIC)



MODEL 375ASTDA 6" (STANDARD & METRIC)



◇ Rated Flow (Established by approval agencies)



87A-100 SERIES

Stainless Steel ASME Class 150 Flanged Std. Port Ball Valve - 4" through 8"

For **STANDARDS COMPLIANCE** and **STANDARD FEATURES** refer to page D-3.



STANDARD MATERIAL LIST

PART	MATERIAL	
1	Body	ASTM A351 CF8M
2	Retainer	ASTM A351 CF8M
3	Ball	ASTM A276 Type 316 or A351 CF8M
4	Stem	ASTM A276 Type 316
5	Packing Gland	ASTM A276 Type 316
6	Stem Seals	PTFE
7	Seats	RPTFE
8	Gland Screws	ASTM A193 B8 Class 1
9	Gland Plate	316 SS
10	Adapter Screw	18-8 SS
11	Handle Adapter	316 SS
12	Stem Bearing	RPTFE
13	Stop	ASTM A276 Type 316
14	Stop Screw	316 SS
15	Lock Plate	302 or 304 SS
16	Body Seal	RPTFE
17	Grounding Spring	SS
18	Body Joint Stud	ASTM A193 Grade B8M
19	Body Joint Nut	ASTM A194 Grade 8
20	Lockwasher	302 or 304 SS
21	Pipe Handle	Galvanized Steel (not Shown)

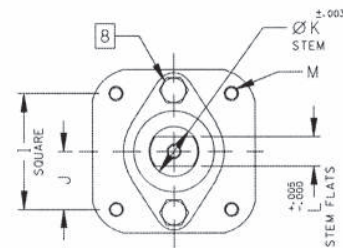
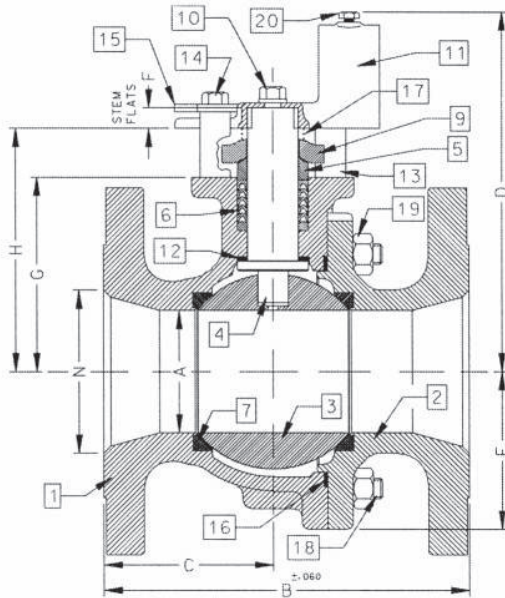
VARIATIONS AVAILABLE:

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

OPTIONS AVAILABLE: (More information in Section J)

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

(SUFFIX)	OPTION
-01	Standard Configuration
-14	Side Vented Ball (Uni-Directional)
-21	UHMWPE Seats
-24	Graphite packing, spiral wound graphite body seal, RPTFE bearing (API 607, 6th edition, ISO 10497:2010)
-35	PTFE Seats and Seals
-49	No Lubrication. Assembled Dry.
-57	Oxygen Cleaned
-65	MPTFE Seats and Graphite Packing (Fire Safe)
-67	Cleaned For Industrial Gases
-69	Drilled and Tapped Purge Ports with Plugs
-70	Extended Bonnet
-73	316 SS Spiral Wound Gaskets w/PTFE Filler
-76	Live Loaded (Lever)
-77	Live Loaded (Gear, Actuator)
-80	Multi-Seal (Super TFE) 87A/88A Series
-82	Flat Face Flanges
-90	Double Packed 4" Extended Bonnet
-9P-	Double Packed 4" Extended Bonnet with Monitoring Port
-EP-	Garlock EVSP Stem Packing w/Spiral Wound Graphite Gasket (Fire Safe by Design)
-KF-	PCTFE Stem Bearing
-MG-	Gear Operator with Standard Handwheel
-MH-	Gear Operator with Standard Handwheel & Locking Device
-MJ-	Gear Operator with Oversize Handwheel
-MK-	Gear Operator with Oversize Handwheel & Locking Device
-MP-	Positive Material Identification
-TC-	With Test Certificate
-TD-	Tested to API Spec 6D
-UL-	UL & CSA Listed (w/Markings)



ACTUATOR MOUNTING

FOR PRESSURE/TEMPERATURE RATINGS, REFER TO PAGE M-9, GRAPH NO. 2

PRODUCT NUMBER	SIZE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	WT.
87A-10A-01	4"	3.00	9.00	4.18	8.80	3.88	0.50	4.75	5.95	2.840	1.420	1.250	0.725	3/8-16	4.00	73
87A-10C-01	6"	4.00	10.50	4.69	9.99	5.13	0.50	5.94	7.13	2.840	1.420	1.250	0.725	3/8-16	6.00	117
87A-10E-01	8"	6.00	18.00	9.00	13.73	7.00	1.00	7.75	9.48	4.596	2.298	2.000	1.375	3/4-10	8.00	310



ASME FLANGED BALL VALVES

Features and Benefits

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



STANDARDS COMPLIANCE:

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

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

STANDARD FEATURES:

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

- Two Position Locking Device (Valves 6" Full Port, 8" Standard Port and smaller)
- Chevron Style Adjustable Stem Seals
- ISO 5211 Mounting Pad Bolt Pattern
- Slot Vented Ball for Thermal Expansion
- Rated up to 150 psig Saturated Steam
 - ASME Class 150, 300, & 600 Valves
- Rated up to 250 psig Saturated Steam
 - ASME Class 300 Valves Require the -65 Option
 - ASME Class 600 Valves Require the -24-80 Options or -38 Option
- Anti-static Grounded Ball and Stem
- Blow-out Proof Stem Design
- Cast Boss for Bleed / Drain Port
- Vacuum Service to 29 inches of Hg
- NACE MR0175 (2000) Compliance on all 87A/87B/88A/88B/88L Valves with SS Ball & Stem
- NACE MR0103 (2003) Compliance on all 87A/87B/88A/88B/88L Valves with SS Ball & Stem

PRODUCT APPROVALS:

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

* Requires "UL" suffix for markings.



FLOW DATA

For Apollo® Ball Valves

The listed Cv "factors" are derived from actual flow testing, in the Apollo® Ball Valve Division, Conbraco Industries, Inc., Pageland, South Carolina. These tests were completed using standard "off the shelf" valves with no special preparation and utilizing standard schedule 40 pipe. It should be understood that these factors are for the valve only and also include the connection configuration. The flow testing is done utilizing water as a fluid media and is a direct statement of the gallons of water flowed per minute with a 1 psig pressure differential across the valve/connection unit. Line pressure is not a factor. Because the Cv is a factor, the formula can be used to estimate flow of most media for valve sizing.

FLOW OF LIQUID

$$Q = C_v \sqrt{\frac{\Delta P}{SpGr}}$$

$$\text{or } \Delta P = \frac{(Q)^2 (SpGr)}{(C_v)^2}$$

Where:

Q = flow in US gpm
 ΔP = pressure drop (psig)
 SpGr = specific gravity at flowing temperature
 Cv = valve constant

FLOW OF GAS

$$Q = 1360 C_v \sqrt{\frac{(\Delta P) (P_2)}{(SpGr) (T)}}$$

$$\text{or } \Delta P = \frac{5.4 \times 10^{-7} (SpGr) (T) (Q)^2}{(C_v)^2 (P_2)}$$

Where:

Q = flow in SCFH
 ΔP = pressure drop (psig)
 SpGr = specific gravity (based on air = 1.0)
 P₂ = outlet pressure-psia (psig + 14.7)
 T = (temp. °F + 460)
 Cv = valve constant

CAUTION: The gas equation shown, is valid at very low pressure drop ratios. The gas equation is NOT valid when the ratio of pressure drop (ΔP) to inlet pressure (P1) exceeds 0.02.

NOTE: Only use the gas equation shown if (P1-P2)/P1 is less than 0.02.

Cv FACTORS FOR APOLLO VALVES

VALVE	SIZE (IN.)														
	1/4	3/8	1/2	3/4	1	1.25	1.5	2	2.5	3	4	6	8	10	12
70B-140 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
70-100/200 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
70-300/400 Series	--	--	15	30	43	48	84	108	--	--	--	--	--	--	--
70-600 Series	2.3	4.5	5.4	12	14	21	34	47	--	--	--	--	--	--	--
70-800 Series	8.4	7.2	15	30	43	48	84	--	--	--	--	--	--	--	--
71-AR Series	--	--	--	30	43	48	84	108	190	370	--	--	--	--	--
71-100/200 Series	--	--	--	30	43	48	84	108	190	370	--	--	--	--	--
72-100/900 Series	--	--	26	48	65	125	170	216	--	--	--	--	--	--	--
73A-100 Series	8.4	7.2	15	30	43	48	84	108	--	--	--	--	--	--	--
73-300/400 Series	--	--	26	48	65	125	170	216	--	--	--	--	--	--	--
74-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
75-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
76-AR Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
76F-100 Series	8.1	15	15	51	68	125	177	389	--	--	--	--	--	--	--
76FJ-100 Series	8.1	15	15	51	68	125	177	389	--	--	--	--	--	--	--
76FK-100 Series	8.1	15	15	51	68	125	177	389	--	--	--	--	--	--	--
76-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
76-300/400 Series	--	--	26	48	65	125	170	216	--	--	--	--	--	--	--
76-600 Series	2.3	4.5	5.4	12	14	21	34	47	--	--	--	--	--	--	--
76J-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
76J-AR Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
76K-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
76K-AR Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
7K-100 Series	--	--	15	51	68	125	177	389	503	--	--	--	--	--	--
77-AR Series	8.1	15	15	51	68	125	177	389	--	--	--	--	--	--	--
77C-100/200 Series	4.5	7.2	16	36	68	125	177	389	503	--	--	--	--	--	--
77D-140 Series	4.5	7.2	16	36	68	125	177	389	--	--	--	--	--	--	--

continued on next page



FLOW DATA

For Apollo® Ball Valves

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

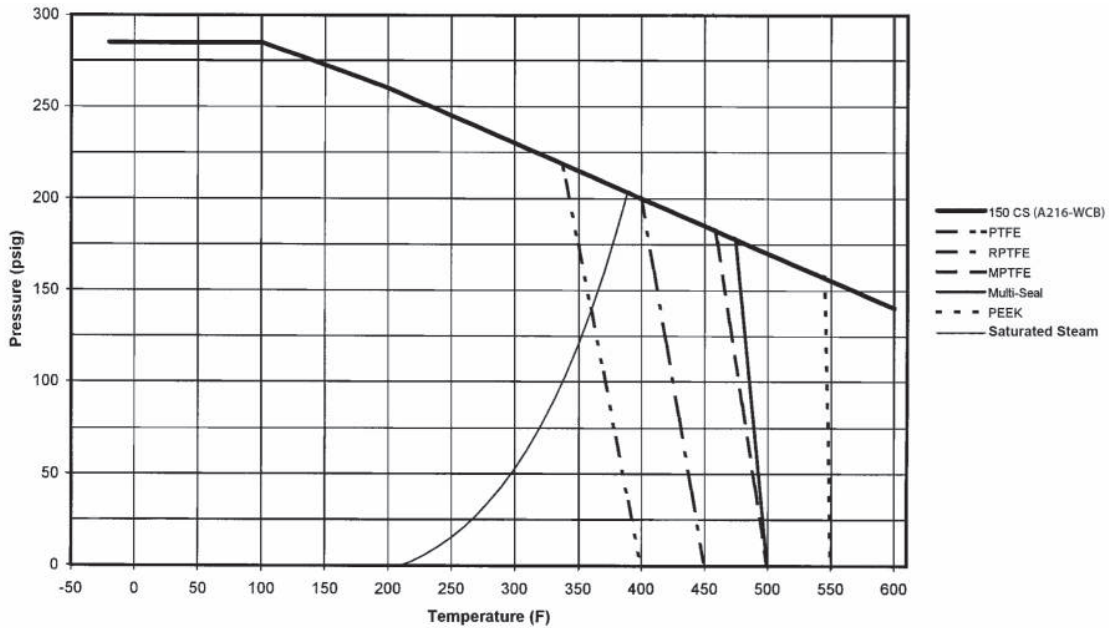
VALVE	SIZE (IN.)														
	1/4	3/8	1/2	3/4	1	1.25	1.5	2	2.5	3	4	6	8	10	12
77D-640 Series	--	--	--	11	24	35	--	--	--	--	--	--	--	--	--
77G-UL Series	4.5	7.2	16	36	68	125	177	389	503	--	--	--	--	--	--
77W Series	--	--	16	36	68	125	177	389	--	--	--	--	--	--	--
77-100/200 Series	8.1	15	15	51	68	125	177	389	503	--	--	--	--	--	--
79 Series	8.5	8.5	9.8	32	44	66	148	218	440	390	--	--	--	--	--
80 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
82-100/200 Series	8.1	14	26	51	68	120	170	376	510	996	1893	--	--	--	--
83A/83B Series	8.1	14	26	51	68	120	170	376	--	--	--	--	--	--	--
83R-100/200 Series	--	--	--	--	--	--	170	376	--	996	1893	--	--	--	--
86A/86B Series	8.1	14	26	51	68	120	170	376	--	--	--	--	--	--	--
86R-100/200 Series	--	--	--	--	--	--	170	376	--	996	1893	--	--	--	--
87A-100 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87A-200 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
87A-700 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87A-900 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
87A-F00 Series	--	--	--	--	75	--	195	410	545	1021	2016	4837	--	--	--
87B-100 Series	--	--	--	--	--	--	--	--	--	375	673	1099	1902	3890	--
87J-100 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87J-200 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
87J-700 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87J-900 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
87K-100 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87K-200 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
87K-700 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87K-900 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
88A-100 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
88A-200 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
88A-700 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
88A-900 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
88A-F00 Series	--	--	--	--	75	--	195	410	545	1021	2016	4837	--	--	--
88B-100 Series	--	--	--	--	--	--	--	--	--	375	673	1099	1902	3890	--
89-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
9A-100 Series	8.3	6.7	5.7	10	16	25	40	62	--	--	--	--	--	--	--
90-100 Series	8.3	6.7	5.7	10	16	25	40	62	--	--	--	--	--	--	--
92-100 Series	8.3	6.7	5.7	10	16	25	40	62	--	--	--	--	--	--	--
93-100 Series	8.3	6.7	5.7	10	16	25	40	62	--	--	--	--	--	--	--
94A-100/200 Series	6	7	19	34	50	104	268	309	629	1018	1622	--	--	--	--
96-100 Series	8.3	6.7	5.7	10	16	25	40	62	--	--	--	--	--	--	--
399-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
489-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--

PRESSURE TEMPERATURE RATINGS

Class 150

(CS) ASTM A216-WCB

(GRAPH 1)



Class 150

(SS) ASTM A351-CF8M

(GRAPH 2)

