VOLUME XI: CORROSION RESISTANT THERMOPLASTIC VALVES

Industrial Technical Manual Series

SECOND EDITION

IPEX THERMOPLASTIC VALVES

- Ball Valves
- Butterfly Valves
- Diaphragm Valves
- Check and Vent Valves
- Specialty Valves

IPEX
by aliaxis

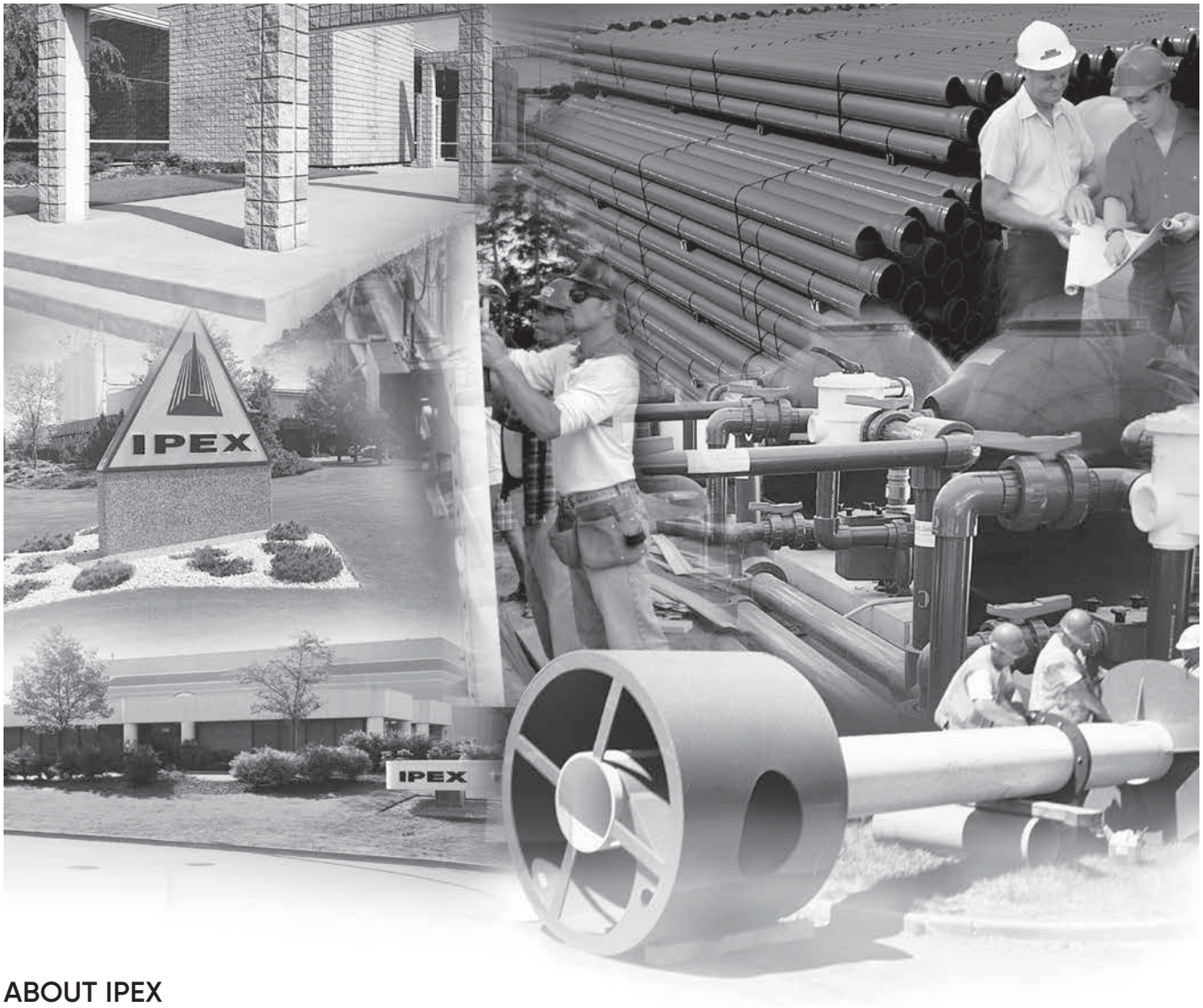
Thermoplastic Valves

Industrial Technical Manual Series

Vol. 11, 2nd Edition

© 2023 by IPEX. All rights reserved. No part of this book may be used or reproduced in any manner whatsoever without prior written permission.

For information contact: IPEX, Marketing, 1425 North Service Road East, Oakville, Ontario, Canada, L6H 1A7



ABOUT IPEX

At IPEX, we have been manufacturing non-metallic pipe and fittings since 1951. We formulate our own compounds and maintain strict quality control during production. Our products are made available for customers thanks to a network of regional stocking locations throughout North America. We offer a wide variety of systems including complete lines of piping, fittings, valves and custom-fabricated items.

More importantly, we are committed to meeting our customers' needs. As a leader in the plastic piping industry, IPEX continually develops new products, modernizes manufacturing facilities and acquires innovative process technology. In addition, our staff take pride in their work, making available to customers their extensive thermoplastic knowledge and field experience. IPEX personnel are committed to improving the safety, reliability and performance of thermoplastic materials. We are involved in several standards committees and are members of and/or comply with the organizations listed on this page.

For specific details about any IPEX product, contact our customer service department.

SAFETY ALERTS

Engineered thermoplastics are safe inert materials that do not pose any significant safety or environmental hazards during handling or installation. However, improper installation or use can result in personal injury and/or property damage. It is important to be aware of and recognize safety alert messages as they appear in this manual.

The types of safety alert messages are described below.

This safety alert symbol indicates important safety messages in this manual. When you see this symbol be alert to the possibility of personal injury and carefully read and fully understand the message that follows.

⚠ WARNING

"WARNING" identifies hazards or unsafe practices that can result in severe personal injury or death if instructions, including recommended precautions, are not followed.

⚠ CAUTION

"CAUTION" identifies hazards or unsafe practices that can result in minor personal injury or product or property damage if instructions, including recommended precautions, are not followed.

NOTE: The use of the word "NOTE" signifies special instructions which are important but are not related to hazards.

For the materials described in this manual, the following warming applies.

⚠ WARNING

- NEVER use compressed air or gas in PVC/CPVC/PP/PVDF pipe and fittings.
- NEVER test PVC/CPVC/PP/PVDF pipe and fittings with compressed air or gas, or air-over-water boosters.
- ONLY use PVC/CPVC/PP/PVDF pipe for water and approved chemicals.

Use of compressed air or gas in PVC/CPVC/PP/PVDF pipe and fittings can result in explosive failures and cause severe injury or death.

This page intentionally

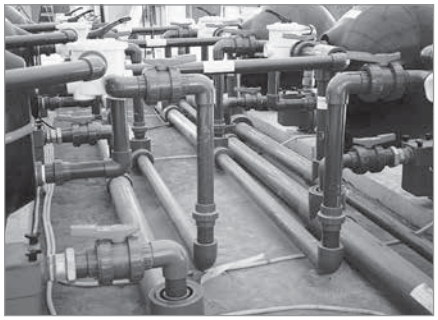
left blank

CONTENTS

SECTION ONE: GENERAL INFORMATION

OVERVIEW

This manual provides the most up-to-date and comprehensive information about IPEX corrosion resistant thermoplastic valves. Written with the needs of the engineer and contractor in mind, all aspects of our valves are covered. This includes material properties, specifications, valve types and selection, installation, as well as testing and operating considerations.



With more than 50 years of design and manufacturing experience, these lightweight, long life and maintenance free valves save both time and money. Our high-tech automated manufacturing and testing facility ensures unparalleled reliability for each and every valve.

IPEX quality engineered products include many unique characteristics ranging from important safety features, to simple ergonomic and aesthetic benefits. Material options such as PVC, CPVC, PP, PVDF, and ABS make our corrosion resistant valves ideal for use in a wide variety of demanding applications.

IPEX thermoplastic valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards. Our network of manufacturing and customer service facilities across North America ensures fast, reliable service, and expert technical support.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

FEATURES AND BENEFITS

IPEX valves have extensive features and benefits unrivalled by the competition. The compact and double blocking design of our ball valves makes them easy to install, yet safe while conducting line maintenance. Machined components and anti-frictions rings result in reduced seal wear and minimal breakaway torque on all our quarter turn valves. Ergonomic handles with incorporated safety lockouts can be removed to reveal integrated ISO pads for direct mount actuation. Many of our valves feature deep square style threads for improved strength and reliability as well as thick o-rings and deep grooves for maximum sealing. For a complete list of features and benefits, please consult the Thermoplastic Valve Multimedia CD or the specific valve literature.












CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

APPLICATIONS

Industrial and Process Piping

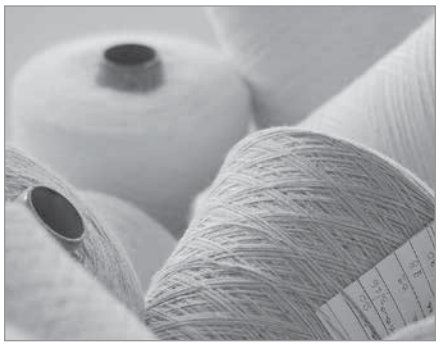
- Plant Water Supply and Distribution Lines
- Cooling Water Systems
- Chemical and Washwater Systems for Photographic Laboratories
- Acid Products Handling for Refineries, Metal Works and Plating Plants
- Bleach, Dye and Acid Lines in Textile Mills
- Deionized Water
- Tailing and Slurry Lines in Mines, Smelters and Fertilizer Plants
- Vacuum Piping
- Pure Chemicals for Semiconductor & Pharmaceutical Industries
- Aquatic Animal Life Support Systems
- Piping in Fish Hatcheries, Zoological and Biological Buildings
- Well Casings and Dewatering Lines
- Drainage and Effluent Piping
- Swimming Pool Piping
- Rainwater Leaders for Buildings

Pulp and Paper

- Pulp/Chemical Recovery Systems
- Bleach Plant Piping Systems
- Washwater Piping and Lagoon Systems

Food Processing

- Brine and Seawater Distribution in Fish Plants
- Brine Systems in Meat Packaging Plants
- Piping for the Dairy, Canning and Beverage Industries



Water and Sewage Treatment

- Alum and Ferric Chloride Handling
- Chlorine Injection Systems
- Piping in Lagoons and Settling Ponds
- Rainwater Lines

Irrigation

- Golf Courses
- Greenhouses
- Agriculture
- Residential Turf
- Commercial Turf

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

MATERIAL DESCRIPTION

BODY MATERIAL

PVC (Polyvinyl Chloride)

PVC is the most frequently specified of all thermoplastic materials and has been used successfully for over 60 years. PVC is characterized by distinctive physical properties, and is resistant to corrosion and chemical attack by acids, alkalis, salt solutions and many other chemicals. It is attacked, however, by polar solvents such as ketones and aromatics. Of the various types and grades of PVC used in plastic piping, the most common is cell classification 12454 conforming to ASTM D1784.

CPVC (Chlorinated Polyvinyl Chloride)

CPVC (Cell Classification 23447) conforming to ASTM D1784 has physical properties at 73°F (23°C) similar to those of PVC and chemical resistance similar to or generally better than that of PVC. With a design stress of 2,000 PSI and maximum service temperature of 210°F (99°C), CPVC has proved to be an excellent material for hot corrosive liquids, hot and cold water distribution and similar applications above the temperature range of PVC.

PP (Polypropylene)

Polypropylene is a lightweight polyolefin that is generally high in chemical resistance. Type 1 Polypropylene conforming to ASTM D4101 is chemically resistant to organic solvents as well as acids and alkalies. Generally, polypropylene should not be used in contact with strong oxidizing acids, chlorinated hydrocarbons and aromatics. Polypropylene has a maximum service temperature of 212°F.

PVDF (Polyvinylidene Fluoride)

Polyvinylidene Fluoride is a strong, abrasion-resistant thermoplastic with excellent heat stability and chemical resistance typical of fluorocarbon polymers. It can be used in temperatures up to 285°F (140°C) with a wide variety of acids, bases and organic solvents, and is ideally suited for handling wet or dry chlorine, bromine and other halogens. No other thermoplastic piping material can approach the combination of strength, chemical resistance and operating temperature that PVDF piping systems can offer.

ABS (Acrylonitrile-Butadiene-Styrene)

ABS identifies a broad family of engineering thermoplastics with a range of performance characteristics. The copolymeric system can be blended to yield the optimum balance of properties suited to a selected end use. Acrylonitrile imparts chemical resistance and rigidity. Butadiene endows the product with impact strength and toughness. Styrene contributes to ease of processing.

SEALING MATERIALS

EPDM (Ethylene propylene diene monomer)

EPDM is the abbreviation, issued by ASTM, for elastomers derived from the propylene and ethylene copolymer. The absence of unsaturation groups at the molecular level gives EPDM excellent resistance to oxidation products but will show a certain swelling when in contact with mineral and petroleum oils, diester base lubricants and organic solvents. Its operating temperature ranges from -65°F to 284°F (-54°C to 140°C).

FKM (Vinylidene fluorine rubber)

FKM is the abbreviation, issued by ASTM, for fluorocarbon elastomers derived from vinylidene fluorine copolymers. Trade names include Viton A&B™ or Tecnoflon™. Characterized by excellent resistance to heat and chemical agents, FKM is virtually inert to oil and most solvents and exhibits good chemical resistance to many aromatic and aliphatic hydrocarbons. Its working temperature range is considered to be from -13°F to 392°F (-25°C to 200°C) although it has been known to seal at very low temperatures such as -58°F (-50°C).

PTFE (Polytetrafluorethylene)

PTFE or polytetrafluorethylene is a fluorinated polymer characterized by a high molecular weight and a nearly complete chemical resistance to reactives and solvents. Thanks to its characteristics of self-lubrication, shock resistance and extraordinary chemical inertness, polytetrafluorethylene polymers, under trade names such as Teflon®, Fluon™ and Argoflon™, have been successfully used in the manufacture of sealing components. Among thermoplastic resins, PTFE allows the highest working temperatures. It can be used at constant temperatures of up to 500°F (260°C).

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VALVE TYPES

By definition, a valve is any device that regulates the flow of gases, liquids, or loose materials through piping or through apertures by opening, closing, or obstructing ports or passageways. Some main categories of valve types are as follows:

Ball Valves

Ball valves are generally used for on/off service, but can range from simple molded-in-place construction to high-end industrial designs with many features and benefits. Multi-port ball valves allow for mixing, diverting, and bypassing flow. Their name is derived from the modified ball in the center of the valve which allows flow to enter and exit through two or more ports. This ball is tightly held between multiple seats, and is cycled via a stem-handle connection. They are typically categorized as "quarter turn" or 90° valves, and can be easily automated. Many ball valves feature full port flow, blocking true union ends, and compact ergonomic designs allowing for simple installation and maintenance.

Butterfly Valves

These highly versatile valves can be used for simple on/off service but also for processes requiring precise throttling. They get their name from the stem-disc assembly that controls the flow. Cycling the valve just 90° allows full travel from the closed position (disc perpendicular to the pipeline) to the open position (disc parallel to the pipeline) or vice versa. A continuous flow profile between fully closed and fully open makes these valves ideal for use in modulating service. While typically connected to the system between two flanges, end-of-line installation is possible while maintaining pressure upstream. An extensive size range and direct mount actuation make them suitable for a wide range of applications.

Diaphragm Valves

These valves are the perfect solution when precise flow throttling is required. Their design employs a flexible "diaphragm" component which is compressed against the body of the valve to provide a bubble tight seal. The weir style design is extremely good for abrasive slurries as there is no "dead space" for particles to become trapped. They are widely used in high purity applications because their design prevents friction and subsequent particle creation when cycling. Only the body and diaphragm are in contact with the process media. Due to the modular nature of the design, many body styles, diaphragm and seal materials, and actuation options are available.

Check and Vent Valves

Check valves are unidirectional and should be used whenever there is a need to prevent back-flow of process media. This may be when two incompatible fluids cannot be allowed to mix, or when reverse flow would cause undesirable drainage of a system line or tank. Many styles exist including: simple ball checks, heavy duty swing checks, and highly efficient piston checks. These valves are typically gravity operated and require very little back pressure seal. Air release or vent valves safely allow any entrapped air or gas to escape, avoiding potential damage to the piping system.

Specialty Valves

IPEX offers a few specialized valves for a variety of process requirements. Sediment strainers trap suspended particles flowing in the process line, ensuring that downstream components are protected. Solenoid valves are ideal for high-cycle applications where remote operation and precise control are important. Lab valves are an economical solution for small scale on/off requirements.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

The following table should be used as a guide only as some valves only offer certain combinations of sizes, materials, connections, and pressure capabilities. Always consult the specific valve style section for complete information regarding availability and technical performance.

IPEX Thermoplastic Valves

Valve Series	Valve Type	Sizes (in)	Materials	End Connections	Pressure Rating (PSI)
VKD	Ball	1/2 – 4	PVC, CPVC, PP	TU (S, T), Sm, F	up to 232
VXE	Ball	1/2 – 6*	PVC, CPVC	TU (S, T), F	up to 232
VEE	Ball	1/2 – 4	PVC	TU (S, T)	232
MP	Compact Ball	1/2 – 2	PVC	S, T	150
TKD	3-Way Ball	1/2 – 2	PVC, CPVC	TU (S, T)	232
VKR	Regulating Ball	1/2 – 2	PVC, PP, PVDF	TU (S,T), Sm, F	up to 232
FK	Butterfly	1-1/2 – 16	Body: PP Disc: CPVC, PP, PVC, PVDF & ABS	F (W, L)	up to 150
FX	Butterfly	1-1/2 – 12	Body: PVC Disc: PP or PVC	F (W, L)	up to 150
FE	Butterfly	1-1/2 – 12	PVC	F (W)	up to 150
VM	Diaphragm	1/2 – 4 20 – 110 (mm)	PVC, CPVC, PP, PVDF	TU (S, T), F, Sp, Sm	150
DV	Diaphragm	1/2 – 6	PVC	F	150
CM	Compact Diaphragm	1/2 16 – 20 (mm)	PVC, CPVC, PP, PVDF	TU (S, T), Sp, Sm	90
DKD	Diaphragm	1/2 – 2	PVC	TU (S, T), Sp	120
SXE	Ball Check	1/2 – 4	PVC, CPVC	TU (S, T)	232
SSE	Spring-Assisted Check	1/2 – 4	PVC	TU, (S,T)	232
VR	Piston Check	1/2 – 4	PVC	TU (S, T), S, T, F	232 (1/2" to 1") 150 (1-1/4" to 2") 90 (3" to 4")
SC	Swing Check	3 – 8	PVC	F	100 (3") 70 (4" to 8")
VA	Air Release	3/4, 1-1/4, 2	PVC	SU (S, T)	232
RV	Strainer	1/2 – 4	PVC, CPVC	TU (S, T), S, T, F	232 (1/2" to 1") 150 (1-1/4" to 2") 60 (3" to 4")
LV	Lab	1/4	PVC	T	150
S12/22	Solenoid	1/4 – 1/2	PVC	TU (S,T)	up to 90

TU = True Union, SU = Single Union, S = Socket (IPS), T = Threaded (NPT), F = Flanged (ANSI 150),
W = Wafer, L = Lugged, Si = Spigot (IPS), Sm = Socket (Metric), Sp = Spigot (Metric)
*4" with venturied ends

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VALVE SELECTION

As is the case with other thermoplastic components in a processing system, valves must be selected based on the characteristics of the fluid medium, the system's operating parameters, and its intended function for a particular application. Certain valve types are more suitable than others for on/off service, throttling or modulating, automation, back flow prevention, etc.

Fluid Properties

Like other system components, the material that is used in valve construction should be chosen depending on the chemistry of the fluid. Different plastics have varying abilities to handle certain chemical types. In a given piping system, the material selected for a valve is typically the same as what is specified for the pipe and fittings. However, since valves contain other components such as seats and seals, particular attention should be paid to their material selection. Please consult IPEX's Chemical Resistance Guide for specific material-fluid compatibilities. Abrasiveness, viscosity, and other fluid properties are sometimes important to consider as well.

Temperature and Pressure

As with pipe and fittings, the strength of a valve is limited by the operating temperature and pressure of the system. However, the type of failure that can be expected in valves is different than that of other piping components as valves typically contain seats, seals, and moving components. These critical points can be potentially displaced if the seat or seal housing softens or distorts due to excessive prolonged heat. This can result in a loss of pressure capacity if these contact points lose competence. During the design, manufacture, and assembly of IPEX valves, careful attention is given to these vital connections in order to compensate for reduced performance under extreme conditions.

Valves are typically pressure rated by style; however size, material type, and temperature play significant roles in determining the pressure capabilities of a specific valve. Since they are often constructed of more than one material type, it is important to review the pressure-temperature relationship. General pressure ratings are given assuming an ambient operating temperature of 73°F (23°C), above which the maximum pressure capability decreases. To account for this, detailed pressure-temperature graphs are included in this manual for each valve type.

Flow Rate

An important consideration in valve selection is the intended flow rate of the system. The flow rate of a particular valve is expressed as a C_V coefficient. This value represents the number of gallons per minute (GPM) that will flow through a fully open valve with a 1 PSI pressure drop at 68°F (20°C). These values are determined from an industry standard testing procedure which uses water as the flowing media (specific gravity of 1.0). Tables showing acceptable flow rates for different size valves are included in this manual for each valve type.

Vacuum Service

Many of our valves have been tested to determine their ability to withstand service under vacuum conditions. Our VKD ball, FK butterfly and VM diaphragm valves have been tested to hold a vacuum in excess of 29 inches of mercury. Please contact the IPEX technical services department for specific vacuum service applications.

Other Considerations

Occasionally it may be important to select a particular valve based on spatial constraints or weight limitations. Some compact light weight valves are better suited to applications where space is limited and/or pipe support is not possible. Requirements such as automation or remote operation may also demand the selection of a particular valve. For details regarding actuated ball and butterfly valves, please refer to the IPEX Industrial technical manual entitled "Quarter Turn Automation".

Silicone Free

IPEX now offers silicone free valves. These valves are expertly cleaned within a new clean room facility, conforming to ISO 14644-1 clean room standards. The facility utilizes a three stage chemical cleaning process, including ultrasonic cleaning tanks, to ensure all valve components are free from traces of silicone. The valve is then dried using a compressed air system and bagged within a dual skin silicone free package to prevent contamination. In addition, a non-silicone lubricant is used for both the ball valves and butterfly valves to maintain efficient operation over the lifetime of the system. With this technology, valves are supplied to you silicone free by IPEX.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

FURTHER INFORMATION

System Design

The necessity and selection of valves for use in a piping system is largely a function of the overall process requirements. For detailed information regarding the design process and associated considerations, please refer to the IPEX Industrial technical manual entitled "Vinyl Process Piping Systems".

Installation Considerations

For detailed information regarding piping installation and associated considerations, please refer to the IPEX Industrial technical manual entitled "Vinyl Process Piping Systems". For particular valve installation instructions, please refer to the specific valve type section in this manual.

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial technical manual entitled "Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system.

Important points

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

IPEX's vented ball valves are designed to protect the ball and body from a failure due to potential off-gassing. When a ball valve is cycled to the closed position, liquid may be trapped in the ball cavity. Chemicals such as sodium hypochlorite (NaOCl), hydrogen peroxide (H_2O_2), and aqua ammonia (NH_3) may off-gas and cause a potentially dangerous pressure build up. Without proper pressure relief, this may cause the valve to prematurely fail.

IPEX vented ball valves feature a small vent hole on the upstream side of the ball that will relieve the pressure from the ball cavity while maintaining a positive seal on the downstream side.

Maintenance

IPEX valves are designed and manufactured to high quality standards with long service life expectancy. However, if maintenance is required, please refer to the specific valve type section in this manual for instructions.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VKD SERIES BALL VALVES

IPEX VKD Series Ball Valves offer a variety of advanced features such as the patented seat stop carrier, a high quality stem and ball support system, and a multifunctional locking handle. The new DUAL BLOCK® system locks the union nuts preventing back-off due to vibration or thermal cycling. Deep grooves, thick o-rings, and cushioned Teflon® seats contribute to strong seals at pressures up to 232 PSI while an integral mounting flange and support bracketing combine for simple adaptation for actuation and anchoring. VKD Series Ball Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

VALVE AVAILABILITY

BODY MATERIAL	PVC, CPVC, PP
SIZE RANGE	1/2" through 4"
PRESSURE	up to 232 PSI, 150 PSI (PP)
SEATS	Teflon® (PTFE)
SEALS	EPDM or FKM
END CONNECTIONS	Socket (IPS), Threaded (FNPT) Socket (Metric)

Note: PVDF valves available on request

ASTM D1784
ASTM D2464
ASTM D2466
ASTM D2467
ASTM D4101
ASTM F437
ASTM F439
ASTM F1498

ANSI B1.20.1

ISO 11922-1

Certified to NSF/ANSI 61 & 372

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VKD SERIES BALL VALVES

Sample Specification

1.1 Material

- The valve body, stem, ball and unions shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

or The valve body, stem, ball and unions shall be made of Corzan® CPVC compound which shall meet or exceed the requirements of 23447 according to ASTM D1784.

or The valve body, stem, ball and unions shall be made of stabilized PP homopolymer compound, also containing a RAL 7032 pigment, which shall meet or exceed the requirements of Type I Polypropylene according to ASTM D4101.

1.2 Seats

- The ball seats shall be made of Teflon® (PTFE).

1.3 Seals

- The o-ring seals shall be made of EPDM.

or The o-ring seals shall be made of FKM.

2.0 Connections

2.1 Socket style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

or The IPS socket CPVC end connectors shall conform to the dimensional standard ASTM F439.

or The Metric socket PP end connectors shall conform to the dimensional standard ISO 11922-1.

2.2 Threaded style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1.

or The female NPT threaded CPVC end connectors shall conform to the dimensional standards ASTM F437, ASTM F1498, and ANSI B1.20.1.

or The female NPT threaded PP end connectors shall conform to the dimensional standards ASTM F1498, and ANSI B1.20.1.

3.0 Design Features

- The valve shall be double blocking with union ends.
- All valves shall be full port.
- All valves shall allow for bi-directional flow.
- The valve body shall be single end entry with a threaded carrier (ball seat support).
- The threaded carrier shall be adjustable with the valve installed.
- The valve body shall have an expansion and contraction compensating groove on the molded end.
- The valve body, union nuts, and carrier shall have deep square style threads for increased strength.
- The ball and stem shall be machined smooth to minimize wear on valve seats and seals.
- All valve seats shall have o-ring backing cushions to compensate for wear and prevent seizure of the ball.
- The stem design shall feature double o-ring seals as well as a safety shear point above the o-rings.
- All valves shall have integrally molded mounting features for actuation.
- All valves shall have integrally molded support bracketing for anchoring.
- 2-1/2" to 4" valves handle shall incorporate a transparent PVC plug and tag holder for valve identification.

3.1 Pressure Tested

- All valves shall have been pressure tested in both the open and closed positions by the manufacturer.

3.2 Pressure Rating

- All PVC and CPVC valves shall be rated at 232 PSI at 73°F.
- All PP valves shall be rated at 150 PSI at 73°F.

3.3 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.4 Color Coding

- All PVC valves shall be color-coded dark gray.

or All CPVC valves shall be color-coded light gray.

or All PP valves shall be color-coded beige gray.

4.0 NSF Listings

- All PVC and CPVC valves shall be listed with NSF to Standard 61 for potable water.
- All PVC and CPVC valves shall be listed with NSF to Standard 372 for lead content requirements.

5.0 All valves shall be Xirtec® PVC, Xirtec® CPVC, or PP by IPEX or approved equal.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VKD SERIES BALL VALVES

Valve Selection

Size (inches)	Body Material	Seal Material	IPEX Part Number IPS Socket	IPEX Part Number FNPT Threaded	Pressure Rating
3/8	PVC	EPDM	253067		232 psi for PVC and CPVC socket or threaded
		FKM	253068		
	CPVC	EPDM	253069		
		FKM	253070		
	PP	EPDM	–	–	
		FKM	–	–	
1/2	PVC	EPDM	053461		
		FKM	053467		
	CPVC	EPDM	053473		
		FKM	253008		
	PP	EPDM	053513*	053519*	
		FKM	053525*	253002*	
3/4	PVC	EPDM	053462		
		FKM	053468		
	CPVC	EPDM	053474		
		FKM	253009		
	PP	EPDM	053614*	053520*	
		FKM	053526*	253003*	
1	PVC	EPDM	053463		
		FKM	053469		
	CPVC	EPDM	053475		
		FKM	253010		
	PP	EPDM	053515*	053521*	
		FKM	053527*	253004*	
1-1/4	PVC	EPDM	053464		
		FKM	053470		
	CPVC	EPDM	253476		
		FKM	253011		
	PP	EPDM	053516*	053522*	
		FKM	053528*	253005*	
1-1/2	PVC	EPDM	053465		
		FKM	053471		
	CPVC	EPDM	053477		
		FKM	253012		
	PP	EPDM	053517*	053523*	
		FKM	053529*	253006*	
2	PVC	EPDM	053466		
		FKM	053472		
	CPVC	EPDM	053478		
		FKM	253013		
	PP	EPDM	053518*	053524*	
		FKM	053530*	253007*	
2-1/2	PVC	EPDM	053539	–	150 psi for PP socket or threaded
		FKM	053542	–	
	CPVC	EPDM	053545	–	
		FKM	053548	–	
3	PVC	EPDM	053540	–	
		FKM	053543	–	
	CPVC	EPDM	053546	–	
		FKM	053549	–	
4	PVC	EPDM	053541	–	
		FKM	053544	–	
	CPVC	EPDM	053547	–	
		FKM	053550	–	

* Socket (Metric)
Flanged valves available on request
2-1/2" – 4" threaded valves available on request

Body Material:

- ☐ PVC
- ☐ CPVC
- ☐ PP
- ☐ PVDF

Size (inches):

- ☐ 1/2
- ☐ 2
- ☐ 3/4
- ☐ 2-1/2
- ☐ 1
- ☐ 3
- ☐ 1-1/4
- ☐ 4
- ☐ 1-1/2

Seals:

- ☐ EPDM
- ☐ FKM

End Connections:

- ☐ Socket (IPS)
- ☐ Threaded (FNPT)
- ☐ Flanged (ANSI 150)
- ☐ Socket (Metric)

IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VKD SERIES BALL VALVES

Valve Selection – Vented

Vented ball valves are used with volatile liquids such as Hydrogen Peroxide (H_2O_2) and sodium hypochlorite (NaClO) to relieve a potentially dangerous pressure build-up in the ball cavity, when the valve is closed.

Size (inches)	Body Material	Seal Material	IPEX Part Number		Pressure Rating
			IPS Socket	FNPT Threaded	
3/8	PVC	FKM	353028		232 psi for socket or threaded
	CPVC		353000		
1/2	PVC		353083		
	CPVC		353021		
3/4	PVC		353084		
	CPVC		353022		
1	PVC		353085		
	PP		353023		
1-1/4	PVC		053503		
	CPVC		353024		
1-1/2	PVC		053504		
	CPVC		353025		
2	PVC		053505		
	CPVC		353026		
2-1/2	PVC		053506	–	
	CPVC		353027	–	
3	PVC		353086	–	
	CPVC		353029	–	
4	PVC		053562	–	
	CPVC		353030	–	

Flanged valves available on request
2-1/2" – 4" threaded valves available on request

Body Material:

☐ PVC ☐ CPVC

Size (inches):

☐ 1/2 ☐ 2
☐ 3/4 ☐ 2-1/2
☐ 1 ☐ 3
☐ 1-1/4 ☐ 4
☐ 1-1/2

Seals:

☐ FKM

End Connections:

☐ Socket (IPS)
☐ Threaded (FNPT)
☐ Flanged (ANSI 150)

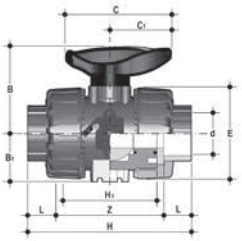
IPEX Part Number:

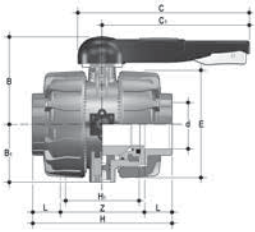
_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VKD SERIES BALL VALVES

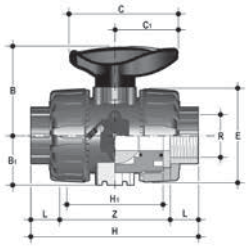
Dimensions

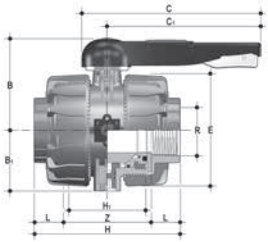




IPS Socket Connections – Dimension (inches)

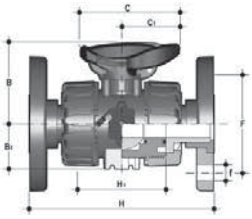
Size	d	H	L	Z	H_1	E	B_1	B	C_1	C
3/8	0.68	4.61	0.77	3.07	2.56	2.13	1.14	2.13	1.57	2.64
1/2	0.84	4.61	0.89	2.83	2.56	2.13	1.14	2.13	1.57	2.64
3/4	1.05	5.08	1.00	3.07	2.76	2.56	1.36	2.56	1.93	3.35
1	1.32	5.59	1.13	3.33	3.07	2.87	1.54	2.74	1.93	3.35
1-1/4	1.66	6.38	1.26	3.86	3.46	3.39	1.81	3.25	2.52	4.25
1-1/2	1.90	6.77	1.38	4.02	3.66	3.86	2.05	3.50	2.52	4.25
2	2.38	7.83	1.50	4.83	4.37	4.80	2.44	4.25	2.99	5.28
2-1/2	2.88	9.25	1.75	5.75	5.24	6.46	3.43	6.46	6.89	8.86
3	3.50	10.63	1.89	6.85	5.87	7.99	4.13	6.97	10.71	12.87
4	4.50	12.13	2.26	7.60	6.57	9.37	5.08	7.68	12.99	15.16





Female NPT Threaded Connections – Dimension (inches)

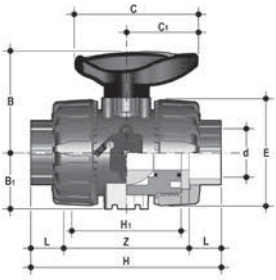
Size	R	H	L	Z	H_1	E	B_1	B	C_1	C
3/8	3/8-UPT	4.06	0.54	2.98	2.56	2.13	1.14	2.13	1.57	2.69
1/2	1/2-NPT	4.37	0.70	2.97	2.56	2.13	1.14	2.13	1.57	2.64
3/4	3/4-NPT	4.61	0.71	3.19	2.76	2.56	1.36	2.56	1.93	3.35
1	1-NPT	5.31	0.89	3.54	3.07	2.87	1.54	2.74	1.93	3.35
1-1/4	1-1/4-NPT	6.02	0.99	4.05	3.46	3.39	1.81	3.25	2.52	4.25
1-1/2	1-1/2-NPT	6.14	0.97	4.20	3.66	3.86	2.05	3.50	2.52	4.25
2	2-NPT	7.32	1.17	4.99	4.37	4.80	2.44	4.25	2.99	5.28
2-1/2	2-1/2-NPT	9.25	1.31	6.64	5.24	6.46	3.43	6.46	6.89	8.86
3	3-NPT	10.63	1.40	7.83	5.87	7.99	4.13	6.97	10.71	12.87
4	4-NPT	12.13	1.48	9.17	6.57	9.37	5.08	7.68	12.99	15.16



VKD Flanged Connections – Dimension (inches)

Size	H	H_1	B	B_1	C	C_1	F	f	U
1/2"	5.63	2.56	2.13	1.14	2.64	1.58	2.37	0.63	0.16
3/4"	6.77	2.76	2.56	1.36	3.35	1.93	2.75	0.63	0.16
1"	7.36	3.07	2.74	1.54	3.35	1.93	3.13	0.63	0.16
1 1/4"	7.48	3.47	3.25	1.81	4.25	2.52	3.5	0.63	0.16
1 1/2"	8.35	3.66	3.5	2.05	4.25	2.52	3.87	0.63	0.16
2"	9.21	4.37	4.25	2.44	5.28	2.99	4.75	0.75	0.16

Note: Dimensions based on VKD ANSI 150 Flanging Kit

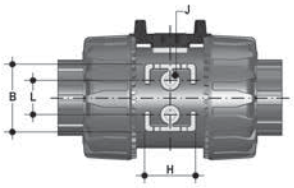


Metric Socket Connections – Dimension (inches)

Size	d	H	L	Z	H_1	E	B_1	B	C_1	C
20mm	0.79	4.02	0.57	2.87	2.56	2.13	1.14	2.13	1.57	2.64
25mm	0.98	4.49	0.63	3.23	2.76	2.56	1.36	2.56	1.93	3.35
32mm	1.26	4.96	0.71	3.54	3.07	2.87	1.54	2.74	1.93	3.35
40mm	1.57	5.55	0.81	3.94	3.35	3.39	1.81	3.25	2.52	4.25
50mm	1.97	6.46	0.93	4.61	3.66	3.86	2.05	3.50	2.52	4.25
63mm	2.48	7.83	1.08	5.67	4.37	4.80	2.44	4.25	2.99	5.28

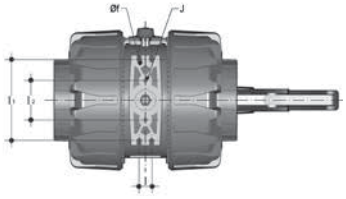
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VKD SERIES BALL VALVES



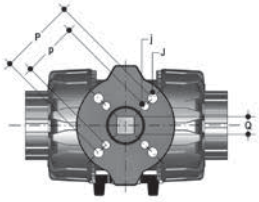
Support Bracket – Dimension (inches)

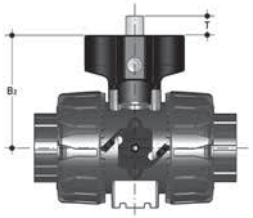
Size	J	B	L	H
1/2	M4	1.24	0.79	1.06
3/4	M4	1.57	0.79	1.18
1	M4	1.57	0.79	1.18
1-1/4	M6	1.97	1.18	1.38
1-1/2	M6	1.97	1.18	1.38
2	M6	2.36	1.18	1.57



Support Bracket – Dimension (inches)

Size	J	f	I	I1	I2
2-1/2	M6	0.25	0.69	3.54	2.04
3	M8	0.33	0.83	4.43	2.48
4	M8	0.33	0.83	5.39	2.64

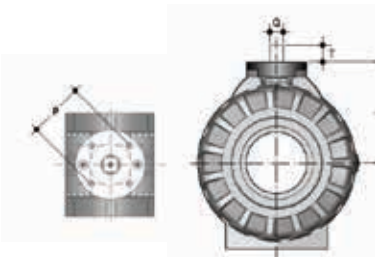




Actuation Pad – Dimension (inches)

Size	B_2	p	P	j	J	T	Q
1/2	2.28	F03	F04	0.22	0.22	0.47	0.43
3/4	2.89	F03	F05	0.22	0.26	0.47	0.43
*3/4	2.89	F04		0.22		0.47	0.43
1	2.91	F03	F05	0.22	0.26	0.47	0.43
*1	2.91	F04		0.22		0.43	0.43
1-1/4	3.82	F05	F07	0.26	0.33	0.63	0.55
1-1/2	4.09	F05	F07	0.26	0.33	0.63	0.55
2	4.49	F05	F07	0.26	0.33	0.63	0.55

*Available upon request.



Actuation Pad – Dimension (inches)

Size	P	J	T	Q
2-1/2	F07	0.35	0.63	0.55
3	F07	0.35	0.63	0.55
4	F07	0.35	0.75	0.67

Weights

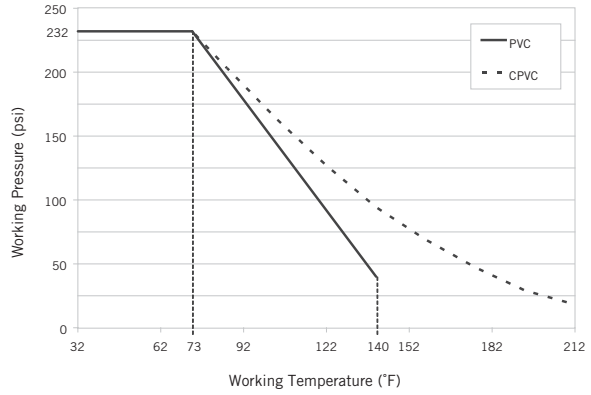
Approximate Weight (lbs)

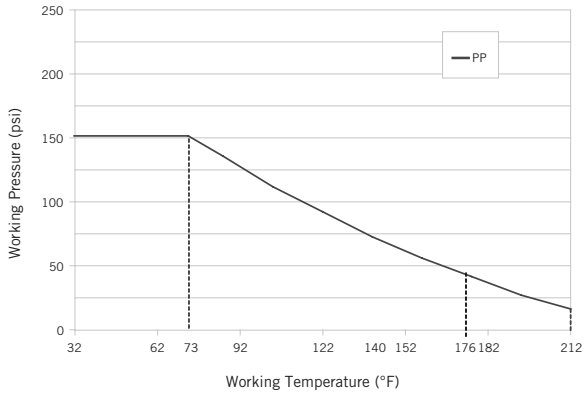
Size (inches)		IPS / Metric Socket			FNPT Threaded		
IPS	Metric	PVC	CPVC	PP	PVC	CPVC	PP
1/2	20mm	0.47	0.51	0.32	0.46	0.50	0.31
3/4	25mm	0.76	0.82	0.48	0.74	0.79	0.50
1	32mm	0.99	1.06	0.66	0.99	1.06	0.67
1-1/4	40mm	1.58	1.70	1.06	1.49	1.61	1.01
1-1/2	50mm	2.15	2.31	1.50	2.11	2.26	1.43
2	63mm	3.77	4.06	2.57	3.68	3.95	2.50
2-1/2	-	9.68	10.5	-	9.69	10.5	-
3	-	15.9	17.3	-	16.0	17.4	-
4	-	24.4	26.9	-	24.5	27.0	-

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

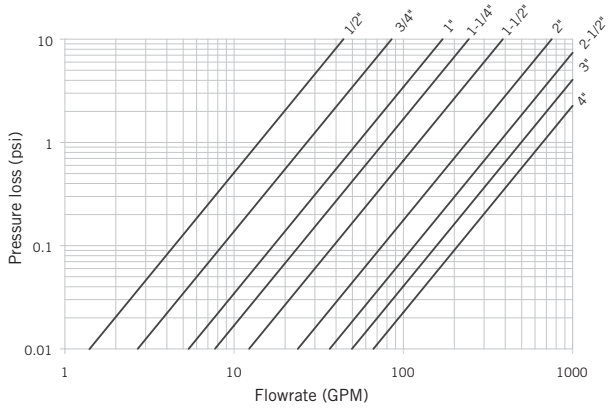
VKD SERIES BALL VALVES

Pressure – Temperature Ratings





Pressure Loss Chart



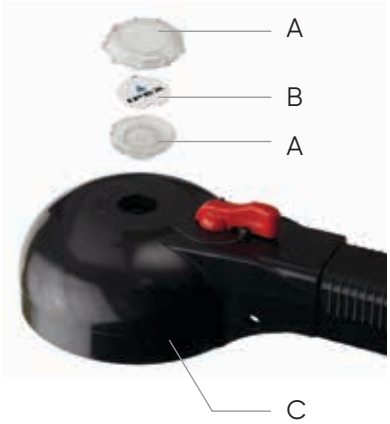
Flow Coefficients

Size (in)	C_V
1/2	14.0
3/4	27.0
1	53.9
1-1/4	77.0
1-1/2	123
2	238
2-1/2	368
3	497
4	665

Customize VKD EasyFit

It is often necessary to customize a valve by labelling or tagging it in order to mark, protect and identify it.

The 2-1/2" to 4" VKD is equipped with a specially designed water resistant module for the customization of the valve. The module is housed in the handle and is composed of a transparent PVC service plug and a white tag holder. The transparent plug can be easily removed to be used for self-labelling on its blank side. Self labelling can be done in several ways, but we recommend designing and printing custom labels through the EasyFit Labelling System (LSE).



A Transparent PVC Service Plug

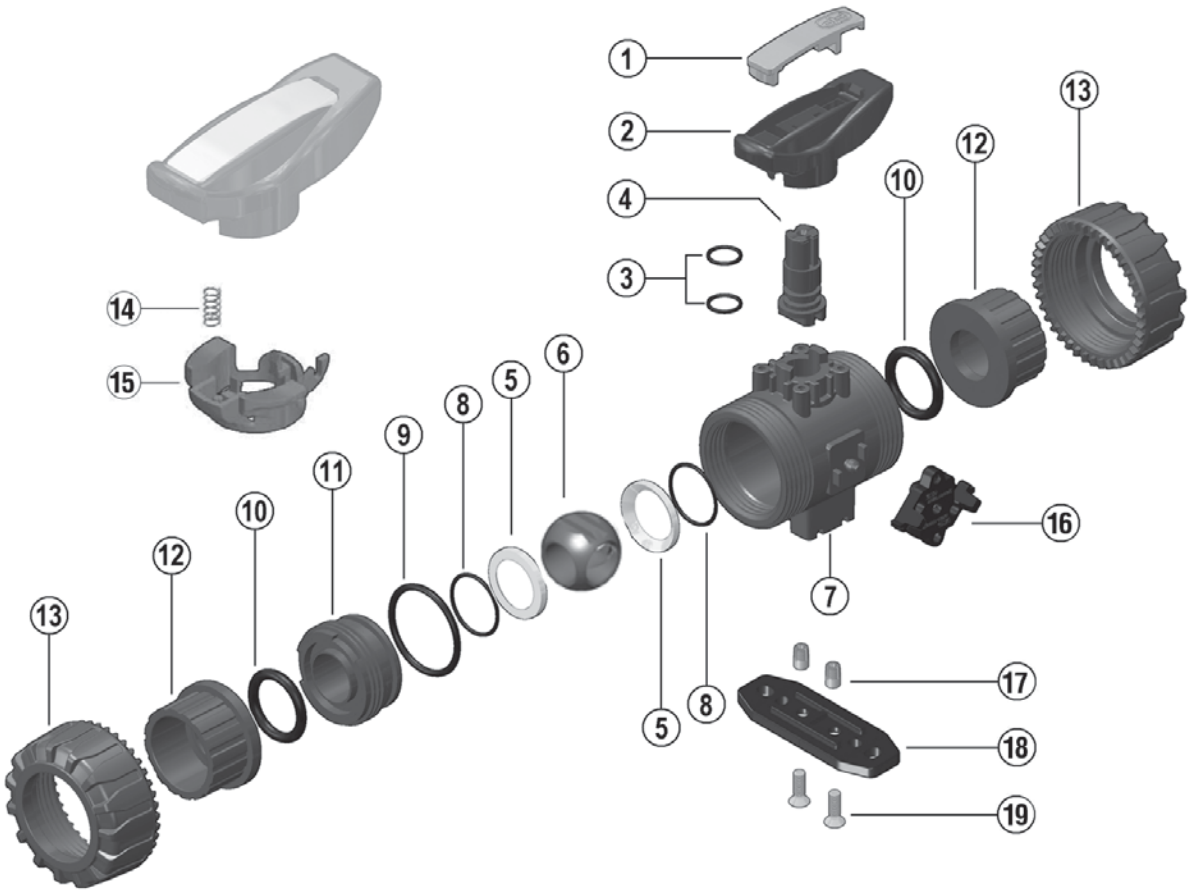
B PVC Tag Holder

C EasyFit Multifunction Handle

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VKD SERIES BALL VALVES

Components: Sizes 1/2" to 2"



#	Component	Material	Qty
1	insert	PVC / CPVC / PP	1
2	handle	PVC / CPVC / PP	1
3	stem o-ring	EPDM / FKM	2
4	stem	PVC / CPVC / PP	1
5	ball seat	PTFE	2
6	ball	PVC / CPVC / PP	1
7	body	PVC / CPVC / PP	1
8	ball seat o-ring	EPDM / FKM	2
9	body o-ring	EPDM / FKM	1
10	socket o-ring	EPDM / FKM	2

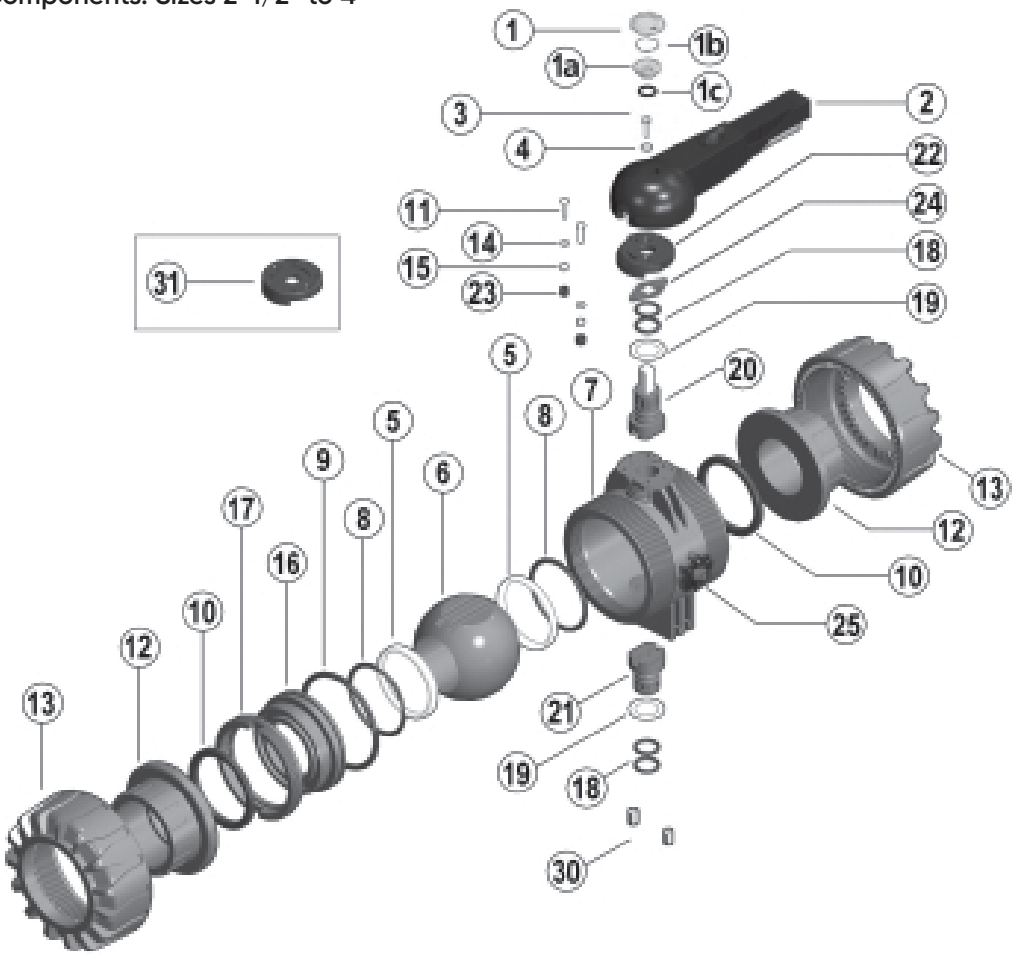
#	Component	Material	Qty
11	carrier with stop ring	PVC / CPVC / PP	1
12	end connector	PVC / CPVC / PP	2
13	union nut	PVC / CPVC / PP	2
14*	spring	SS	1
15*	handle lock	GRPP	1
16	DUAL BLOCK®	POM	1
17*	bracket bushing	SS / brass	2
18*	mounting plate	GRPP	1
19*	screw	SS	2

* Optional Accessories

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VKD SERIES BALL VALVES

Components: Sizes 2-1/2" to 4"



#	Component	Material	Qty
1 a,b,c	transparent service plug	PE	1
2	handle	PVC	1
3	bolt	SS	1
4	washer	SS	1
5	ball seat	PTFE	2
6	ball	PVC / CPVC	1
7	body	PVC / CPVC	1
8	ball seat o-ring	EPDM / FKM	2
9	body o-ring	EPDM / FKM	1
10	socket seal	EPDM / FKM	2
11	bolt	SS	2
12	end connector	PVC / CPVC	2
13	union nut	PVC / CPVC	2
14	washer	SS	2
15	nut	SS	2
16	carrier	PVC / CPVC	1

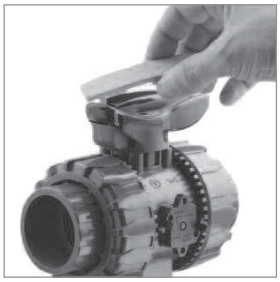
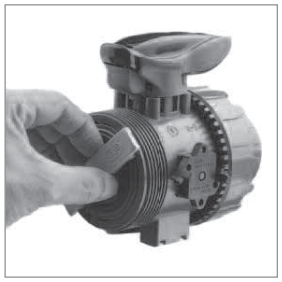
#	Component	Material	Qty
17	stop ring	PVC / CPVC	1
18	stem o-ring	EPDM / FKM	4
19	bushing	PTFE	2
20	upper stem	PVC / CPVC & SS	1
21	lower stem	PVC / CPVC	1
22	pad	GRPP	1
23	protective cap	PE	2
24	spring	SS	2
25	nut block	GRPP	2
26	cover	PP	1
27	nut block button	GRPP	1
28	protective cap	PE	1
29	screw	nylon	2
30	bracket bushing	brass	2
31	actuation pad	GRPP	1

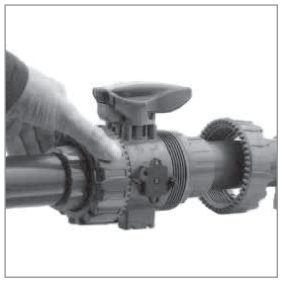
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VKD SERIES BALL VALVES

Installation Procedures

1. Remove the union nuts (part #13 on previous pages) and slide them onto the pipe.
2. Please refer to the appropriate connection style sub-section:
   a. For socket style, solvent cement or fuse the end connectors (12) onto the pipe ends. For correct solvent cementing procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". **Be sure to allow sufficient cure time before continuing with the valve installation.**
   b. For threaded style, thread the end connectors (12) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
3. Open and close the valve to ensure that the carrier (11 or 16) is at the desired adjustment. If adjustment is required, ensure that the valve is in the closed position then remove the insert tool (1) from the handle (2). For sizes 2-1/2" to 4", use the tool that accompanies the valve. Line up the moldings on the tool with the slots in the carrier. Tighten or loosen to the desired position then replace the tool on the handle.
4. Ensure that the valve is in the closed position, and that the socket o-rings (10) are properly fitted in their grooves. If anchoring is required, insert the bracket bushings (17) into the bottom of the valve (sizes 1/2" to 2" only). Carefully place the valve in the system between the two end connections and fix if necessary.
5. Tighten the union nut on the side opposite to that which is marked "ADJUST". Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. **Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack.**
6. Tighten the union nut on the side marked "ADJUST". Tightening the union nuts in this order results in the best possible valve performance due to optimum positioning and sealing of the ball and seat support system.
7. Open and close the valve to again ensure that the cycling performance is adequate. If adjustment is required, place the valve in the closed position, loosen the union nuts, remove the valve from the system, and then continue from Step 3.
8. Engage the Dual Block® system by affixing the molded piece (16, sizes 1/2" to 2") to the side of the valve body or by turning the red knob (27, sizes 2-1/2" to 4") to the locked position. This feature will prevent back-off of the union nuts during operation.





1/2" – 2" Dual Block® Mechanism

2-1/2" – 4" Dual Block® Mechanism


FREE

LOCK

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VKD SERIES BALL VALVES

Valve Maintenance

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the line. **Be sure to depressurize and drain the valve and isolated branch.**
2. If necessary, detach the valve from the support structure by disassembling the connections to the optional bracket on the bottom of the valve body (7).
3. Unlock the Dual Block® system by compressing the two ends of the molded piece (16, sizes 1/2" to 2") or by turning the red knob (27, sizes 2-1/2" to 4") to the unlocked position. Loosen both union nuts (13) and drop the valve out of the line. If retaining the socket o-rings (10), take care that they are not lost when removing the valve from the line.
4. Place the valve in the open position then line up the moldings on the wrench tool (1, sizes 1/2" to 2") with the slots in the carrier (found on the side marked "ADJUST"). Loosen and remove the carrier (11 or 16).
5. Carefully press the ball (6) out of the valve body, taking care not to score or damage the outer surface.
6. Remove the handle (2) by pulling upwards (sizes 1/2" to 2") or by removing transparent service plug (1 a,b,c), bolt (3) and washer (4) (sizes 2-1/2" to 4").
7. On sizes 2-1/2" to 4", remove the throttling pad (22) by loosening and removing the bolts (11), washers (14), nuts (15), and caps (23).
8. Press the stem (4 or 20) into the valve body from above. On sizes 2-1/2" to 4", remove the lower stem (21) by pushing it into the valve body from below.
9. The stem o-rings (3 or 18), body o-ring (9), ball seats (5), ball seat o-rings (8), and bushings (19, sizes 2-1/2" to 4") can now be removed and/or replaced.

Note: It is not typically necessary to disassemble the Dual Block® components.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.**

1. Replace the stem o-rings (3 or 18), body o-ring (9), ball seat o-rings (8), ball seats (5), and bushings (19, sizes 2-1/2" to 4") in their proper positions.
2. Insert the stem (4 or 20) into position from inside the valve body (7). On sizes 2-1/2" to 4", insert the lower stem (21) as well.
3. On sizes 2-1/2" to 4", replace the throttling pad (22) and affix in position using the bolts (11), washers (14), and nuts (15). Replace the caps (23) over the nuts.
4. Replace the handle (2). On sizes 2-1/2" to 4", affix using the bolt (3) and washer (4), then replace the transparent service plug (1 a,b,c).
5. Carefully insert the ball (6) into the valve body, taking care not to score or damage the outer surface. **Ensure that the valve handle and ball position correspond to the same operating position.**
6. Insert the threaded carrier (11 or 16) and tighten into the valve body. Use the wrench tool to sufficiently tighten.
7. Place the end connectors (12) into the union nuts (13), then thread onto the valve body taking care that the socket o-rings remain properly fitted in their grooves.
8. Engage the Dual Block® system by affixing the molded piece (16, sizes 1/2" to 2") to the side of the valve body or by turning the red knob (27, sizes 2-1/2" to 4") to the locked position.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VKD SERIES BALL VALVES

Testing & Operation

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, *"Volume I: Vinyl Process Piping Systems"* under the section entitled, *"Testing"*. The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system.**

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

For safety reasons, please contact IPEX customer service and technical support when using volatile liquids such as hydrogen peroxide (H2O2) and sodium hypochlorite (NaClO). These liquids may vaporize causing a potentially dangerous pressure increase in the dead space between the ball and the valve body. Special VKD ball valves are available for these types of critical applications.

Note: The VKD handle incorporates a locking mechanism that prevents unintentional rotation. When engaged, the spring-loaded handle release is locked and the valve cannot be cycled. A padlock can be installed through this portion of the handle as an additional safety precaution.

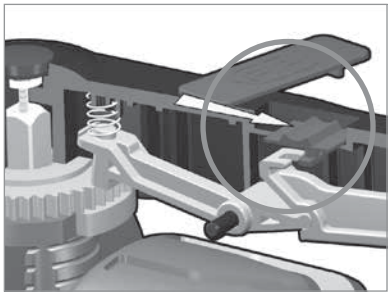
Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

Size 2-1/2"

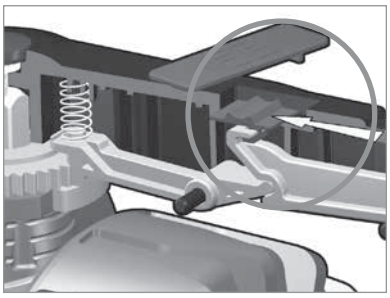
FREE

LOCK

Size 3" – 4"



FREE



LOCK

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VXE SERIES BALL VALVES

The IPEX EasyFit VXE Series True Union Ball Valves represent the latest innovation in thermoplastic ball valve manufacturing technology. Developed in collaboration with Giugiaro Design, the VXE Series replaces the well received VX Series with new and cutting edge features and is designed for industrial, general purpose and O.E.M. applications. This valve features an ultra-compact double block design, and full port bi-directional operation. The true union design allows the valve to be easily removed from the piping system and be fully serviced. A threaded seat stop carrier provides improved seal integrity under tough service conditions while the EasyFit multifunction handle doubles as a tool for ball seat adjustment, and for tightening union nuts precisely.

VXE ball valves are part of our complete system of IPEX pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

ASTM D1784
ASTM D2464
ASTM D2466
ASTM D2467
ASTM F437
ASTM F439
ASTM F1498

ANSI B1.20.1

Certified to NSF/ANSI 61 & 372

VALVE AVAILABILITY

BODY MATERIAL	PVC, CPVC
SIZE RANGE	1/2" through 6"*
Pressure	up to 232 psi
SEATS	Teflon® (PTFE)
SEALS	EPDM or FKM
END CONNECTIONS	Socket (IPS), Threaded (FNPT), Flanged (ANSI150)

* 4" with venturied ends

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SAMPLE SPECIFICAITONS

Sample Specifications

1.0 Ball Valves – VXE

1.1 Material

- The valve body, stem, ball and unions shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

or The valve body, stem, ball and unions shall be made of Corzan® CPVC compound which shall meet or exceed the requirements of 23447 according to ASTM D1784.

- These compounds shall be listed with NSF to Standard 61 for potable water.
- These compounds shall be listed with NSF to Standard 372 for lead content requirements.

1.2 Seats

- The ball seats shall be made of Teflon® (PTFE).

1.3 Seals

- The o-ring seals shall be made of EPDM.

or The o-ring seals shall be made of Fluoropolymer (FKM).

2.0 Connections

2.1 Socket Style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

or The IPS socket CPVC end connectors shall conform to the dimensional standard ASTM F439.

2.2 Threaded Style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1.

or The female NPT threaded CPVC end connectors shall conform to the dimensional standards ASTM F437, ASTM F1498, and ANSI B1.20.

2.3 Flanged Style

- The ANSI 150 flanged PVC end connectors shall conform to the dimensional standard ANSI B16.5

or The ANSI 150 flanged CPVC end connectors shall conform to the dimensional standards ANSI B16.5

3.0 Design Features

- The valve shall be double blocking with union ends.
- All sizes 1/2" through 4" shall be full port.
- All sizes shall allow for bi-directional flow.
- The valve body shall be single end entry with a threaded carrier (ball seat support).
- The valve body shall have an expansion and contraction compensating groove on the molded end.
- The valve body, union nuts, and carrier shall have deep square style threads for increased strength.
- The ball shall be machined smooth to minimize wear on valve seats.
- The stem design shall feature a shear point above the o-ring to maintain system integrity in the unlikely event of a stem breakage.
- The handle shall incorporate a tool for adjustment of the threaded carrier.
- The handle shall incorporate a tool for adjustment of union nuts.
- The handle shall incorporate a transparent PVC plug and tag holder for valve identification.

3.1 Pressure Tested

- All valves shall have been pressure tested in both the open and closed positions by the manufacturer.

3.2 Pressure Rating

- Socket and threaded valves shall be rated at 232 psi at 73°F.
- Flanged valves shall be rated at 150psi at 73°F.

3.3 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.4 Color Coding

- All PVC valves shall be color-coded dark gray.

or All CPVC valves shall be color-coded light gray.

4.0 NSF Listings

- All valves shall be listed with NSF to Standard 61 for portable water.
- All valves shall be listed with NSF to Standard 372 for lead content requirements.

5.0 All valves shall be Xirtec® PVC or Xirtec® CPVC by IPEX or approved equal.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VXE SERIES BALL VALVES

Valve Selection

Size (inches)	Body Material	O-ring Material	IPEX Part Number			Pressure Rating
			IPS Socket	FNPT Threaded	ANSI Flanged	
1/2	PVC	EPDM	353001		353627	232 psi for socket or threaded
		FKM	353002		353637	
	CPVC	EPDM	353041		353651	
		FKM	353042		353661	
3/4	PVC	EPDM	353003		353628	
		FKM	353004		353638	
	CPVC	EPDM	353043		353652	
		FKM	353044		353662	
1	PVC	EPDM	353005		353629	
		FKM	353006		353639	
	CPVC	EPDM	353045		353653	
		FKM	353046		353663	
1-1/4	PVC	EPDM	353007		353630	
		FKM	353008		353640	
	CPVC	EPDM	353047		353654	
		FKM	353048		353664	
1-1/2	PVC	EPDM	353009		353631	
		FKM	353010		353641	
	CPVC	EPDM	353049		353655	
		FKM	353050		353665	
2	PVC	EPDM	353011		353632	150 psi for flanged
		FKM	353012		353642	
	CPVC	EPDM	353051		353656	
		FKM	353052		353666	
2-1/2	PVC	EPDM	353623	-	353633	
		FKM	353624	-	353643	
	CPVC	EPDM	353647	-	353657	
		FKM	353648	-	353667	
3	PVC	EPDM	353013	353017	353634	
		FKM	353014	353018	353644	
	CPVC	EPDM	353053	353057	353658	
		FKM	353054	353058	353668	
4	PVC	EPDM	353015	353019	353635	
		FKM	353016	353020	353645	
	CPVC	EPDM	353055	353059	353659	
		FKM	353056	353060	353669	
6	PVC	EPDM	353625	-	353636	
		FKM	353626	-	353646	
	CPVC	EPDM	353649	-	353660	
		FKM	353650	-	353670	

Body Material:

☐ PVC ☐ CPVC

Size (inches):

☐ 1/2 ☐ 2

☐ 3/4 ☐ 2-1/2

☐ 1 ☐ 3

☐ 1-1/4 ☐ 4

☐ 1-1/2 ☐ 6

Seals:

☐ EPDM

☐ Fluoropolymer (FKM)

End Connections:

☐ Socket (IPS)

☐ Threaded (FNPT)

☐ Flanged (ANSI 150)

IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VXE SERIES BALL VALVES

Valve Selection – Vented

Vented ball valves are used with volatile liquids such as Hydrogen Peroxide (H_2O_2) and sodium hypochlorite (NaClO) to relieve a potentially dangerous pressure build-up in the ball cavity, when the valve is closed.

Size (inches)	Body Material	Seal Material	IPEX Part Number			Pressure Rating
			IPS Socket	FNPT Threaded	ANSI 150 Flanged	
1/2	PVC	FKM	353031		–	232 psi for socket or threaded
	CPVC		353067		–	
3/4	PVC		353032		–	
	CPVC		353068		–	
1	PVC		353033		–	
	CPVC		353069		–	
1-1/4	PVC		353034		–	
	PP		353070		–	
1-1/2	PVC		353035		–	
	CPVC		353071		–	
2	PVC		353036		–	
	CPVC		353072		–	
2-1/2	PVC		353037	–	353063	
	CPVC		353073	–	353079	
3	PVC		353038	353040	353064	
	CPVC		353074	353076	353080	
4	PVC		353039	353061	353065	
	CPVC		353075	353077	353081	
6	PVC		353086	–	353066	
	CPVC		353029	–	353082	

Size (inches):

- ☐ 1/2
- ☐ 3/4
- ☐ 1
- ☐ 1-1/4
- ☐ 1-1/2
- ☐ 2
- ☐ 2-1/2
- ☐ 3
- ☐ 4
- ☐ 6

End Connections:

- ☐ Socket (IPS)
- ☐ Threaded (FNPT)
- ☐ Flanged (ANSI 150)

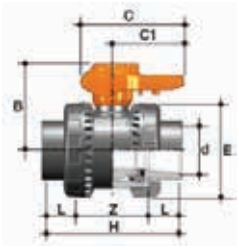
IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

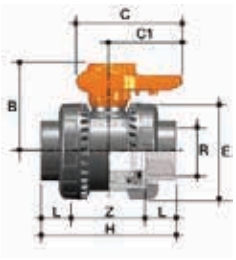
VXE SERIES BALL VALVES

Dimensions



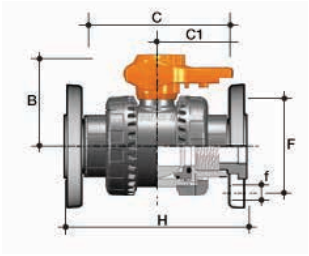
VXE IPS Socket (inches)

Size	d	L	Z	H	E	B	C	C1
1/2	0.84	0.89	2.01	3.78	2.13	1.93	2.52	0.79
3/4	1.05	1.00	2.13	4.13	2.48	2.44	3.07	0.91
1	1.32	1.13	2.34	4.61	2.83	2.80	3.43	1.06
1-1/4	1.66	1.26	2.83	5.35	3.35	3.23	4.02	1.18
1-1/2	1.90	1.38	3.03	5.79	3.94	3.62	4.29	1.30
2	2.38	1.50	3.84	6.85	4.65	4.33	5.24	1.54



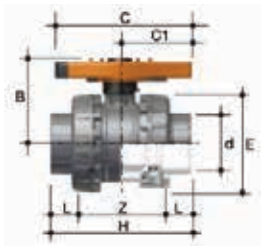
VXE NPT Female (inches)

Size	R	L	Z	H	E	B	C	C1
1/2	1/2-NPT	0.70	2.14	3.54	2.13	1.93	2.52	0.79
3/4	3/4-NPT	0.71	2.24	3.66	2.48	2.44	3.07	0.91
1	1-NPT	0.89	2.55	4.33	2.83	2.80	3.43	1.06
1-1/4	1-1/4-NPT	0.99	3.02	5.00	3.35	3.23	4.02	1.18
1-1/2	1-1/2-NPT	0.97	3.21	5.16	3.94	3.62	4.29	1.30
2	2-NPT	1.17	4.01	6.34	4.65	4.33	5.24	1.54



VXE ANSI Flanged (inches)

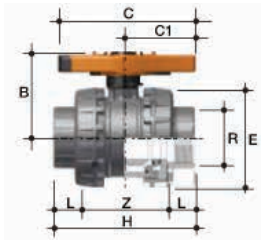
Size	No of Holes	f	F	H	B	C	C1
1/2	4	5/8	2-3/8	5.59	1.93	2.52	0.79
3/4	4	5/8	2-3/4	6.07	2.44	3.07	0.91
1	4	5/8	3-1/8	6.74	2.80	3.43	1.06
1-1/4	4	5/8	3-1/2	7.54	3.23	4.02	1.18
1-1/2	4	5/8	3-7/8	8.29	3.62	4.29	1.30
2	4	3/4	4-3/4	9.60	4.33	5.24	1.54



VXE IPS Socket (inches)

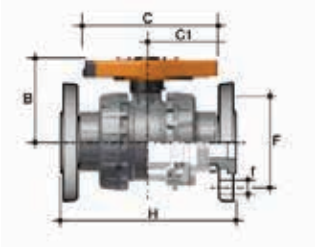
Size	d	L	Z	H	E	B	C	C1
2-1/2	2.875	1.75	4.80	8.31	6.18	5.59	8.43	4.53
3	3.5	1.89	5.98	9.76	6.85	5.95	9.41	4.96
4	4.5	2.26	6.61	11.14	8.35	6.87	10.63	5.71
*6	6.625	3.03	18.56	24.62	8.35	6.87	10.63	5.71

* 6" VXE is a 4" with venturied ends



VXE NPT Female (inches)

Size	R	L	Z	H	E	B	C	C1
2-1/2	2-1/2-NPT	1.31	5.69	8.31	6.18	5.59	8.43	4.53
3	3-NPT	1.40	6.97	9.76	6.85	5.95	9.41	4.96
4	4-NPT	1.48	8.18	11.14	8.35	6.87	10.63	5.71



VXE ANSI Flanged (inches)

Size	No of Holes	f	F	H	B	C	C1
2-1/2	4	3/4	5-1/2	10.93	1.93	2.52	0.79
3	4	3/4	6	12.22	2.44	3.07	0.91
4	8	3/4	7-1/2	13.93	2.80	3.43	1.06
*6	8	7/8	9-1/2	27.48	3.23	4.02	1.18

Note: Flanged connections are assembled at the factory. Due to manufacturing constraints dimension H may not be exactly as shown. The dimensions provided are approximate and should not be used to create precise layouts.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VXE SERIES BALL VALVES

Weights

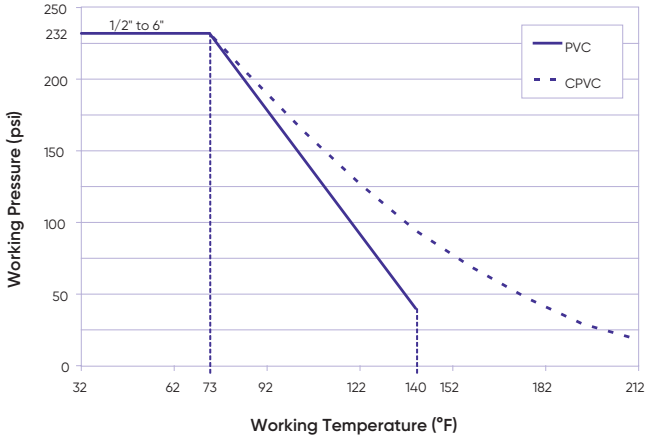
Approximate Weight (lbs)

Size (inches)	PVC		CPVC	
	IPS Socket/ FNPT Threaded	ANSI Flanged	IPS Socket/ FNPT Threaded	ANSI Flanged
1/2	0.39	0.79	0.39	0.79
3/4	0.57	1.11	0.57	1.11
1	0.81	1.63	0.81	1.63
1-1/4	1.25	2.25	1.25	2.25
1-1/2	1.76	2.99	1.76	2.99
2	2.93	4.92	2.93	4.92
2-1/2	6.06	8.64	6.61	9.19
3	7.57	11.36	8.25	12.04
4	12.82	18.09	13.97	19.24
*6	21.42	31.44	23.14	33.74

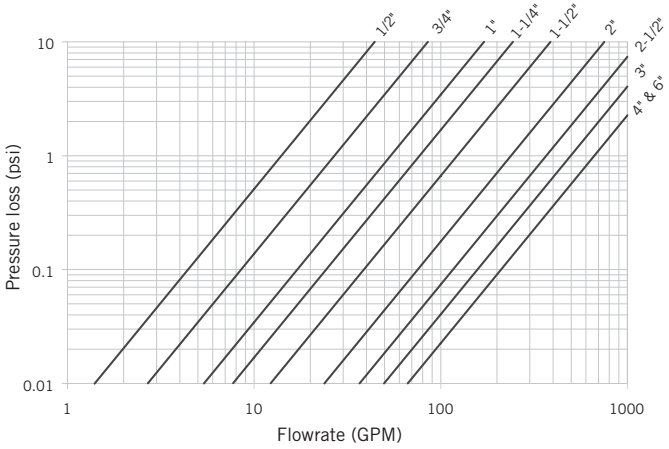
* 6" VXE is a 4" with venturied ends

Pressure – Temperature Ratings

For Socketed and Threaded Only



Pressure Loss Chart



Flow Coefficients

Size	C_v
1/2	14.0
3/4	27.0
1	53.9
1-1/4	77.0
1-1/2	123
2	238
2-1/2	348
3	487.2
4	654.2
*6	654.2

* Not including venturied ends

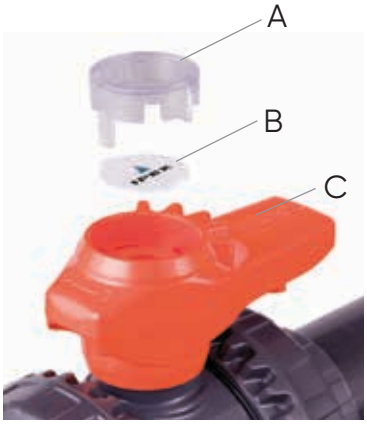
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Customize VXE Series Ball Valves

It is often necessary to customize a valve by labelling or tagging it in order to mark, protect and identify it.

VXE EasyFit valves are therefore equipped with a plastic water-resistant module designed to meet this specific need. The module is housed in the handle, is composed of a transparent PVC service plug and a white circle tag holder, IPEX branded on one side. The tag holder is embedded in the plug and can be easily removed to be used for self labelling on its blank side. Self labelling can be done in several ways, but we recommend designing and printing custom labels through the EasyFit Labelling System (LSE).

Please contact IPEX customer service for options and pricing on customization of VXE valves with LSE sets



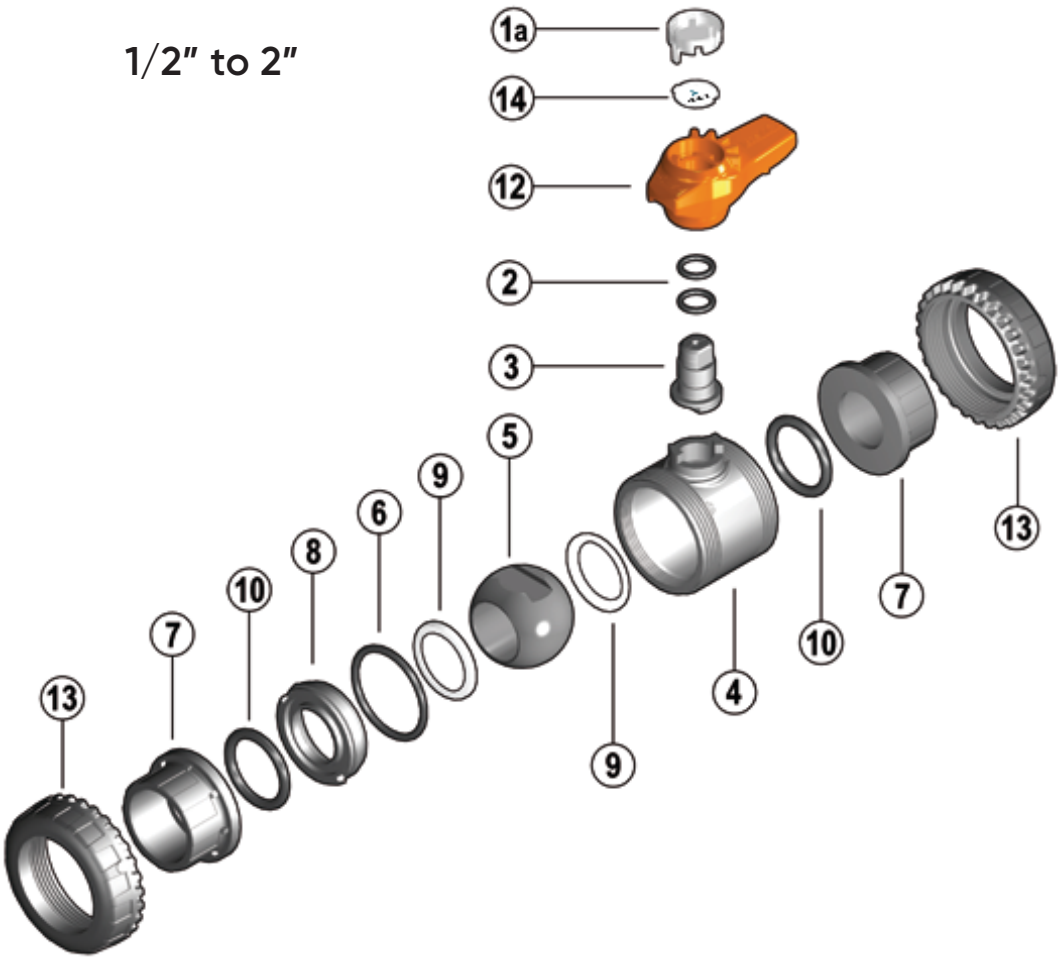
A Transparent PVC Service Plug
B PVC Tag Holder
C EasyFit Multifunction Handle

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VXE SERIES BALL VALVES

Components

1/2" to 2"



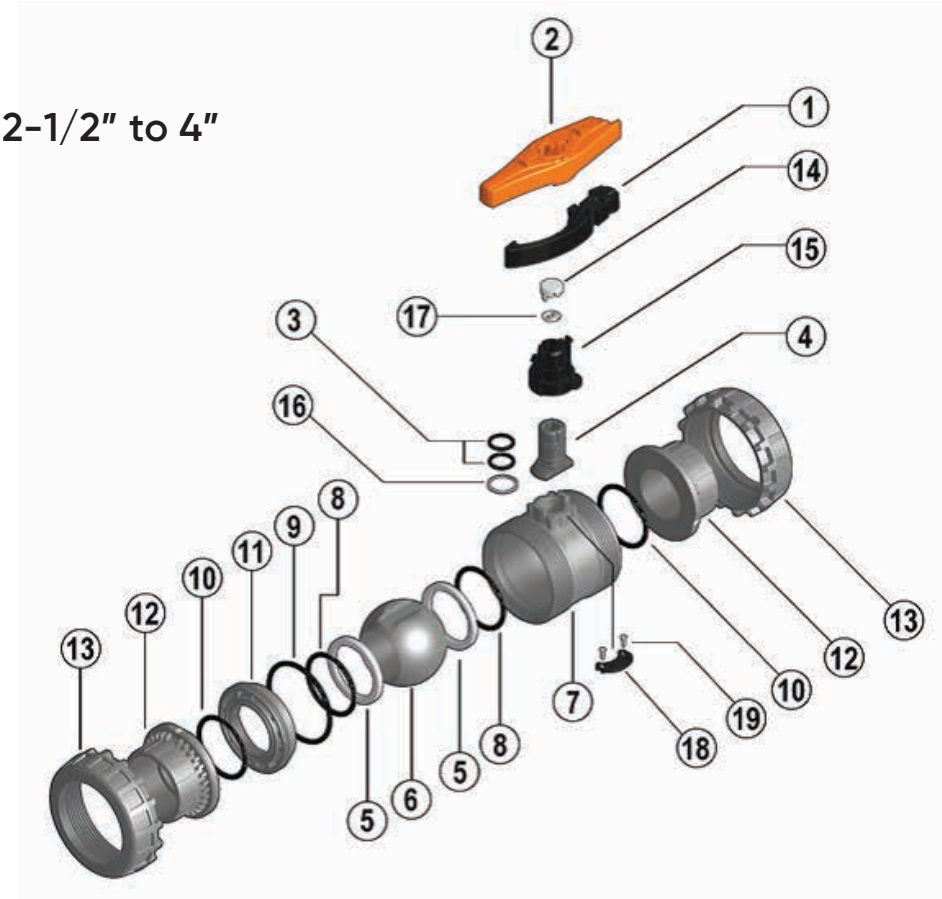
No.	Component	Material	Qty
1a	Transparent Service Plug	PVC	1
2*	Stem O-Ring	EPDM / FKM	2
3*	Stem	PVC / CPVC	1
4	Body	PVC / CPVC	1
5	Ball	PVC / CPVC	1
6*	Body Seal O-Ring	EPDM / FKM	1
7	End Connector	PVC / CPVC	2
8	Support for Ball Seat	PVC / CPVC	1
9*	Ball Seat	PTFE	2
10*	Socket Seal O-Ring	EPDM / FKM	2
12	Handle	PVC	1
13	Union Nut	PVC / CPVC	2
14	Tag Holder	PVC	1

* Spare parts available.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VXE SERIES BALL VALVES

Components



No.	Component	Material	Qty
1	Easyfit multifunctional Tool	GFPP	1
2*	Easyfit multifunctional Handle	PVC	1
3*	Stem O-rings	EPDM / FKM	2
4	Stem	PVC / CPVC	1
5	Ball Seat	PTFE	2
6*	Ball	PVC / CPVC	1
7	Body	PVC / CPVC	1
8	Ball Seat O-Ring	EPDM / FKM	2
9*	Radial Seal O-Ring	EPDM / FKM	1
10*	Socket Seal O-Ring	EPDM / FKM	2
11	Support for ball seat	PVC / CPVC	1
12	End Connector	PVC / CPVC	2
13	Union Nut	PVC / CPVC	2
14	Transparent Service Plug	PVC	1
15	Central Hub	PVC	1
16	Friction reducing bush	PTFE	1
17	Tag Holder	PVC	1
18	Tamper-proof plate	PVC	1
19	Self-tapping screw	SS	2

* Spare parts available.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VXE SERIES BALL VALVES

Installation Procedures

1. For socket and threaded style connections, remove the union nuts (part #13 on previous page) and slide them onto the pipe. For flanged connections, remove the union nut / flange assemblies from the valve.
2. Please refer to the appropriate connection style sub-section:
   a. For socket style, solvent cement the end connectors (7 or 12) onto the pipe ends. For correct joining procedure, please refer to the section entitled, *"Joining Methods – Solvent Cementing"* in the IPEX Industrial Technical Manual Series, *"Volume I: Vinyl Process Piping Systems"*. **Be sure to allow sufficient cure time before continuing with the valve installation.**

   b. For threaded style, thread the end connectors (7) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".

3. Open and close the valve to ensure that the ball seat support (8) is at the desired adjustment. If adjustment is required, ensure that the valve is in the closed position then remove the handle (12 or 2) from the valve stem. Line up the moldings on the handle wit the slots in the ball seat support. Tighten or loosen to the desired position then replace the handle on the valve stem.
4. Ensure that the valve is in the closed position, and that the socket o-rings (10) are properly fitted in their grooves. Carefully place the valve in the system between the two end connections.
5. Tighten the union nut on the side opposite to that which is marked "ADJUST". Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. If additional tightening is required, the Easyfit multifunctional handle tool can be used to tighten the union nuts an additional 1/4 turn.
6. Tighten the union nut on the side marked "ADJUST". Tightening the union nuts in this order results in the best possible valve performance due to optimum positioning and sealing of the ball and seat support system.

   Over-tightening may damage the threads on the valve body and/ or the union nut and may even cause the union nut to crack. It is recommended to use the Easyfit handle to prevent damage.

7. Open and close the valve to again ensure that the cycling performance is adequate. If adjustment is required, place the valve in the closed position, loosen the union nuts, remove the valve from system and then continue from Step 3.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VXE SERIES BALL VALVES

Valve Maintenance

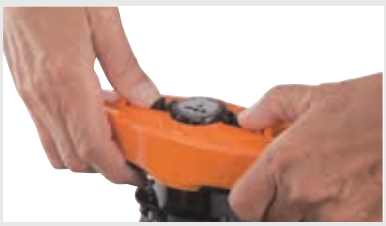
Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. **Be sure to depressurize and drain the isolated branch and valve before continuing.**
2. Loosen both union nuts (13) and drop the valve out of the line. If retaining the socket o-rings (10), take care that they are not lost when removing the valve from the line.
   a. For 1/2" to 2" remove the handle (12) and the transparent service plug (1a). Turn handle over, and seat on valve stem, ensuring the integrated gear teeth on the handle mesh with the union nut teeth. Turn clockwise to loosen.
   b. For 2-1/2" to 6" remove handle (2). Remove the Easyfit multifunctional tool (1) from the bottom of the handle (2), turn it over and re-install it. Engage the tool (1) with the outer ring profile on the union nut (13) and loosen.
3. To disassemble, place the valve in the closed position and locate the ball seat support adjustment tool on the multifunctional handle. This is found on the bottom of 1/2" to 2" handles and on the top of 2-1/2" to 6" handles.
4. Line up the moldings on the handle with the slots in the ball seat support (found on the side marked "ADJUST"). Loosen and remove the ball seat support (8 or 11) by turning in a counterclockwise direction.
5. Carefully press the ball (5 or 6) out of the valve body, taking care not to score or damage the outer surface.
6. To remove the stem (3 or 4), remove the central hub (15) on 2-1/2" to 6" sizes, press the stem into the valve body (4 or 7) from above.
7. The stem o-rings (2 or 3), body o-ring (6 or 9), friction reducing bushing (16) and ball seats (9 or 5) can now be removed and/or replaced.

1/2" – 2" VXE Ball Valves



2-1/2" – 6" VXE Ball Valves



CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VXE SERIES BALL VALVES

Valve Maintenance

Assembly

NOTE: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.**

1. Firmly place the ball seat (9 or 5) in the groove on the opposite end inside the valve body (4 or 7).
2. Properly fit the stem o-rings (2 or 3) in the grooves on the stem (3 or 4) and the friction reducing bushing (16) onto the stem, then insert the stem from the inside of the valve body.
3. Ensure that the valve stem is in the closed position then insert the ball (5 or 6) into the valve body taking care not to score or damage the outer surface.
4. Check that the ball seat (9 or 5) and body o-ring (6 or 9) are properly fitted on the ball seat support (8 or 11), then slightly hand tighten into the valve body. Line up the moldings on the handle (12 or 2) with the slots in the ball seat support then tighten by turning in a clockwise direction.
5. Replace the handle on the valve stem then cycle the valve open and closed to determine whether or not the performance is adequate. If so desired, the handle can be removed and used to make further adjustments.
6. Properly fit the socket o-rings (10) in their respective grooves.
7. Place the end connectors (7 or 12) into the union nuts (13), then thread onto the valve body taking care that the socket o-rings remain properly fitted in their grooves.
    a. For 1/2" to 2" remove the handle (2) and the transparent service plug (1a). Turn handle over and seat over stem ensuring the integrated gear teeth mesh with the union nut teeth. Turn couter-clockwise to tighten.
    b. For 2-1/2" to 6" remove handle (12). Remove the Easyfit multifunctional tool (1) from the bottom of the handle (12), turn it over and re-install it. Engage the tool (1) with the outer ring profile on the union nut (13) and tighten.
8. Replace the handle on the valve stem then cycle the valve open and closed to determine whether or not the performance is adequate.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Testing & Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, *"Volume I: Vinyl Process Piping Systems" under the section entitled "Testing".* The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system.**

IMPORTANT POINTS:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

For safety reasons, please contact IPEX customer service and technical support when using volatile liquids such as hydrogen peroxide (H202) and sodium hypochlorite (NaClO). These liquids may vaporize causing a potentially dangerous pressure increase in the dead space between the ball and the valve body. Special VXE ball valves are available for these types of critical applications.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

MP SERIES COMPACT BALL VALVES

IPEX MP Compact Ball Valves are ideally suited to all kinds of plumbing and industrial applications where a compact, inexpensive on/off valve is required. The simple one piece PVC body with integral end connections eliminates potential problems cause by improper adjustment of the ball seating. MP Compact Ball Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

ASTM D1784
ASTM D2464
ASTM D2466
ASTM D2467
ASTM F1498

ANSI B1.20.1

VALVE AVAILABILITY

Body Material:	PVC
Size Range:	1/2" through 2"
Pressure:	150 psi
Seats:	Teflon® (PTFE)
Seals:	EPDM
End Connections:	Socket (IPS), Threaded (FNPT)

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

MP SERIES COMPACT BALL VALVES

Sample Specifications

1.0 Ball Valves – MP

1.1 Material

- The valve body and ball shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

1.2 Seats

- The ball seats shall be made of Teflon® (PTFE).

1.3 Seals

- The o-ring seals shall be made of EPDM.

2.0 Connections

2.1 Socket style

- The IPS socket PVC end connections shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

2.2 Threaded style

- The female NPT threaded PVC end connections shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1.

3.0 Design Features

- The valve shall be composed of a one piece PVC body.
- The end connections shall be an integral part of the body.
- All sizes shall allow for bi-directional flow.

3.1 Pressure Rating

- All sizes shall be rated at 150 psi at 73°F (non-shock).

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Colour Coding

- All PVC Schedule 40 valves shall be colour-coded white.
- All PVC Schedule 80 valves shall be colour-coded dark gray.

4.0 All valves shall be Xirtec® PVC by IPEX or approved equal.

Valve Selection

Size (inches)	Body Material	O-ring Material	IPEX Part Number		Pressure Rating
			IPS Socket	FNPT Threaded	
1/2	Sch 40 PVC	EPDM	052277	052283	150 psi
	Sch 80 PVC		052000	052026	
3/4	Sch 40 PVC		052278	052284	
	Sch 80 PVC		052006	052029	
1	Sch 40 PVC		052279	052285	
	Sch 80 PVC		052007	052107	
1-1/4	Sch 40 PVC		052280	052286	
	Sch 80 PVC		052009	052108	
1-1/2	Sch 40 PVC		052281	052287	
	Sch 80 PVC		052019	052109	
2	Sch 40 PVC		052282	052288	
	Sch 80 PVC		052024	052144	

Body Material:

☐ Sch 40 white PVC
☐ Sch 80 grey PVC

Size (inches):

☐ 1/2
☐ 3/4
☐ 1
☐ 1-1/4
☐ 1-1/2
☐ 2

End Connections:

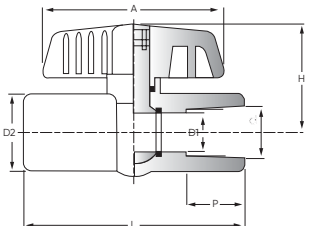
☐ Socket (IPS)
☐ Threaded (FNPT)

IPEX Part Number:

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

MP SERIES COMPACT BALL VALVES

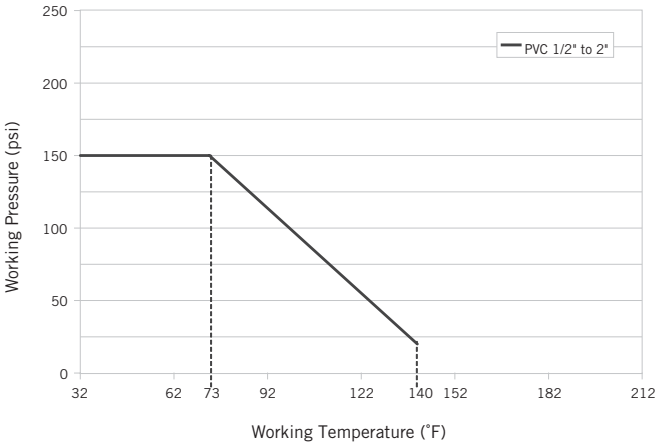
Dimensions



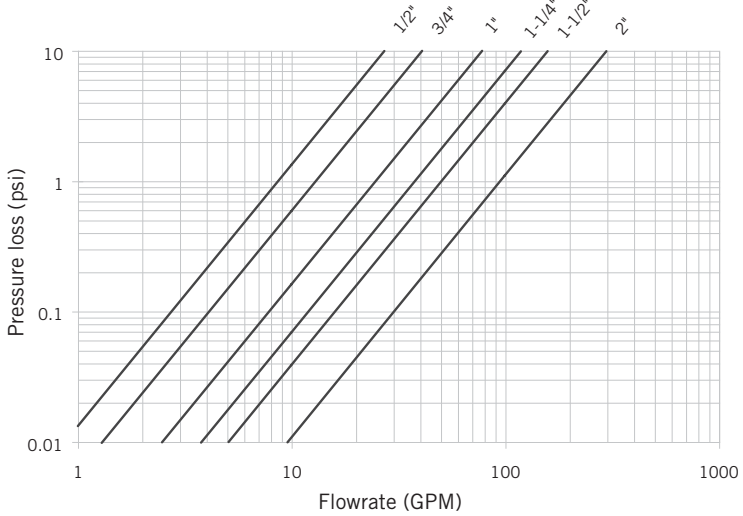
Dimension (inches)

Size	D1	d Socket	d Threaded	P	L	D2	H	A	W (lbs)
1/2	0.59	0.84	1/2 NPT	0.88	3.11	1.38	1.85	2.76	0.24
3/4	0.79	1.05	3/4 NPT	1.00	3.54	1.58	2.24	3.03	0.35
1	0.98	1.32	1 NPT	1.13	4.13	1.89	2.40	3.50	0.52
1-1/4	1.26	1.66	1-1/4 NPT	1.25	4.76	2.13	2.60	3.50	0.74
1-1/2	1.54	1.90	1-1/2 NPT	1.38	5.00	2.44	2.91	4.37	1.06
2	1.97	2.38	2 NPT	1.50	5.87	2.95	3.15	5.47	1.72

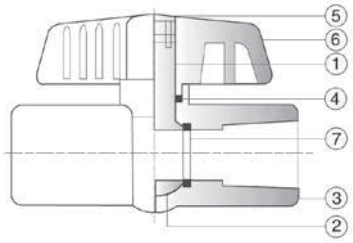
Pressure – Temperature Ratings



Pressure Loss Chart



Components



#	Component	Material	Qty
1	stem	PVC	1
2	ball	PVC	1
3	body	PVC (white) / PVC (grey)	1
4	stem o-ring	EPDM	1
5	cap	ABS	1
6	handle	ABS	1
7	seat	PTFE	2

Flow Coefficients

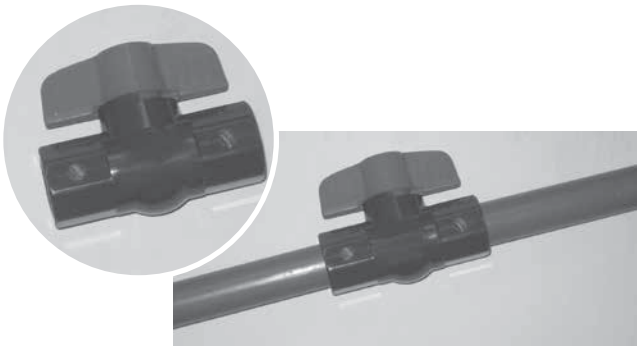
Size	C_v
1/2	8.80
3/4	13.2
1	25.2
1-1/4	38.5
1-1/2	51.3
2	96.7

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

MP SERIES COMPACT BALL VALVES

Assembly

1. Please refer to the appropriate connection style sub-section:
    a. For socket style, solvent cement each pipe end into the body of the valve. For correct joining procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". Be sure to allow sufficient cure time before pressurizing the system.
    b. For threaded style, thread each pipe end into the body of the valve. For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".



Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. Be sure to depressurize and drain the isolated branch and valve before continuing.
2. Please refer to the appropriate connection style sub-section:
    a. For socket style, cut the pipe as close to the ends of the valve body as possible. The valve can now be replaced.
    b. For threaded style, unthread the pipe ends from the valve body. The valve can now be reused and/or replaced.

Note: The MP Compact Ball Valve is a molded-in-place valve. It cannot be disassembled.

Testing & Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system.

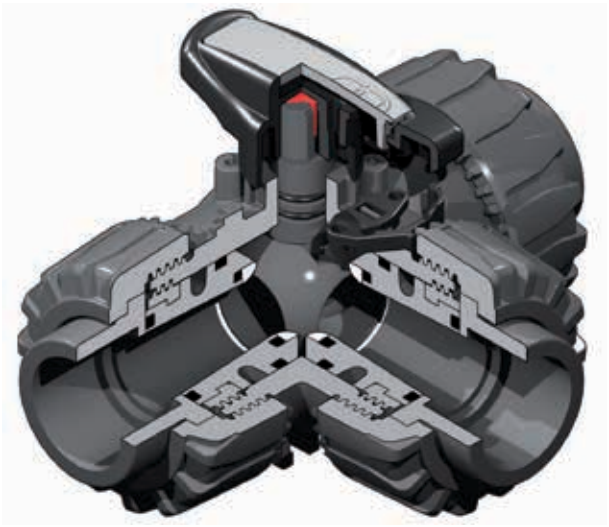
Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.
- For safety reasons, please contact IPEX customer service and technical support when using volatile liquids such as hydrogen peroxide (H2O2) and sodium hypochlorite (NaClO). These liquids may vaporize causing a potentially dangerous pressure increase in the dead space between the ball and the valve body.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

TKD SERIES 3-WAY BALL VALVES



IPEX TKD Series 3-Way Ball Valves can be used for flow diverting, mixing, or on/off isolation. They will replace a Tee + 2 valve linkage assembly at reduced cost and space, along with shorter installation and maintenance time. The patented seat stop carrier allows for in-line microadjustment of the ball seating, and features o-ring cushioning to minimize wear and prevent seizing. The TKD also includes our patented DUAL BLOCK® locking union nut system, which ensures the nuts are held in position even under severe service conditions such as high vibration or thermal expansion. Integral mounting flange and bracketing allows for direct actuation and simple support, while a locking handle can prevent improper positioning. TKD Series 3-Way Ball Valves are part of our complete Xirtec® PVC systems of pipe, valves and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

ASTM D1784
ASTM D2466
ASTM D2467
ASTM D2464
ASTM F437
ASTM F439
ASTM F1498

ANSI B1.20.1

Certified to NSF/ANSI 61 & 372

VALVE AVAILABILITY

Body Material:	PVC, CPVC
Size Range:	1/2" through 2"
Port Configuration:	Full port with T or L flow pattern
Pressure:	232psi
Seats:	Teflon® (PTFE)
Seals:	EPDM or FKM
End Connections:	Socket (IPS), Threaded (FNPT)

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

TKD SERIES 3-WAY BALL VALVES

Sample Specifications

1.0 Ball Valves – TKD

1.1 Material

- The valve body, stem, ball, end connectors, and unions shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.
- The valve body, stem, ball and unions shall be made of Corzan® CPVC compound which shall meet or exceed the requirements of 23447 according to ASTM D1784.

1.2 Seats

- The ball seats shall be made of Teflon® (PTFE).

1.3 Seals

- The o-ring seals shall be made of EPDM.

or The o-ring seals shall be made of FKM.

2.0 Connections

2.1 Socket style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

or The IPS socket CPVC end connectors shall conform to the dimensional standard ASTM F439.

2.2 Threaded style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498 and ANSI B1.20.1.

or The female NPT threaded CPVC end connectors shall conform to the dimensional standards ASTM F437, ASTM F1498, and ANSI B1.20.1.

3.0 Design Features

- All valves shall be true union at all three ports.
- All sizes shall be full port.
- Valve design shall permit positive shutoff of any of the three ports.
- Balls shall be of T-port or L-port design (specifier must select one).
- The valve shall have blocking seat supports at all three ports.
- The threaded carrier (ball seat support) shall be adjustable with the valve installed.
- The valve body, union nuts, and carrier shall have deep square style threads for increased strength.
- The ball shall be machined smooth to minimize wear on valve seats.
- All valve seats shall have o-ring backing cushions to compensate for wear and prevent seizure of the ball.
- The thickness of the valve body shall be the same at all three ports.
- The stem design shall feature a shear point above the o-ring to maintain system integrity in the unlikely event of a stem breakage.
- The valve shall include the DUAL BLOCK® union nut locking mechanism.
- The handle shall incorporate an optional feature to allow the valve position to be secured with a padlock.
- The handle shall incorporate a removable tool for adjustment of the threaded carrier.
- The top of the stem shall incorporate molded features to indicate port location and ball position.
- All valves shall have integrally molded mounting flanges for support and actuation.

3.1 Pressure Rating

- All valves shall be rated at 232psi at 73°F (23°C).

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturer's name or trade mark.

3.3 Color Coding

- All PVC valves shall be color-coded dark grey.

or All CPVC valves shall be color-coded light grey.

4.0 NSF Listings

- All valves shall be listed with NSF to Standard 61 for potable water.
- All valves shall be listed with NSF to Standard 372 for lead content requirements.

5.0 All valves shall be Xirtec® PVC or Xirtec® CPVC by IPEX or approved equal.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

TKD SERIES 3-WAY BALL VALVES

Size (inches)	Body Material	Port Style	O-ring Material	IPEX Part Number IPS Socket	IPEX Part Number FNPT Threaded	Pressure Rating @ 73°F
1/2	PVC	T	EPDM	253850		232 psi
			FKM	253862		
		L	EPDM	253844		
			FKM	253856		
	CPVC	T	EPDM	253899		
			FKM	253907		
		L	EPDM	253893		
			FKM	253905		
3/4	PVC	T	EPDM	253851		
			FKM	253863		
		L	EPDM	253845		
			FKM	253857		
	CPVC	T	EPDM	253900		
			FKM	253908		
		L	EPDM	253894		
			FKM	253922		
1	PVC	T	EPDM	253852		
			FKM	253864		
		L	EPDM	253846		
			FKM	253858		
	CPVC	T	EPDM	253901		
			FKM	253909		
		L	EPDM	253895		
			FKM	253906		
1-1/4	PVC	T	EPDM	253853		
			FKM	253865		
		L	EPDM	253847		
			FKM	253859		
	CPVC	T	EPDM	253902		
			FKM	253910		
		L	EPDM	253896		
			FKM	253923		
1-1/2	PVC	T	EPDM	253854		
			FKM	253866		
		L	EPDM	253848		
			FKM	253860		
	CPVC	T	EPDM	253903		
			FKM	253911		
		L	EPDM	253897		
			FKM	253924		
2	PVC	T	EPDM	253855		
			FKM	253867		
		L	EPDM	253849		
			FKM	253861		
	CPVC	T	EPDM	253904		
			FKM	253912		
		L	EPDM	253898		
			FKM	253925		

Note: Flanged valves available upon request.

Material:

☐ PVC ☐ CPVC

Port:

☐ T ☐ L

Size (inches):

☐ 1/2 ☐ 1-1/4

☐ 3/4 ☐ 1-1/2

☐ 1 ☐ 2

Seals:

☐ EPDM

☐ FKM

End Connections:

☐ Socket (IPS)

☐ Threaded (FNPT)

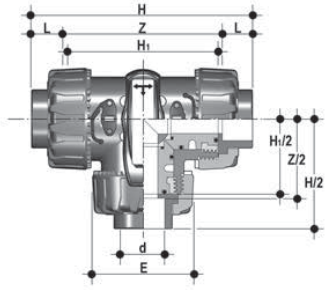
IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

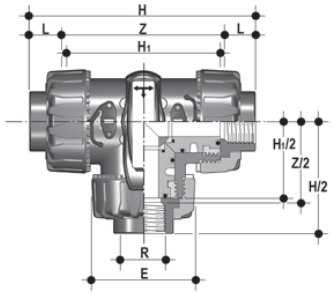
TKD SERIES 3-WAY BALL VALVES

Dimensions



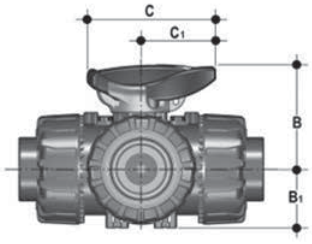
IPS Socket Connections – Dimension (inches)

Size (d)	E	H	H_1	L	Z
1/2	2.13	5.20	3.15	0.91	3.43
3/4	2.56	6.27	3.94	1.00	4.26
1	2.87	6.85	4.33	1.13	4.59
1-1/4	3.39	8.07	5.16	1.26	5.55
1-1/2	3.86	8.96	5.83	1.38	6.20
2	4.80	10.51	7.05	1.50	7.50



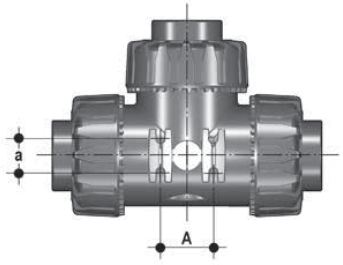
Female NPT Threaded Connections – Dimension (inches)

Size (R)	E	H	H_1	L	Z
1/2	2.13	4.96	3.15	0.71	3.56
3/4	2.56	5.76	3.94	0.71	4.35
1	2.87	6.56	4.33	0.89	4.78
1-1/4	3.39	7.71	5.16	0.99	5.73
1-1/2	3.86	8.32	5.83	0.97	6.38
2	4.80	9.99	7.05	1.17	7.66



IPS Socket & Female NPT Threaded – Dimension (inches)

Size	B	B_1	C	C1
1/2	2.13	1.14	2.64	1.58
3/4	2.56	1.36	3.35	1.93
1	2.74	1.54	3.35	1.93
1-1/4	3.25	1.81	4.25	2.52
1-1/2	3.50	2.05	4.25	2.52
2	4.25	2.44	5.28	2.99



Mounting Flanges – Dimension (inches)

Size	A
1/2	1.22
3/4	1.22
1	1.22
1-1/4	1.97
1-1/2	1.97
2	1.97

Weights

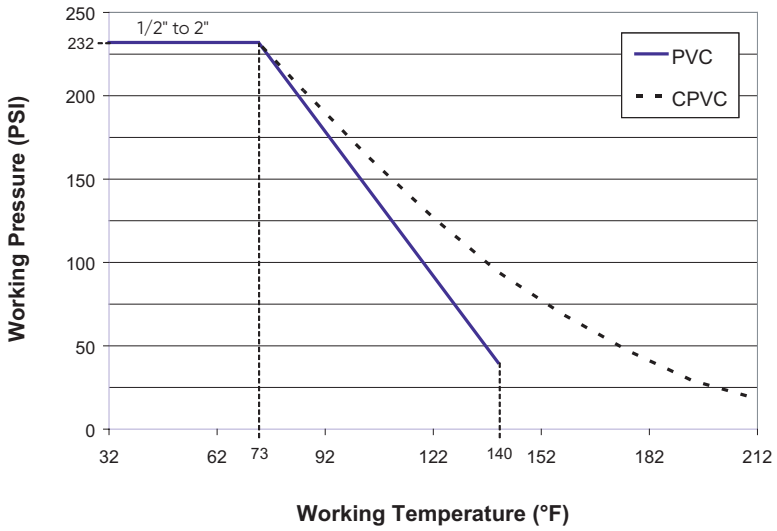
Approximate Weight (lbs)

Size (inches)	IPS Socket	FNPT Threaded
1/2	0.68	0.68
3/4	1.21	1.21
1	1.74	1.74
1-1/4	2.81	2.81
1-1/2	3.66	3.66
2	6.17	6.17

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

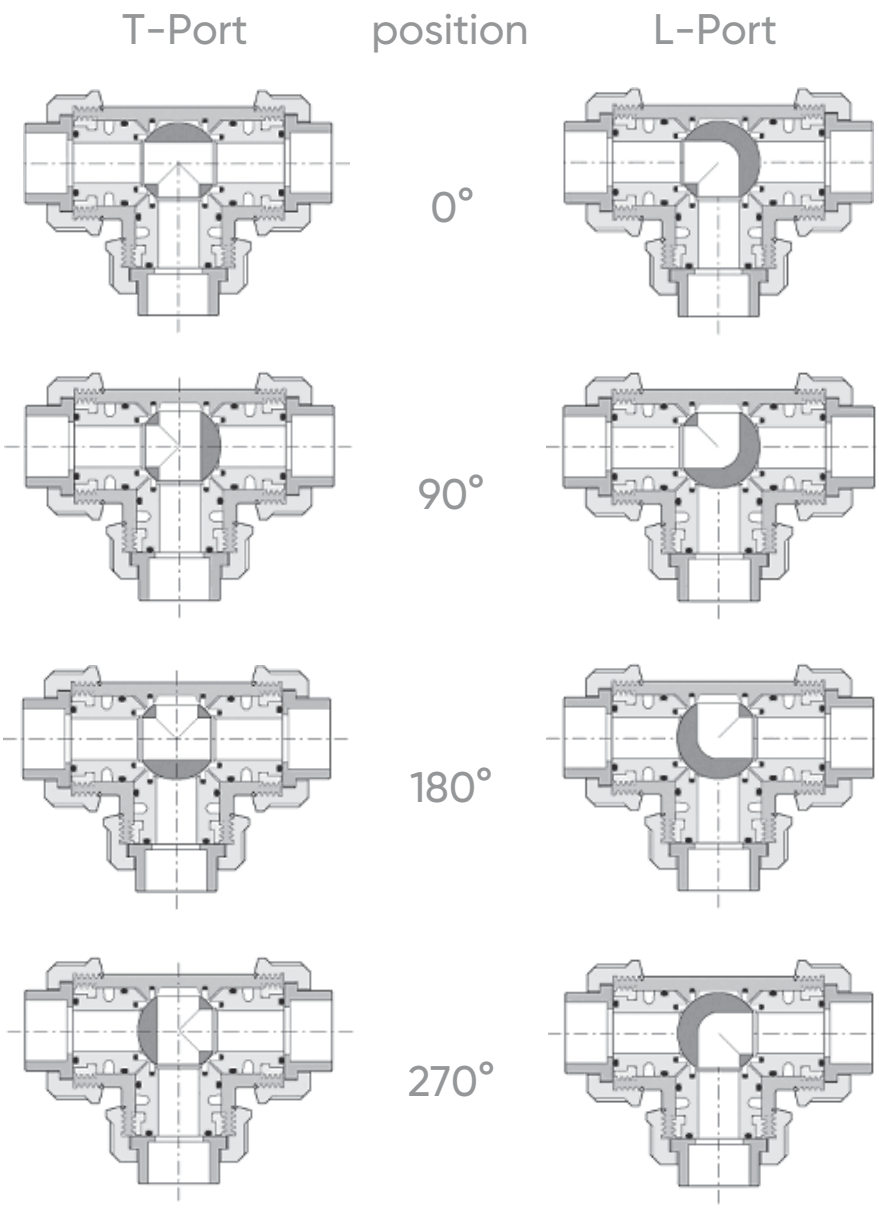
TKD SERIES 3-WAY BALL VALVES

Pressure – Temperature Ratings



CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Operating Positions



Position	T-Port	L-Port
0°	mixing	diverting
90°	diverting	closed
180°	straight flow	closed
270°	diverting	diverting

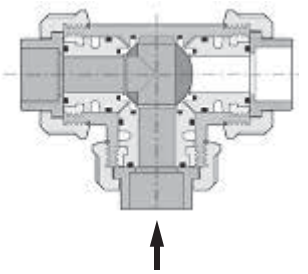
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

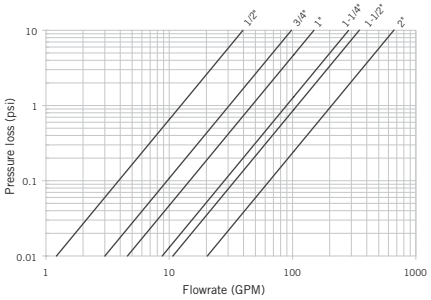
TKD SERIES 3-WAY BALL VALVES

Pressure Loss Chart

Position A:

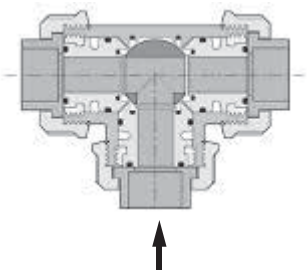
- T-Port
- Center Inlet
- Diverting Flow

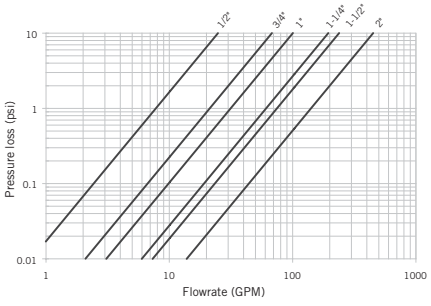




Position B:

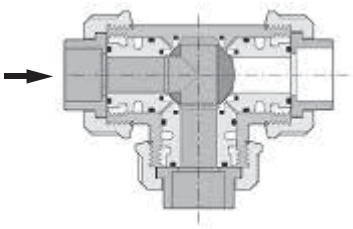
- T-Port
- Center Inlet
- Separating Flow

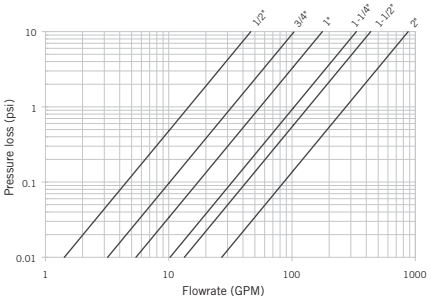




Position C:

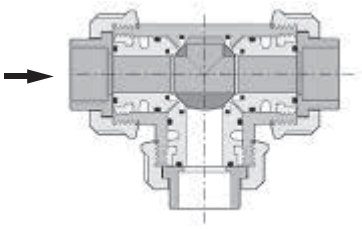
- T-Port
- Side Inlet
- Diverting Flow

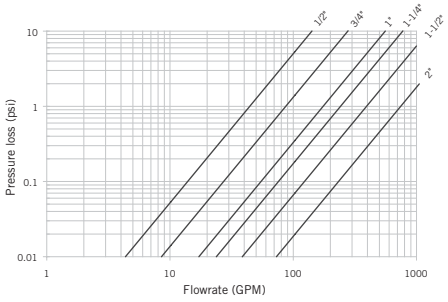




Position D:

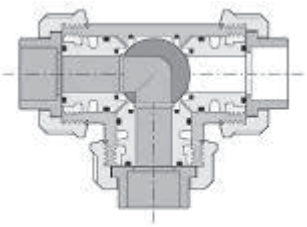
- T-Port
- Side Inlet
- Straight Flow

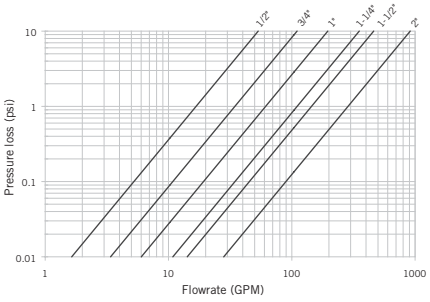




Position E:

- L-Port
- Any Inlet
- Diverting Flow





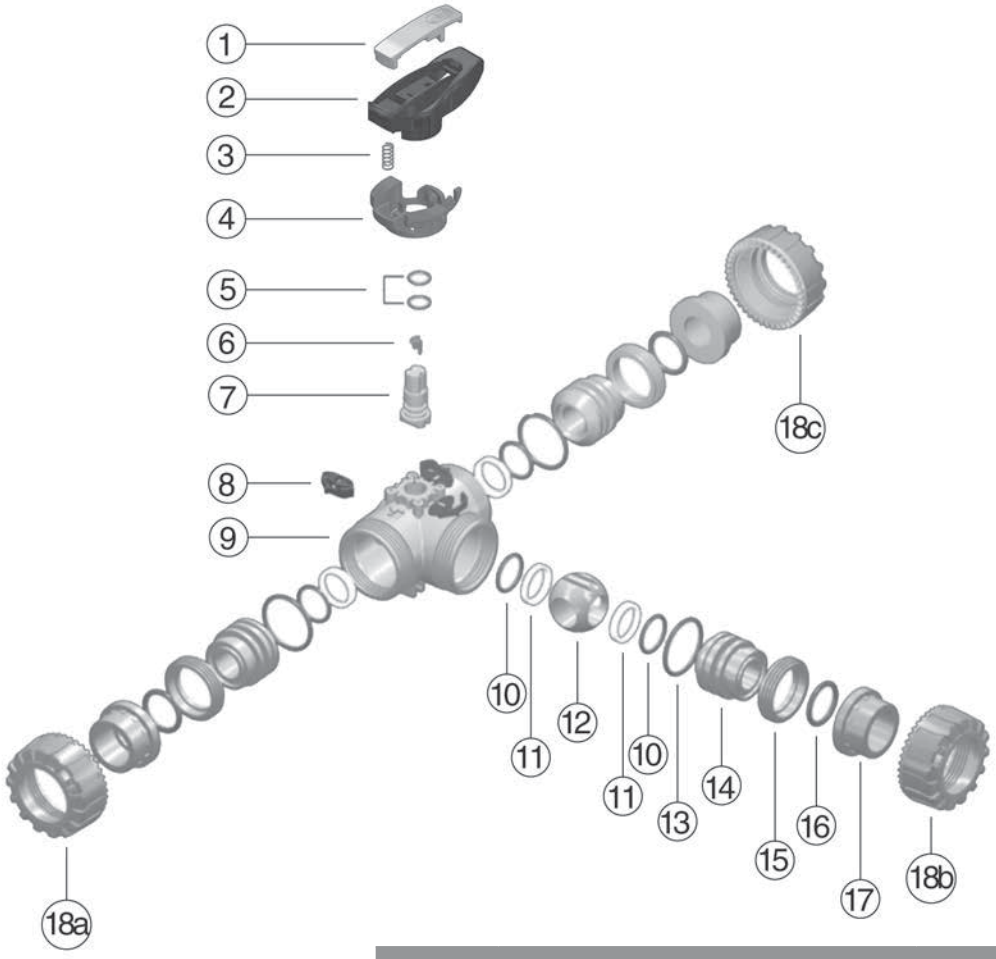
Flow Coefficients

C_V Value

Size	Position				
	A	B	C	D	E
1/2	3.85	2.45	4.55	13.7	5.11
3/4	9.50	6.65	10.2	26.6	10.5
1	14.4	9.80	17.2	53.2	18.6
1-1/4	27.3	18.9	32.2	73.5	33.3
1-1/2	33.3	23.1	42.0	119	43.4
2	63.0	43.4	84.0	224	85.4

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

TKD SERIES 3-WAY BALL VALVES



#	Component	Material	Qty
1	insert	PVC	1
2	handle	HI-PVC	1
3	spring (SHKD)	Stainless Steel	1
** 4	safety handle block (SHKD)	PP-GR	1
* 5	stem o-rings	EPDM / FKM	2
6	position indicator	POM	1
7	stem	PVC / CPVC	1
8	Dual Block®	POM	3
9	body	PVC / CPVC	1
* 10	support o-ring for ball seat	EPDM / FKM	4
* 11	ball seat	PTFE	4
12	ball	PVC / CPVC	1
13	radial seal o-ring	EPDM / FKM	3
14	support for ball seat	PVC / CPVC	3
15	stop ring	PVC / CPVC	3
* 16	socket seal o-ring	EPDM / FKM	3
* 17	end connector	PVC / CPVC	3
18abc	union nuts	PVC / CPVC	3

* Spare parts available ** Optional feature

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

TKD SERIES 3-WAY BALL VALVES

Installation Procedures

1. For socket and threaded style connections, remove the union nuts (part #18 on previous page) and slide them onto the pipe. For flanged connections, remove the union nut / flange assemblies from the valve.
2. Please refer to the appropriate connection style sub-section:
   a. For socket style, solvent cement the end connectors (17) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". **Be sure to allow sufficient cure time before continuing with the valve installation.**
   b. For threaded style, thread the end connectors (17) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
   c. For flanged style, join the union nut / flange assemblies to the pipe flanges. For correct joining procedure, please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
3. Open and close the valve to ensure that the seat supports (14) are at the desired adjustment. If adjustment is required, remove the insert tool (1) from the handle (2). Line up the moldings on the tool with the slots in the seat supports. Tighten or loosen to the desired position then replace the tool on the handle. **For correct alignment of the ball and seat support system, adjustment should begin with the center port.**
4. Ensure that the socket o-rings (16) are properly fitted in their grooves then carefully place the valve in the system between the end connections. If anchoring is required, fix the valve to the supporting structure via the integral mounting flange on the bottom of the valve body (9).
5. Tighten the three union nuts. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. **Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack.**
6. Check the installation of the dedicated lock nut device DUAL BLOCK® (8) on the valve body.
7. Open and close the valve to ensure that the cycling performance is adequate. If adjustment is required, loosen the union nuts, remove the valve from the system, and then continue from Step 3.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

TKD SERIES 3-WAY BALL VALVES

Valve Maintenance

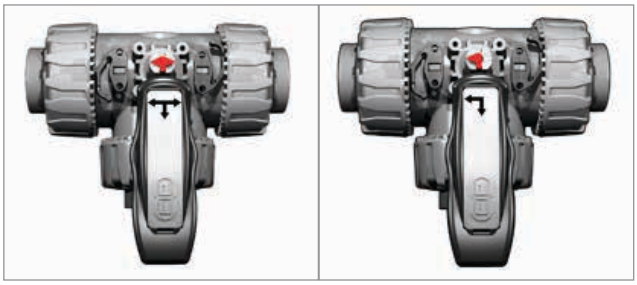
Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. **Be sure to depressurize and drain the isolated branch and valve before continuing.**
2. Unlock the Dual Block® system by compressing the lever (8). Loosen the three union nuts (18) and drop the valve out of the line. If retaining the socket o-rings (16), take care that they are not lost when removing the valve from the line.
3. To disassemble, rotate the handle (2) to the following position:
   a. For T-Port valves, the three arrows must line up with the three valve ports (The valve must be open at all three ports).
   b. For L-Port valves, the two arrows must line up with ports "a" and "b" (see component diagram).
4. Remove the insert tool (1) from the handle then line up the moldings on the tool with the slots in the seat supports (14). Loosen and remove all three seat supports from the valve body (9).
5. Remove the ball (12) from the valve body while taking care not to score or damage the outer surface.
6. Remove the handle from the stem (7) by pulling upwards. To remove the stem, push it into the valve body from above.
7. Remove the seats (11), backing o-rings (10), and body o-rings (13) from the seat supports.
8. Remove the seat and backing o-ring from the inside of the valve body.
9. Remove the stem o-rings (5).
10. The valve components can now be checked for problems and/or replaced.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.**

1. Properly fit the stem o-rings (5) in the grooves on the stem (7), then insert the stem from the inside of the valve body (9).
2. Line up the markings on the stem with the ports in the valve body.
3. Replace the backing o-ring (10) and seat (11) at the back of the valve body.
4. Insert the ball (12) into the valve body while ensuring that the ports line up with the markings on the stem.
5. Ensure that all body o-rings (13), backing o-rings, and seats are properly fitted on the three seat supports (14). Starting with the center port, tighten each support into the valve body using the insert tool (1).
6. Replace the handle (2) on the stem while ensuring that the position markings on the handle line up with those on the stem. Replace the insert tool on the handle.
7. Properly fit the socket o-rings (16) in their respective grooves.
8. Place the end connectors (17) into the union nuts (18), then thread onto the valve body taking care that the socket o-rings remain properly fitted in their grooves.



CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

TKD SERIES 3-WAY BALL VALVES

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system.

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

The TKD offers an optional locking mechanism that prevents unintentional rotation. A padlock can be installed through the handle as an additional safety precaution.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VKR SERIES REGULATING BALL VALVES

Designed to meet the requirements of the most severe industrial applications, IPEX VKR Series Regulating Ball Valves combine the reliability and safety features of IPEX VKD ball valves with a newly designed profiled ball. The patented ball design provides linear flow regulation throughout its full range of operation even when the valve is open just a few degrees. Like a traditional shut-off ball valve, the VKR has a 90° operating angle which allows the use of a standard quarter-turn actuator, ensuring perfect alignment and reducing the torque required for actuation. The patented Dual Block® mechanism locks the union nuts in place preventing back-off during severe service conditions.

VKR Regulating Ball Valves are part of our complete system of IPEX pipe, valves and fittings, engineered and manufactured to our strict quality, performance and dimensional standards.

VALVE AVAILABILITY

Body Material	PVC, PP, PVDF
Size Range	1/2" through 2"
Pressure	up to 232 psi
Seats	Teflon® (PTFE)
Seals	EPDM or Fluoropolymer (FKM)
End Connections	Socket (IPS),Threaded (FNPT) Socket (Metric), Flanged (ANSI 150)

ASTM D1784
ASTM D2464
ASTM D2466
ASTM D2467
ASTM D4101
ASTM D3222
ASTM F1498

ANSI B1.20.1

Certified to NSF/ANSI 61 & 372

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VKR SERIES REGULATING BALL VALVES

Sample Specifications

1.0 Ball Valves – VKR

1.1 Material

- The valve body, stem, ball and unions shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

or The valve body, stem, ball and unions shall be made of stabilized polypropylene (PP) homopolymer compound, also containing a RAL 7032 pigment, which shall meet or exceed the requirements of Type PP according to ASTM D4101.

or The valve body, including end connectors and unions shall be made of virgin, non-regrind polyvinylidene fluoride (PVDF) compound which shall meet or exceed the requirements of Table 1 according to ASTM D3222.

1.2 Seats

- The ball seats shall be made of Teflon® (PTFE).

1.3 Seals

- The o-ring seals shall be made of EPDM.

or The o-ring seals shall be FKM.

2.0 Connections

2.1 Socket style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

or The Metric socket PP end connectors shall conform to the dimensional standard ISO 11922-1.

or The Metric socket PVDF end connectors shall conform to the dimensional standard ISO 10931.

2.2 Threaded style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1.

or The female NPT threaded PP end connectors shall conform to the dimensional standards ASTM F1498, and ANSI B1.20.1.

3.0 Design Features

- The valve shall be double blocking with union ends.
- All valves shall have a flow indication arrow on the side of the body.
- The valve body shall be single end entry with a threaded carrier (ball seat support).
- The threaded carrier shall be adjustable with the valve installed.
- The valve body shall have an expansion and contraction compensating groove on the molded end.
- The valve body, union nuts, and carrier shall have deep square style threads for increased strength.
- The ball design shall allow flow regulation starting at a 6o angle of opening.
- The ball and stem shall be machined smooth to minimize wear on valve seats and seals.
- The stem design shall feature double o-ring seals as well as a safety shear point above the o-rings.
- All valve seats shall have o-ring backing cushions to compensate for wear and prevent seizure of the ball.
- All valves shall have integrally molded mounting features for actuation.
- All valves shall have integrally molded support bracketing for anchoring.

3.1 Pressure Tested

- All valves shall have been pressure tested in both the open and closed positions by the manufacturer.

3.2 Pressure Rating

- All PVC and PVDF valves shall be rated at 232 PSI at 73°F.
- All PP valves shall be rated at 150 PSI at 73°F.
- All flanged valves shall be rated at 150 PSI at 73°F.

3.3 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.4 Color Coding

- All PVC valves shall be color-coded dark gray.

or All PP valves shall be color-coded beige gray.

or All PVDF valves shall not be color-coded and be white (unpigmented) in appearance.

4.0 NSF Listings

- All PVC valves shall be listed with NSF to standard 61 for potable water.
- All PVC valves shall be listed with NSF to Standard 372 for lead content requirements.

5.0 All valves shall be Xirtec® PVC, PP or PVDF by IPEX or approved equal.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VKR SERIES REGULATING BALL VALVES

Valve Selection

Valve Size (inches)	Body Material	O-ring Material	IPEX Part Number IPS Socket	Pressure Rating at 73°F
1/2	PVC	EPDM	353684	232 psi
		FKM	353675	
3/4	PVC	EPDM	353683	
		FKM	353676	
1	PVC	EPDM	353682	
		FKM	353678	
1-1/4	PVC	EPDM	353681	
		FKM	353685	
1-1/2	PVC	EPDM	353680	
		FKM	353686	
2	PVC	EPDM	353679	
		FKM	353677	

Body Material:

- ☐ PVC
- ☐ PP
- ☐ PVDF

Size:

- ☐ 1/2″
- ☐ 3/4″
- ☐ 1″
- ☐ 1-1/4″
- ☐ 1-1/2″
- ☐ 2″

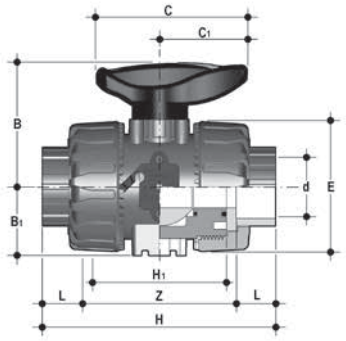
Seals:

- ☐ EPDM
- ☐ FKM

IPEX Part Number:

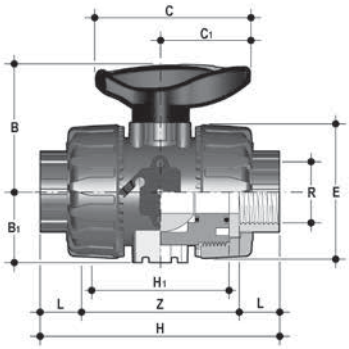
_____

Dimensions



IPS Socket Connections – Dimension (inches)

Size	d	H	L	Z	H1	E	B1	B	C1	C
1/2	0.84	4.61	0.89	2.83	2.56	2.13	1.14	2.13	1.57	2.64
3/4	1.05	5.08	1.00	3.07	2.76	2.56	1.36	2.56	1.93	3.35
1	1.32	5.59	1.13	3.33	3.07	2.87	1.54	2.74	1.93	3.35
1-1/4	1.66	6.38	1.26	3.86	3.46	3.39	1.81	3.25	2.52	4.25
1-1/2	1.90	6.77	1.38	4.02	3.66	3.86	2.05	3.50	2.52	4.25
2	2.38	7.83	1.50	4.83	4.37	4.80	2.44	4.25	2.99	5.28

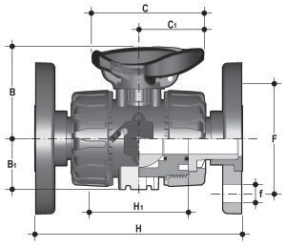


Female NPT Threaded Connections – Dimension (inches)

Size	R	H	L	Z	H1	E	B1	B	C1	C
1/2	1/2-NPT	4.37	0.70	2.97	2.56	2.13	1.14	2.13	1.57	2.64
3/4	3/4-NPT	4.61	0.71	3.19	2.76	2.56	1.36	2.56	1.93	3.35
1	1-NPT	5.31	0.89	3.54	3.07	2.87	1.54	2.74	1.93	3.35
1-1/4	1-1/4-NPT	6.02	0.99	4.05	3.46	3.39	1.81	3.25	2.52	4.25
1-1/2	1-1/2-NPT	6.14	0.97	4.20	3.66	3.86	2.05	3.50	2.52	4.25
2	2-NPT	7.32	1.17	4.99	4.37	4.80	2.44	4.25	2.99	5.28

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

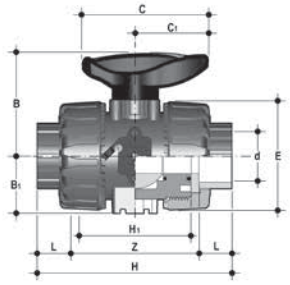
VKR SERIES REGULATING BALL VALVES



VKD Flanged Connections – Dimension (inches)

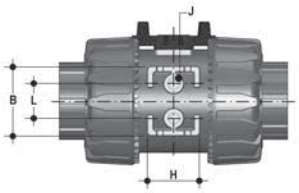
Size	H	H_1	B	B_1	C	C_1	F	f	U
1/2"	5.63	2.56	2.13	1.14	2.64	1.58	2.37	0.63	0.16
3/4"	6.77	2.76	2.56	1.36	3.35	1.93	2.75	0.63	0.16
1"	7.36	3.07	2.74	1.54	3.35	1.93	3.13	0.63	0.16
1-1/4"	7.48	3.47	3.25	1.81	4.25	2.52	3.5	0.63	0.16
1-1/2"	8.35	3.66	3.5	2.05	4.25	2.52	3.87	0.63	0.16
2"	9.21	4.37	4.25	2.44	5.28	2.99	4.75	0.75	0.16

Note: Dimensions based on VKD ANSI 150 Flanging Kit



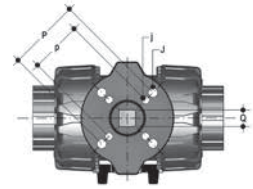
Metric Socket Connections – Dimension (inches)

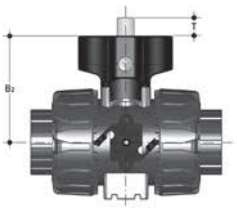
Size	d	H	L	Z	H_1	E	B_1	B	C_1	C
20mm	0.79	4.02	0.57	2.87	2.56	2.13	1.14	2.13	1.57	2.64
25mm	0.98	4.49	0.63	3.23	2.76	2.56	1.36	2.56	1.93	3.35
32mm	1.26	4.96	0.71	3.54	3.07	2.87	1.54	2.74	1.93	3.35
40mm	1.57	5.55	0.81	3.94	3.35	3.39	1.81	3.25	2.52	4.25
50mm	1.97	6.46	0.93	4.61	3.66	3.86	2.05	3.50	2.52	4.25
63mm	2.48	7.83	1.08	5.67	4.37	4.80	2.44	4.25	2.99	5.28



Support Bracket – Dimension (inches)

Size	J	B	L	H
1/2	M4	1.24	0.79	1.06
3/4	M4	1.57	0.79	1.18
1	M4	1.57	0.79	1.18
1-1/4	M6	1.97	1.18	1.38
1-1/2	M6	1.97	1.18	1.38
2	M6	2.36	1.18	1.57





Actuation Pad – Dimension (inches)

Size	B_2	p	P	j	J	T	Q
1/2	2.28	F03	F04	0.22	0.22	0.47	0.43
3/4	2.89	F03	F05	0.22	0.26	0.47	0.43
* 3/4	2.89	F04		0.22		0.47	0.43
1	2.91	F03	F05	0.22	0.26	0.47	0.43
* 1	2.91	F04		0.22		0.43	0.43
1-1/4	3.82	F05	F07	0.26	0.33	0.63	0.55
1-1/2	4.09	F05	F07	0.26	0.33	0.63	0.55
2	4.49	F05	F07	0.26	0.33	0.63	0.55

*Available upon request.

Weights

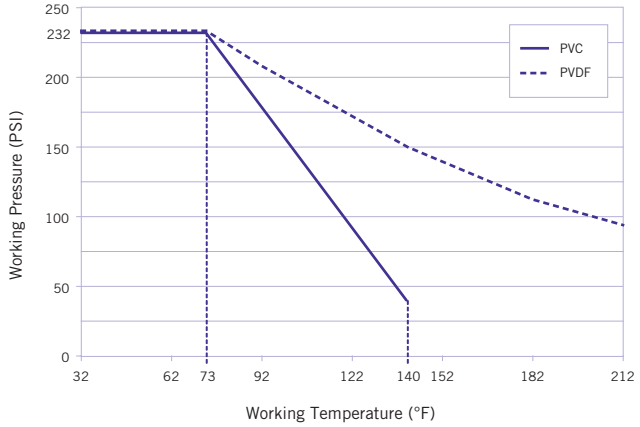
Approximate Weight (lbs)

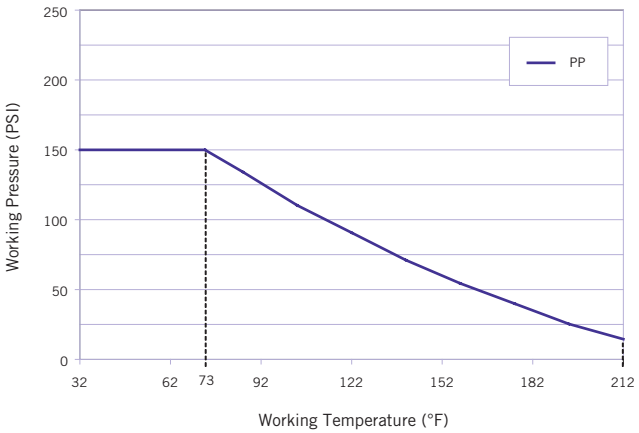
Size (inches)		IPS / Metric Socket			FNPT Threaded	
IPS	Metric	PVC	PP	PVDF	PVC	PP
1/2	20mm	0.47	0.32	0.60	0.46	0.31
3/4	25mm	0.76	0.48	0.98	0.74	0.50
1	32mm	0.99	0.66	1.29	0.99	0.67
1-1/4	40mm	1.58	1.06	2.07	1.49	1.01
1-1/2	50mm	2.15	1.50	2.74	2.11	1.43
2	63mm	3.77	2.57	4.82	3.68	2.50

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

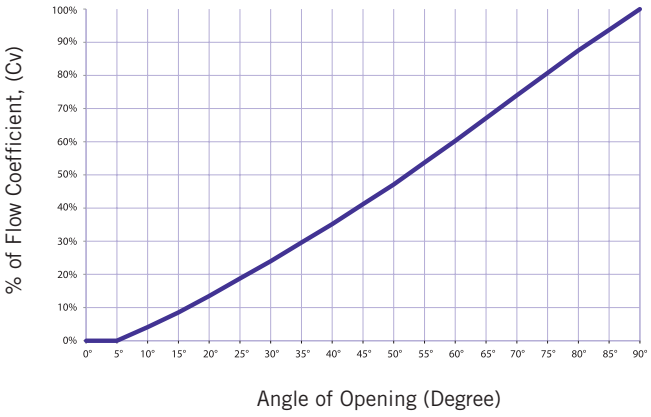
VKR SERIES REGULATING BALL VALVES

Pressure – Temperature Ratings

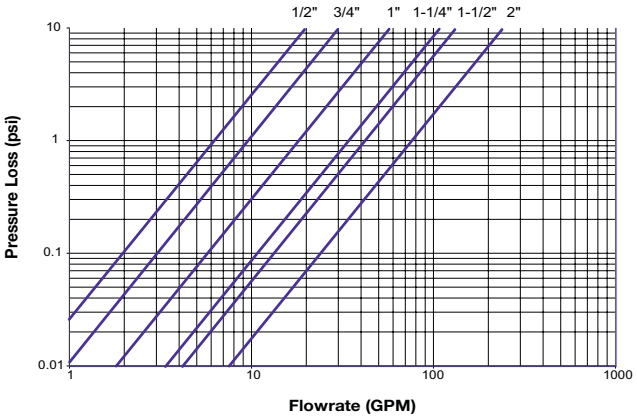




Flow Performance Curve



Pressure Loss Chart



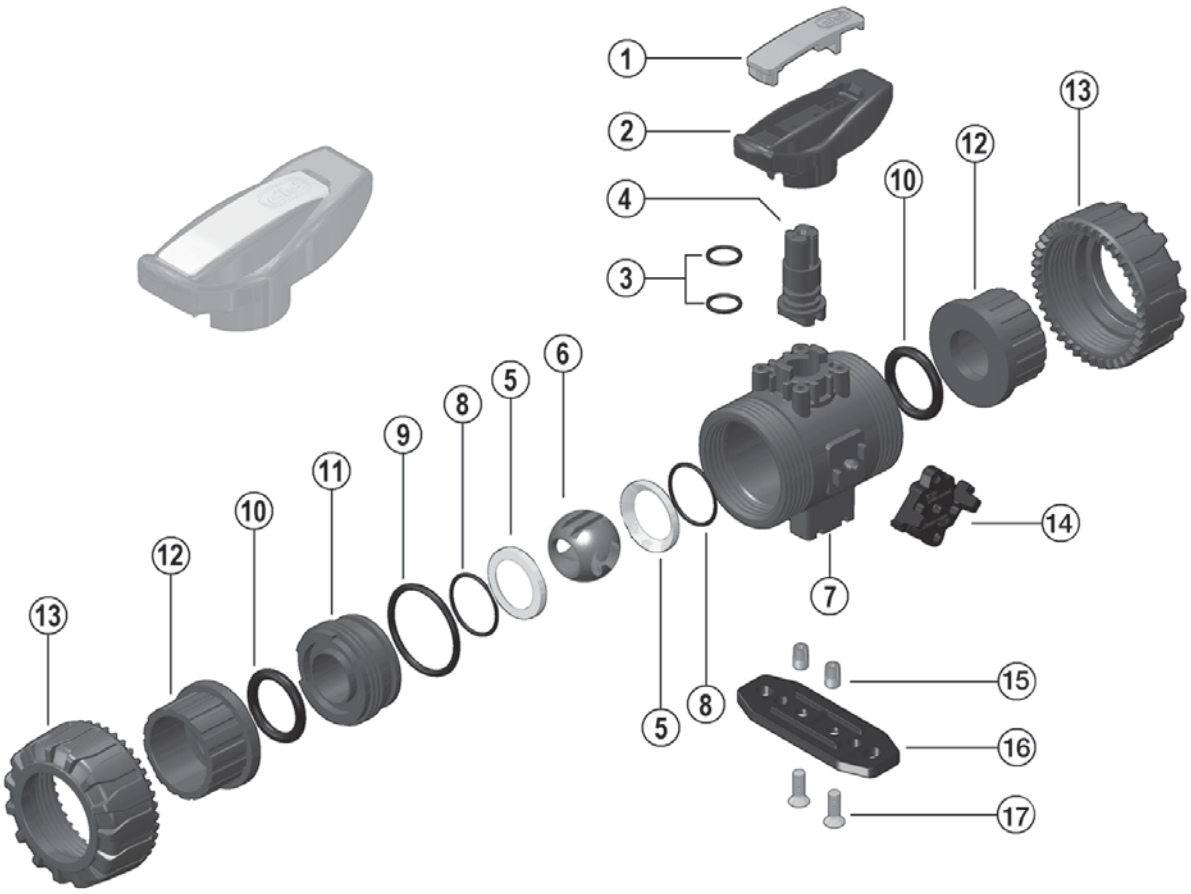
Flow Coefficients

Size (in)	C_v
1/2	6.1
3/4	9.4
1	17.8
1-1/4	33.2
1-1/2	41.1
2	74.1

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VKR SERIES REGULATING BALL VALVES

Components



#	Component	Material	Qty
1	insert	PVC / PP / PVDF	1
2	handle	PVC / PP / PVDF	1
3	stem o-ring	EPDM / FKM	2
4	stem	PVC / PP / PVDF	1
5	ball seat	PTFE	2
6	profiled ball	PVC / PP / PVDF	1
7	body	PVC / PP / PVDF	1
8	ball seat o-ring	EPDM / FKM	2
9	body o-ring	EPDM / FKM	1
10	socket o-ring	EPDM / FKM	2

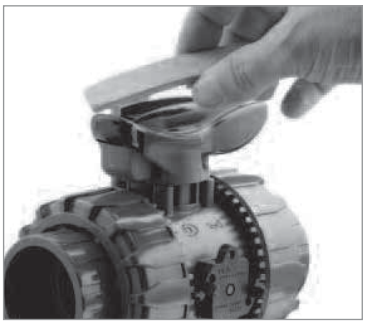
#	Component	Material	Qty
11	carrier with stop ring	PVC / PP / PVDF	1
12	end connector	PVC / PP / PVDF	2
13	union nut	PVC / PP / PVDF	2
14	DUAL BLOCK®	POM	1
* 15	bracket bushing	SS / brass	2
* 16	mounting plate	GRPP	1
* 17	screw	SS	2

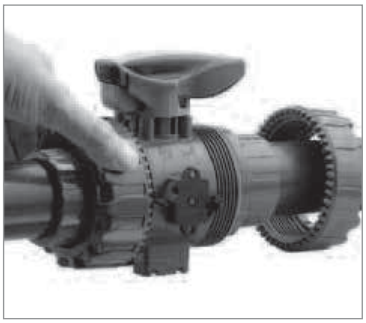
* Optional Accessories

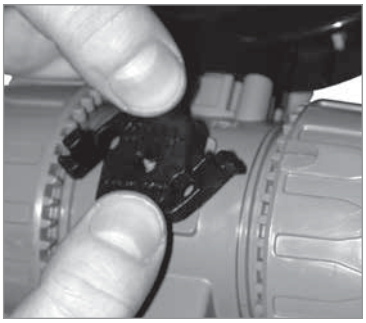
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VKR SERIES REGULATING BALL VALVES

Installation Procedures







1. Remove the union nuts (part #13 on previous pages) and slide them onto the pipe.
2. Please refer to the appropriate connection style sub-section:
   a. For socket style, solvent cement or fuse the end connectors (12) onto the pipe ends. For correct solvent cementing procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". Be sure to allow sufficient cure time before continuing with the valve installation.
   b. For threaded style, thread the end connectors (12) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
3. Open and close the valve to ensure that the carrier (11) is at the desired adjustment. If adjustment is required, ensure that the valve is in the closed position then remove the insert tool (1) from the handle (2).
4. Ensure that the valve is in the closed position, and that the socket o-rings (10) are properly fitted in their grooves. If anchoring is required, insert the bracket bushings (15) into the bottom of the valve. Carefully place the valve in the system between the two end connections and fix if necessary.
5. Tighten the union nut on the side opposite to that which is marked "ADJUST". Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack.
6. Tighten the union nut on the side marked "ADJUST". Tightening the union nuts in this order results in the best possible valve performance due to optimum positioning and sealing of the ball and seat support system.
7. Open and close the valve to again ensure that the cycling performance is adequate. If adjustment is required, place the valve in the closed position, loosen the union nuts, remove the valve from the system, and then continue from Step 3.
8. Engage the Dual Block® system by affixing the molded piece (14) to the side of the valve body. This feature will prevent back-off of the union nuts during operation.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VKR SERIES REGULATING BALL VALVES

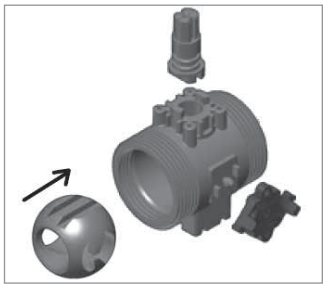
Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the line. Be sure to depressurize and drain the valve and isolated branch.
2. If necessary, detach the valve from the support structure by disassembling the connections to the optional bracket on the bottom of the valve body (7).
3. Unlock the Dual Block® system by compressing the two ends of the molded piece (14) to the unlocked position. Loosen both union nuts (13) and drop the valve out of the line. If retaining the socket o-rings (10), take care that they are not lost when removing the valve from the line.
4. Place the valve in the open position then line up the moldings on the wrench tool (1) with the slots in the carrier (found on the side marked "ADJUST"). Loosen and remove the carrier (11).
5. Carefully press the ball (6) out of the valve body, taking care not to score or damage the outer surface.
6. Remove the handle (2) by pulling upwards.
7. Press the stem (4) into the valve body from above.
8. The stem o-rings (3), body o-ring (9), ball seats (5), and ball seat o-rings (8) can now be removed and/or replaced.

Note: It is not typically necessary to disassemble the Dual Block® components.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.**



1. Replace the stem o-rings (3), body o-ring (9), ball seat o-rings (8), and ball seats (5) in their proper positions.
2. Insert the stem (4) into position from inside the valve body (7).
3. Replace the handle (2) as shown.
4. Carefully insert the ball (6) into the valve body as shown, taking care not to score or damage the outer surface. Ensure that the valve handle and ball position correspond to the same operating position.
5. Insert the threaded carrier (11) and tighten into the valve body. Use the wrench tool to sufficiently tighten.
6. Place the end connectors (12) into the union nuts (13), then thread onto the valve body taking care that the socket o-rings remain properly fitted in their grooves.
7. Engage the Dual Block® system by affixing the molded piece (16) to the side of the valve body.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system.**

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

For safety reasons, please contact IPEX customer service and technical support when using volatile liquids such as hydrogen peroxide (H_2O_2) and sodium hypochlorite (NaClO). These liquids may vaporize causing a potentially dangerous pressure increase in the dead space between the ball and the valve body. Special VKR ball valves are available for these types of critical applications.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

FK SERIES BUTTERFLY VALVES

IPEX FK Series Butterfly Valves offer superior strength and chemical resistance in highly corrosive environments and process flow conditions. The special trapezoid shape of the liner and a serrated body cavity guarantee a bubble tight seal while keeping break-away torque at an absolute minimum. This versatile industrial valve features double self-lubricating seals, direct actuator mount capability, and the option of either a lever handle or mounted gear box. The FK lever handle includes the EasyFit labeling system for valve identification. A special integral stainless steel lug version provides for full bi-directional operation allowing disassembly of the downstream flange connection without weakening the integrity of the upstream connection to the pressurized line. FK Series Butterfly Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

ASTM D4101
ASTM D1784
ASTM D3222

ANSI B16.5

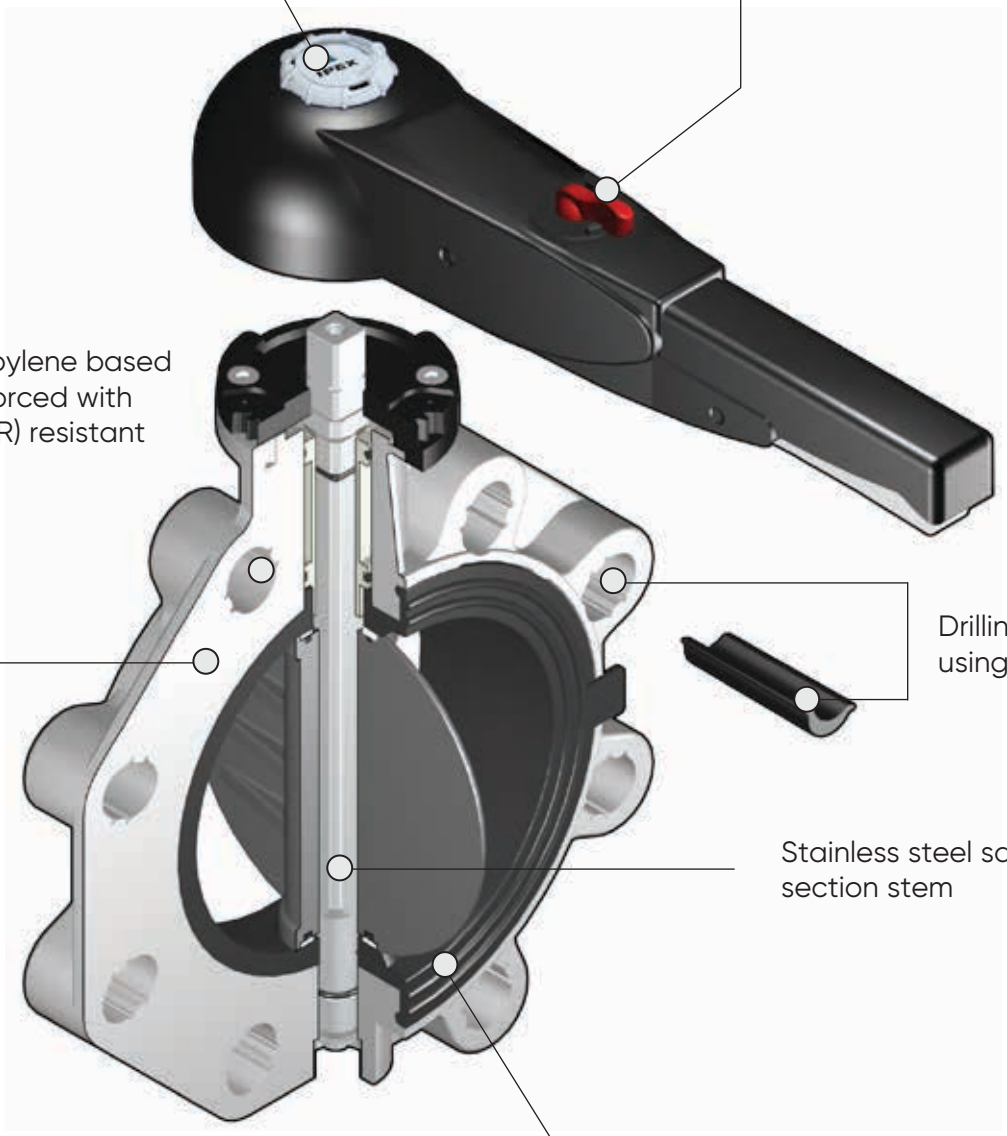
Certified to NSF/ANSI 61-G

VALVE AVAILABILITY

Body Material	Glass reinforced PP (GRPP)
Disc Material	CPVC, also offered in PP, PVC, ABS, and PVDF
Size Range	1-1/2" through 16"
Pressure	See Sample Specifications
Seals	EPDM or FKM
Body Style	Wafer or Lugged
Control Style	Lever Handle or Mounted Gear Box
End Connections	Flanged (ANSI 150)

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Components



CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

FK SERIES BUTTERFLY VALVES

Sample Specifications

1.0 Butterfly Valves – FK

1.1 Material

- The valve body shall be made of glass reinforced polypropylene (GRPP) obtained from homopolymer polypropylene (PPH).
- The valve disc shall be made of Corzan® CPVC compound which shall meet or exceed the requirements of 23447 according to ASTM D1784.

or The valve disc shall be made of stabilized PP homopolymer compound, also containing a RAL 7032 pigment, which shall meet or exceed the requirements of Type I Polypropylene according to ASTM D4101.

or The valve disc shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

or The valve disc shall be made of virgin, non-regrind PVDF compound which shall meet or exceed the requirements of Table 1 according to ASTM D3222.

- These compounds shall be listed with NSF to Standard 61 for potable water.
- The valve shaft shall be made of 316 stainless steel.

1.2 Seats

- The disc liner shall be made of EPDM.

or The disc liner shall be made of FKM.

1.3 Seals

- The o-ring seals shall be made of EPDM.

or The o-ring seals shall be made of FKM.

2.0 Connections

2.1 Flanged style

- The ANSI 150 flanged connections shall conform to the dimensional standard ANSI B16.5.

3.0 Design Features

- The valve shall be of either wafer or lugged design (specifier must select one).
- The lugged style shall feature permanently integrated stainless steel lugs.
- Manual control of the valve shall be achieved through the use of either a lever handle or mounted gear box (specifier must select one).
- The shaft shall have standard ISO square dimensions for direct mounting of actuators.
- The disc seat shall be a trapezoidal elastomeric liner and provide a bubble tight seal.
- The liner shall completely isolate the valve body from the process flow.
- The liner shall function as a flange gasket on both sides of the valve.
- The body cavity shall feature special channeling to prevent liner slippage and compression.
- The disc, seats, and seals shall be the only wetted parts.
- Teflon® seated o-ring seals shall prevent the stainless steel shaft from becoming wetted.
- The handle shall incorporate a transparent PVC plug and tag holder for valve identification.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

3.1 Pressure Rating

CPVC Disc, Wafer Style

- 1-1/2" and 2" shall be rated at 232 psi at 73°F
- 2-1/2" to 10" shall be rated at 150 psi at 73°F
- 12" shall be rated at 120 psi at 73°F

PP Disc, Wafer Style

- 1-1/2" to 10" shall be rated at 150 psi at 73°F
- 12" shall be rated at 120 psi at 73°F
- 14" shall be rated at 100 psi at 73°F
- 16" shall be rated at 85 psi at 73°F

PVC Disc, Wafer Style

- 14" shall be rated at 100 psi at 73°F
- 16" shall be rated at 85 psi at 73°F

PVDF Disc, Wafer Style

- 1-1/2" and 2" shall be rated at 232 psi at 73°F
- 2-1/2" to 10" shall be rated at 150 psi at 73°F
- 12" shall be rated at 120 psi at 73°F

CPVC Disc, Lugged Style

- 2-1/2" to 8" shall be rated at 150 psi at 73°F
- 12" shall be rated at 85 psi at 73°F

PP Disc, Lugged Style

- 2-1/2" to 8" shall be rated at 150 psi at 73°F
- 10" and 12" shall be rated at 85 psi at 73°F

PVDF Disc, Lugged Style

- 2-1/2" to 8" shall be rated at 150 psi at 73°F
- 12" shall be rated at 85 psi at 73°F

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Color Coding

- All valve bodies shall be color-coded beige gray.
- CPVC valve discs shall be color-coded light gray
- PP valve discs shall be color-coded beige gray
- PVC valve discs shall be color-coded dark gray
- PVDF valve discs shall not be color-coded and be white in appearnce

4.0 All valves shall be listed to NSF Standard 61 for potable water.

5.0 All valves shall be by IPEX or approved equal.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

FK SERIES BUTTERFLY VALVES

Valve Selection

Significant Number	IPEX Part Number	Body Material	Body Style	Liner Material	Size	Disc Material	Control Style	Pressure Rating @ 73°F
FKOM107C	353112	GRPP	Wafer	EPDM	1-1/2"	CPVC	Lever Handle	232
FKOM108C	353113				2"			
FKOM109C	353114				2-1/2"			150
FKOM110C	353115				3"			
FKOM111C	353116				4"			
FKOM112C	353117				5"			
FKOM113C	353118				6"			
FKOM114C	353119				8"			
FKOM207C	353137	GRPP	Wafer	FKM	1-1/2"	CPVC	Lever Handle	232
FKOM208C	353213				2"			
FKOM209C	353214				2-1/2"			150
FKOM210C	353216				3"			
FKOM211C	353218				4"			
FKOM212C	353224				5"			
FKOM213C	353225				6"			
FKOM214C	353226				8"			
FKOM109GC	254100	GRPP	Wafer	EPDM	2-1/2"	CPVC	Gearbox	150
FKOM110GC	254134				3"			
FKOM111GC	254135				4"			
FKOM112GC	254136				5"			
FKOM113GC	254137				6"			
FKOM114GC	254138				8"			
FKOM115GC	254128				10"			
FKOM116GC	254139				12"			120
FKOM117GV	253194				14"	PVC		100
FKOM118GV	253195				16"			85
FKOM209GC	254144	GRPP	Wafer	FKM	2-1/2"	CPVC	Gearbox	150
FKOM210GC	254155				3"			
FKOM211GC	254156				4"			
FKOM212GC	254157				5"			
FKOM213GC	254158				6"			
FKOM214GC	254159				8"			
FKOM215GC	254160				10"			
FKOM216GC	254161				12"			120
FKOM217GV	253196				14"	PVC		100
FKOM218GV	253197				16"			85

Significant Number

Code	FK	O	M	1	07	G	C
Position	1	2	3	4	5	6	7

Position	Code	Description
1		**Model**
	FK	Butterfly Valve
2		**Connection**
	O	ANSI 150 Flange – Wafer
	L	ANSI 150 Flange – 316 SS LUG
3		**Body Material**
	M	PP
4		**Liner Material**
	1	EPDM
	2	FKM
5	**Size**	**Imperial** / **DN**
	07	1-1/2" / 40 mm
	08	2" / 50 mm
	09	2-1/2" / 65 mm
	10	3" / 80 mm
	11	4" / 100 mm
	12	5" / 125 mm
	13	6" / 150 mm
	14	8" / 200 mm
	15	10" / 250 mm
	16	12" / 300 mm
	17	14" / 350 mm
	18	16" / 400 mm
6		**Control Style**
		Lever Handle
	G	Gearbox
7		**Disc Material**
	C	CPVC
	F	PVDF
		PP
	V	PVC

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

FK SERIES BUTTERFLY VALVES

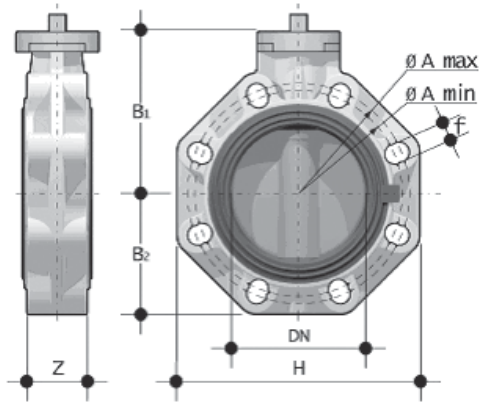
Dimensions

Significant Number	IPEX Part Number	Body Material	Body Style	Liner Material	Size	Disc Material	Control Style	Pressure Rating @ 73°F
FKLM109C	353120	GRPP	ANSI 316 SS LUG	EPDM	2-1/2"	CPVC	Lever Handle	150
FKLM110C	353121				3"			
FKLM111C	353122				4"			
FKLM112C	353123				5"			
FKLM113C	353129				6"			
FKLM114C	353130				8"			
FKLM209C	353159	GRPP	ANSI 316 SS LUG	FKM	2-1/2"	CPVC	Lever Handle	150
FKLM210C	353167				3"			
FKLM211C	353168				4"			
FKLM212C	353169				5"			
FKLM213C	353170				6"			
FKLM214C	353171				8"			
FKLM109GC	254171	GRPP	ANSI 316 SS LUG	EPDM	2-1/2"	CPVC	Gearbox	150
FKLM110GC	254172				3"			
FKLM111GC	254173				4"			
FKLM112GC	254174				5"			
FKLM113GC	254175				6"			
FKLM114GC	254176				8"			
FKLM115GC	254142				10"			85
FKLM116GC	254143				12"			
FKLM209GC	254165	GRPP	ANSI 316 SS LUG	FKM	2-1/2"	CPVC	Gearbox	150
FKLM210GC	254166				3"			
FKLM211GC	254167				4"			
FKLM212GC	254168				5"			
FKLM213GC	254169				6"			
FKLM214GC	254170				8"			
FKLM215GC	254119				10"			85
FKLM216GC	254164				12"			

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

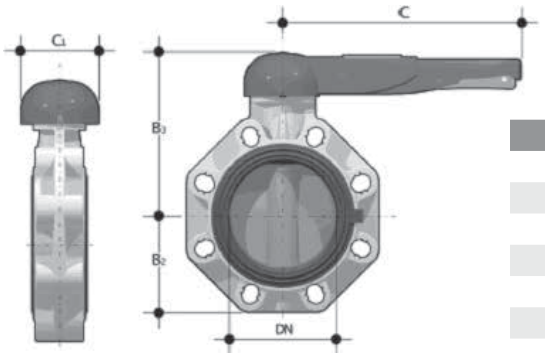
FK SERIES BUTTERFLY VALVES

Pressure – Temperature Ratings



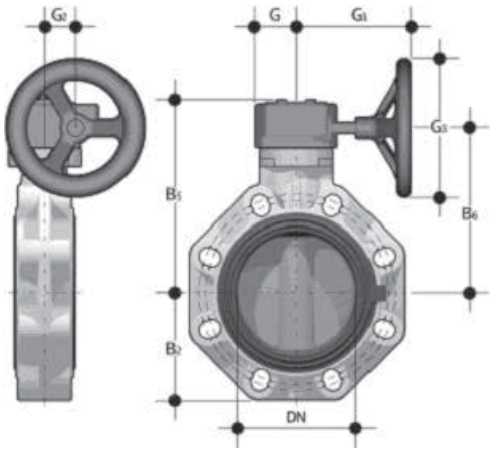
Free Stem – Dimension (inches)

Size	DN	Z	B_1	B_2	H	Amin	Amax	f	# holes
1-1/2	40	1.30	4.17	2.36	5.20	3.90	4.29	0.75	4
2	50	1.69	4.41	2.76	5.79	4.53	4.94	0.75	4
2-1/2	65	1.81	4.69	3.15	6.50	5.04	5.67	0.75	4
3	80	1.93	5.24	3.66	7.28	5.71	6.30	0.75	12*
4	100	2.20	5.79	4.21	8.31	6.50	7.48	0.75	8
5	125	2.52	6.57	4.72	9.45	8.03	8.46	0.91	8
6	150	2.76	7.09	5.28	10.55	9.06	9.53	0.91	8
8	200	2.80	8.94	6.34	12.72	11.02	11.73	0.91	8
10	250	4.49	9.76	8.27	15.94	13.19	14.25	1.00	12
12	300	4.49	12.01	9.65	18.70	15.35	17.01	1.14	12
14	350	5.08	12.99	11.02	20.87	18.74	18.74	1.12	12
16	400	6.65	13.78	12.05	23.39	21.26	21.26	1.12	16



Lever Handle – Dimension (inches)

Size	DN	C1	C	B_2	B_3	# holes
1-1/2	40	3.94	6.89	2.36	5.39	4
2	50	3.94	6.89	2.76	5.63	4
2-1/2	65	4.33	10.71	3.15	6.46	4
3	80	4.33	10.71	3.66	7.01	12*
4	100	4.33	10.71	4.21	7.56	8
5	125	4.33	12.99	4.72	8.35	8
6	150	4.33	12.99	5.28	8.86	8
8	200	4.80	16.54	6.34	10.71	8

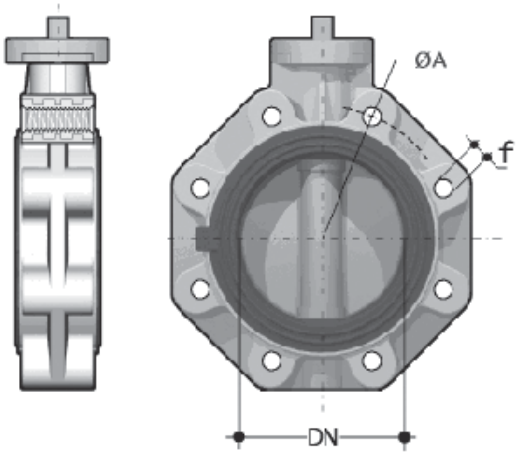


Gearbox Operated Butterfly Valve – Dimension (inches)

Size	DN	G2	G	G_1	G_3	B_2	B_5	B_6	# holes
2-1/2	65	1.54	1.89	5.31	4.92	3.15	6.85	5.75	4
3	80	1.54	1.89	5.31	4.92	3.66	7.40	6.30	8
4	100	1.54	1.89	5.31	4.92	4.21	7.95	6.85	8
5	125	1.54	1.89	5.67	7.87	4.72	8.74	7.64	8
6	150	1.54	1.89	5.67	7.87	5.28	9.25	8.15	8
8	200	2.36	2.56	8.03	7.87	6.34	11.30	10.08	8
10	250	2.99	3.46	9.29	9.84	8.27	12.48	11.06	12
12	300	2.99	3.46	9.29	9.84	9.65	14.72	13.31	12
14	350	3.15	3.46	14.21	11.81	11.02	17.24	15.35	12
16	400	3.15	3.46	14.21	11.81	12.05	17.24	15.35	16

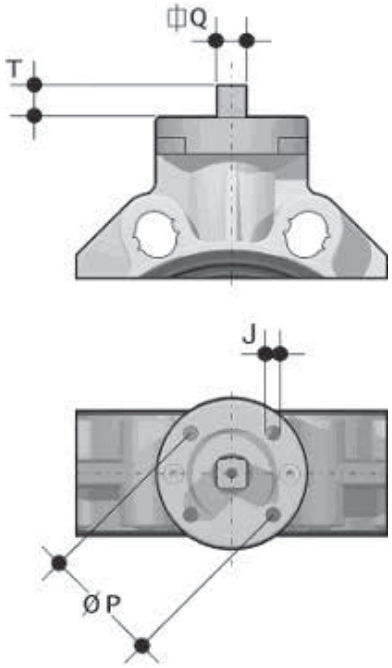
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Customize FK EasyFit



ANSI Lugged – Dimension (inches)

Size (in.)	DN	A	f	# holes
2-1/2	65	5.50	5/8 - UNC	4
3	80	6.00	5/8 - UNC	8
4	100	7.50	5/8 - UNC	8
5	125	8.50	3/4 - UNC	8
6	150	9.50	3/4 - UNC	8
8	200	11.75	3/4 - UNC	8
10	250	14.25	7/8 - UNC	12
12	300	17.00	7/8 - UNC	12



Mounting Pad for Actuation – Dimension (inches)

Size (in.)	ISO	J	P	T	Q
1-1/2	F05	0.28	1.97	0.47	0.43
2	F05	0.28	1.97	0.47	0.43
2-1/2	F05 / F07	0.28 / 0.35	1.97 / 2.76	0.47	0.43
3	F07	0.35	2.76	0.63	0.55
4	F07	0.35	2.76	0.63	0.55
5	F07	0.35	2.76	0.75	0.67
6	F07	0.35	2.76	0.75	0.67
8	F10	0.43	4.02	0.94	0.87
10	F10 / F12 / F14	0.43 / 0.51 / 0.67	4.02 / 4.92 / 5.51	1.14	1.06
12	F10 / F12 / F14	0.43 / 0.51 / 0.67	4.02 / 4.92 / 5.51	1.14	1.06
14	F12 / F14	0.55 / 0.71	4.92 / 5.51	1.14	1.06
16	F12 / F14	0.55 / 0.71	4.92 / 5.51	1.14	1.06

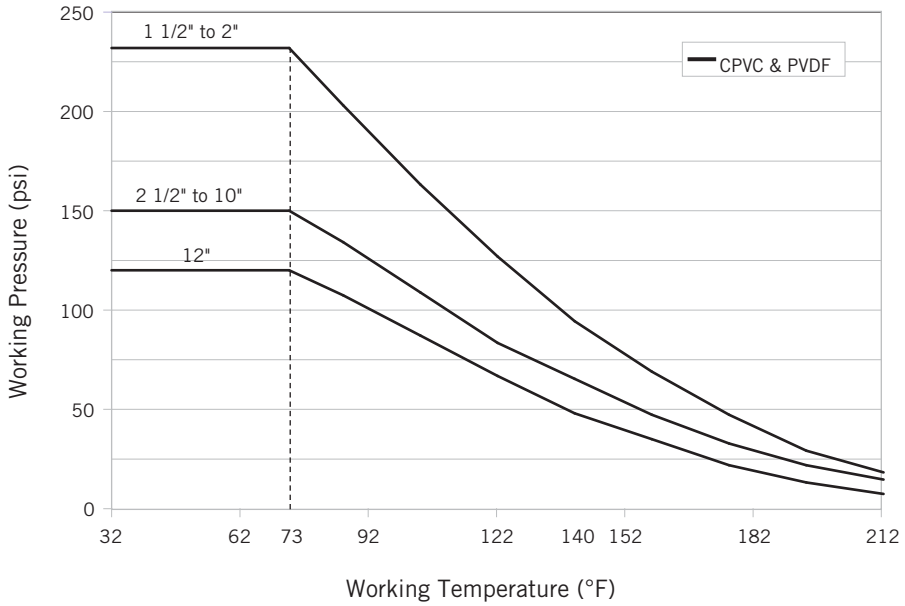
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Weights

Approximate Weight (lbs)

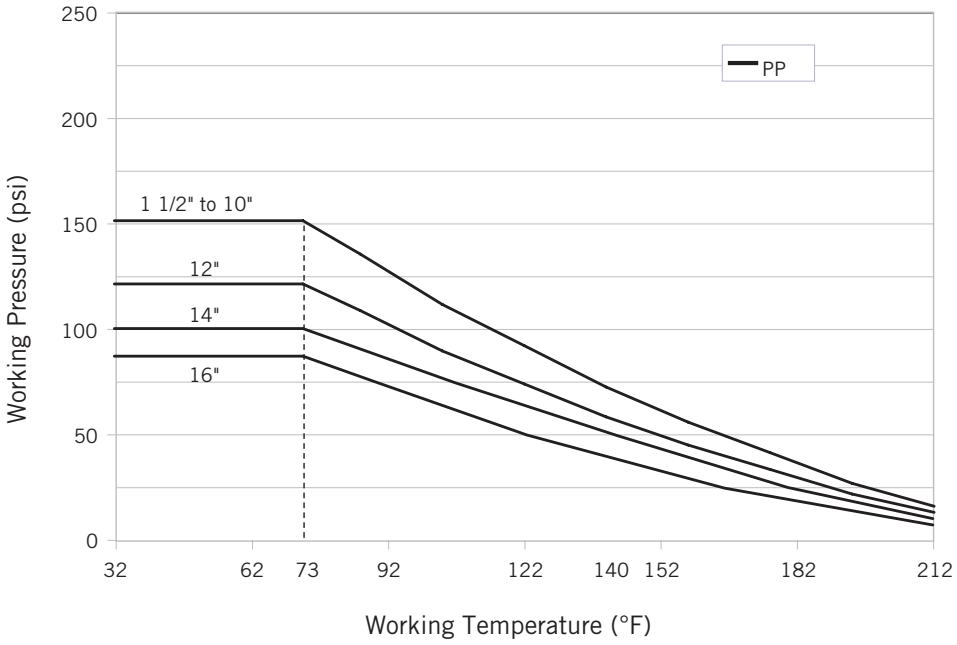
Size (in.)	Valve	w/ Handle	w/ Gear Box
1-1/2	1.27	1.98	–
2	1.66	2.38	–
2-1/2	2.20	3.24	5.29
3	3.09	4.12	6.17
4	3.86	4.89	6.94
5	5.62	6.83	9.81
6	7.28	8.49	11.46
8	13.23	14.88	20.50
10	26.46	–	41.01
12	41.89	–	56.44
14	51.00	–	70.00
16	61.00	–	85.00

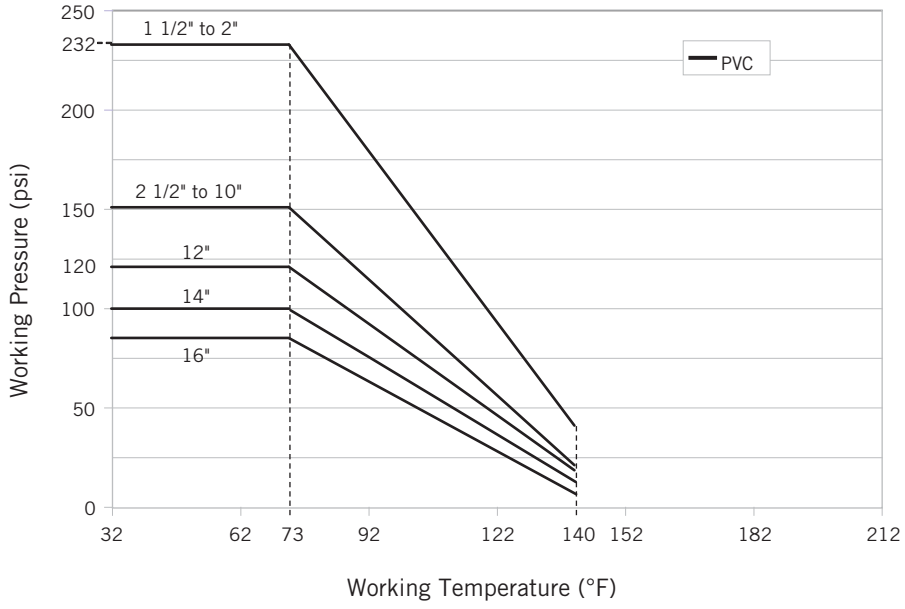
Pressure – Temperature Ratings



CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Pressure – Temperature Ratings





CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

FK SERIES BUTTERFLY VALVES

Flow Coefficients

The flow coefficient (C_v) represents the flow rate in gallons per minute (GPM) at 68°F for which there is a 1 psi pressure drop across the valve in the fully open position. These values are determined from an industry standard testing procedure which uses water as the flowing media (specific gravity of 1.0). To determine specific flow rate and pressure loss scenarios, one can use the following formula:

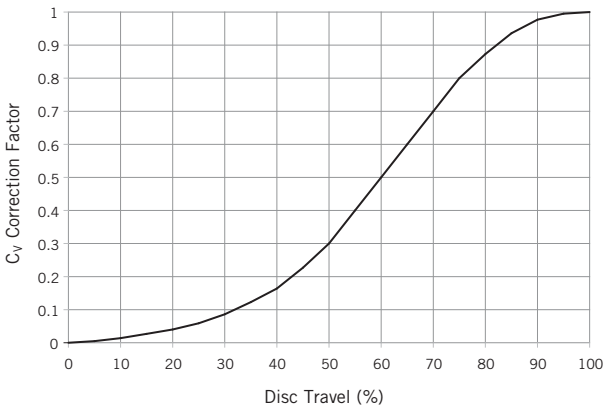
$$f = sg \times \left(\frac{Q}{C_V}\right)^2$$

Where,

- f is the pressure drop (friction loss) in psi,
- sg is the specific gravity of the fluid,
- Q is the flow rate in GPM,
- C_V is the flow coefficient.

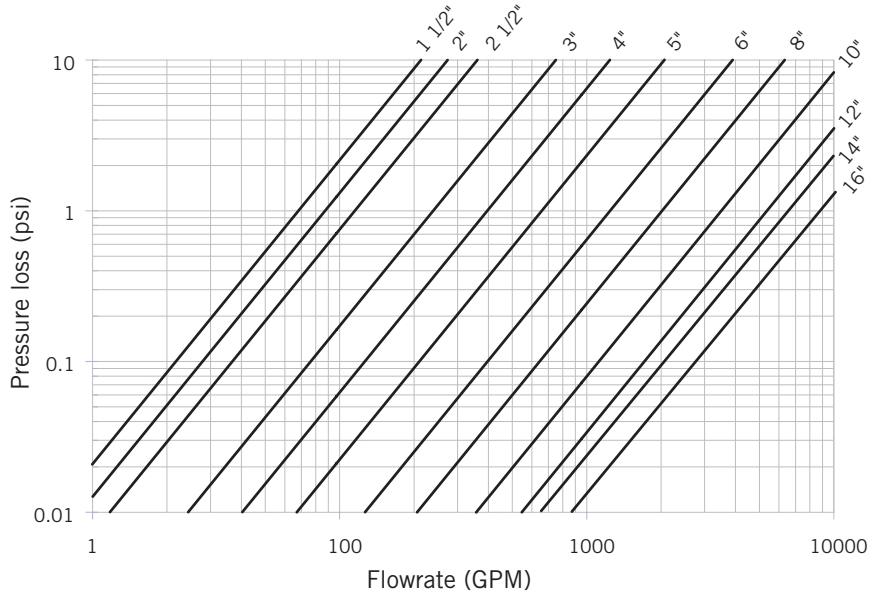
Flow Coefficient Correction Factor

Use this chart to determine the appropriate flow coefficient correction factor depending on the amount of disc travel. As the valve cycles from fully open (100% travel) to fully closed (0% travel), the corresponding C_v value will decrease in accordance with the adjacent graph.



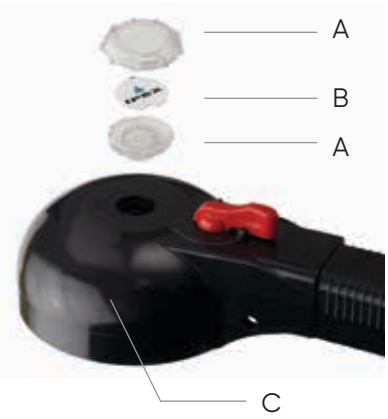
Size (in)	C_v
1-1/2	70
2	90
2-1/2	119
3	249
4	413
5	690
6	1309
8	2135
10	3724
12	5712
14	6587
16	8743

Pressure Loss Chart



CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Customize FX EasyFit



A Transparent PVC Service Plug

B PVC Tag Holder

C EasyFit Multifunction Handle

It is often necessary to customize a valve by labelling or tagging it in order to mark, protect and identify it.

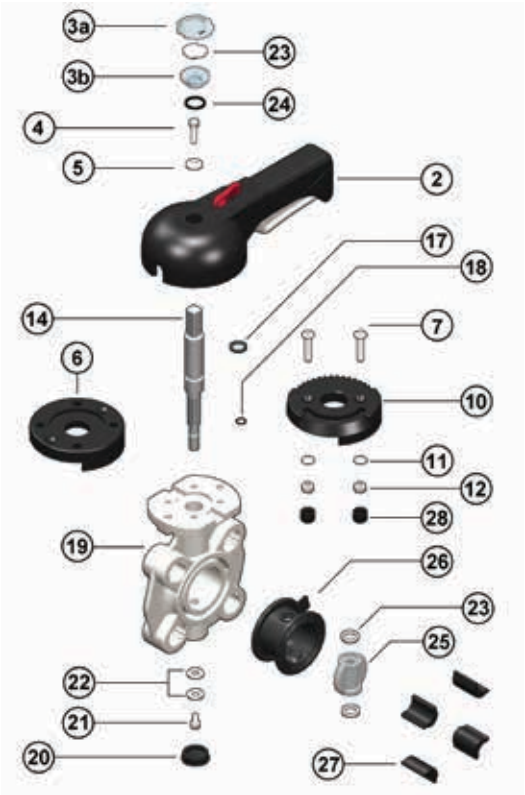
The FK is equipped with a specially designed water resistant module for the customization of the valve. The module is housed in the handle and is composed of a transparent PVC service plug and a white tag holder. The transparent plug can be easily removed to be used for self-labelling on its blank side. Self labelling can be done in several ways, but we recommend designing and printing custom labels through the EasyFit Labelling System (LSE).

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

FK SERIES BUTTERFLY VALVES

Components

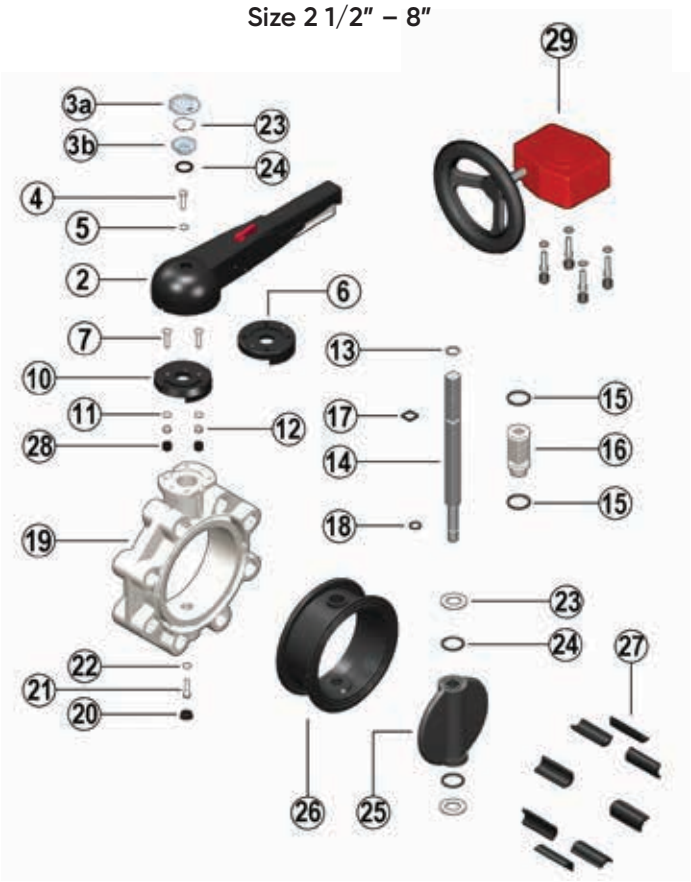
Size 1 1/2" – 2"



#	Component	Material	Qty
* 1	position indicator	PA	1
* 2	handle	PVC	1
* 3 a,b	transparent service plug	PVC	1
* 4	screw	SS	1
* 5	washer	SS	1
6	spacer pad	GRPP	1
7	screw	SS	2
8	screw	SS	2
9	ratchet	SS	1
10	pad	GRPP	1
11	washer	SS	2
12	nut	SS	2
13	retaining ring	SS	1
* 14	shaft	420 SS	1

* Spare parts available.

Size 2 1/2" – 8"



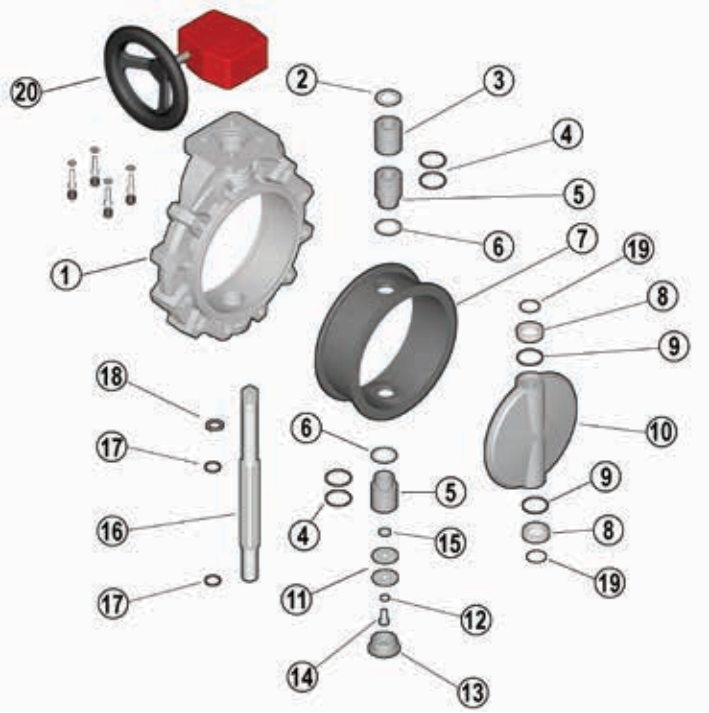
#	Component	Material	Qty
* 15	bushing o-ring	EPDM or FKM	2
16	bushing	Nylon	1
* 17	shaft o-ring	EPDM or FKM	1
* 18	shaft o-ring	EPDM or FKM	1
19	body	GRPP	1
20	cap	PE	1
21	screw	SS	1
22	washer	SS	1
* 23	anti-friction ring	PTFE	2
* 24	disc o-ring	EPDM or FKM	2
* 25	disc	CPVC / PP / PVC / ABS / PVDF	1
* 26	primary liner	EPDM or FKM	1
27	inserts	ABS	4 or 8
28	cap	PE	2
29	gearbox	Al, Steel	1

* Spare parts available.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

FK SERIES BUTTERFLY VALVES

Size 10" – 12"



#	Component	Material	Qty
1	body	GRPP	1
2	washer	SS	1
3	bushing	PP	1
* 4	bushing o-ring	EPDM or FKM	4
5	bushing for o-ring	PP	2
6	washer	PTFE	2
* 7	primary liner	EPDM or FKM	1
* 8	anti-friction ring	PTFE	2
* 9	disc o-ring	EPDM or FKM	2
* 10	disc	CPVC / PP / PVC / PVDF	1
11	washer	SS	2
12	washer	SS	1
13	cap	PE	1
14	screw	SS	1
15	washer	SS	1
* 16	shaft	420 SS	1
* 17	shaft o-ring	EPDM or FKM	2
18	retaining ring	SS	1
19	o-ring	EPDM or FKM	2
20	gearbox	Al, Steel	1

* Spare parts available.

Size 14" – 16"

#	Component	Material	Qty
1	body	PP-GR	1
2	washer	Stainless Steel	1
3	bush	PP-H	1
4	bush o-ring	EPDM or FKM	6
5	bush	PP-H	1
6	washer	PP-H	2
7	liner (EPDM or FKM)	EPDM or FKM	1
8	anti-friction ring	PTFE	2
9	disk O-ring	EPDM or FKM	2
10	disk	PP-H	1
11	washer	Stainless Steel	1
12	washer	Stainless Steel	1
13	protection plug	PE	1
14	screw	Stainless Steel	1
16	stem	Stainless Steel	1
17	stem o-ring	EPDM or FKM	2
18	seeger ring	Stainless Steel	1
20	gearbox	Al, Steel	1
21	pin	Stainless Steel	21
22	washer	Stainless Steel	1
23	position indicator	PA	1

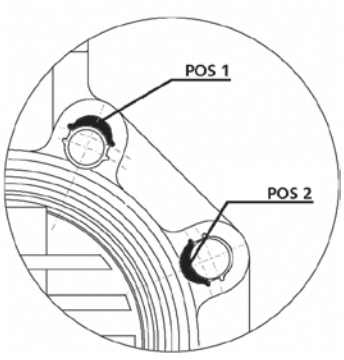
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

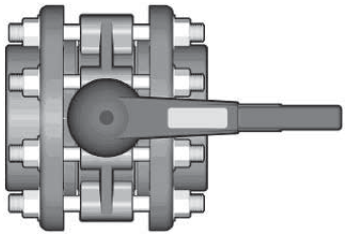
Installation Procedures

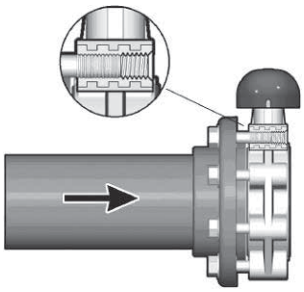
1. For the lever handle style, attach the handle (part #2 on previous pages) to the valve body (19) using the supplied bolt (4) and washer (5). Affix the cap (3) over the bolt.
2. For non-lugged style sizes 1-1/2" through 8", push the inserts (27) into the body holes according to the position chart below.
3. **Ensure that the length of the bolts is sufficient for the size of valve being installed. Due to the varying designs of plastic flanges, there is no recommended minimum length. However, a length that results in at least 5 exposed threads on each side should be sufficient.**
4. Please refer to the appropriate application sub-section:
   a. For typical inline installation, ensure that the disc is in the partially closed position then carefully insert the valve into the piping system between the two flanges. Insert the bolts, washers, and nuts (if necessary), then hand tighten. **Take care to properly line up the valve and flanges as any misalignment may cause leakage.**
   b. For lugged version end of line installation, ensure that the disc is in the partially closed position then carefully position the valve on the flange. Insert the bolts, and washers, then hand tighten. **Take care to properly line up the valve and flange as any misalignment may cause leakage.**
5. To avoid damage to the primary gasket, cycle the valve to the open position before tightening the bolts. For correct joining procedure, please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". The bolts should be tightened in an even pattern to the nominal torque in the table below. These torque ratings are sufficient to maintain a watertight seal at the maximum rated operating pressure.

NOTE: If the process media is dirty or contains suspended particles, it is advisable to install the valve in an orientation in which the shaft is not vertical (see diagrams). Over time, particles may collect at the bottom of the valve posing a threat to the seal between the disc, liner, and shaft.

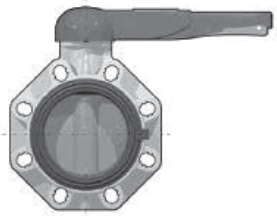
Size (in.)	ANSI 150 Insert Position	Nominal Bolt Torque (ft-lbs)
1-1/2	POS 1	7
2	–	9
2-1/2	POS 2	11
3	POS 2	13
4	POS 2	15
5	POS 2	26
6	POS 2	30
8	POS 2	41
10	–	52
12	–	52
14	–	55
16	–	55





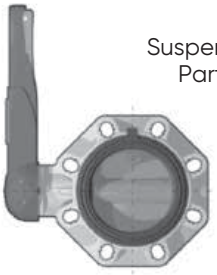


0° Normal Service



45° Dirty Fluids

90° Suspended Particles



CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system.**

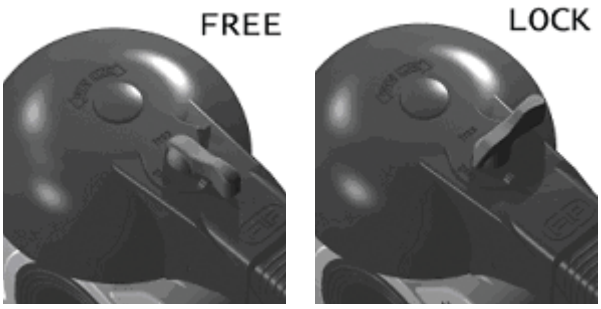
Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

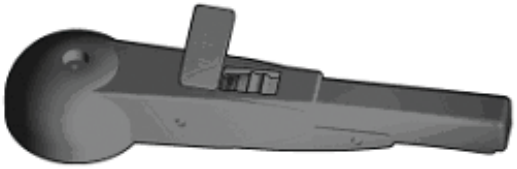
The FK handle incorporates a locking mechanism that prevents unintentional rotation. When engaged, the spring-loaded handle release is locked and the valve cannot be cycled. A padlock can be installed through this portion of the handle as an additional safety precaution.

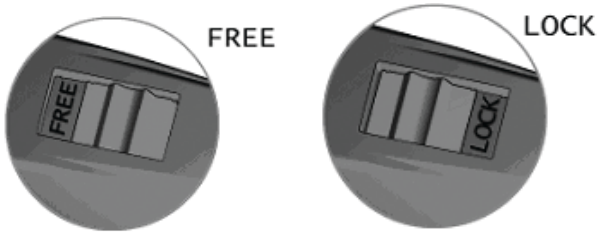
Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

Sizes 1-1/2" to 2"



Sizes 2-1/2" to 8"





CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

FE SERIES BUTTERFLY VALVES

IPEX FE Series Butterfly Valves incorporate many features of our industrial FK valve, yet the all PVC construction and EPDM liner make this valve the perfect choice for water and light industrial applications. The special trapezoid shape of the liner and serrated body cavity guarantee a bubble tight seal while keeping break-away torque at an absolute minimum. This versatile valve features double self-lubricating seals, direct actuator mount capability, and the option of either a lever handle or mounted gear box. The FE lever handle includes the EasyFit Labeling system for valve identification. FE Series Butterfly Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

ASTM D1784

ANSI B16.5

VALVE AVAILABILITY

Body Material:	PVC
Disc Material:	PVC
Size Range:	1-1/2" through 12"
Pressure:	232 psi (1-1/2" to 2"), 150 psi (2-1/2" to 8") 75 psi (10" to 12")
Seats:	EPDM
Seals:	EPDM
Body Style:	Wafer
Control Style:	Lever Handle or Mounted Gear Box
End Connections:	Flanged (ANSI 150)

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

FE SERIES BUTTERFLY VALVES

Sample Specification

1.0 Butterfly Valves – FE

1.1 Material

- The valve body and disc shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.
- The valve shaft shall be made of zinc plated steel.

1.2 Seats

- The disc liner shall be made of EPDM.

1.3 Seals

- The o-ring seals shall be made of EPDM.

2.0 Connections

2.1 Flanged style

- The ANSI 150 flanged connections shall conform to the dimensional standard ANSI B16.5.

3.0 Design Features

- The valve shall be of wafer design.
- Manual control of the valve shall be achieved through the use of either a lever handle or mounted gear box (specifier must select one).
- The shaft shall have standard ISO square dimensions for direct mounting of actuators.
- The disc seat shall be a trapezoidal elastomeric liner and provide a bubble tight seal.
- The liner shall completely isolate the valve body from the process flow.
- The liner shall function as a flange gasket on both sides of the valve.
- The body cavity shall feature special channeling to prevent liner slippage and compression.
- The disc, seats, and seals shall be the only wetted parts.
- Teflon® seated o-ring seals shall prevent the shaft from becoming wetted.
- The handle shall incorporate a transparent PVC plug and tag holder for valve identification.

3.1 Pressure Rating

- All valves sizes 1-1/2" through 2" shall be rated at 232 psi at 73°F.
- All valves sizes 2-1/2" through 8" shall be rated at 150 psi at 73°F.
- All valves sizes 10" through 12" shall be rated at 75 psi at 73°F.
- The handle shall incorporate a transparent PVC plug and tag holder for valve identificaiton.

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Colour Coding

- All valves shall be colour-coded dark gray.

4.0 All valves shall be Xirtec® PVC by IPEX or approved equal.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

FE SERIES BUTTERFLY VALVES

Valve Selection

Size (inches)	Disc Material	Body Style	O-ring Material	IPEX Part Number	Pressure Rating @ 73°F
1-1/2	PVC	Handle	EPDM	053202	232 psi
2		Handle		053203	
2-1/2		Handle		053842	150 psi
		Gearbox		253842	
3		Handle		053081	
		Gearbox		253081	
4		Handle		053082	
		Gearbox		253082	
5		Handle		053843	
		Gearbox		253843	
6		Handle		053083	
		Gearbox		253083	
8		Handle		053084	
		Gearbox		253084	
10		Gearbox		052264	75 psi
12		Gearbox		052265	

Note: Size 14" through 24" valves are available upon request.

Size (inches):

- ☐ 1-1/2
- ☐ 2
- ☐ 2-1/2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 8
- ☐ 10
- ☐ 12

Control Style:

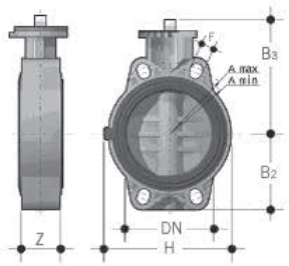
- ☐ Lever Handle
- ☐ Mounted Gear Box

IPEX Part Number:

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

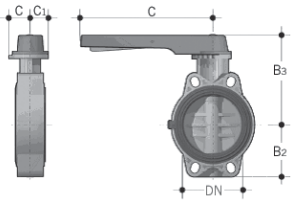
FE SERIES BUTTERFLY VALVES

Dimensions



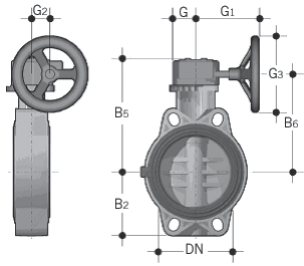
Dimension (inches)

Size	DN	Z	B_2	B_3	H	Amin	Amax	f	# holes	Pattern
1-1/2	1.57	1.30	2.36	4.17	5.20	3.68	4.29	0.75	4	square
2	1.97	1.69	2.76	4.45	5.79	4.25	4.88	0.75	4	square
2-1/2	2.56	1.81	3.15	4.84	6.50	5.04	5.67	0.75	4	square
3	3.15	1.93	3.54	5.59	5.12	5.71	6.26	0.75	4	rectangular
4	3.94	2.20	4.13	5.98	5.91	6.50	7.48	0.75	4	rectangular
5	4.92	2.52	4.76	6.93	7.28	8.03	8.46	0.91	4	rectangular
6	5.91	2.76	5.20	7.44	8.27	9.06	9.53	0.91	4	rectangular
8	7.87	2.80	6.34	8.46	12.80	11.02	11.73	0.91	8	square
10	9.84	4.49	8.27	9.76	15.94	14.25	14.25	1.00	12	square
12	11.81	4.49	9.65	12.01	18.70	17.00	17.00	1.00	12	square



Lever Handle – Dimension (inches)

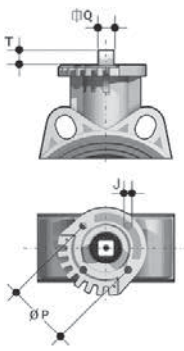
Size	DN	C_1	C_2	C	B_2	B_3	# holes	Pattern
1-1/2	1.57	1.77	1.65	6.89	2.36	5.35	4	square
2	1.97	1.77	1.65	6.89	2.76	5.63	4	square
2-1/2	2.56	1.77	2.09	9.84	3.15	6.61	4	square
3	3.15	1.77	2.09	9.84	3.54	7.17	4	rectangular
4	3.94	1.77	2.09	9.84	4.13	7.72	4	rectangular
5	4.92	1.77	2.09	13.19	4.76	8.46	4	rectangular
6	5.91	1.77	2.09	13.19	5.20	9.02	4	rectangular
8	7.87	2.56	3.23	16.73	6.34	12.17	8	square



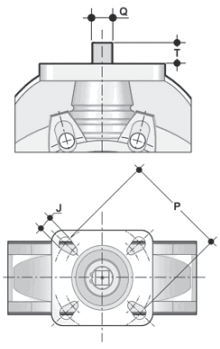
Mounted Gear Box – Dimension (inches)

Size	DN	G_2	G	G_1	G_3	B_2	B_5	B_6	# holes	
2-1/2	2.56	1.54	1.89	5.31	4.92	3.15	6.81	5.71	4	square
3	3.15	1.54	1.89	5.31	4.92	3.54	7.36	6.26	4	rectangular
4	3.94	1.54	1.89	5.31	4.92	4.13	7.91	6.81	4	rectangular
5	4.92	1.54	1.89	5.67	7.87	4.76	8.66	7.56	4	rectangular
6	5.91	1.54	1.89	5.67	7.87	5.20	9.25	8.15	4	rectangular
8	7.87	2.36	2.56	6.89	7.87	6.34	11.34	10.12	8	square
10	9.84	2.99	3.46	9.29	9.84	8.27	12.48	11.06	12	square
12	11.81	2.99	3.46	9.29	9.84	9.65	14.72	13.31	12	square

Sizes 1-1/2" to 8"



Sizes 10" to 12"



Mounting Pad for Actuation – Dimension (inches)

Size	ISO	J	P	T	Q
1-1/2	F05	0.28	1.97	0.47	0.43
2	F05	0.28	1.97	0.47	0.43
2-1/2	F05 / F07	0.28 / 0.35	1.97 / 2.76	0.47	0.43
3	F07	0.35	2.76	0.63	0.55
4	F07	0.35	2.76	0.63	0.55
5	F07	0.35	2.76	0.75	0.67
6	F07	0.35	2.76	0.75	0.67
8	F10	0.43	4.02	0.94	0.87
10	F10 / F12 / F14	0.43 / 0.51 / 0.67	4.02 / 4.92 / 5.51	0.94	0.87
12	F10 / F12 / F14	0.43 / 0.51 / 0.67	4.02 / 4.92 / 5.51	0.94	0.87

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

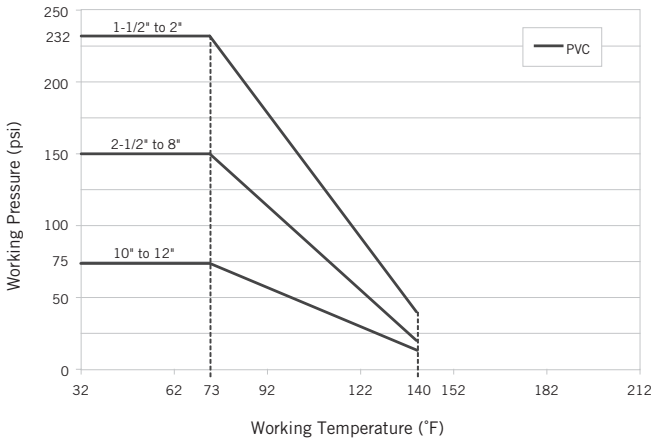
FE SERIES BUTTERFLY VALVES

Weights

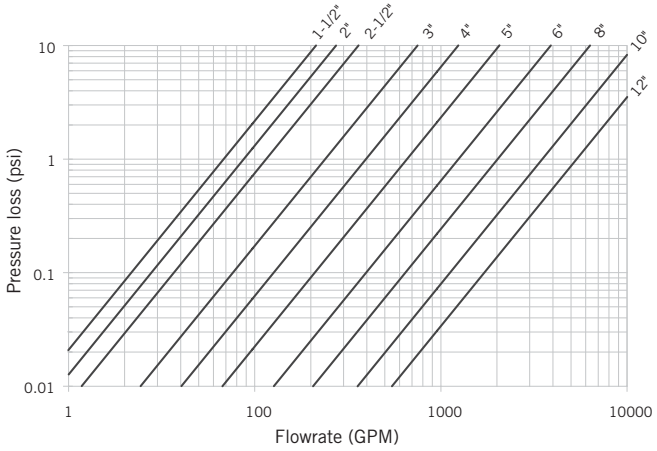
Approximate Weight (lbs)

Size	Valve	w/ Handle	w/ Gear Box
1-1/2	1.27	1.82	-
2	1.66	2.23	-
2-1/2	2.20	3.13	5.25
3	3.09	3.62	5.73
4	3.86	4.39	6.50
5	5.62	6.68	9.70
6	7.28	8.22	11.24
8	13.23	18.17	20.41
10	26.46	-	41.01
12	41.89	-	56.44

Pressure – Temperature Ratings



Pressure Loss Chart



Flow Coefficients

Size	C_v
1-1/2	70
2	90
2-1/2	119
3	249
4	413
5	690
6	1309
8	2135
10	3724
12	5712

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Components

It is often necessary to customize a valve by labelling or tagging it in order to mark, protect and identify it.

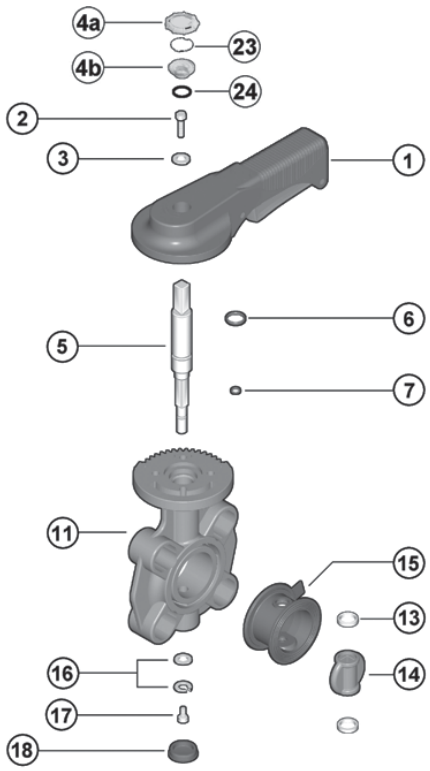
The FE is equipped with a specially designed water resistant module for the customization of the valve. The module is housed in the handle and is composed of a transparent PVC service plug and a white tag holder. The transparent plug can be easily removed to be used for self-labelling on its blank side. Self labelling can be done in several ways, but we recommend designing and printing custom labels through the EasyFit Labelling System (LSE).

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

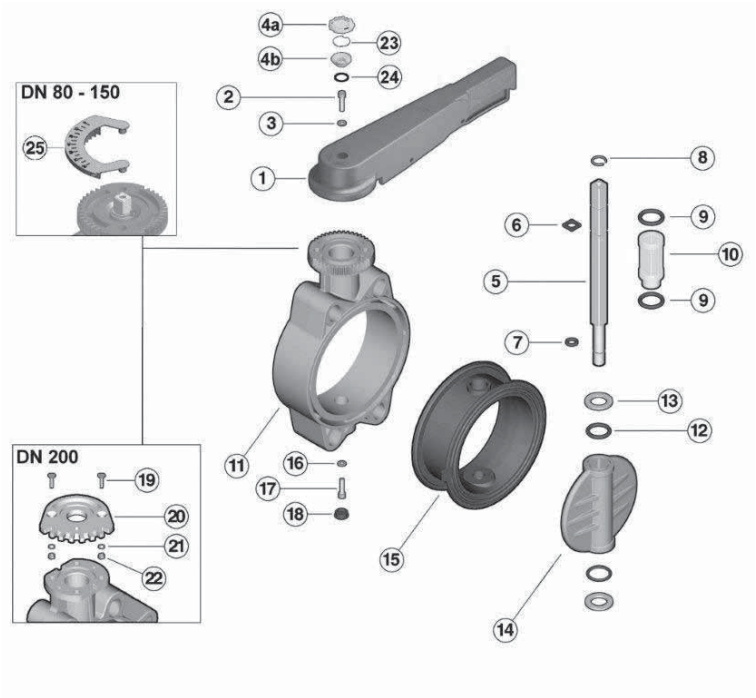
FE SERIES BUTTERFLY VALVES

Components

Sizes 1-1/2" to 2"



Sizes 2-1/2" to 8"



#	Component	Material	Qty
* 1	handle	PVC	1
2	screw	SS	1
3	washer	SS	1
4	cap	PE	1
4 a,b	transparent service plug	PVC	1
* 5	shaft	zinc plated steel	1
* 6	shaft o-ring	EPDM	1
* 7	shaft o-ring	EPDM	1
8	retaining ring	SS	1
* 9	bushing o-ring	EPDM	2
10	bushing	Nylon	1
11	body	PVC	1
* 12	disc o-ring	EPDM	2

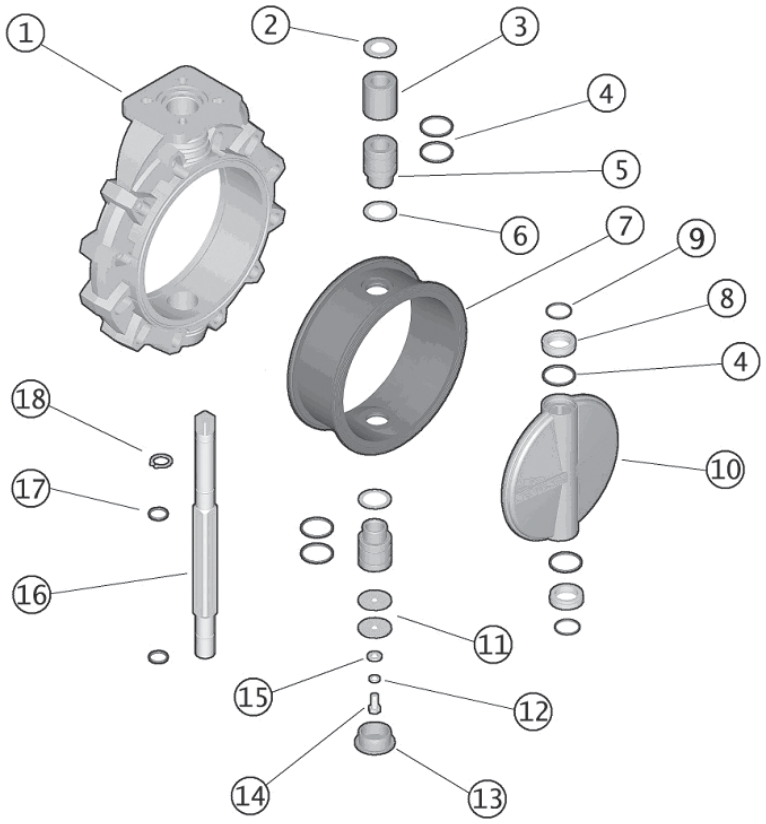
#	Component	Material	Qty
* 13	anti-friction ring	PTFE	2
* 14	disc	PVC	1
* 15	primary liner	EPDM	1
16	washer	SS	1
17	screw	SS	1
18	cap	PE	1
19	screw	SS	2
20	pad	PVC	1
21	washer	SS	2
22	nut	SS	2
23	tag holder	PVC	1
24	seal (o-ring)	NBR	1
25	position indicator	PVC	1

* Spare parts available

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Components

Sizes 10" to 12"



#	Component	Material	Qty
1	body	PVC	1
2	washer	SS	1
3	bushing	PP	1
* 4	bushing o-ring	EPDM	4
5	bushing for o-ring	PP	2
6	washer	PTFE	2
* 7	primary liner	EPDM	1
* 8	anti-friction ring	PTFE	2
* 9	disc o-ring	EPDM	2
* 10	disc	PVC	1
11	washer	SS	2
12	washer	SS	1
13	cap	PE	1
14	screw	SS	1
15	washer	SS	1
* 16	shaft	Zinc Plated Steel	1
* 17	shaft o-ring	EPDM	2
18	retaining ring	SS	1

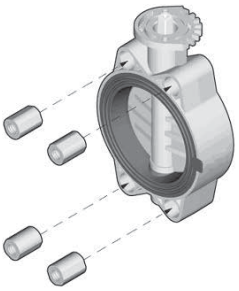
* Spare parts available.

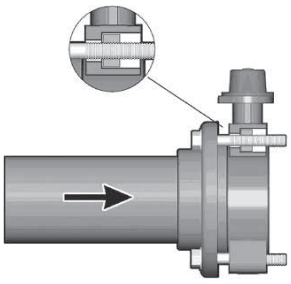
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

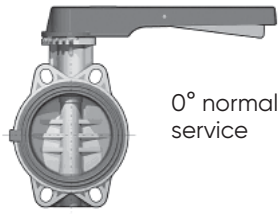
FE SERIES BUTTERFLY VALVES

Installation Procedures

1. For the lever handle style, attach the handle (part #1 on previous pages) to the valve body (11) using the supplied bolt (2) and washer (3). Affix the cap (4) over the bolt.
2. **Ensure that the length of the bolts is sufficient for the size of valve being installed. Due to the varying designs of plastic flanges, there is no recommended minimum length. However, a length that results in at least 5 exposed threads on each side should be sufficient**.
3. Please refer to the appropriate application sub-section:
   a. For typical inline installation, ensure that the disc is in the partially closed position then carefully insert the valve into the piping system between the two flanges. **Insert the bolts, washers, and nuts (if necessary), then hand tighten. Take care to properly line up the valve and flanges as any misalignment may cause leakage**.
   b. For lugged version end of line installation, insert the necessary steel lugs into the valve body. Ensure that the disc is in the partially closed position then carefully position the valve on the flange. Insert the bolts, and washers, then hand tighten. **Take care to properly line up the valve and flange as any misalignment may cause leakage**.
4. To avoid damage to the primary gasket, cycle the valve to the open position before tightening the bolts. For correct joining procedure, please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". **The bolts should be tightened in an even pattern to the nominal torque in the table below. These torque ratings are sufficient to maintain a watertight seal at the maximum rated operating pressure**.





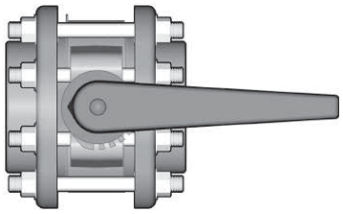


0° normal service

45° Dirty Fluids

90° Suspended Particles

Note: End of line installation will cause the maximum rated pressure to be reduced to the values listed in the table below. If the process media is dirty or contains suspended particles, it is advisable to install the valve in an orientation in which the shaft is not vertical (see diagrams). Over time, particles may collect at the bottom of the valve posing a threat to the seal between the disc, liner, and shaft.



Size	Nominal Bolt Torque ((ft-lbs)	Lugged Pmax (psi)
1-1/2	7	90
2	9	90
2-1/2	11	90
3	13	90
4	15	90
5	26	90
6	30	60
8	41	60
10	52	–
12	52	–

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

FE SERIES BUTTERFLY VALVES

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. **Be sure to depressurize and drain the isolated branch before continuing**.
2. Cycle the valve to a partially open position then loosen each bolt holding the valve to the pipe flange(s). Please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" for a recommended bolt tightening pattern diagram. Follow the same pattern when disassembling the flanged joint(s) then carefully remove the valve from the line.

Sizes 1-1/2" to 8"

3. For the lever handle style, remove the protection cap (4) then loosen the screw (2) and washer (3) to remove the handle (1).
4. For the mounted gear box style, loosen and remove the bolts and washers fixed to the gear box. Carefully remove the gear box from the valve taking care not to damage the stem.
5. For 8" sizes, loosen and remove the bolts (19), washers (21), and nuts (22) then remove the spacer pad (20) from the valve body.
6. Remove the cap (18) then loosen and remove the screw (17) and washer(s) (16) from the base of the valve body.
7. Carefully pull the shaft (5) out of the valve body then remove the disc (14).
8. Remove the primary liner (15) from the valve body.
9. Remove the nylon bushing (10) and o-rings (9) from the valve body (sizes 2-1/2" to 8").
10. Remove the disc anti-friction rings (13), and o-rings (12, sizes 2-1/2" to 8").
11. Remove the retaining ring (8, sizes 2-1/2" to 8") and o-rings (6, 7) from the shaft.
12. The valve components can now be checked for problems and/or replaced.

Sizes 10" to 12"

3. Loosen and remove the bolts and washers fixed to the gear box. Carefully remove the gear box from the valve taking care not to damage the stem.
4. Remove the cap (13) then loosen and remove the screw (14) and washers (11, 12, and 15) from the base of the valve body (1).
5. Carefully pull the shaft (16) out of the valve body then remove the disc (10).
6. Remove the primary liner (7) from the valve body
7. Remove the upper and lower bushings (3, 5), washers (2, 6), and o-rings (4) from the valve body.
8. Remove the disc anti-friction rings (8) and o-rings (4, 9).
9. Remove the retaining ring (18) and o-rings (17) from the shaft.
10. The valve components can now be checked for problems and/or replaced.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.**

Sizes 1-1/2" to 8"

1. Insert the primary liner (15) into the valve body (11). **Ensure that the proper holes line up with those on the body**.
2. Properly fit the o-rings (9) on the nylon bushing (10) (sizes 2-1/2" to 8") then insert into the valve body from above.
3. Properly fit the disc o-rings (12, sizes 2-1/2" to 8") and anti-friction rings (13) on the disc (14), then insert into the valve liner taking care to center the holes.
4. Properly fit the o-rings (6, 7) and retaining ring (8, sizes 2-1/2" to 8") in their grooves on the shaft (6), then carefully insert into the valve body from above.
5. Fasten the shaft at the base of the valve body using the screw (17) and washer (16). Affix the cap (18) over the bolt.
6. For 8" sizes, affix the spacer pad (20) to the valve body using the screws (19), washers (21), and nuts (22).
7. For the lever handle style, affix the handle (1) using the screw (2), washer (3), and protection cap (4).
8. For the mounted gear box style, carefully place the gear box on the stem, lining up the holes. Fasten using the necessary bolts and washers.

Sizes 10" to 12"

1. Insert the primary liner (7) into the valve body (1). **Ensure that the proper holes line up with those on the body**.
2. Properly fit the o-rings (4) on the upper and lower bushings (3, 5) then insert into the valve body from above and below along with the washers (2, 6).
3. Properly fit the disc o-rings (4, 9) and anti-friction rings (8) on the disc (10), then insert into the valve liner taking care to center the holes.
4. Properly fit the o-rings (17) and retaining ring (18) in their grooves on the shaft (16), then carefully insert into the valve body from above.
5. Fasten the shaft at the base of the valve body using the screw (14) and washers (11, 12, and 15). Affix the cap (13) over the bolt.
6. Carefully place the gear box on the stem, lining up the holes. Fasten using the necessary bolts and washers.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system.**

Important Points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

The FE handle incorporates a locking mechanism that prevents unintentional rotation. The spring-loaded handle must be depressed to cycle the valve. A padlock can be installed through this portion of the handle as an additional safety precaution.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

NOTES

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES MANUAL DIAPHRAGM VALVES

IPEX DK Series Dialock® Diaphragm Valves are the ideal solution for modulating flow and controlling dirty or abrasive fluids in a variety of applications. The modular nature of these valves results in many material, body style, and diaphragm options. The re-designed weir-style body has significantly improved the DK's flow rate compared to the old design and it facilitates precise linear flow regulation through the valve's full range of operation. The new innovative and patented Dialock locking mechanism allows the manual handwheel to be adjusted and locked in over 300 positions.

VALVE AVAILABILITY

Body Material:	PVC, CPVC, PP, PVDF
Size Range:	1/2" t hrough 2-1/2"
Pressure:	150 psi
Diaphragm:	EPDM, FKM or PTFE (EPDM backed)
Control Style:	Manual Handwheel
End Connections:	Spigot, True Union (Socket, Threaded) Flanged (ANSI 150)

ASTM D1784
ASTM D1785
ASTM D4101
ASTM D3222
ASTM D2464
ASTM D2467
ASTM D2466
ASTM F441
ASTM F437
ASTM F439
ASTM F1498

ISO 3609
ISO 10931

ANSI B16.5

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES MANUAL DIAPHRAGM VALVES

Sample Specification

1.0 Diaphragm Valves – DK Manual

1.1 Material

- The valve body, including end connectors and unions, shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

or The valve body, including end connectors and unions, shall be made of Corzan® CPVC compound which shall meet or exceed the requirements of cell classification 23447 according to ASTM D1784.

or The valve body, including end connectors and unions, shall be made of stabilized PP homopolymer compound, also containing a RAL 7032 pigment, which shall meet or exceed the requirements of Type I Polypropylene according to ASTM D4101.

or The valve body, including end connectors and unions, shall be made of virgin, non-regrind PVDF compound which shall meet or exceed the requirements of Table 1 according to ASTM D3222.

- The valve bonnet assembly shall be made of high temperature, high strength, glass-filled polypropylene (GFPP).

1.2 Diaphragm

- The diaphragm shall be made of EPDM.

or The diaphragm shall be made of FKM.

or The diaphragm shall be made of PTFE (backed with EPDM).

2.0 Connections

2.1 Spigot Style

- The IPS spigot PVC end connectors shall conform to the dimensional standard ASTM D1785.

or The IPS spigot CPVC end connectors shall conform to the dimensional standard ASTM F441.

or The Metric spigot PP end connectors shall conform to the dimensional standard ISO 3609.

or The Metric spigot PVDF end connectors shall conform to the dimensional standard ISO 10931.

2.2 Socket Style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

or The IPS socket CPVC end connectors shall conform to the dimensional standard ASTM F439.

or The Metric socket PP end connectors shall conform to the dimensional standard ISO 3609.

or The Metric socket PVDF end connectors shall conform to the dimensional standard ISO 10931.

2.3 Threaded Style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1.

or The female NPT threaded CPVC end connectors shall conform to the dimensional standards ASTM F437, ASTM F1498, and ANSI B1.20.1.

2.4 Flanged Style

- The ANSI 150 flanged PVC end connectors shall conform to the dimensional standard ANSI B16.5.

or The ANSI 150 flanged CPVC end connectors shall conform to the dimensional standard ANSI B16.5.

or The ANSI 150 flanged PP end connectors shall conform to the dimensional standard ANSI B16.5.

or The ANSI 150 flanged PVDF end connectors shall conform to the dimensional standard ANSI B16.5.

3.0 Design Features

- All valves shall be weir-style for throttling applications.
- All valves shall have a manual handwheel that can be adjusted and locked in over 300 positions.
- The manual handwheel shall be made of high strength glass-filled polypropylene (GFPP).
- All valves shall have a graduated optical position indicator to allow for a visual check of the valve position.
- All valves shall have a custom labelling plate housed in a transparent cap.
- All through bolts shall be made of stainless steel.
- The valve shall incorporate a feature that allows an identification tag to be easily affixed to the valve body.
- Bodies of PVC, CPVC and PP valves shall have brass mounting inserts.
- Bodies of PVDF valves shall have stainless steel mounting inserts.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES MANUAL DIAPHRAGM VALVES

3.1 Pressure Rating

- All valves shall be rated at 150 psi at 73°F.

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Colour Coding

- All PVC valves shall be colour-coded dark gray.

or All CPVC valves shall be colour-coded light gray.

or All PP valves shall be colour-coded beige gray.

or All PVDF valves shall not be colour-coded and be white in appearance.

- All bonnet assemblies shall be colour-coded black.

4.0 All valves shall be Xirtec® PVC, Xirtec® CPVC, PP or PVDF by IPEX or approved equal.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES MANUAL DIAPHRAGM VALVES

Valve Selection

Valve Size (inches)	Body Material	Diaphragm Material	IPEX Part Number True Union				Pressure Rating @ 73°F
			IPS Spigot	IPS Socket	FNPT Threaded	ANSI 150 Flanged	
1/2	PVC	EPDM	354175	354202	354004	354220	150 psi
		FKM	354184	354214	354016	354229	
		PTFE	354193	354208	354010	354238	
	CPVC	EPDM	354247	354274	354022	354292	
		FKM	354256	354280	354028	354301	
		PTFE	354265	354286	354034	354310	
3/4	PVC	EPDM	354176	354203	354005	354221	
		FKM	354185	354215	354017	354230	
		PTFE	354194	354209	354011	354239	
	CPVC	EPDM	354248	354275	354023	354293	
		FKM	354257	354281	354029	354302	
		PTFE	354266	354287	354035	354311	
1	PVC	EPDM	354177	354204	354006	354222	
		FKM	354186	354216	354018	354231	
		PTFE	354195	354210	354012	354240	
	CPVC	EPDM	354249	354276	354024	354294	
		FKM	354258	354282	354030	354303	
		PTFE	354267	354288	354036	354312	
1-1/4	PVC	EPDM	354178	354205	354007	354223	
		FKM	354187	354217	354019	354232	
		PTFE	354196	354211	354013	354241	
	CPVC	EPDM	354250	354277	354025	354295	
		FKM	354259	354283	354031	354304	
		PTFE	354268	354289	354037	354313	
1-1/2	PVC	EPDM	354179	354206	354008	354224	
		FKM	354188	354218	354020	354233	
		PTFE	354197	354212	354014	354242	
	CPVC	EPDM	354251	354278	354026	354296	
		FKM	354260	354284	354032	354305	
		PTFE	354269	354290	354038	354314	
2	PVC	EPDM	354180	354207	354009	354225	
		FKM	354189	354219	354021	354234	
		PTFE	354198	354213	354015	354243	
	CPVC	EPDM	354252	354279	354027	354297	
		FKM	354261	354285	354033	354306	
		PTFE	354270	354291	354039	354315	
2-1/2	PVC	EPDM	354181	–	–	354226	
		FKM	354190	–	–	354235	
		PTFE	354199	–	–	354244	
	CPVC	EPDM	354253	–	–	354298	
		FKM	354262	–	–	354307	
		PTFE	354271	–	–	354316	

Body Material:

- ☐ PVC
- ☐ CPVC

Size (inches):

- ☐ 1/2
- ☐ 3/4
- ☐ 1
- ☐ 1-1/4
- ☐ 1-1/2
- ☐ 2
- ☐ 2-1/2

Diaphragm:

- ☐ EPDM
- ☐ FKM
- ☐ PTFE (EPDM Backed)

End Connections:

- ☐ Spigot (IPS)
- ☐ True Union (IPS Socket)
- ☐ True Union (FNPT Threaded)
- ☐ Flanged (ANSI 150)

IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Valve Selection, continued

Valve Size (mm)	Body Material	Diaphragm Material	IPEX Part Number True Union		Pressure Rating @ 73°F
			Metric Spigot	Metric Socket	
20	PP	EPDM	354219	354346	150 psi
		FKM	354328	354352	
		PTFE	354337	354358	
	PVDF	EPDM	354364	354391	
		FKM	354373	354397	
		PTFE	354382	354403	
25	PP	EPDM	354220	354347	
		FKM	354329	354353	
		PTFE	354338	354359	
	PVDF	EPDM	354365	354392	
		FKM	354374	354398	
		PTFE	354383	354405	
32	PP	EPDM	354221	354348	
		FKM	354330	354354	
		PTFE	354339	354360	
	PVDF	EPDM	354366	354393	
		FKM	354375	354399	
		PTFE	354384	354406	
40	PP	EPDM	354222	354349	
		FKM	354331	354355	
		PTFE	354340	354361	
	PVDF	EPDM	354367	354394	
		FKM	354376	354400	
		PTFE	354385	354407	
50	PP	EPDM	354223	354350	
		FKM	354332	354356	
		PTFE	354341	354362	
	PVDF	EPDM	354368	354395	
		FKM	354377	354401	
		PTFE	354386	354408	
63	PP	EPDM	354224	354351	
		FKM	354333	354357	
		PTFE	354342	354363	
	PVDF	EPDM	354369	354396	
		FKM	354378	354402	
		PTFE	354387	354409	
75	PP	EPDM	354225	-	
		FKM	354334	-	
		PTFE	354343	-	
	PVDF	EPDM	354370	-	
		FKM	354379	-	
		PTFE	354388	-	

Body Material:

- ☐ PP
- ☐ PVDF

Size (inches):

- ☐ 20mm
- ☐ 25mm
- ☐ 32mm
- ☐ 40mm
- ☐ 50mm
- ☐ 63mm
- ☐ 75mm

Diaphragm:

- ☐ EPDM
- ☐ FKM
- ☐ PTFE (EPDM Backed)

End Connections:

- ☐ Spigot (Metric)
- ☐ True Union (Metric Socket)

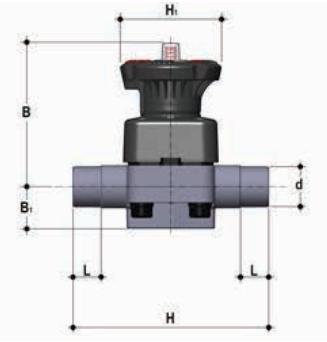
IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES MANUAL DIAPHRAGM VALVES

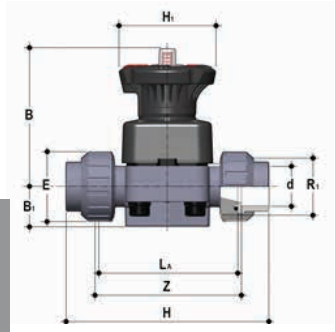
Dimensions



IPS Spigot Connections

Dimension (inches)

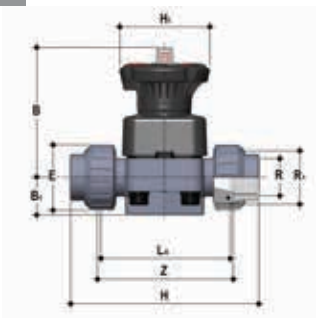
Size	d(in) PVC/CPVC	d(mm) PP/PVDF	B	B_1	H	H_1	L
1/2	0.84	20	4.02	0.98	4.88	3.15	0.63
3/4	1.05	25	4.13	1.18	5.67	3.15	0.75
1	1.32	32	4.49	1.30	6.06	3.15	0.87
1-1/4	1.66	40	4.69	1.18	6.85	3.15	1.02
1-1/2	1.90	50	5.79	1.38	7.64	4.72	1.22
2	2.38	63	6.77	1.81	8.82	4.72	1.50
2-1/2	2.88	75	6.77	1.81	11.18	4.72	1.73



IPS Socket Connections

Dimension (inches)

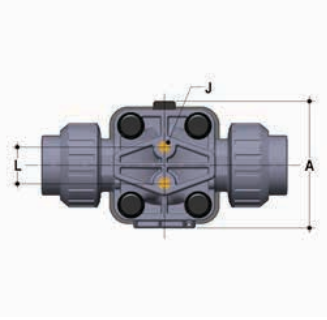
Size	d(in) PVC/CPVC	d(mm) PP/PVDF	B	B_1	E	H PVC/CPVC	H PP/PVDF	H_1	L_A	R_1	Z PVC/CPVC	Z PP/PVDF
1/2	0.84	20	4.02	0.98	1.61	5.63	5.08	3.15	3.54	1	3.86	3.94
3/4	1.05	25	4.13	1.18	1.97	6.57	6.06	3.15	4.25	1-1/4	4.53	4.57
1	1.32	32	4.49	1.30	2.28	7.09	6.61	3.15	4.57	1-1/2	4.80	4.88
1-1/4	1.66	40	4.69	1.18	2.83	8.19	7.56	3.15	5.28	2	5.67	5.51
1-1/2	1.90	50	5.79	1.38	3.11	9.21	8.74	4.72	6.06	1-1/4	6.46	6.30
2	2.38	63	6.77	1.81	3.86	10.71	10.47	4.72	7.24	2-3/4	7.68	7.48



FNPT Threaded Connections

Dimension (inches)

R	B	B_1	E	H	H_1	L_A	R_1	Z
1/2	4.02	0.98	1.61	5.16	3.15	3.54	1	3.82
3/4	4.13	1.18	1.97	5.94	3.15	4.25	1-1/4	4.65
1	4.49	1.30	2.28	6.50	3.15	4.57	1-1/2	5.00
1-1/4	4.69	1.18	2.83	7.40	3.15	5.28	2	5.71
1-1/2	5.79	1.38	3.11	8.19	4.72	6.06	2-1/4	6.50
2	6.77	1.81	3.86	9.69	4.72	7.24	2-3/4	7.68



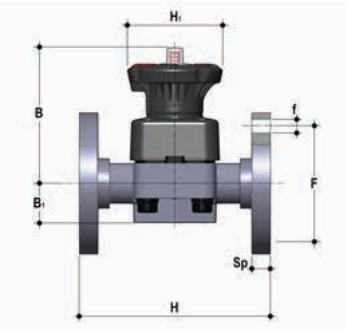
Dimension (inches)

Size	A	L	J
1/2	2.91	0.98	M6 x 10
3/4	2.91	0.98	M6 x 10
1	3.43	0.98	M6 x 10
1-1/4	3.43	0.98	M6 x 10
1-1/2	4.49	1.75	M8 x 14
2	5.35	1.75	M8 x 14
2-1/2	5.35	1.75	M8 x 14

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES MANUAL DIAPHRAGM VALVES

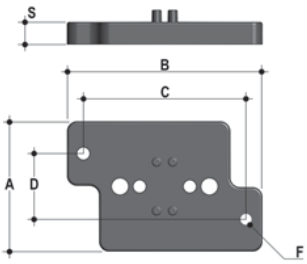
Dimensions



ANSI 150 Flanged (Vanstone) Connections

Dimension (inches)

Size	B	B_1	f	H	H_1	Sp	# holes
1/2	4.02	0.98	5/8	4.25	3.15	0.53	4
3/4	4.13	1.18	5/8	5.91	3.15	0.53	4
1	4.49	1.30	5/8	6.30	3.15	0.55	4
1-1/4	4.69	1.18	5/8	7.09	3.15	0.55	4
1-1/2	5.79	1.38	5/8	7.87	4.72	0.63	4
2	6.77	1.81	3/4	9.06	4.72	0.63	4
2-1/2	6.77	1.81	3/4	11.42	4.72	0.83	4

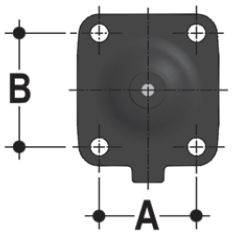


Wall/Panel Mounting Plate

Dimension (inches)

Size	A	B	C	D	F	S
1/2	2.56	3.82	3.19	1.30	0.22	0.43
3/4	2.56	3.82	3.19	1.30	0.22	0.43
1	2.56	3.82	3.19	1.30	0.22	0.43
1-1/4	2.56	3.82	3.19	1.30	0.22	0.43
1-1/2	2.56	5.67	5.12	1.30	0.26	0.43
2	2.56	5.67	5.12	1.30	0.26	0.43
2-1/2	2.56	5.67	5.12	1.30	0.26	0.43

Diaphragm



Dimension (inches)

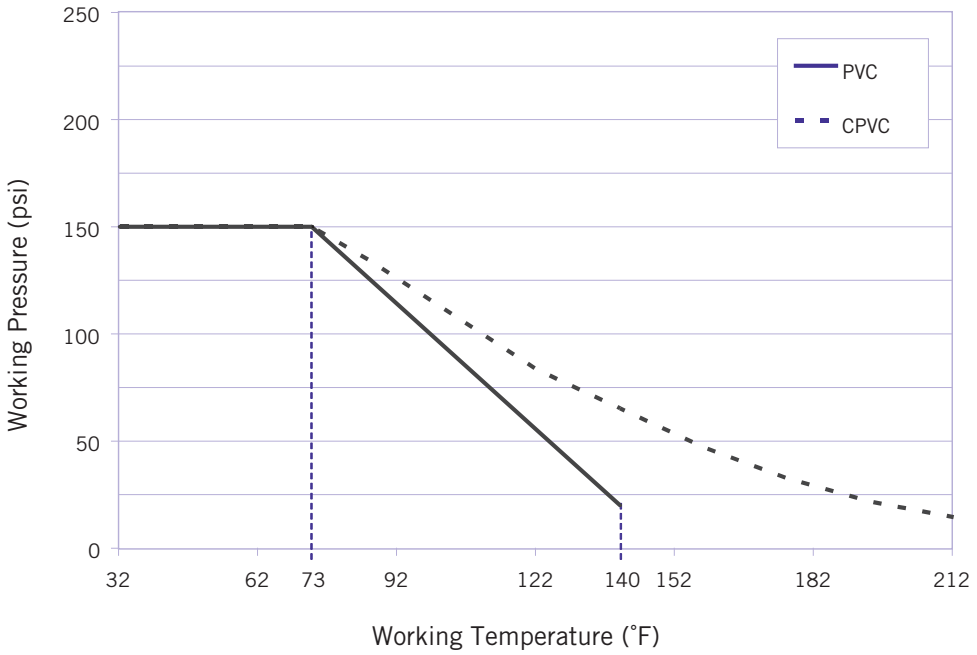
Size (in)	Size (mm)	A	B
1/2	20	1.57	1.73
3/4	25	1.57	1.73
1	32	1.81	2.13
1-1/4	40	1.81	2.13
1-1/2	50	2.56	2.76
2	63	3.07	3.23
2-1/2	75	3.07	3.23

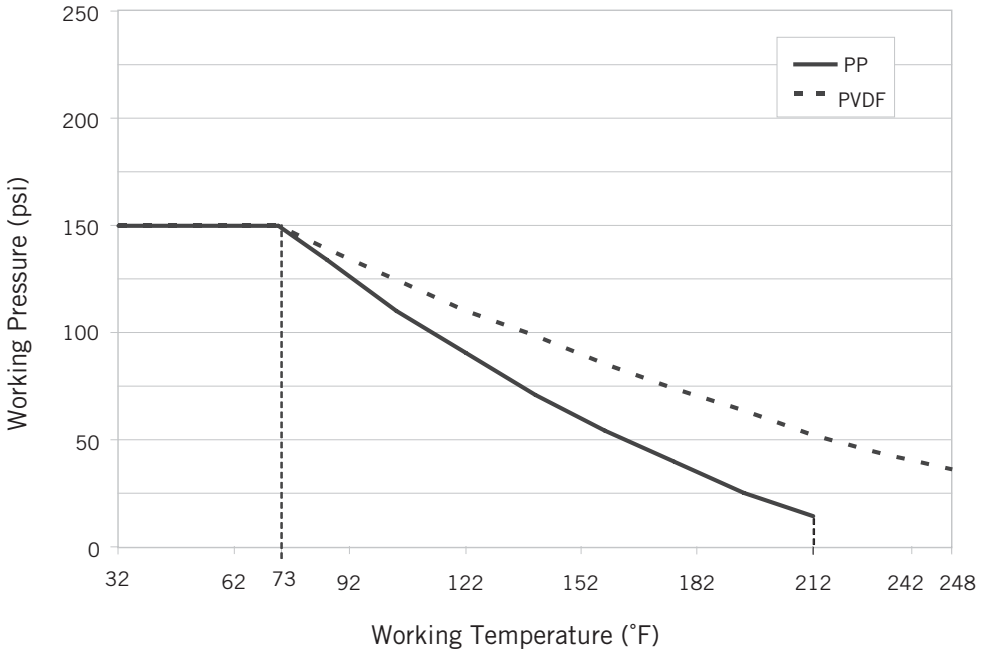
Approximate Weight (lbs)

Size	PVC			CPVC			PP		PVDF	
	Spigot	True Union	Flanged	Spigot	True Union	Flanged	Spigot	True Union	Spigot	True Union
1/2	1.01	1.10	1.47	1.01	1.10	1.47	0.95	1.01	1.10	1.21
3/4	1.06	1.24	1.50	1.06	1.24	1.50	0.98	1.10	1.16	1.40
1	1.50	1.74	2.14	1.50	1.74	2.14	1.37	1.53	1.67	2.00
1-1/4	1.60	2.02	2.61	1.60	2.02	2.61	1.43	1.72	1.80	2.37
1-1/2	3.36	3.83	4.63	3.36	3.83	4.63	3.04	3.36	3.75	4.38
2	5.27	6.14	6.96	5.27	6.14	6.96	4.71	5.31	5.94	7.13
2-1/2	5.55	–	7.98	5.55	–	7.98	4.91	–	6.33	–

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Pressure – Temperature Ratings



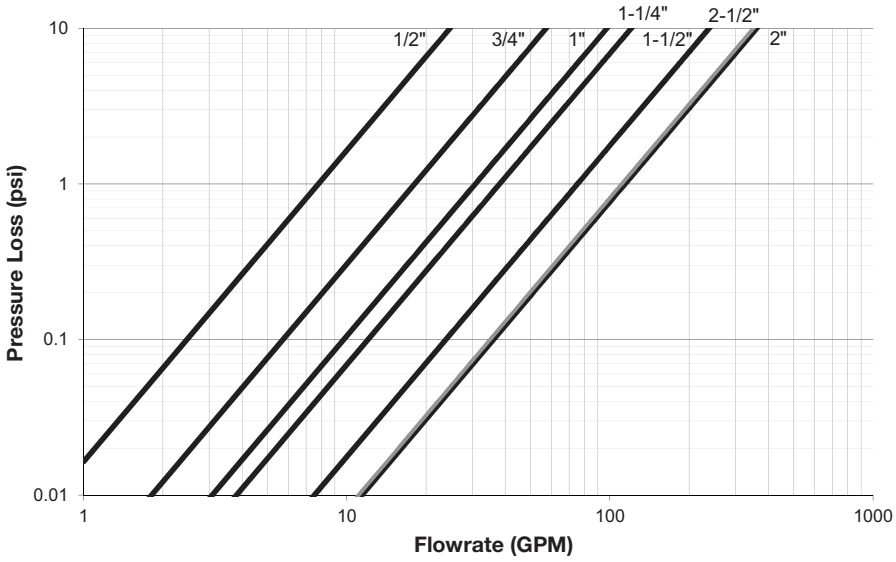


CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Flow Coefficients

Size (in)	C_v
1/2	7.8
3/4	18.1
1	30.8
1-1/4	38.1
1-1/2	75.3
2	114.2
2-1/2	110.9

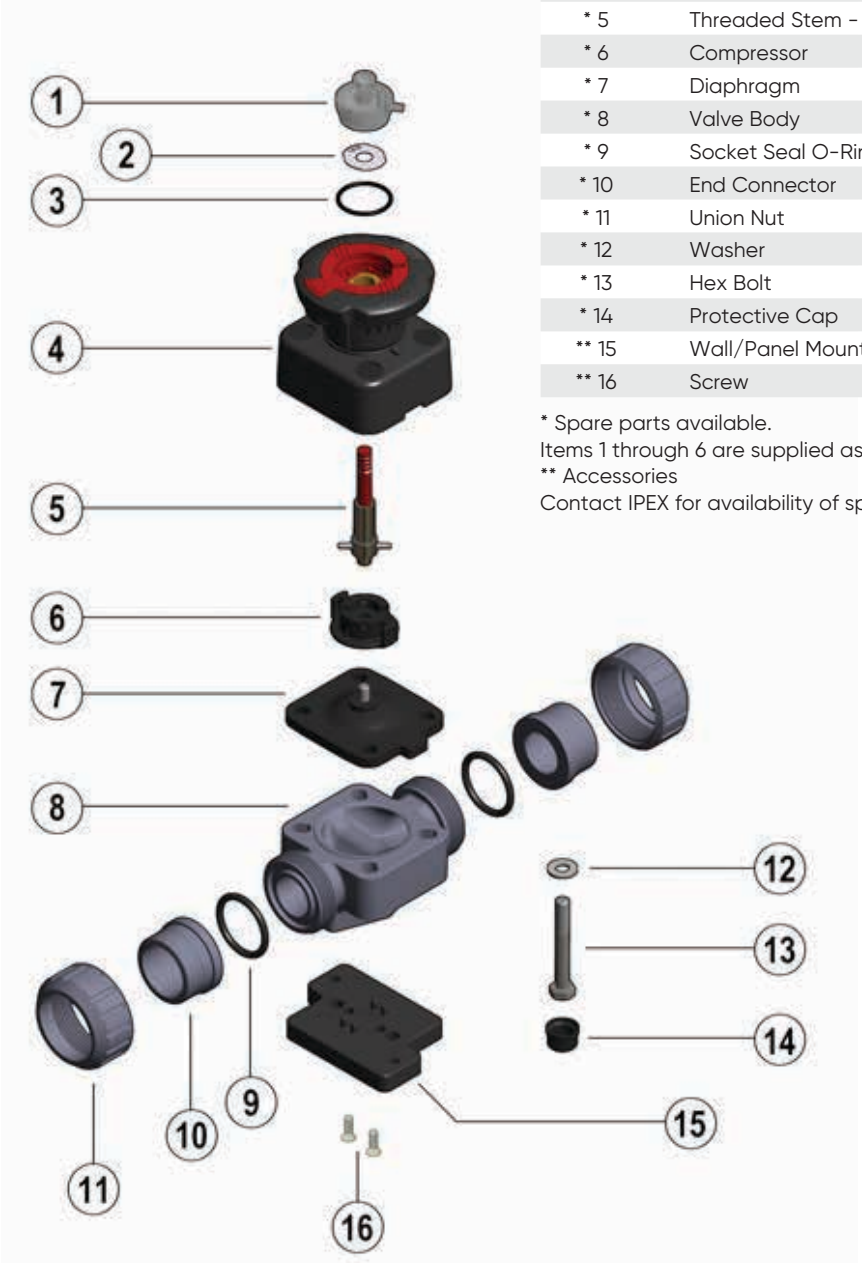
Pressure Loss Chart



CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES MANUAL DIAPHRAGM VALVES

Components



#	Component	Material	Qty
* 1	Transparent Cap	PVC	1
* 2	Labelling Plate	PVC	1
* 3	O-Ring	EPDM	1
* 4	Handwheel / Bonnet	GFPP / PVDF	1
* 5	Threaded Stem - Indicator	SS	1
* 6	Compressor	IXEF®	1
* 7	Diaphragm	EPDM / FKM / PTFE	1
* 8	Valve Body	PVC / CPVC / PP / PVDF	1
* 9	Socket Seal O-Ring	EPDM / FKM	2
* 10	End Connector	PVC / CPVC / PP / PVDF	2
* 11	Union Nut	PVC / CPVC / PP / PVDF	2
* 12	Washer	SS	4
* 13	Hex Bolt	SS	4
* 14	Protective Cap	PE	4
** 15	Wall/Panel Mounting Plate	GFPP	1
** 16	Screw	SS	2

* Spare parts available.
Items 1 through 6 are supplied as an assembly.
** Accessories
Contact IPEX for availability of spare components for Spigot and Flanged style valves.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Installation Procedures

1. The valve may be installed in any position or direction.
2. Please refer to the appropriate connection style subsection:
   a. For spigot style, solvent cement each pipe onto the ends of the valve body. Ensure that excess solvent does not run into the body of the valve.
   b. For true union style, remove the union nuts and slide them onto the pipe.
      i. For socket style, solvent cement the end connectors onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". Ensure that excess solvent does not run into the body of the valve. Be sure to allow sufficient cure time before continuing with the valve installation.
      ii. For threaded style, thread the end connectors onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
      iii. Ensure that the socket o-rings are properly fitted in their grooves then carefully place the valve in the system between the two end connections.
      iv. Tighten both union nuts. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack.
   c. For flanged style, join both flanges to the pipe flanges. For correct joining procedure, please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
3. If anchoring is required, fix the valve to the supporting structure using the wall/panel mounting kit.

Locking Device

The DK valve is equipped with the Dialock® handwheel locking system that prevents the valve from being opened or closed.

The Dialock system can be engaged by simply lifting the handwheel (4) once the required valve position has been reached.

To release the operating mechanism, simply return the handwheel (4) to its previous position by pushing it downwards.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Installation Procedures, continued

Stroke Limiter (optional)

The DKL version of the diaphragm valve is equipped with a handwheel stroke control system which allows the minimum and maximum flows to be preset and the diaphragm to be protected from excessive compression during closing.

The stroke limiter allows the valve stroke to be modified using the two independent adjusting screws, which determine the mechanical limits of the valve during opening and closing.

The valve is sold with the stroke limiters positioned such that they do not limit the opening or closing stroke.

To access and set the adjusting screws, remove the transparent cap on top of the bonnet.

Travel stop adjustment.
Minimum flow rate or closed valve.

1. Rotate the handwheel clockwise until the required minimum flow rate is reached or the valve is closed.
2. Screw in nut (D) as far as it will go and lock it in this position by tightening the locknut (E).

To deactivate the function of limiting the closing stroke, completely unscrew nuts (D and E). This way, the valve will fully close.

3. Re-assemble the transparent cap making sure that the seal o-ring remains properly seated.

Stroke limiter adjustment. Maximum flow rate

1. Rotate the handwheel counter-clockwise until the required maximum flow rate is reached.
2. Rotate knob (F) counter-clockwise as far as the stop. The labelling plate indicates the direction of rotation of the handwheel required to obtain a higher or lower maximum flow rate.

   If the opening stroke does not need to be limited, rotate the knob (F) clockwise a number of times. This way, the valve will fully open.
3. Re-assemble the transparent cap making sure that the seal O-Ring remains properly seated.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES MANUAL DIAPHRAGM VALVES

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the line. **Be sure to depressurize and drain the valve and isolated branch**.
2. If necessary, detach the valve from the support structure by disassembling the wall/panel mounting kit attached to the bottom of the valve body (8).
3. Please refer to the appropriate connection style subsection:
   a. For spigot style, cut the pipe on either side of the valve and remove from the line.
   b. For true union style, loosen both union nuts and drop the valve out of the line. If retaining the socket o-rings (9), take care that they are not lost when removing the valve from the line.
   c. For flanged style, loosen each bolt holding the valve to the pipe flanges. Please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" for a recommended bolt tightening pattern diagram. Follow the same pattern when disassembling the flanged joints then carefully remove the valve from the line.
4. Remove the protective caps (14), then loosen and remove the bolts (13) and washers (12) from the bottom of the valve body.
5. Separate the valve body (8) from the handwheel/bonnet (4).
6. Rotate the handwheel/bonnet (4) clockwise to free the threaded stem (5), compressor (6) and diaphragm (7).
7. Unscrew the diaphragm (7) and remove the compressor (6).
8. The valve components can now be checked for problems and/or replaced.

Note: It is not recommended to attempt to further disassemble the handwheel/bonnet assembly as it may cause irreversible damage to the components.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant.

Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.

1. Insert the compressor (6) on the threaded stem (5) aligning it correctly with the reference pin on the stem.

2. Screw the diaphragm (7) on the threaded stem (5).
3. Lubricate the threaded stem (5), insert it in the bonnet (4), and rotate the handwheel/bonnet counter-clockwise until the stem is fully engaged (5). Make sure that the compressor (6) and diaphragm are correctly aligned with the housing in the bonnet.
4. Fit the handwheel/bonnet (4) on the valve body (8) and tighten the bolts (13) and washers (12).
5. Tighten the bolts (13) in an even (cross-like) pattern, ensuring that recommended tightening torque found on the instruction sheet is followed.
6. Replace the protection caps on the bolt heads (14).

Note: During assembly, it is advisable to lubricate the threaded stem. Mineral oils are not recommended for this task as they react aggressively with EPDM rubber.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Testing and Operation

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system**.

Important points:

- **Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.**
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

DK SERIES PNEUMATIC DIAPHRAGM VALVES

1/2" to 2-1/2"

IPEX DK Series Pneumatic Diaphragm Valves are the ideal solution for modulating flow and controlling dirty or abrasive fluids in a variety of applications. The modular nature of this valve results in many material, body style, and diaphragm options. The re-designed weir-style body has significantly improved the DK's flow rate compared to the old design and it facilitates precise linear flow regulation through the valve's full range of operation. This pneumatically actuated version provides automatic control with an extensive range of options and accessories.

VALVE AVAILABILITY

Body Material:	PVC, CPVC, PP, PVDF
Size Range:	1/2" through 2-1/2"
Pressure:	150 psi
Diaphragm:	EPDM, FKM or PTFE (EPDM backed)
Control Style:	Pneumatically Actuated (Double Acting, Normally Open, Normally Closed)
End Connections:	Spigot, True Union (Socket, Threaded) Flanged (ANSI 150)

ASTM D1784
ASTM D1785
ASTM D4101
ASTM D3222
ASTM D2464
ASTM D2466
ASTM D2467
ASTM F441
ASTM F437
ASTM F439
ASTM F1498

ISO 3609
ISO 10931

ANSI B16.5

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES PNEUMATIC DIAPHRAGM VALVES

Sample Specification

1.0 Diaphragm Valves – DK Pneumatic

1.1 Material

- The valve body, including end connectors and unions, shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

or The valve body, including end connectors and unions, shall be made of Corzan® CPVC compound which shall meet or exceed the requirements of cell classification 23447 according to ASTM D1784.

or The valve body, including end connectors and unions, shall be made of stabilized PP homopolymer compound, also containing a RAL 7032 pigment, which shall meet or exceed the requirements of Type I Polypropylene according to ASTM D4101.

or The valve body, including end connectors and unions, shall be made of virgin, non-regrind PVDF compound which shall meet or exceed the requirements of Table 1 according to ASTM D3222.

- The pneumatic valve bonnet assembly shall be made of high temperature, high strength, glass-filled polypropylene (GFPP).

1.2 Diaphragm

- The diaphragm shall be made of EPDM.

or The diaphragm shall be made of FKM.

or The diaphragm shall be made of PTFE (backed with EPDM).

2.0 Connections

2.1 Spigot Style

- The IPS spigot PVC end connectors shall conform to the dimensional standard ASTM D1785.

or The IPS spigot CPVC end connectors shall conform to the dimensional standard ASTM F441.

or The Metric spigot PP end connectors shall conform to the dimensional standard ISO 3609.

or The Metric spigot PVDF end connectors shall conform to the dimensional standard ISO 10931.

2.2 Socket Style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

or The IPS socket CPVC end connectors shall conform to the dimensional standard ASTM F439.

or The Metric socket PP end connectors shall conform to the dimensional standard ISO 3609.

or The Metric socket PVDF end connectors shall conform to the dimensional standard ISO 10931.

2.3 Threaded Style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1.

or The female NPT threaded CPVC end connectors shall conform to the dimensional standards ASTM F437, ASTM F1498, and ANSI B1.20.1.

2.4 Flanged Style

- The ANSI 150 flanged PVC end connectors shall conform to the dimensional standard ANSI B16.5.

or The ANSI 150 flanged CPVC end connectors shall conform to the dimensional standard ANSI B16.5.

or The ANSI 150 flanged PP end connectors shall conform to the dimensional standard ANSI B16.5.

or The ANSI 150 flanged PVDF end connectors shall conform to the dimensional standard ANSI B16.5.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES PNEUMATIC DIAPHRAGM VALVES

Sample Specification, continued

3.0 Design Features

- All valves shall be weir-style for throttling applications.
- 1/2" and 3/4" valves shall have a standard optical position indicator to allow for a visual check of the valve position.
- 1/2" and 3/4" valves shall have a custom labelling plate housed in a transparent cap.
- All through bolts shall be made of stainless steel.
- The valve shall incorporate a feature that allows an identification tag to be easily affixed to the valve body.
- Bodies of PVC, CPVC and PP valves shall have brass mounting inserts.
- Bodies PVDF valves shall have stainless steel mounting inserts.

3.1 Actuators

- All actuators shall be made of high strength glass-filled polypropylene (GFPP).
- Actuators shall be piston style.
- Actuators shall have 6 independent cartridge springs arranged radially to uniformly distribute the load on the piston.
- The following accessories shall be available for all actuators: position indicator, stroke limiter, stroke limiter with position indicator, limit switch, limit switch box, 3-15 psi positioner, 4-20 mA positioner, pilot solenoid valve.

3.2 Pressure Rating

- All valves shall be rated at 150 psi at 73°F.

3.3 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.4 Colour Coding

- All PVC valves shall be colour-coded dark gray.

or All CPVC valves shall be colour-coded light gray.

or All PP valves shall be colour-coded beige gray.

or All PVDF valves shall not be colour-coded and be white in appearance.

- All bonnet assemblies shall be colour-coded black.

4.0 All valves shall be Xirtec® PVC, Xirtec® CPVC, PP or PVDF by IPEX or approved equal.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES PNEUMATIC DIAPHRAGM VALVES

Valve Selection – Double Acting

Valve Size (inches)	Body Material	Diaphragm Material	IPEX Part Number Double Acting True Union				Pressure Rating @ 73°F
			IPS Spigot	IPS Socket	FNP Threaded	ANSI 150 Flanged	
1/2	PVC	EPDM	354040	354052	354058	354076	150 psi
		FKM	354042	354054	354060	354078	
		PTFE	354044	354056	354062	354080	
	CPVC	EPDM	354082	354094	354100	354118	
		FKM	354084	354096	354102	354120	
		PTFE	354086	354098	354104	354122	
3/4	PVC	EPDM	354041	354053	354059	354077	
		FKM	354043	354055	354061	354079	
		PTFE	354045	354057	354063	354081	
	CPVC	EPDM	354083	354095	354101	354119	
		FKM	354085	354097	354103	354121	
		PTFE	354087	354099	354105	354123	
1	PVC	EPDM	354417	354661	354418	354733	
		FKM	354580	354697	354436	354777	
		PTFE	354624	354715	354472	354796	
	CPVC	EPDM	354815	354896	354490	354908	
		FKM	354853	354900	354508	354913	
		PTFE	354891	354904	354544	354918	
1-1/4	PVC	EPDM	354562	354669	354426	354741	
		FKM	354606	354705	354462	354778	
		PTFE	354625	354723	354480	354797	
	CPVC	EPDM	354818	354897	354498	354909	
		FKM	354861	354901	354534	354914	
		PTFE	354892	354905	354552	354919	
1-1/2	PVC	EPDM	354570	354670	354427	354742	
		FKM	354607	354706	354463	354779	
		PTFE	354651	354724	354481	354805	
	CPVC	EPDM	354843	354898	354499	354910	
		FKM	354862	354902	354535	354915	
		PTFE	354893	354906	354553	354920	
2	PVC	EPDM	354571	354696	354435	354768	
		FKM	354615	354714	354471	354787	
		PTFE	354652	354732	354489	354806	
	CPVC	EPDM	354844	354899	354507	354911	
		FKM	354889	354903	354543	354916	
		PTFE	354894	354907	354561	354921	
2-1/2	PVC	EPDM	354579	-	-	354769	
		FKM	354616	-	-	354788	
		PTFE	354660	-	-	354814	
	CPVC	EPDM	354852	-	-	354912	
		FKM	354890	-	-	354917	
		PTFE	354895	-	-	354922	

Body Material:

- ☐ PVC
- ☐ CPVC

Size (inches):

- ☐ 1/2
- ☐ 3/4
- ☐ 1
- ☐ 1-1/4
- ☐ 1-1/2
- ☐ 2
- ☐ 2-1/2

Diaphragm:

- ☐ EPDM
- ☐ FKM
- ☐ PTFE (EPDM Backed)

Control Style:

- ☐ Pneumatic (Double Acting)
- ☐ Pneumatic (Normally Open)
- ☐ Pneumatic (Normally Closed)

End Connections:

- ☐ Spigot (IPS)
- ☐ True Union (IPS Socket)
- ☐ True Union (FNPT Threaded)
- ☐ Flanged (ANSI 150)

IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES PNEUMATIC DIAPHRAGM VALVES

Valve Selection – Double Acting

Valve Size (mm)	Body Material	Diaphragm Material	IPEX Part Number Double Acting True Union		Pressure Rating @ 73°F
			Metric Spigot	Metric Socket	
20	PP	EPDM	354124	354130	150 psi
		FKM	354126	354132	
		PTFE	354128	354134	
	PVDF	EPDM	354172	354883	
		FKM	354174	354885	
		PTFE	354881	354887	
25	PP	EPDM	354125	354131	
		FKM	354127	354133	
		PTFE	354129	354135	
	PVDF	EPDM	354173	354884	
		FKM	354880	354886	
		PTFE	354882	354888	
32	PP	EPDM	354923	354938	
		FKM	354928	354942	
		PTFE	354933	354946	
	PVDF	EPDM	354950	354965	
		FKM	354955	354969	
		PTFE	354960	354973	
40	PP	EPDM	354924	354939	
		FKM	354929	354943	
		PTFE	354934	354947	
	PVDF	EPDM	354951	354966	
		FKM	354956	354970	
		PTFE	354961	354974	
50	PP	EPDM	354925	354940	
		FKM	354930	354944	
		PTFE	354935	354948	
	PVDF	EPDM	354952	354967	
		FKM	354957	354971	
		PTFE	354962	354975	
63	PP	EPDM	354926	354941	
		FKM	354931	354945	
		PTFE	354936	354949	
	PVDF	EPDM	354953	354968	
		FKM	354958	354972	
		PTFE	354963	354976	
75	PP	EPDM	354927	-	
		FKM	354932	-	
		PTFE	354937	-	
	PVDF	EPDM	354954	-	
		FKM	354959	-	
		PTFE	354964	-	

Body Material:

- ☐ PP
- ☐ PVDF

Size (inches):

- ☐ 20mm
- ☐ 25mm
- ☐ 32mm
- ☐ 40mm
- ☐ 50mm
- ☐ 63mm
- ☐ 75mm

Diaphragm:

- ☐ EPDM
- ☐ FKM
- ☐ PTFE (EPDM Backed)

Control Style:

- ☐ Pneumatic (Double Acting)
- ☐ Pneumatic (Normally Open)
- ☐ Pneumatic (Normally Closed)

End Connections:

- ☐ Spigot
- ☐ True Union (Metric Socket)

IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES PNEUMATIC DIAPHRAGM VALVES

Valve Selection – Normally Open

Size (in)	Body Material	Diaphragm Material	IPEX Part Number Normally Open True Union				Pressure Rating @ 73°F
			IPS Spigot	IPS Socket	FNPT Threaded	ANSI 150 Flanged	
1/2	PVC	EPDM	354410	354437	354046	354455	150 psi
		FKM	354419	354443	354048	354464	
		PTFE	354428	354449	354050	354473	
	CPVC	EPDM	354482	354509	354088	354527	
		FKM	354491	354515	354090	354536	
		PTFE	354500	354521	354092	354545	
3/4	PVC	EPDM	354411	354438	354047	354456	
		FKM	354420	354444	354049	354465	
		PTFE	354429	354450	354051	354474	
	CPVC	EPDM	354483	354510	354089	354528	
		FKM	354492	354516	354091	354537	
		PTFE	354501	354522	354093	354546	
1	PVC	EPDM	354003	354439	354064	354457	
		FKM	354421	354445	354068	354466	
		PTFE	354430	354451	354072	354475	
	CPVC	EPDM	354484	354511	354106	354529	
		FKM	354493	354517	354110	354538	
		PTFE	354502	354523	354114	354547	
1-1/4	PVC	EPDM	354413	354440	354065	354458	
		FKM	354422	354446	354069	354467	
		PTFE	354431	354452	354073	354476	
	CPVC	EPDM	354485	354512	354107	354530	
		FKM	354494	354518	354111	354539	
		PTFE	354503	354524	354115	354548	
1-1/2	PVC	EPDM	354414	354441	354066	354459	
		FKM	354423	354447	354070	354468	
		PTFE	354432	354453	354074	354477	
	CPVC	EPDM	354486	354513	354108	354531	
		FKM	354495	354519	354112	354540	
		PTFE	354504	354525	354116	354549	
2	PVC	EPDM	354415	354442	354067	354460	
		FKM	354424	354448	354071	354469	
		PTFE	354433	354454	354075	354478	
	CPVC	EPDM	354487	354514	354109	354532	
		FKM	354496	354520	354113	354541	
		PTFE	354505	354526	354117	354550	
2-1/2	PVC	EPDM	354416	-	-	354461	
		FKM	354425	-	-	354470	
		PTFE	354434	-	-	354479	
	CPVC	EPDM	354488	-	-	354533	
		FKM	354497	-	-	354542	
		PTFE	354506	-	-	354551	

Body Material:

- ☐ PVC
- ☐ CPVC

Size (inches):

- ☐ 1/2
- ☐ 3/4
- ☐ 1
- ☐ 1-1/4
- ☐ 1-1/2
- ☐ 2
- ☐ 2-1/2

Diaphragm:

- ☐ EPDM
- ☐ FKM
- ☐ PTFE (EPDM Backed)

Control Style:

- ☐ Pneumatic (Double Acting)
- ☐ Pneumatic (Normally Open)
- ☐ Pneumatic (Normally Closed)

End Connections:

- ☐ Spigot (IPS)
- ☐ True Union (IPS Socket)
- ☐ True Union (FNPT Threaded)
- ☐ Flanged (ANSI 150)

IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES PNEUMATIC DIAPHRAGM VALVES

Valve Selection – Normally Open

Valve Size (mm)	Body Material	Diaphragm Material	Product Code Normally Open True Union Metric Spigot	Product Code Normally Open True Union Metric Socket	Pressure Rating @ 73°F
20	PP	EPDM	354554	354581	150 psi
		FKM	354563	354587	
		PTFE	354572	354593	
	PVDF	EPDM	354599	354582	
		FKM	354608	354588	
		PTFE	354617	354594	
25	PP	EPDM	354555	354626	
		FKM	354564	354632	
		PTFE	354573	354638	
	PVDF	EPDM	354600	354627	
		FKM	354609	354633	
		PTFE	354618	354639	
32	PP	EPDM	354556	354583	
		FKM	354565	354589	
		PTFE	354574	354595	
	PVDF	EPDM	354601	354584	
		FKM	354610	354590	
		PTFE	354619	354596	
40	PP	EPDM	354557	354585	
		FKM	354566	354628	
		PTFE	354575	354634	
	PVDF	EPDM	354602	354640	
		FKM	354611	354629	
		PTFE	354620	354635	
50	PP	EPDM	354558	354641	
		FKM	354567	354630	
		PTFE	354576	354591	
	PVDF	EPDM	354603	354597	
		FKM	354612	354586	
		PTFE	354621	354592	
63	PP	EPDM	354559	354598	
		FKM	354568	354636	
		PTFE	354577	354642	
	PVDF	EPDM	354604	354631	
		FKM	354613	354637	
		PTFE	354622	354643	
75	PP	EPDM	354560	-	
		FKM	354569	-	
		PTFE	354578	-	
	PVDF	EPDM	354605	-	
		FKM	354614	-	
		PTFE	354623	-	

Body Material:

- ☐ PP
- ☐ PVDF

Size (inches):

- ☐ 20mm
- ☐ 25mm
- ☐ 32mm
- ☐ 40mm
- ☐ 50mm
- ☐ 63mm
- ☐ 75mm

Diaphragm:

- ☐ EPDM
- ☐ FKM
- ☐ PTFE (EPDM Backed)

Control Style:

- ☐ Pneumatic (Double Acting)
- ☐ Pneumatic (Normally Open)
- ☐ Pneumatic (Normally Closed)

End Connections:

- ☐ Spigot
- ☐ True Union (Metric Socket)

IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES PNEUMATIC DIAPHRAGM VALVES

Valve Selection – Normally Closed

Size (in)	Body Material	Diaphragm Material	Product Code Normally Closed True Union IPS Spigot	IPS Socket	FNPT Threaded	ANSI 150 Flanged	Pressure Rating @ 73°F
1/2	PVC	EPDM	354644	354671	354136	354689	150 psi
		FKM	354653	354677	354142	354698	
		PTFE	354662	354683	354148	354707	
	CPVC	EPDM	354716	354743	354154	354761	
		FKM	354725	354749	354160	354770	
		PTFE	354734	354755	354166	354780	
3/4	PVC	EPDM	354645	354672	354137	354690	
		FKM	354654	354678	354143	354699	
		PTFE	354663	354684	354149	354708	
	CPVC	EPDM	354717	354744	354155	354762	
		FKM	354726	354750	354161	354771	
		PTFE	354735	354756	354167	354781	
1	PVC	EPDM	354646	354673	354138	354691	
		FKM	354655	354679	354144	354700	
		PTFE	354664	354685	354150	354709	
	CPVC	EPDM	354718	354745	354156	354763	
		FKM	354727	354751	354162	354772	
		PTFE	354736	354757	354168	354782	
1-1/4	PVC	EPDM	354647	354674	354139	354692	
		FKM	354656	354680	354145	354701	
		PTFE	354665	354686	354151	354710	
	CPVC	EPDM	354719	354746	354157	354764	
		FKM	354728	354752	354163	354773	
		PTFE	354737	354758	354169	354783	
1-1/2	PVC	EPDM	354648	354675	354140	354693	
		FKM	354657	354681	354146	354702	
		PTFE	354666	354687	354152	354711	
	CPVC	EPDM	354720	354747	354158	354765	
		FKM	354729	354753	354164	354774	
		PTFE	354738	354759	354170	354784	
2	PVC	EPDM	354649	354676	354141	354694	
		FKM	354658	354682	354147	354703	
		PTFE	354667	354688	354153	354712	
	CPVC	EPDM	354721	354748	354159	354766	
		FKM	354730	354754	354165	354775	
		PTFE	354739	354760	354171	354785	
2-1/2	PVC	EPDM	354650	-	-	354695	
		FKM	354659	-	-	354704	
		PTFE	354668	-	-	354713	
	CPVC	EPDM	354722	-	-	354767	
		FKM	354731	-	-	354776	
		PTFE	354740	-	-	354786	

Body Material:

- ☐ PVC
- ☐ CPVC

Size (inches):

- ☐ 1/2
- ☐ 3/4
- ☐ 1
- ☐ 1-1/4
- ☐ 1-1/2
- ☐ 2
- ☐ 2-1/2

Diaphragm:

- ☐ EPDM
- ☐ FKM
- ☐ PTFE (EPDM Backed)

Control Style:

- ☐ Pneumatic (Double Acting)
- ☐ Pneumatic (Normally Open)
- ☐ Pneumatic (Normally Closed)

End Connections:

- ☐ Spigot (IPS)
- ☐ True Union (IPS Socket)
- ☐ True Union (FNPT Threaded)
- ☐ Flanged (ANSI 150)

IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES PNEUMATIC DIAPHRAGM VALVES

Valve Selection – Normally Closed

Valve Size (mm)	Body Material	Diaphragm Material	Product Code Normally Closed Ture Union		Pressure Rating @ 73°F
			Metric Spigot	Metric Socket	
20	PP	EPDM	354789	354816	150 psi
		FKM	354798	354824	
		PTFE	354807	354830	
	PVDF	EPDM	354836	354863	
		FKM	354845	354868	
		PTFE	354854	354874	
25	PP	EPDM	354790	354819	
		FKM	354799	354825	
		PTFE	354808	354831	
	PVDF	EPDM	354837	354864	
		FKM	354846	354869	
		PTFE	354855	354875	
32	PP	EPDM	354791	354820	
		FKM	354800	354826	
		PTFE	354809	354832	
	PVDF	EPDM	354838	354817	
		FKM	354847	354870	
		PTFE	354856	354876	
40	PP	EPDM	354792	354821	
		FKM	354801	354827	
		PTFE	354810	354833	
	PVDF	EPDM	354839	354865	
		FKM	354848	354871	
		PTFE	354857	354877	
50	PP	EPDM	354793	354822	
		FKM	354802	354828	
		PTFE	354811	354834	
	PVDF	EPDM	354840	354866	
		FKM	354849	354872	
		PTFE	354858	354878	
63	PP	EPDM	354794	354823	
		FKM	354803	354829	
		PTFE	354812	354835	
	PVDF	EPDM	354841	354867	
		FKM	354850	354873	
		PTFE	354859	354879	
75	PP	EPDM	354795	-	
		FKM	354804	-	
		PTFE	354813	-	
	PVDF	EPDM	354842	-	
		FKM	354851	-	
		PTFE	354860	-	

Body Material:

- ☐ PP
- ☐ PVDF

Size (inches):

- ☐ 20mm
- ☐ 25mm
- ☐ 32mm
- ☐ 40mm
- ☐ 50mm
- ☐ 63mm
- ☐ 75mm

Diaphragm:

- ☐ EPDM
- ☐ FKM
- ☐ PTFE (EPDM Backed)

Control Style:

- ☐ Pneumatic (Double Acting)
- ☐ Pneumatic (Normally Open)
- ☐ Pneumatic (Normally Closed)

End Connections:

- ☐ Spigot
- ☐ True Union (Metric Socket)

IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES PNEUMATIC DIAPHRAGM VALVES

Options and Accessories

Electrical Position Indicator, 1 Mechanical Switch

Valve	Dimension (in)	IPEX Part Number
DK / NC	1/2 – 3/4	154472
DK / NC	1 – 1-1/4	054953
DK / NC	1-1/2	054954
DK / NC	2 – 2-1/2	054955

Microswitch Box, 2 Electromechanical Switches (IP 65)

Valve	Dimension (in)	IPEX Part Number
DK / NO-DA	1/2 – 3/4	154474
DK / NC	1/2 – 3/4	154473
DK / NO-DA	1 – 2 1/2	054969
DK / NC	1 – 1 1/2	054967
DK / NC	2 – 2 1/2	054968

Microswitch Box, 2 Inductive Switches (IP 65, NAMUR*, SAFETY CLASS: Eex ia IIC T6)

Valve	Dimension (in)	IPEX Part Number
DK / NO-DA	1/2 – 3/4	154477
DK / NC	1/2 – 3/4	154476
DK / NO-DA	1 – 2-1/2	054972
DK / NC	1 – 1-1/2	054970
DK / NC	2 – 2-1/2	054971

* to be used with an amplifier

Optical Position Indicator

Valve	Dimension (in)	IPEX Part Number
DK / DA-NO-NC	1 – 2-1/2	054997

Stroke Limiter

Valve	Dimension (in)	IPEX Part Number
DK / DA-NO	1/2 – 2-1/2	054994
DK / NC	1 – 1-1/2	054991
DK / NC	2 – 2-1/2	054992

Stroke Limiter w/ Position Indicator

Valve	Dimension (in)	IPEX Part Number
DK / DA-NO-NC	1/2 – 3/4	154470
DK / DA-NO	1 – 2-1/2	053066
DK / NC	1 – 1-1/4	054999
DK / NC	1-1/2	053063
DK / NC	2 – 2-1/2	053064

Stroke Limiter w/ Position Indicator and Manual Override

Valve	Dimension (in)	IPEX Part Number
DK / DA-NO-NC	1/2 – 3/4	154471
DK / DA-NO*	1 – 1-1/4	053072
DK / DA-NO*	1-1/2 - 2-1/2	053073
DK / NC*	1 - 1-1/4	053069
DK / NC*	1-1/2 – 2-1/2	053071

* factory assembled

Pilot Solenoid Valve – Direct Mount, NBR Seals

Valve	Style	Voltage	Dimension (in)	IPEX Part Number
DK / DA-NO-NC	3/2 Way	24 VDC	1/2 – 2 1/2	154036
DK / DA-NO-NC	3/2 Way	110 VAC	1/2 – 2 1/2	053074
DK / DA-NO-NC	3-5/2 Way	24 VDC	1/2 – 3/4	154485
DK / DA-NO-NC	3-5/2 Way	110 VAC	1/2 – 3/4	154486
NAMUR Adapter Plate	–	–	1/2 – 3/4	154484

Pilot Solenoid Valve – Gang Mount, NBR Seals

Valve	Style	Voltage	Dimension (in)	IPEX Part Number
DK / DA-NO-NC	3/2 Way	24 VDC	1/2 – 2-1/2	154483
DK / DA-NO-NC	3/2 Way	110 VAC	1/2 – 2-1/2	053076

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

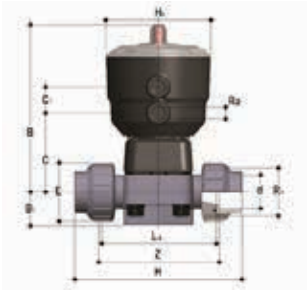
DK SERIES PNEUMATIC DIAPHRAGM VALVES

Dimensions – 1/2" to 2-1/2"

IPS Spigot Connections – Double Acting, Normally Open, Normally Closed

Dimension (inches)

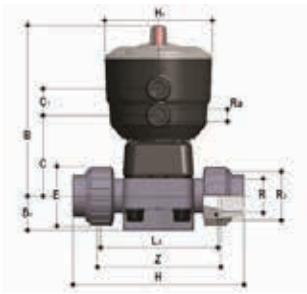
Size	PVC/ CPVC d(in)	PP/ PVDF d(mm)	B	B_1	C	C_1	H	H_1	L	Ra
1/2	0.84	20	5.83	0.98	2.60	0.94	4.88	3.82	0.63	1/4
3/4	1.05	25	5.94	1.16	2.72	0.94	5.67	3.82	0.75	1/4
1	1.32	32	6.26	1.30	3.07	0.94	6.06	3.82	0.87	1/4
1-1/4	1.66	40	6.42	1.18	3.23	0.94	6.85	3.82	1.02	1/4
1-1/2	1.90	50	8.15	1.38	4.41	0.94	7.64	4.96	1.22	1/4
2	2.38	63	9.65	1.81	5.59	0.94	8.82	6.18	1.50	1/4
2-1/2	2.88	75	9.65	1.81	5.59	0.94	11.18	6.18	1.73	1/4



IPS Socket Connections – Double Acting, Normally Open, Normally Closed

Dimension (inches)

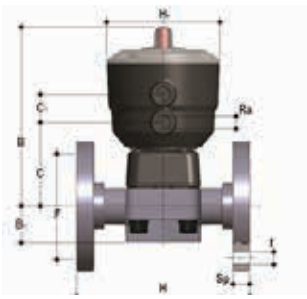
Size	PVC/ CPVC d(in)	PP/ PVDF d(mm)	B	B_1	C	C_1	E	H (PVC/ CPVC)	H (PP/ PVDF)	H_1	LA	R_1	Ra	Z (PVC/ CPVC)	Z (PP/ PVDF)
1/2	0.84	20	5.83	0.98	2.60	0.94	1.61	5.63	5.08	3.82	3.54	1	1/4	3.86	3.94
3/4	1.05	25	5.94	1.16	2.72	0.94	1.97	6.57	6.06	3.82	4.25	1-1/4	1/4	4.53	4.57
1	1.32	32	6.26	1.30	3.07	0.94	2.28	7.09	6.61	3.82	4.57	1-1/2	1/4	4.8	4.88
1-1/4	1.66	40	6.42	1.18	3.23	0.94	2.83	8.19	7.56	3.82	5.28	2.00	1/4	5.67	5.51
1-1/2	1.90	50	8.15	1.38	4.41	0.94	3.11	9.21	8.74	4.96	6.06	2-1/4	1/4	6.46	6.30
2	2.38	63	9.65	1.81	5.59	0.94	3.86	10.71	10.47	6.18	7.24	2-3/4	1/4	7.68	7.48



FNPT Threaded Connections – Double Acting, Normally Open, Normally Closed

Dimension (inches)

R	B	B_1	C	C_1	E	H	H_1	LA	R_1	Ra	Z
1/2	5.83	0.98	2.60	0.94	1.61	5.16	3.82	3.54	1	1/4	3.82
3/4	5.94	1.18	2.72	0.94	1.97	5.94	3.82	4.25	1-1/4	1/4	4.65
1	6.26	1.30	3.07	0.94	2.28	6.50	3.82	4.57	1-1/2	1/4	5.00
1-1/4	6.42	1.18	3.23	0.94	2.83	7.40	3.82	5.28	2	1/4	5.71
1-1/2	8.15	1.38	4.41	0.94	3.11	8.19	4.96	6.06	2-1/4	1/4	6.50
2	9.65	1.81	5.59	0.94	3.86	9.69	6.18	7.24	2-3/4	1/4	7.68



ANSI 150 Flanged (Vanstone) Connections – Double Acting, Normally Open, Normally Closed

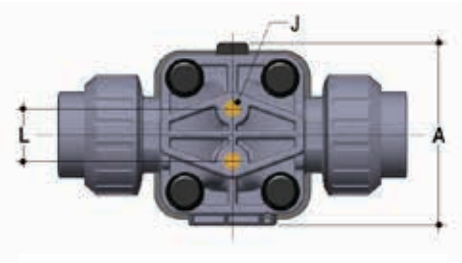
Dimension (inches)

Size	B	B_1	C	C1	f	H	H_1	Ra	Sp	# holes
1/2	5.83	0.98	2.60	0.94	5/8	4.25	3.82	1/4	0.53	4
3/4	5.94	1.18	2.72	0.94	5/8	5.91	3.82	1/4	0.53	4
1	6.26	1.30	3.07	0.94	5/8	6.30	3.82	1/4	0.53	4
1-1/4	6.42	1.18	3.23	0.94	5/8	7.09	3.82	1/4	0.55	4
1-1/2	8.15	1.38	4.41	0.94	5/8	7.87	4.96	1/4	0.63	4
2	9.65	1.81	5.59	0.94	3/4	9.06	6.18	1/4	0.63	4
2-1/2	9.65	1.81	5.59	0.94	3/4	11.42	6.18	1/4	0.83	4

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

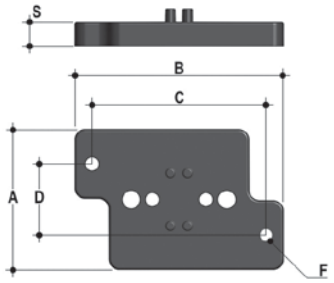
DK SERIES PNEUMATIC DIAPHRAGM VALVES

Dimensions



Dimension (inches)

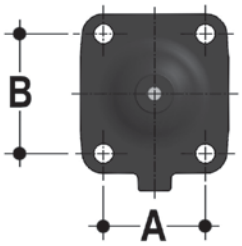
Size	A	L	J
1/2	2.91	0.98	M6 x 10
3/4	2.91	0.98	M6 x 10
1	3.43	0.98	M6 x 10
1-1/4	3.43	0.98	M6 x 10
1-1/2	4.49	1.75	M8 x 14
2	5.35	1.75	M8 x 14
2-1/2	5.35	1.75	M8 x 14



Wall/Panel Mounting Plate

Dimensions (inches)

Size	A	B	C	D	F	S
1/2	2.56	3.82	3.19	1.30	0.22	0.43
3/4	2.56	3.82	3.19	1.30	0.22	0.43
1	2.56	3.82	3.19	1.30	0.22	0.43
1-1/4	2.56	3.82	3.19	1.30	0.22	0.43
1-1/2	2.56	5.67	5.12	1.30	0.26	0.43
2	2.56	5.67	5.12	1.30	0.26	0.43
2-1/2	2.56	5.67	5.12	1.30	0.26	0.43



Diaphragm

Dimensions (inches)

Size (in)	Size (mm)	A	B
1/2	20	1.57	1.73
3/4	25	1.57	1.73
1	32	1.81	2.13
1-1/4	40	1.81	2.13
1-1/2	50	2.56	2.76
2	63	3.07	3.23
2-1/2	75	3.07	3.23

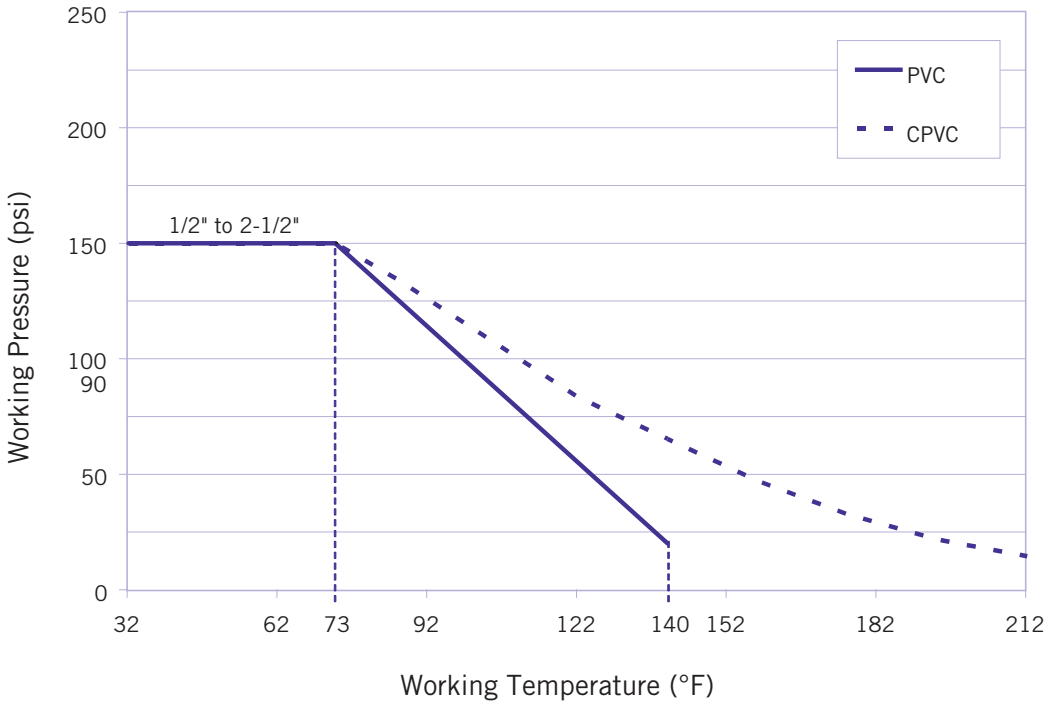
Weights

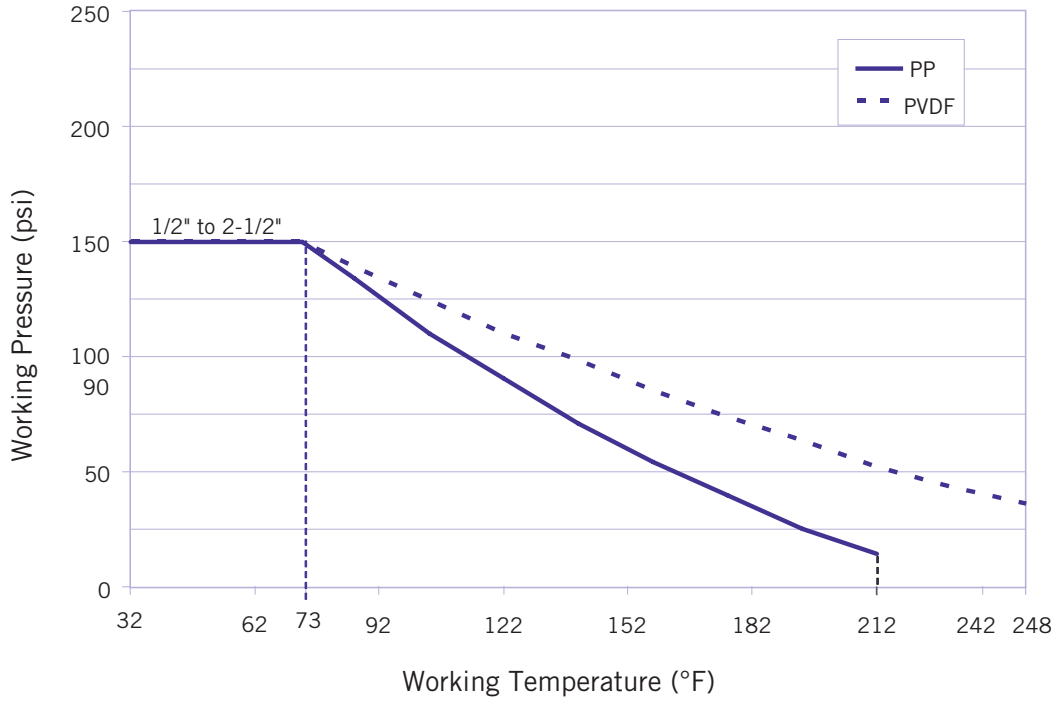
Approximate Weight (lbs)

Size	PVC / CPVC Spigot			PVC / CPVC True Union			PVC / CPVC Flanged			PP Spigot			PP True Union			PVDF Spigot			PVDF True Union		
	DA	NO	NC	DA	NO	NC	DA	NO	NC	DA	NO	NC	DA	NO	NC	DA	NO	NC	DA	NO	NC
1/2	1.27	1.53	1.53	1.36	1.62	1.62	1.77	2.04	2.04	1.20	1.47	1.47	1.25	1.52	1.52	1.35	1.61	1.61	1.47	1.73	1.73
3/4	1.32	1.58	1.58	1.49	1.76	1.76	1.93	2.22	2.22	1.23	1.50	1.50	1.36	1.62	1.62	1.42	1.68	1.68	1.66	1.92	1.92
1	1.76	2.02	2.02	2.00	2.26	2.26	2.54	2.80	2.80	1.62	1.88	1.88	1.79	2.05	2.05	1.92	2.18	2.18	2.25	2.51	2.51
1-1/4	1.85	2.12	2.12	2.27	2.54	2.54	2.98	3.22	3.22	1.69	1.95	1.95	1.98	2.24	2.24	2.05	2.32	2.32	2.63	2.89	2.89
1-1/2	4.41	4.94	5.96	4.89	6.44	6.44	5.81	6.34	7.35	4.06	4.59	5.60	4.43	4.96	5.98	4.76	5.30	6.31	5.38	5.91	6.93
2	8.15	9.12	13.05	9.00	13.90	13.90	9.81	10.78	14.71	7.89	8.86	12.79	8.18	9.14	13.07	9.12	10.09	14.01	10.25	11.22	15.15
2-1/2	8.53	9.50	13.43	-	-	-	11.14	12.10	16.03	8.22	9.19	13.12	-	-	-	9.65	10.61	14.54	-	-	-

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Pressure – Temperature Ratings



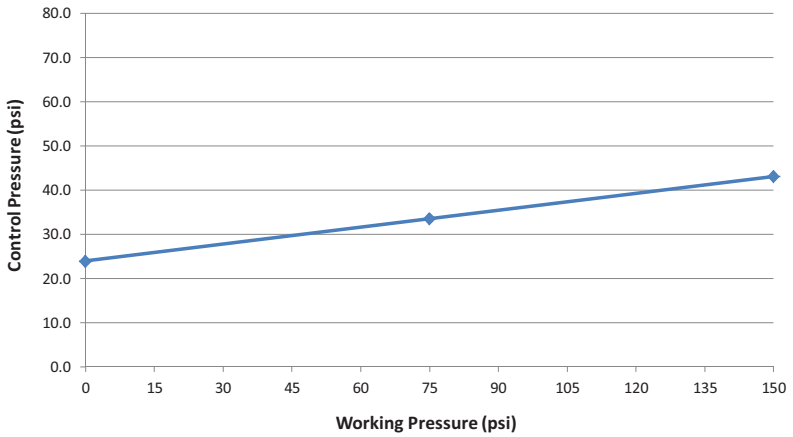


CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES PNEUMATIC DIAPHRAGM VALVES

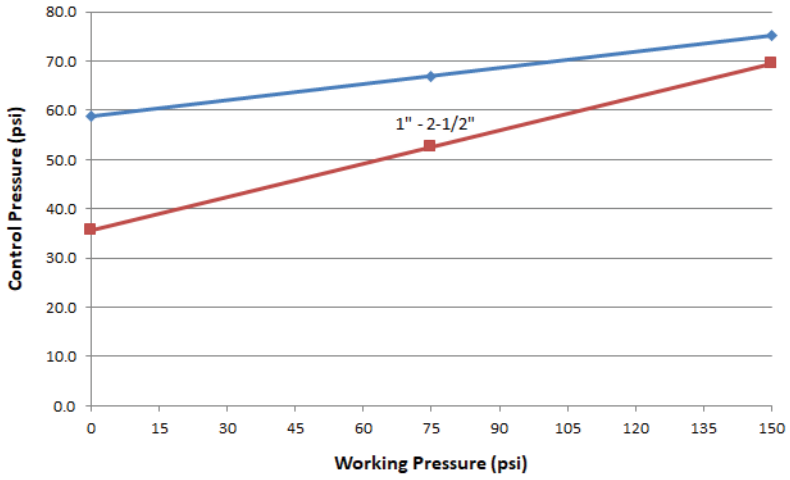
Control Pressure – 1/2" to 2-1/2"

Double Acting

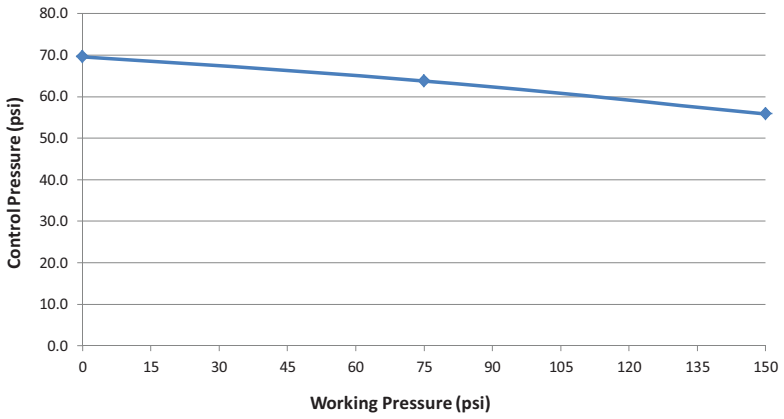


*** Maximum Control Pressure - 75 psi**

Normally Open



Normally Closed



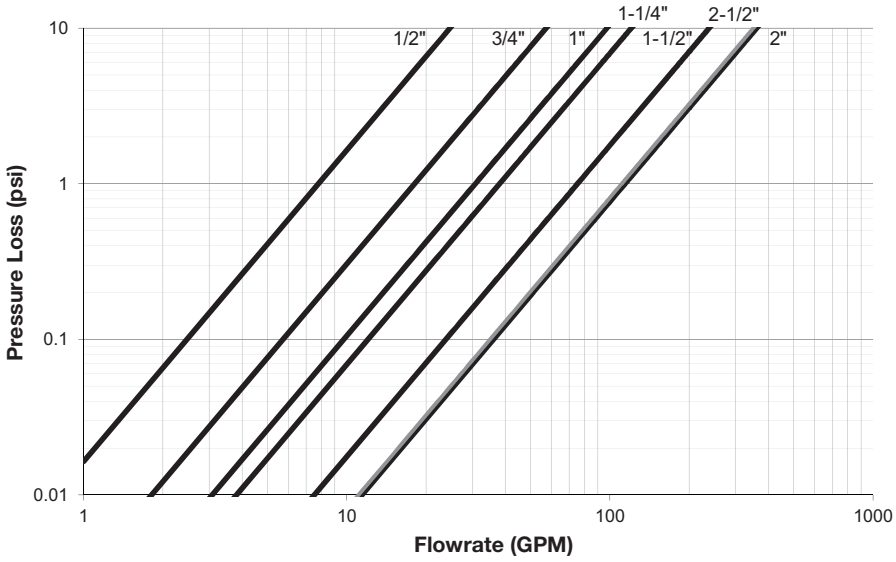
*** Maximum Control Pressure - 100 psi**

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Flow Coefficients

Size (in)	C_v
1/2	7.8
3/4	18.1
1	30.8
1-1/4	38.1
1-1/2	75.3
2	114.2
2-1/2	110.9

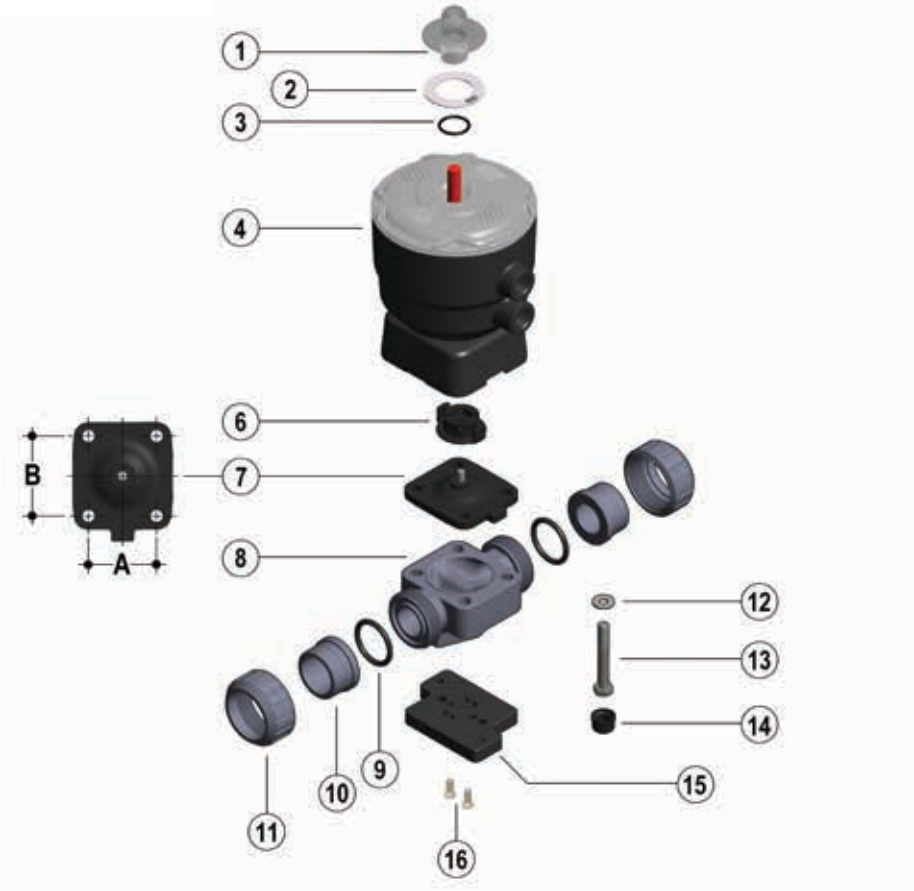
Pressure Loss Chart



CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES PNEUMATIC DIAPHRAGM VALVES

Components



1/2" to 2-1/2" – Double Acting, Normally Open, Normally Closed

#	Component	Material	Qty
* 1	Transparent Cap	PVC	1
* 2	Labelling Plate	PVC	1
* 3	O-Ring	EPDM	1
* 4	Actuator, DA/NO/NC	GFPP	1
* 6	Compressor	IXEF®	1
* 7	Diaphragm	EPDM / FKM / PTFE	1
* 8	Valve Body	PVC / CPVC / PP / PVDF	1
* 9	Socket Seal O-Ring	EPDM / FKM	2
* 10	End Connector	PVC / CPVC / PP / PVDF	2
* 11	Union Nut	PVC / CPVC / PP / PVDF	2
* 12	Washer	SS	4
* 13	Hex Bolt	SS	4
* 14	Protective Cap	PE	4
** 15	Wall/Panel Mounting Plate	GFPP	1
** 16	Screw	SS	2

* Spare parts available.

Items 1 through 6 are supplied as an assembly

** Accessories

Contact IPEX for availability of spare components for Spigot and Flanged style valves.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Installation Procedures

1. The valve may be installed in any position or direction.
2. Please refer to the appropriate connection style subsection:
    a. For spigot style, solvent cement each pipe onto the ends of the valve body. **Ensure that excess solvent does not run into the body of the valve.**
    b. For true union style, remove the union nuts and slide them onto the pipe.
        i. For socket style, solvent cement the end connectors onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". **Ensure that excess solvent does not run into the body of the valve. Be sure to allow sufficient cure time before continuing with the valve installation.**
        ii. For threaded style, thread the end connectors onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods - Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
        iii. Ensure that the socket o-rings are properly fitted in their grooves then carefully place the valve in the system between the two end connections.
        iv. **Tighten both union nuts. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack.**
    c. **For flanged style, join both flanges to the pipe flanges. For correct joining procedure, please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".**
3. If anchoring is required, fix the valve to the supporting structure using the wall/panel mounting kit.
4. Connect any accessories then a suitable air supply and pilot system to the actuator. Be sure to check that both the working and control pressure are in accordance with the specifications.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DK SERIES PNEUMATIC DIAPHRAGM VALVES

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the line. Be sure to depressurize and drain the valve and isolated branch. **Depressurize and disconnect the pneumatic control line before continuing with disassembly.**
2. If necessary, detach the valve from the support structure by disassembling the wall/panel mounting kit attached to the bottom of the valve body (8).
3. Please refer to the appropriate connection style subsection:
    a. For spigot style, cut the pipe on either side of the valve and remove from the line.
    b. For true union style, loosen both union nuts and drop the valve out of the line. If retaining the socket o-rings (9), take care that they are not lost when removing the valve from the line.
    c. For flanged style, loosen each bolt holding the valve to the pipe flanges. Please refer to the section entitled, "Joining Methods - Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" for a recommended bolt tightening pattern diagram. Follow the same pattern when disassembling the flanged joints then carefully remove the valve from the line.
4. Remove the protective caps (14), then loosen and remove the bolts (13) and washers (12) from the bottom of the valve body.
5. Separate the valve body (8) from the actuator (1 or 4).
6. Unscrew the diaphragm (7) and remove the compressor (6).
7. The valve components can now be checked for problems and/or replaced.

Note: All operations on equipment under pressure or containing compressed springs must be carried out under safe conditions for the operator. For safety reasons, it is not recommended to attempt to disassemble the actuator.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant.

Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.

1. Insert the compressor (6) on the actuator stem (1 or 4) aligning it correctly in its housing.
2. Screw the diaphragm (7) on the stem, aligning it correctly with its housing on the actuator.
3. Mount the actuator (1 or 4) on the valve body (8) and tighten the bolts (13) and washers (12).
4. Tighten the bolts (13) in an even (cross-like) pattern, ensuring that recommended tightening torque found on the instruction sheet is followed.
5. Replace the protection caps on the bolt heads (14).
6. Reconnect the valve to the pneumatic and electrical connections.

Note: All operations on equipment under pressure or containing compressed springs must be carried out under safe conditions for the operator. For safety reasons, it is not recommended to attempt to disassemble the actuator.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Testing and Operation

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system**.

Important points:

- **Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.**
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

NOTES

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VM SERIES MANUAL DIAPHRAGM VALVES

IPEX VM Series Diaphragm Valves are the ideal solution for modulating flow and controlling dirty or contaminated fluids in a variety of applications. The weir-style design allows for precise throttling while the compact design allows for installation in any orientation. The modular nature of this valve results in many material, body style, and diaphragm options. VM Series Diaphragm Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

VALVE AVAILABILITY

Body Material:	PVC, CPVC, PP, PVDF
Size Range:	3" through 4"
Pressure:	150 psi
Diaphragm:	EPDM, FKM or PTFE (EPDM backed)
Control Style:	Manual Handwheel
End Connections:	Spigot, True Union (Socket), Flanged (ANSI 150)

ASTM D1784
ASTM D1785
ASTM D4101-86
ASTM D3222
ASTM D2467
ASTM D2466
ASTM F441
ASTM F439

ISO 3609
ISO 10931

ANSI B16.5

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VM SERIES MANUAL DIAPHRAGM VALVES

Sample Specification

1.0 Diaphragm Valves - VM Manual

1.1 Material

- The valve body, including end connectors and unions, shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

or The valve body, including end connectors and unions shall be made of Corzan® CPVC compound which shall meet or exceed the requirements of 23447 according to ASTM D1784.

or The valve body, including end connectors and unions shall be made of stabilized PP homopolymer compound, also containing a RAL 7032 pigment, which shall meet or exceed the requirements of Type I Polypropylene according to ASTM D4101-86.

or The valve body, including end connectors and unions shall be made of virgin, non-regrind PVDF compound which shall meet or exceed the requirements of Table 1 according to ASTM D3222.

- The valve bonnet assembly shall be made of high temperature, high strength, glass-filled polypropylene.

1.2 Diaphragm

- The diaphragm shall be made of EPDM.

or The diaphragm shall be made of FKM.

or The diaphragm shall be made of PTFE (backed with EPDM).

2.0 Connections

2.1 Spigot style

- The IPS spigot PVC end connectors shall conform to the dimensional standard ASTM D1785.

or The IPS spigot CPVC end connectors shall conform to the dimensional standard ASTM F441.

or The Metric spigot PP end connectors shall conform to the dimensional standard ISO 3609.

or The Metric spigot PVDF end connectors shall conform to the dimensional standard ISO 10931.

2.2 Socket style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

or The IPS socket CPVC end connectors shall conform to the dimensional standard ASTM F439.

or The Metric socket PP end connectors shall conform to the dimensional standard ISO 3609.

or The Metric socket PVDF end connectors shall conform to the dimensional standard ISO 10931.

2.3 Flanged style

- **The ANSI 150 flanged PVC end connectors shall conform to the dimensional standard ANSI B16.5.**

or The ANSI 150 flanged CPVC end connectors shall conform to the dimensional standard ANSI B16.5.

or The ANSI 150 flanged PP end connectors shall conform to the dimensional standard ANSI B16.5.

or The ANSI 150 flanged PVDF end connectors shall conform to the dimensional standard ANSI B16.5.

3.0 Design Features

- All valves shall be weir-style for throttling applications.
- All bodies to be used with EPDM or Viton® diaphragms shall feature raised molded sealing rings (concentric).
- All bodies to be used with PTFE diaphragms shall be machined flat.
- All PTFE diaphragms shall feature a raised molded ring to combine sealing performance and longer life.
- All through bolts shall be made of 304 stainless steel.
- All manual valves shall have a rising position indicator.
- Bodies of all sizes and materials shall have mounting brass inserts.

3.1 Pressure Rating

- All valves shall be rated at 150 psi at 73°F.

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Colour Coding

- All PVC valves shall be colour-coded dark gray.

or All CPVC valves shall be colour-coded light gray.

or All PP valves shall be colour-coded beige gray.

or All PVDF valves shall not be colour-coded and be white in appearance.

- All bonnet assemblies shall be colour-coded black.

4.0 All valves shall be Xirtec® PVC, Xirtec® CPVC, PP or PVDF by IPEX or approved equal.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VM SERIES MANUAL DIAPHRAGM VALVES

Valve Selection

Valve Size (inches)	Body Material	Diaphragm Material	IPEX Part Number			Pressure Rating @ 73°F
			Spigot	True Union	ANSI Flanged	
3	PVC	EPDM	054182	n/a	054227	150 psi
		FKM	054191		054236	
		PTFE	054200		054245	
	CPVC	EPDM	054254		054299	
		FKM	054263		054308	
		PTFE	054272		054317	
4	PVC	EPDM	054183	n/a	054228	
		FKM	054192		054237	
		PTFE	054201		054246	
	CPVC	EPDM	054255		054300	
		FKM	054264		054309	
		PTFE	054273		054318	

Body Material:

- ☐ PVC
- ☐ CPVC

Size (inches):

- ☐ 3
- ☐ 4

Diaphragm:

- ☐ EPDM
- ☐ FKM
- ☐ PTFE

End Connections:

- ☐ Spigot
- ☐ True Union (Socket)
- ☐ Flanged (ANSI 150)

IPEX Part Number:

_____

Valve Size (mm)	Body Material	Diaphragm Material	IPEX Part Number		Pressure Rating @ 73°F
			Spigot	True Union	
90	PP	EPDM	054326	n/a	150 psi
		FKM	054335		
		PTFE	054344		
	PVDF	EPDM	054371		
		FKM	054380		
		PTFE	054389		
110	PP	EPDM	054327	n/a	150 psi
		FKM	054336		
		PTFE	054345		
	PVDF	EPDM	054372		
		FKM	054381		
		PTFE	054390		

Body Material:

- ☐ PP
- ☐ PVDF

Size (inches):

- ☐ 90mm
- ☐ 110mm

Diaphragm:

- ☐ EPDM
- ☐ FKM
- ☐ PTFE

End Connections:

- ☐ Spigot
- ☐ True Union (Socket)
- ☐ Flanged (ANSI 150)

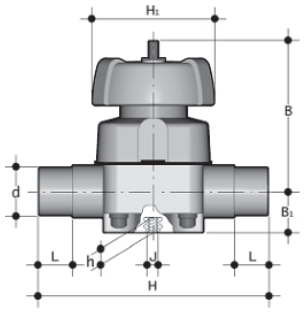
IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VM SERIES MANUAL DIAPHRAGM VALVES

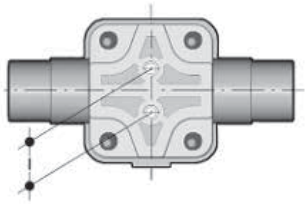
Dimensions



Spigot Connections

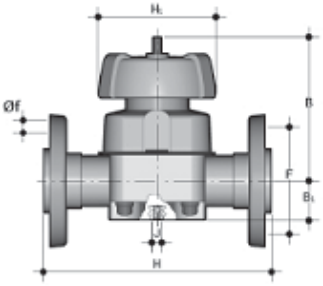
Dimension (inches)

Size	PVC / CPVC d (in)	PP / PVDF d (mm)	H	L
3	3.50	90	11.81	2.01
4	4.50	110	13.39	2.40



Dimension (inches)

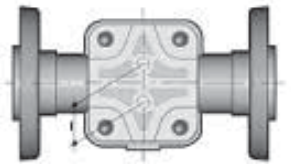
Size	B_1	B	H_1	J	h	I
3	2.17	8.86	8.46	M12	0.91	3.94
4	2.72	11.61	9.84	M12	0.91	4.72



ANSI 150 Flanged (Vanstone) Connections

Dimension (inches)

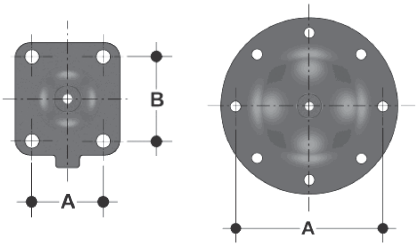
Size	d	H	B_1	B	H_1
3	3.50	11.81	2.17	8.86	8.46
4	4.50	13.39	2.72	11.61	9.84



Dimension (inches)

Size	# holes	f	F	J	h	I
3	4	3/4	6	M12	0.91	3.94
4	4	3/4	7-1/2	M12	0.91	4.72

Sizes 3″ Size 4″



Diaphragm

Dimension (inches)

Size (inches)	Size (mm)	A	B
3	90	4.49	5.00
4	110	7.60	-

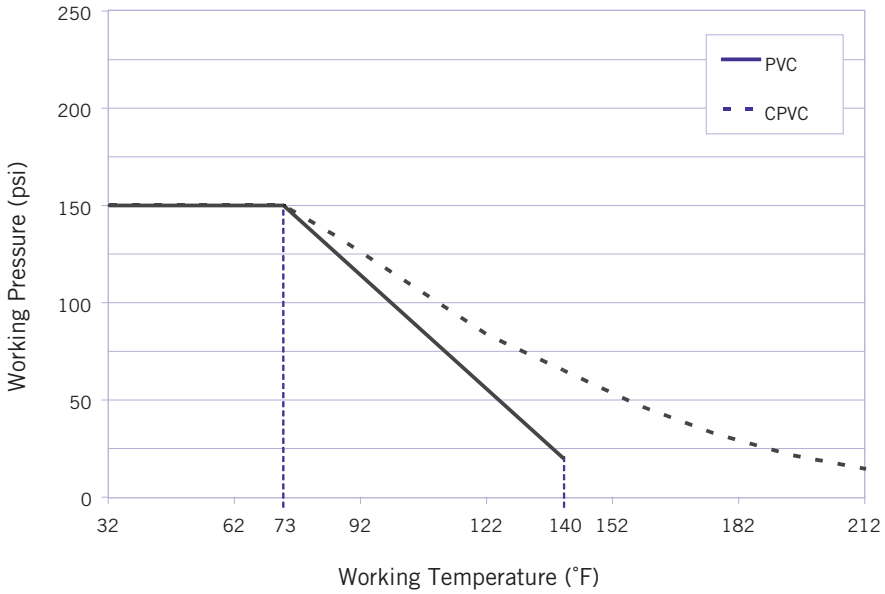
Weights

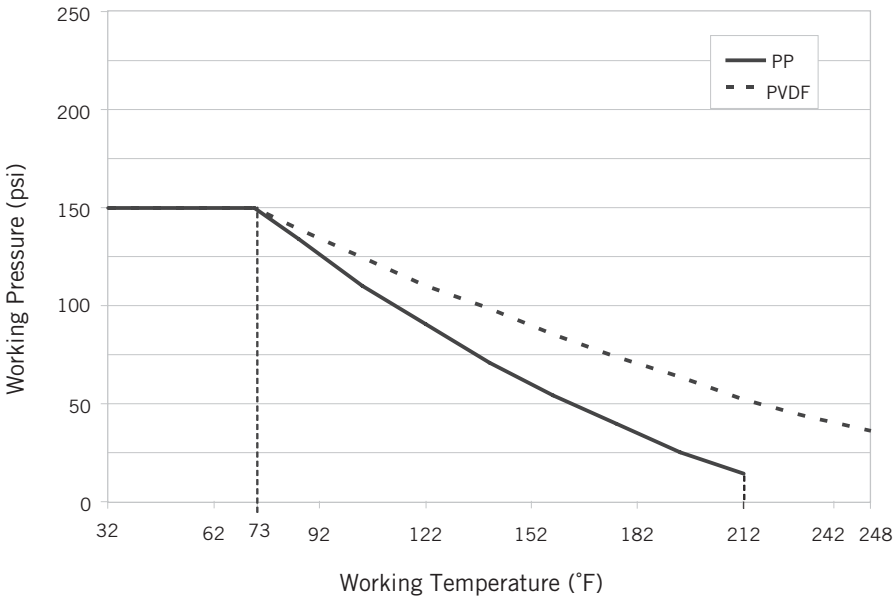
Approximate Weight (lbs)

Size (inches)	PVC			CPVC			PP		PVDF	
	Spigot	True Union	Flanged	Spigot	True Union	Flanged	Spigot	True Union	Spigot	True Union
3	15.43	n/a	18.60	16.01	n/a	19.33	13.23	n/a	17.15	n/a
4	23.15	n/a	28.34	23.94	n/a	29.39	19.84	n/a	25.65	n/a

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Pressure – Temperature Ratings



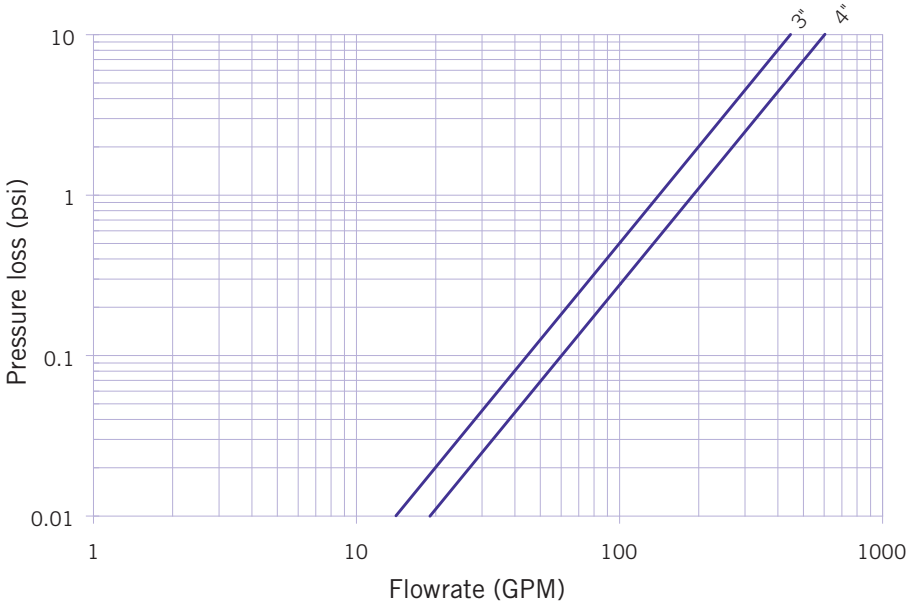


CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Flow Coefficients

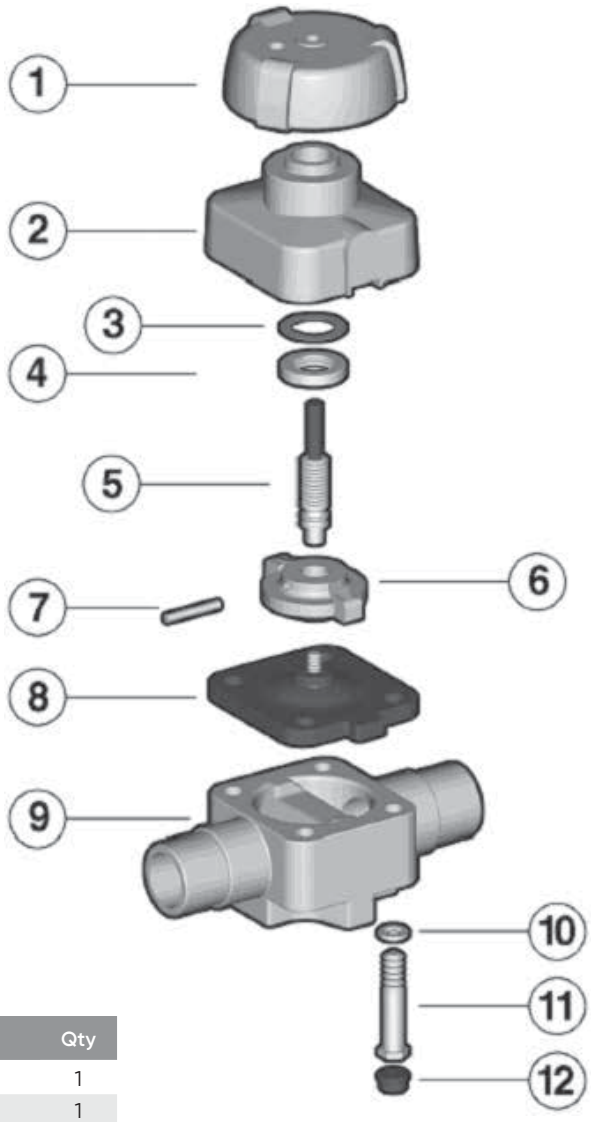
Size (in)	C_V
3	140
4	189

Pressure Loss Chart



CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Components



#	Component	Material	Qty
* 1	handwheel	GFPP	1
* 2	bonnet	GFPP	1
* 3	compression bearing	POM	1
* 4	security ring	brass	1
* 5	indicator - stem	SS	1
* 6	compressor	PBT	1
* 7	pin	SS	1
* 8	diaphragm	EPDM / FKM / PTFE	1
* 9	valve body	PVC / CPVC / PP / PVDF	1
* 10	washer	zinc plated steel	4
* 11	hex bolt	zinc plated steel	4
* 12	protective cap	PE	4

* Spare parts available.
Items 1 through 7 are supplied as an assembly.
Contact IPEX for availability of spare components for True Union and Flanged style valves.
Note: Sizes 2-1/2" to 4" have similar components.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VM SERIES MANUAL DIAPHRAGM VALVES

Installation Procedures

1. The valve may be installed in any position or direction.
2. Please refer to the appropriate connection style sub-section:
    a. For spigot style, solvent cement each pipe onto the ends of the valve body. Ensure that excess solvent does not run into the body of the valve.
    b. For true union style, remove the union nuts and slide them onto the pipe.
        i. For socket style, solvent cement the end connectors onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". Ensure that excess solvent does not run into the body of the valve. Be sure to allow sufficient cure time before continuing with the valve installation.
        ii. For threaded style, thread the end connectors onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods - Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
        iii. Ensure that the socket o-rings are properly fitted in their grooves then carefully place the valve in the system between the two end connections.
        iv. Tighten both union nuts. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack.
    c. For flanged style, join both flanges to the pipe flanges. For correct joining procedure, please refer to the section entitled, "Joining Methods - Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
3. If anchoring is required, fix the valve to the supporting structure using the mounting holes on the bottom of the valve body.

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the line. Be sure to depressurize and drain the valve and isolated branch.
2. If necessary, detach the valve from the support structure by disassembling the threaded connections on the bottom of the valve body (9).
3. Please refer to the appropriate connection style sub-section:
    a. For spigot style, cut the pipe on either side of the valve and remove from the line.
    b. For true union connections, loosen both union nuts and drop the valve out of the line. If retaining the socket o-rings, take care that they are not lost when removing the valve from the line.
    c. For flanged style, loosen each bolt holding the valve to the pipe flanges. Please refer to the section entitled, "Joining Methods - Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" for a recommended bolt tightening pattern diagram. Follow the same pattern when disassembling the flanged joints then carefully remove the valve from the line.
4. Remove the protective caps (12), then loosen and remove the bolts (11) and washers (10) from the bottom of the valve body.
5. Loosen and remove the diaphragm (8) from the compressor (6).
6. Rotate the handwheel (1) clockwise until the stem-compressor assembly (5, 6, 7) is released.
7. The valve components can now be checked for problems and/or replaced.

Note: It is not recommended to attempt to further disassemble the handwheel/bonnet assembly as it may cause irreversible damage to the components.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities**.

1. Insert the stem-compressor assembly into the bonnet and tighten by threading in a counterclockwise (left-hand thread) direction. The guide tabs on the compressor must be lined up with the bonnet grooves before cycling the handwheel to further retract the compressor.
2. Insert the diaphragm into the compressor and turn in a clockwise direction until sufficiently tight. Ensure that the tab lines up with the notched side of the bonnet then cycle the handwheel counterclockwise until the diaphragm is fully retracted.
3. Place the bonnet and diaphragm onto the valve body taking care to properly line up the sealing surfaces.
4. Insert the bolts and washers and tighten in an even (cross-like) pattern.
5. Replace the protective caps on the bolt heads.

Assembly

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system**.

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VM SERIES PNEUMATIC DIAPHRAGM VALVES

IPEX VM Series Diaphragm Valves are the ideal solution for modulating flow and controlling dirty or contaminated fluids in a variety of applications. The weir-style design allows for precise throttling while the compact design allows for installation in any orientation. This pneumatically actuated version provides automatic control with an extensive range of options and accessories. The modular nature of this valve results in many material, body style, and diaphragm options. VM Series Diaphragm Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

VALVE AVAILABILITY

Body Material:	PVC, CPVC, PP, PVDF
Size Range:	3" through 4"
Pressure:	150 psi (1/2" to 2"), 90 psi (2-1/2" to 4")
Diaphragm:	EPDM, FKM or PTFE (EPDM backed)
Control Style:	Pneumatically Actuated
End Connections:	Spigot, True Union (Socket), Flanged (ANSI 150)

ASTM D1784
ASTM D4101-86
ASTM D3222
ASTM D1785
ASTM F441
ASTM D2466
ASTM D2467
ASTM F439

ISO 3609
ISO 10931

ANSI B16.5

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VM SERIES PNEUMATIC DIAPHRAGM VALVES

Sample Specification

1.0 Diaphragm Valves - VM Pneumatic

1.1 Material

- The valve body, including end connectors and unions, shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

or The valve body, including end connectors and unions shall be made of Corzan® CPVC compound which shall meet or exceed the requirements of 23447 according to ASTM D1784.

or The valve body, including end connectors and unions, shall be made of stabilized PP homopolymer compound, also containing a RAL 7032 pigment, which shall meet or exceed the requirements of Type I Polypropylene according to ASTM D4101-86.

or The valve body, including end connectors and unions, shall be made of virgin, non-regrind PVDF compound which shall meet or exceed the requirements of Table 1 according to ASTM D3222.

- The valve bonnet assembly shall be made of high temperature, high strength, glass-filled polypropylene.

1.2 Diaphragm

- The diaphragm shall be made of EPDM.

or The diaphragm shall be made of FKM.

or The diaphragm shall be made of PTFE (backed with EPDM).

2.0 Connections

2.1 Spigot style

- The IPS spigot PVC end connectors shall conform to the dimensional standard ASTM D1785.

or The IPS spigot CPVC end connectors shall conform to the dimensional standard ASTM F441.

or The Metric spigot PP end connectors shall conform to the dimensional standard ISO 3609.

or The Metric spigot PVDF end connectors shall conform to the dimensional standard ISO 10931.

2.2 Socket style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

or The IPS socket CPVC end connectors shall conform to the dimensional standard ASTM F439.

or The Metric socket PP end connectors shall conform to the dimensional standard ISO 3609.

or The Metric socket PVDF end connectors shall conform to the dimensional standard ISO 10931.

2.3 Flanged style

- The ANSI 150 flanged PVC end connectors shall conform to the dimensional standard ANSI B16.5.

or The ANSI 150 flanged CPVC end connectors shall conform to the dimensional standard ANSI B16.5.

or The ANSI 150 flanged PP end connectors shall conform to the dimensional standard ANSI B16.5.

or The ANSI 150 flanged PVDF end connectors shall conform to the dimensional standard ANSI B16.5.

3.0 Design Features

- All valves shall be weir-style for throttling applications.
- All bodies to be used with EPDM or Viton® diaphragms shall feature raised molded sealing rings (concentric).
- All bodies to be used with PTFE diaphragms shall be machined flat.
- All PTFE diaphragms shall feature a raised molded ring to combine sealing performance and longer life.
- All through bolts shall be made of 304 stainless steel.
- Bodies of all sizes and materials shall have mounting brass inserts.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VM SERIES PNEUMATIC DIAPHRAGM VALVES

3.1 Actuators

- All actuators shall be made of glass-filled polypropylene.
- All actuators shall feature a smooth top (no nut holes) for cleanliness.
- The edge of the actuator membrane shall be inside of the actuator protective housing.
- All springs shall be cut from spring grade steel for maximum memory life and epoxy coated for maximum chemical resistance.
- Fail safe to open and double-acting actuators shall feature weak springs located in the center of the actuator.
- Fail safe to close actuators shall feature three concentric springs located in the middle of the actuator.
- The following accessories shall be available for all actuators: position indicator, stroke limiter, stroke limiter with position indicator, limit switch, limit switch box, 3-15 psi positioner, 4-20 mA positioner, solenoid pilot valve.

3.2 Pressure Rating

- Valve sizes 1/2" through 2" shall be rated at 150 psi at 73°F.
- Valve sizes 2-1/2" through 4" shall be rated at 90 psi at 73°F.

3.3 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.4 Colour Coding

- All PVC valves shall be colour-coded dark gray.

or All CPVC valves shall be colour-coded light gray.

or All PP valves shall be colour-coded beige gray.

or All PVDF valves shall not be colour-coded and be white in appearance.

- All bonnet assemblies shall be colour-coded red.

4.0 All valves shall be Xirtec® PVC, Xirtec® CPVC, PP or PVDF by IPEX or approved equal.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VM SERIES PNEUMATIC DIAPHRAGM VALVES

Valve Selection

Valve Size (inches)	Body Material	Diaphragm Material	IPEX Part Number						Pressure Rating @ 73°F
			Normally Open & Air to Air			Normally Closed			
			Spigot	True Union	ANSI Flanged	Spigot	True Union	ANSI Flanged	
3	PVC	EPDM	054417	n/a	054462	054651	n/a	054696	150 psi
		FKM	054426		054471	054660		054705	
		PTFE	054435		054480	054669		054714	
	CPVC	EPDM	054489		054534	054723		054768	
		FKM	054498		054543	054732		054778	
		PTFE	054507		054552	054741		054787	
4	PVC	EPDM	054418		054463	054652		054697	
		FKM	054427		054472	054661		054706	
		PTFE	054436		054481	054670		054715	
	CPVC	EPDM	054490		054535	054724		054769	
		FKM	054499		054544	054733		054779	
		PTFE	054508		054553	054742		054788	

Body Material:

- ☐ PVC
- ☐ CPVC

Size (inches):

- ☐ 3
- ☐ 4

Diaphragm:

- ☐ EPDM
- ☐ FKM
- ☐ PTFE

Control Style:

- ☐ Pneumatic (Normally Open & Air to Air)
- ☐ Pneumatic (Normally Closed)

End Connections:

- ☐ Spigot
- ☐ True Union (Socket)
- ☐ Flanged (ANSI 150)

IPEX Part Number:

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VM SERIES PNEUMATIC DIAPHRAGM VALVES

Valve Selection

Valve Size (mm)	Body Material	Diaphragm Material	IPEX Part Number Normally Open & Air to Air		Normally Closed		Pressure Rating @ 73°F
			Spigot	True Union	Spigot	True Union	
90	PP	EPDM	054561	n/a	054796	n/a	150 psi
		FKM	054570		054805		
		PTFE	054579		054814		
	PVDF	EPDM	054606		054843		
		FKM	054615		054852		
		PTFE	054624		054861		
110	PP	EPDM	054562		054797		
		FKM	054571		054806		
		PTFE	054580		054815		
	PVDF	EPDM	054607		054844		
		FKM	054616		054853		
		PTFE	054625		054862		

Body Material:

- ☐ PP
- ☐ PVDF

Size (inches):

- ☐ 90mm
- ☐ 110mm

Diaphragm:

- ☐ EPDM
- ☐ FKM
- ☐ PTFE

Control Style:

- ☐ Pneumatic (Normally Open & Air to Air)
- ☐ Pneumatic (Normally Closed)

End Connections:

- ☐ Spigot
- ☐ True Union (Socket)

IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Options and Accessories

Electrical Position Indicator
1 Switch Mechanical, Accessory B

Style	Dimension (in)	IPEX Part Number
CM / NC	1/2	054952
VM / NC	1/2 – 1	054953
VM / NC	1-1/4 – 1-1/2	054954
VM / NC	2	054955
VM / NC	2-1/2 – 4	054956
* VM Manual	1/2 – 1	054962
* VM Manual	1-1/4 – 1-1/2	054963
* VM Manual	2	054964
* VM Manual	2-1/2 – 3	054965
* VM Manual	4	054966

* Special machining needed for the valve bonnet and compressor.

Microswitches (NEMA 4X)
2 Switches Electromechanical, Accessory C

Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 – 1-1/2	054967
VM / NC	2 – 4	054968
VM / NO	1/2 – 4	054969

Microswitches (NEMA 4X)
2 Switches Inductive, Accessory CI

Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 – 1-1/2	054970
VM / NC	2 – 4	054971
VM / NO	1/2 – 4	054972

Microswitches (NEMA 4X)
2 Switches Electromechanical, Accessory D

Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 – 1	054973
VM / NC	1-1/4 – 1-1/2	054974
VM / NC	2	054975
VM / NO	1/2 – 1	054976
VM / NO	1-1/4 – 1-1/2	054977
VM / NO	2	054978
CM / NC - NO	1/2	054979

Microswitches (NEMA 4X)
2 Switches Inductive, Accessory DI

Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 - 1	054980
VM / NC	1-1/4 - 1-1/2	054981
VM / NC	2	054982
VM / NO	1/2 - 1	054983
VM / NO	1-1/4 - 1-1/2	054984
VM / NO	2	054985
CM / NC - NO	1/2	054986

PS Pilot Valve – Direct Mount
Direct mount solenoid pilot valve for VM and CM series valves

Style	Dimension (in)	Seal Material	IPEX Part Number
VM Series	1/4	Viton®	053074
CM Series	1/8	Viton®	053075

Standard voltage is 110 VAC. Other voltages available upon request.

PS Pilot Valve – Gang or Remote Mount
Gang mount solenoid pilot valve for VM and CM series valves

Style	Dimension (in)	Seal Material	IPEX Part Number
Gang Mount	1/4	Viton®	053076

Standard voltage is 110 VAC. Other voltages available upon request.

Stroke Limiter – Accessory F

Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 – 1-1/2	054991
VM / NC	2	054992
* VM / NC	2-1/2 – 4	054993
VM / NO - DA	1-1/2 – 2	054994
VM / NO - DA	2-1/2 – 4	054995
CM / NC	1/2	054996

Protection cap included for VM.
* Actuator must have the metal cap.

Position Indicator – Accessory G

Style	Dimension (in)	IPEX Part Number
VM / NC - NO - DA	1/2 – 2	054997
VM / NC - NO - DA	2-1/2 – 4	054998

Protection cap included, see assembly instructions.

Stroke Limiter w/ Position Indicator – Accessory H

Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 – 1	054999
VM / NC	1-1/4 – 1-1/2	053063
VM / NC	2	053064
* VM / NC	2-1/2 – 4	053065
VM / NO - DA	1/2 – 2	053066
VM / NO - DA	2-1/2 – 4	053067
CM / NC	1/2	053068

Protection cap included for VM.
* Actuator must have the metal cap.

Stroke Limiter w/ Position Indicator
and Manual Override – Accessory I

Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 - 1	053069
VM / NC	1-1/4 - 1-1/2	053070
VM / NC	2	053071
VM / NO - DA	1/2 - 1	053072
VM / NO - DA	1-1/4 - 2	053073

Protection cap included.

PS Pilot Valve – Direct Mount
Direct mount solenoid pilot valve for VM and CM series valves

Style	Dimension (in)	Seal Material	IPEX Part Number
VM Series	1/4	Viton®	053074
CM Series	1/8	Viton®	053075

Standard voltage is 110 VAC. Other voltages available upon request.

PS Pilot Valve – Gang or Remote Mount
Gang mount solenoid pilot valve for VM and CM series valves

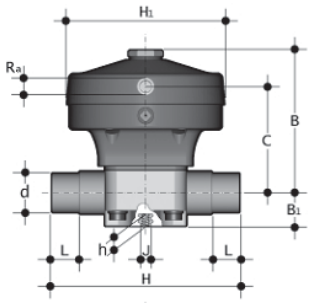
Style	Dimension (in)	Seal Material	IPEX Part Number
Gang Mount	1/4	Viton®	053076

Standard voltage is 110 VAC. Other voltages available upon request.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

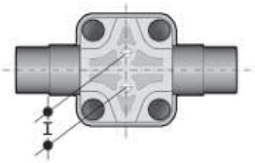
VM SERIES PNEUMATIC DIAPHRAGM VALVES

Dimensions

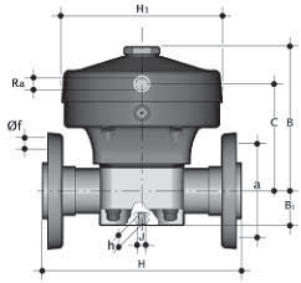


Normally Open & Air to Air – Spigot Connections

Size (in)	PVC / CPVC d (in)	PP / PVDF d (mm)	H (in)	L (in)	B1 (in)
3	3.50	90	11.81	2.01	2.17
4	4.50	110	13.39	2.40	2.72

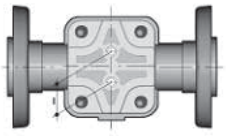


Size (in)	C (in)	Ra (in)	B (in)	H1 (in)	J (in)	h (in)	I (in)
3	9.92	1/4	12.01	10.16	M12	0.91	3.94
4	10.55	1/4	12.99	10.16	M12	0.91	4.72

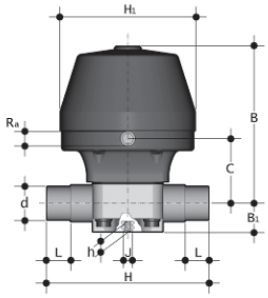


Normally Open & Air to Air – ANSI 150 Flanged (Vanstone) Connections

Size (in)	d (in)	H (in)	B1 (in)	C (in)	Ra (in)	B (in)	H1 (in)
3	3.50	11.81	2.17	9.92	1/4	12.01	10.16
4	4.50	13.39	2.72	10.55	1/4	12.99	10.16

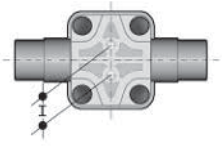


Size (in)	# holes (in)	f (in)	F (in)	J (in)	h (in)	I (in)
3	4	3/4	6	M12	0.91	3.94
4	4	3/4	7-1/2	M12	0.91	4.72



Normally Closed – Spigot Connections

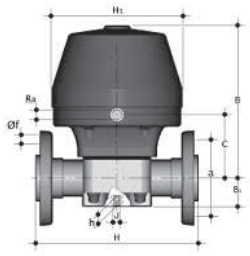
Size (in)	PVC / CPVC d (in)	PP / PVDF d (mm)	H (in)	L (in)	B1 (in)
3	3.50	90	11.81	2.01	2.17
4	4.50	110	13.39	2.40	2.72



Size (in)	C (in)	Ra (in)	B (in)	H1 (in)	J (in)	h (in)	I (in)
3	7.36	1/4	12.80	10.16	M12	0.91	3.94
4	10.55	1/4	13.98	10.16	M12	0.91	4.72

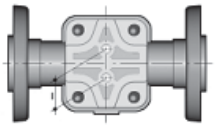
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VM SERIES PNEUMATIC DIAPHRAGM VALVES



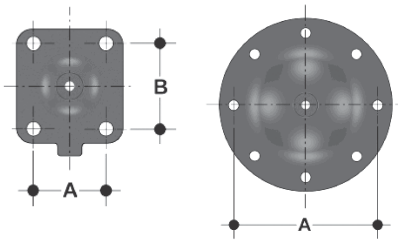
Normally Closed – ANSI 150 Flanged (Vanstone) Connections

Size (in)	d (in)	H (in)	B_1 (in)	C (in)	Ra (in)	B (in)	H_1 (in)
3	3.50	11.81	2.17	7.36	1/4	12.80	10.16
4	4.50	13.39	2.72	10.55	1/4	13.98	10.16



Size (in)	# holes (in)	f (in)	F (in)	J (in)	h (in)	I (in)
3	4	3/4	6	M12	0.91	3.94
4	4	3/4	7-1/2	M12	0.91	4.72

Sizes 3" **Size 4"**



Diaphragm

Dimension (inches)

Size (inches)	Size (mm)	A	B
3	90	4.49	5.00
4	110	7.60	–

Weights

Approximate Weight (lbs) – Normally Open & Air to Air

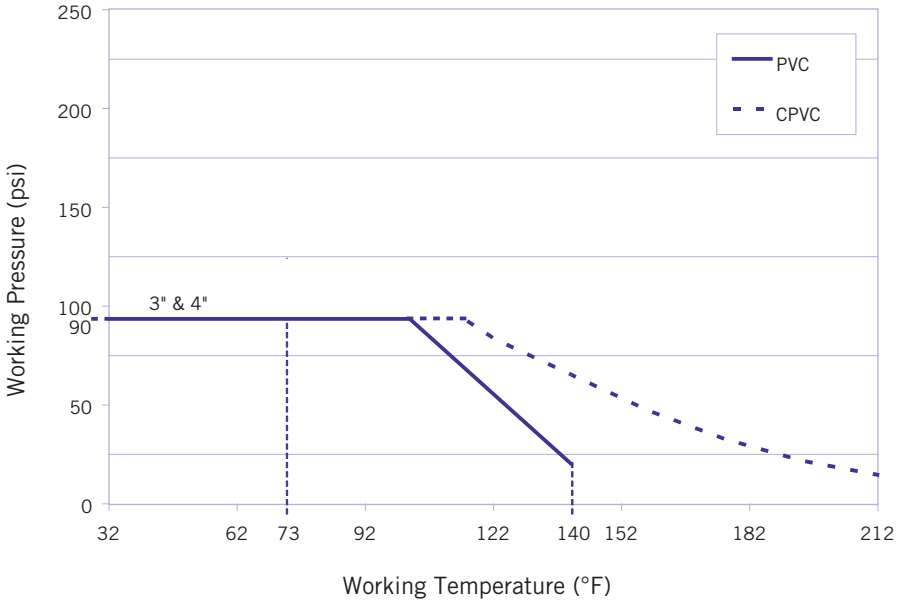
Size (inches)	PVC			CPVC			PP		PVDF	
	Spigot	True Union	Flanged	Spigot	True Union	Flanged	Spigot	True Union	Spigot	True Union
3	28.66	n/a	31.83	29.23	n/a	32.56	26.46	n/a	30.37	n/a
4	48.50	n/a	53.69	49.29	n/a	54.74	45.19	n/a	51.01	n/a

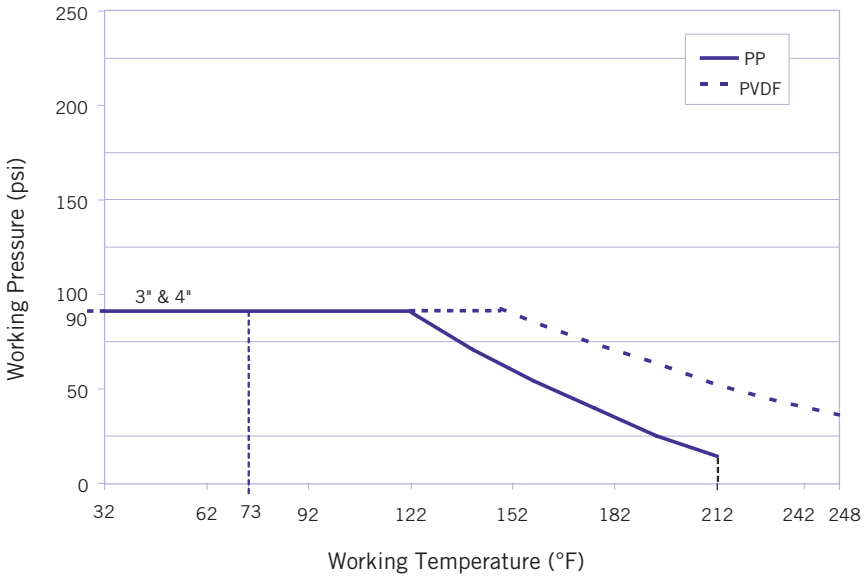
Approximate Weight (lbs) – Normally Closed

Size (inches)	PVC			CPVC			PP		PVDF	
	Spigot	True Union	Flanged	Spigot	True Union	Flanged	Spigot	True Union	Spigot	True Union
3	34.17	n/a	37.34	34.74	n/a	38.07	31.97	n/a	35.89	n/a
4	56.22	n/a	61.41	57.01	n/a	62.46	52.91	n/a	58.72	n/a

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Pressure – Temperature Ratings

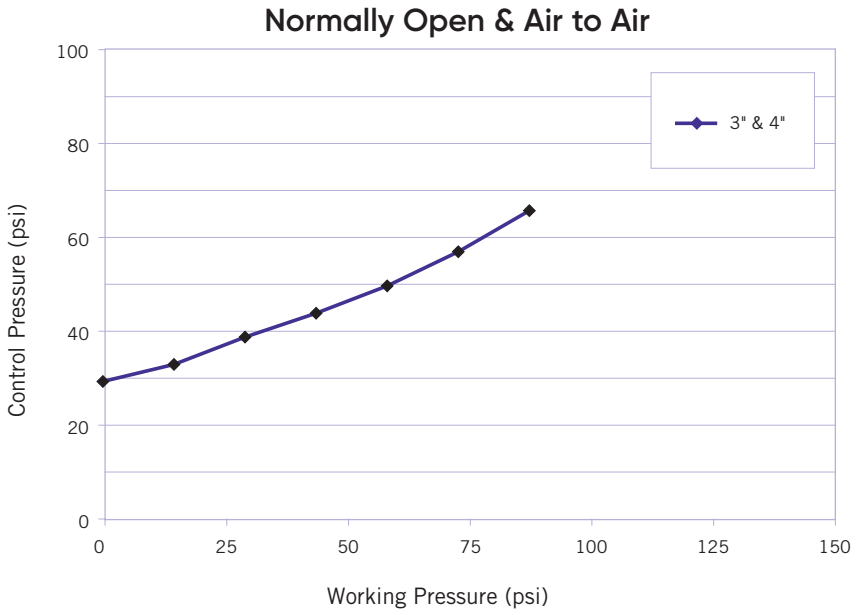


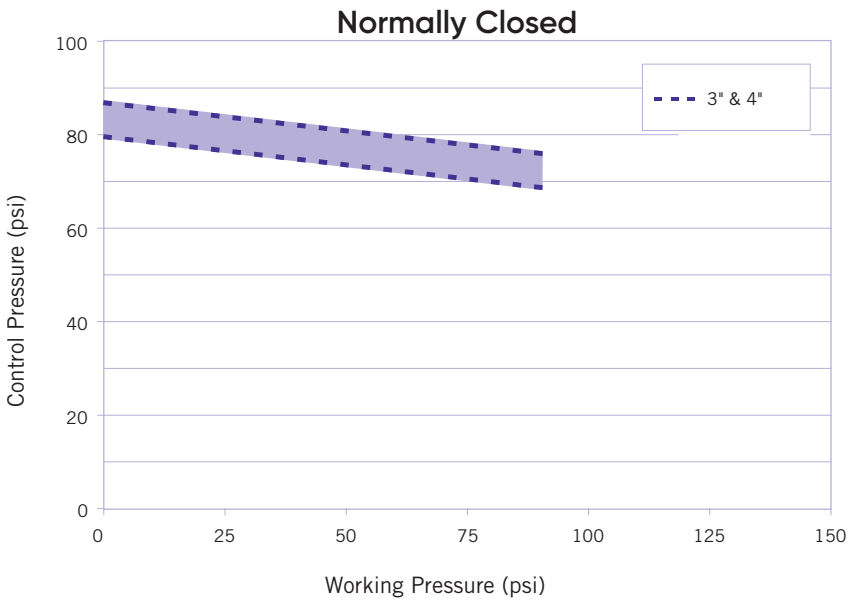


Notes:
- The maximum working pressure is 90 psi for sizes 3" & 4".
- The maximum control pressure allowed for all sizes is 90 psi.
- The control fluid temperature should not exceed 105°F.
- The fluid capacity of the actuator is 134 in^3 for sizes 3" & 4".
- The fluid capacity of the actuator is 128 in^3 for sizes 3" & 4".

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Control Pressure





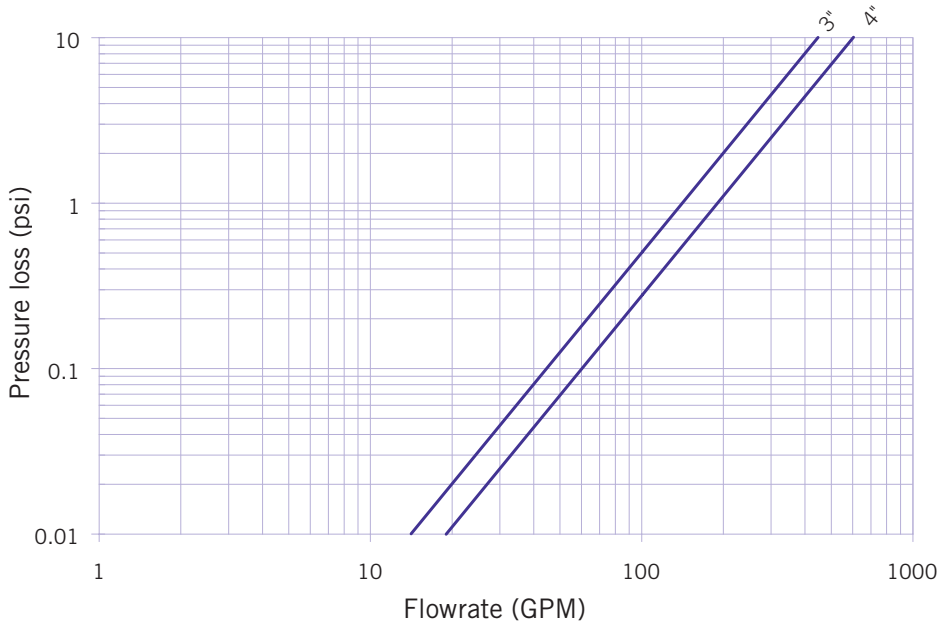
Notes:
- The maximum working pressure is 90 psi for sizes 3" & 4".
- The maximum control pressure allowed for all sizes is 90 psi.
- The control fluid temperature should not exceed 105°F.
- The fluid capacity of the actuator is 134 in^3 for sizes 3" & 4".
- The fluid capacity of the actuator is 128 in^3 for sizes 3" & 4".

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Flow Coefficients

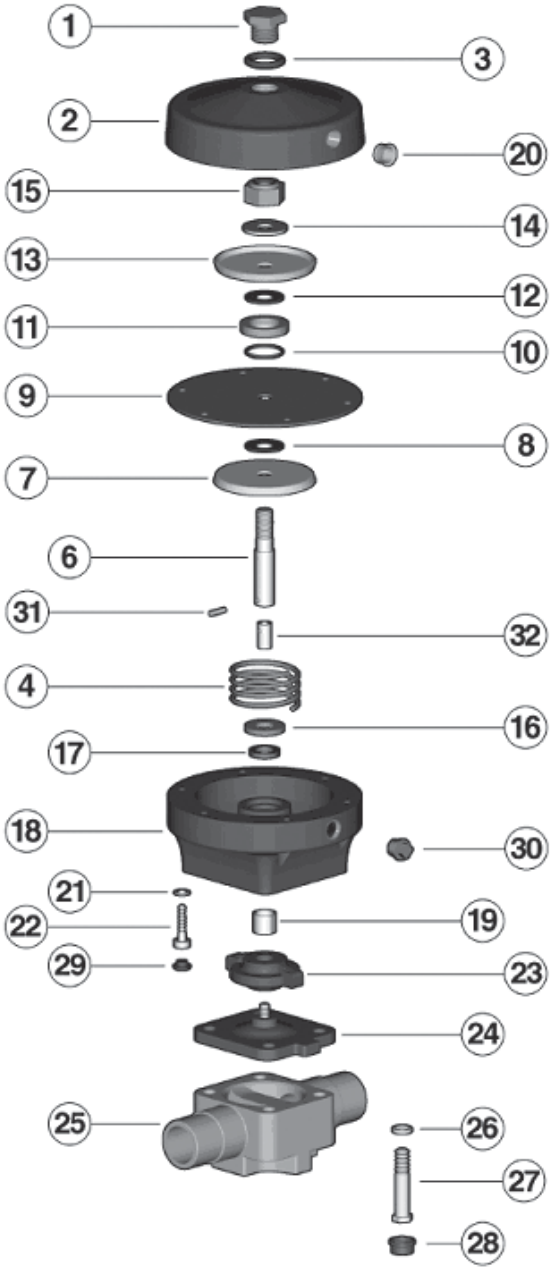
Size (in)	C_V
3	140
4	189

Pressure Loss Chart



CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Components



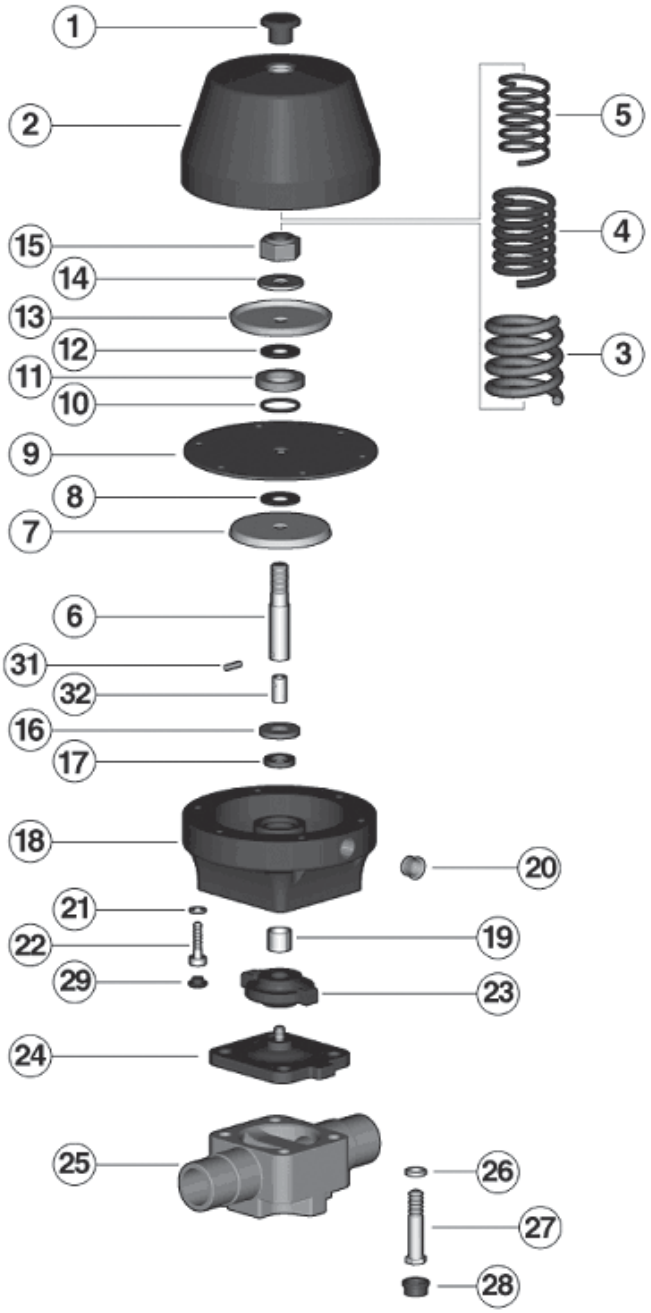
Normally Open & Air to Air

#	Component	Material	Qty
1	threaded plug	AL	1
2	actuator – upper part	GRPP	1
3	o-ring	NBR	1
4	spring	carbon steel	1
6	spindle	stainless steel	1
7	press diaphragm-plate	zinc plated steel	1
8	washer	NBR	1
9	control diaphragm	CR	1
10	o-ring (sizes 1-1/4" to 2")	NBR	1
11	spacer ring (sizes 1-1/4" to 2")	zinc plated steel	1
12	washer	NBR	1
13	press diaphragm-plate	zinc plated steel	1
14	washer	zinc plated steel	1
15	locknut	zinc plated steel	1
16	security washer	brass	1
17	quad-ring	NBR	1
18	actuator – lower part	GRPP	1
19	spindle bearing	metal – PTFE	1
20	plug	PE	1
21	washer	zinc plated steel	6
22	cylindrical screw	zinc plated steel	6
23	compressor	PBT	1
24	sealing diaphragm	EPDM / Viton® / PTFE	1
25	valve body	PVC / CPVC / PP / PVDF	1
26	washer	zinc plated steel[1]	4
27	hex bolt	zinc plated steel[1]	4
28	protective cap	PE	4
29	protective cap	PP	6
30	threaded plug	brass	1
31	pin (sizes 1/2" to 2")	SS	1
32	coupling	SS	1

* Spare parts available.
Items 1 through 7 are supplied as an assembly.
Contact IPEX for availability of spare components for True Union and Flanged style valves.
[1] Stainless steel for PVDF valves.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VM SERIES PNEUMATIC DIAPHRAGM VALVES



Normally Closed

#	Component	Material	Qty
1	plug	PP	1
2	actuator – upper part	GRPP	1
3	spring	carbon steel	1
4	spring	carbon steel	1
5	spring	carbon steel	1
6	spingle	stainless steel	1
7	press diaphragm-plate	zinc plated steel	1
8	washer	NBR	1
9	control diaphragm	CR	1
10	o-ring (sizes 1-1/4" to 2")	NBR	1
11	spacer ring (sizes 1-1/4" to 2")	zinc plated steel	1
12	washer	NBR	1
13	press diaphragm-plate	zinc plated steel	1
14	washer	zinc plated steel	1
15	locknut	zinc plated steel	1
16	security washer	brass	1
17	quad-ring	NBR	1
18	actuator – lower part	GRPP	1
19	spindle bearing	metal – PTFE	1
20	plug	PE	1
21	washer	zinc plated steel	6
22	cylindrical screw	zinc plated steel	6
23	compressor	PBT	1
24	sealing diaphragm	EPDM / Viton® / PTFE	1
25	valve body	PVC / CPVC / PP / PVDF	1
26	washer	zinc plated steel[1]	4
27	hex bolt	zinc plated steel[1]	4
28	protective cap	PE	4
29	protective cap	PP	6
31	pin (sizes 1/2" to 2")	SS	1
32	coupling	SS	1

* Spare parts available.
Items 1 through 7 are supplied as an assembly.
Contact IPEX for availability of spare components or True Union and Flanged style valves.
[1] Stainless steel for PVDF valves.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VM SERIES PNEUMATIC DIAPHRAGM VALVES

Installation Procedures

1. The valve may be installed in any position or direction.
2. Please refer to the appropriate connection style sub-section:
    a. For spigot style, solvent cement each pipe onto the ends of the valve body. Ensure that excess solvent does not run into the body of the valve.
    b. For true union style, remove the union nuts and slide them onto the pipe.
        i. For socket style, solvent cement the end connectors onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods - Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". **Ensure that excess solvent does not run into the body of the valve. Be sure to allow sufficient cure time before continuing with the valve installation.**
        ii. For threaded style, thread the end connectors onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
        iii. Ensure that the socket o-rings are properly fitted in their grooves then carefully place the valve in the system between the two end connections.
        iv. Tighten both union nuts. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. **Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack.**
    c. For flanged style, join both flanges to the pipe flanges. For correct joining procedure, please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
3. Anchoring is strongly recommended due to the weight of the actuator. The valve can be fixed to the supporting structure using the mounting holes on the bottom of the valve body.
4. Connect any accessories then a suitable air supply and pilot system to the actuator. Be sure to check that both the working and control pressure are in accordance with the specifications.

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the line. **Be sure to depressurize and drain the valve and isolated branch. Depressurize and disconnect the pneumatic control line before continuing with disassembly**.
2. Detach the valve from the support structure by disassembling the threaded connections on the bottom of the valve body (25).
3. Please refer to the appropriate connection style sub-section:
    a. For spigot style, cut the pipe on either side of the valve and remove from the line.
    b. For true union connections, loosen both union nuts and drop the valve out of the line. If retaining the socket o-rings, take care that they are not lost when removing the valve from the line.
    c. For flanged style, loosen each bolt holding the valve to the pipe flanges. Please refer to the section entitled, "Joining Methods - Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" for a recommended bolt tightening pattern diagram. Follow the same pattern when disassembling the flanged joints then carefully remove the valve from the line.
4. Remove the protective caps (28), then loosen and remove the bolts (27) and washers (26) from the bottom of the valve body.
5. The valve components can now be checked for problems and/or replaced.

Note: For safety reasons, it is not recommended to attempt to disassemble the actuator. However if necessary, proceed as follows:

6. Using a spring release (or press) to maintain pressure on the internal springs, remove the protective caps (29) then carefully loosen and remove the bolts (22) and washers (21).
7. Back off the pressure on the spring release (or press) to separate the upper (2) and lower (18) parts of the actuator and remove the springs (4 for Normally Open, 3-5 for Normally Closed).
8. Loosen and remove the locknut (15) to disassemble the diaphragm control components (7 through 14).
9. Remove the spindle (6, 31, and 32) – compressor (23) – diaphragm (24) assembly, taking care not to damage the quad-ring (17).
10. Loosen and remove both the diaphragm and compressor.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities**.

1. Assemble the compressor (23) with the diaphragm (24) and thread onto the spindle (6, 31, and 32).
2. Insert the spindle into the lower part (18) of the actuator, ensuring proper placement of the quad-ring (17).
3. For Normally Open actuators, reposition the spring (4) in the lower part of the actuator.
4. Properly assemble the diaphragm control components (7-14) on the spindle and fasten in place using the locknut (15).
5. Carefully line up the holes of the control diaphragm (9) with the proper holes of the lower part of the actuator.
6. For Normally Closed actuators, reposition the springs (3-5) on the press-diaphragm plate (13).
7. Properly position the upper part (2) of the actuator on the lower portion, then clamp in place using a spring release tool or press. Insert and tighten all bolts (22) and washers (21) then replace all protective caps (29).
8. Sufficiently tighten the diaphragm (24) then back off slightly until the bolt holes line up.
9. Position the assembled actuator on the valve body (25) while ensuring that the sealing surfaces properly line up. Insert and tighten all bolts (27) and washers (26) then replace all protective caps (28).

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system**.

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.
- **An unnecessarily high control pressure may shorten the life of the actuator. Pressure reducers are recommended**.
- **Slow cycle times will contribute to a longer actuator life**.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VM SERIES PNEUMATIC DIAPHRAGM VALVES

Valve Maintenance

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the line. Be sure to depressurize and drain the valve and isolated branch. Depressurize and disconnect the pneumatic control line before continuing with disassembly.
2. Detach the valve from the support structure by disassembling the threaded connections on the bottom of the valve body (25).
3. Please refer to the appropriate connection style sub-section:
    a. For spigot style, cut the pipe on either side of the valve and remove from the line.
    b. For true union connections, loosen both union nuts and drop the valve out of the line. If retaining the socket o-rings, take care that they are not lost when removing the valve from the line.
    c. For flanged style, loosen each bolt holding the valve to the pipe flanges. Please refer to the section entitled, "Joining Methods - Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" for a recommended bolt tightening pattern diagram. Follow the same pattern when disassembling the flanged joints then carefully remove the valve from the line.
4. Remove the protective caps (28), then loosen and remove the bolts (27) and washers (26) from the bottom of the valve body.
5. The valve components can now be checked for problems and/or replaced.

Note: For safety reasons, it is not recommended to attempt to disassemble the actuator. However if necessary, proceed as follows:

6. Using a spring release (or press) to maintain pressure on the internal springs, remove the protective caps (29) then carefully loosen and remove the bolts (22) and washers (21).
7. Back off the pressure on the spring release (or press) to separate the upper (2) and lower (18) parts of the actuator and remove the springs (4 for Normally Open, 3-5 for Normally Closed).
8. Loosen and remove the locknut (15) to disassemble the diaphragm control components (7 through 14).
9. Remove the spindle (6, 31, and 32) – compressor (23) – diaphragm (24) assembly, taking care not to damage the quad-ring (17).
10. Loosen and remove both the diaphragm and compressor.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.

1. Assemble the compressor (23) with the diaphragm (24) and thread onto the spindle (6, 31, and 32).
2. Insert the spindle into the lower part (18) of the actuator, ensuring proper placement of the quad-ring (17).
3. For Normally Open actuators, reposition the spring (4) in the lower part of the actuator.
4. Properly assemble the diaphragm control components (7-14) on the spindle and fasten in place using the locknut (15).
5. Carefully line up the holes of the control diaphragm (9) with the proper holes of the lower part of the actuator.
6. For Normally Closed actuators, reposition the springs (3-5) on the press-diaphragm plate (13).
7. Properly position the upper part (2) of the actuator on the lower portion, then clamp in place using a spring release tool or press. Insert and tighten all bolts (22) and washers (21) then replace all protective caps (29).
8. Sufficiently tighten the diaphragm (24) then back off slightly until the bolt holes line up.
9. Position the assembled actuator on the valve body (25) while ensuring that the sealing surfaces properly line up. Insert and tighten all bolts (27) and washers (26) then replace all protective caps (28).

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DV SERIES DIAPHRAGM VALVES

IPEX DV Series Diaphragm Valves are rugged industrial products ideal for throttling or use in abrasive slurry lines. The raising position indicator also functions as an adjustable travel stop. This feature can be used to avoid over-compression of the diaphragm, or as a travel limiter allowing different settings for the "closed" position. The molded flanged body eliminates potentially leaky joints while featuring end-to-end dimensions identical to most plastic lined metal diaphragm valves, allowing for direct replacement. DV Series Diaphragm Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

ASTM D1784

ANSI B16.5

VALVE AVAILABILITY

Body Material:	PVC
Size Range:	1/2" through 6"
Pressure:	150 psi
Diaphragm:	EPDM or Teflon® (PTFE)
End Connections:	Flanged (ANSI 150)

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DV SERIES DIAPHRAGM VALVES

Sample Specification

1.0 Diaphragm Valves - DV

1.1 Material

- The valve body shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.
- This compound shall comply with standards that are equivalent to NSF Standard 61 for potable water.

1.2 Diaphragm

- The diaphragm shall be made of EPDM which shall comply with standards that are equivalent to NSF Standard 61 for potable water.

or The diaphragm shall be made of Teflon® (PTFE) which shall comply with standards that are equivalent to NSF Standard 61 for potable water.

2.0 Connections

2.1 Flanged style

- The ANSI 150 flanged PVC end connections shall conform to the dimensional standard ANSI B16.5.

3.0 Design Features

- All valves shall have integrally molded flanged ends.
- All valves shall have a clear position indicator.
- All valves shall have an adjustable travel stop.
- All valves shall have face-to-face dimensions to the industry standard.
- The valve shall have no wetted metal parts.
- Service of the valve shall be possible without removal from the system line.

3.1 Pressure Rating

- Valve sizes 1/2" through 3" shall be rated at 150 psi at 73°F.
- Valve sizes 4" through 6" shall be rated at 75 psi at 73°F.

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Colour Coding

- All PVC valves shall be colour-coded dark gray.
- All hand wheels shall be colour-coded red.

4.0 All valves shall be Xirtec® PVC by IPEX or approved equal.

Valve Selection

Size (inches)	Body Material	O-ring Material	IPEX Part Number FNPT Threaded	Pressure Rating @ 73°F
1/2	PVC	EPDM	052196	150 psi
		Viton®	052296	
3/4	PVC	EPDM	052197	
		Viton®	052297	
1	PVC	EPDM	052198	
		Viton®	052298	
1-1/2	PVC	EPDM	052207	
		Viton®	052299	
2	PVC	EPDM	052208	
		Viton®	052354	
3	PVC	EPDM	052209	
		Viton®	052355	
4	PVC	EPDM	052217	75 psi
		Viton®	052356	
6	PVC	EPDM	052218	
		Viton®	052357	

Size (inches):

- ☐ 1/2
- ☐ 3/4
- ☐ 1
- ☐ 1-1/2
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 6

Diaphragm:

- ☐ EPDM
- ☐ Teflon® (PTFE)

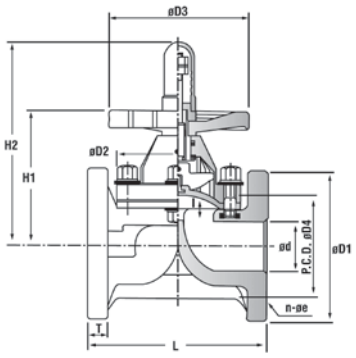
IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DV SERIES DIAPHRAGM VALVES

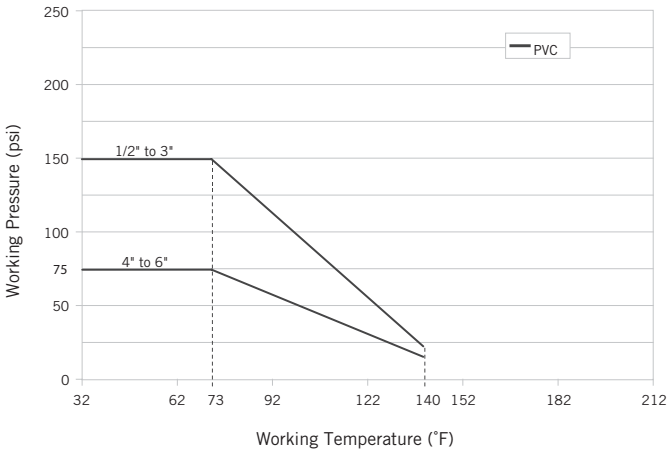
Dimensions and Weights



Dimension (inches)

Size	D1	D2	D3	D4	d	H1	H2	L	I	n-fe	T	W (lbs)
1/2	3.50	2.13 x 2.76	3.74	2.36	0.51	3.35	4.96	4.25	0.39	4-0.63	0.51	1.79
3/4	3.86	2.48 x 3.07	3.74	2.76	0.71	3.70	5.39	5.91	0.47	4-0.63	0.59	2.20
1	4.25	2.48 x 3.46	4.33	3.11	0.98	3.86	5.67	5.91	0.59	4-0.63	0.52	3.67
1-1/2	5.00	4.92	5.91	3.86	1.61	5.12	8.66	6.93	0.87	4-0.63	0.67	4.91
2	5.98	5.83	5.91	4.76	2.05	5.83	8.86	7.95	1.22	4-0.75	0.67	6.45
3	7.52	7.99	8.27	5.98	3.07	9.84	13.50	10.39	1.89	4-0.75	0.79	15.43
4	9.02	10.04	9.84	7.52	3.94	10.83	15.08	12.95	2.36	8-0.75	0.87	24.25
6	10.98	15.16	16.14	9.49	5.83	13.15	18.74	18.90	2.76	8-0.87	0.94	65.04

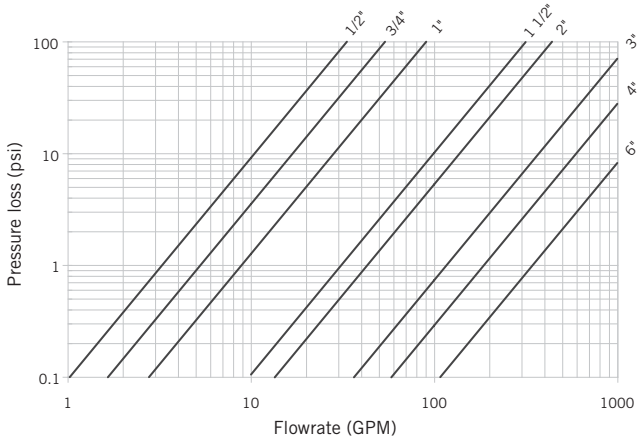
Pressure – Temperature Ratings



Flow Coefficients

Size	C_V
1/2	3.27
3/4	5.29
1	8.87
1-1/2	31.1
2	43.2
3	117
4	187
6	345

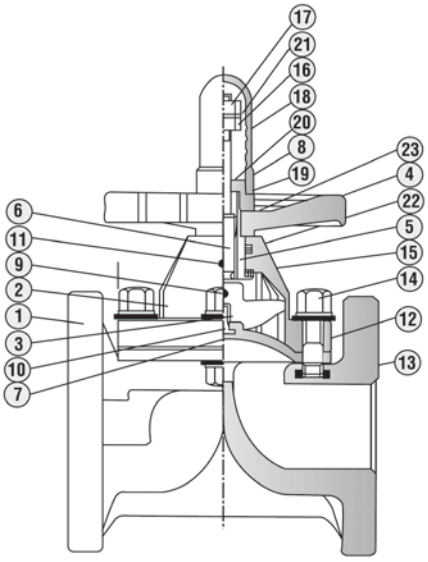
Pressure Loss Chart



CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DV SERIES DIAPHRAGM VALVES

Components



#	Component	Material	Qty
1	body	PVC	1
2	bonnet	PVC	1
3	compressor	FC, SUS	1
4	hand wheel	PP	1
5	sleeve	C3602	1
6	stem	C3602	1
7	diaphragm	EPDM or Teflon®	1
8	cap	PVC	1
9	compressor pin	SUS 304	1
10	inserted metal	C3604, SUS 304	1
11	grease nipple	C3604 (65-150)	1
12	bolt & washer	150	12 ea
13	inserted nut	65-125	8 ea
14	nut & washer	25-50	6 ea
15	thrust bearing	Standard (100-150)	1
16	stopper nut	SUS 304	1
17	set nut	SUS304	1
18	gauge cover	AS	1
19	sheet gasket	EPDM	1
20	sheet ring	SUS 304	1
21	spring washer	SUP	1
22	o-ring	NBR	1
23	name plate	PVC	1

Installation Procedures

1. Remove the protective seals from either end of the valve then carefully place into the system between the two pipe flanges.
2. Join each end of the valve to the pipe flanges. For correct joining procedure, please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".

Travel Stop Adjustment

1. Loosen and remove the gauge cover (part #18 on previous page) from the position indicator assembly.
2. Remove and set aside the sheet gasket (19).
3. Loosen the stopper nut (16), spring washer (21), and set nut (17) from the stem (6).
4. Tighten the handwheel (4) slightly until the diaphragm completely seals.
5. Tighten down the stopper nut until it just touches the cap (8), then tighten the set nut and spring washer accordingly.
6. Fit the sheet gasket over the stem and down onto the cap, then replace the gauge cover and tighten.

Note: It is important not to over-tighten the valve during calibration as it may cause permanent damage to the diaphragm. The valve is completely closed when the handwheel cannot turn any further without using excessive torque.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

DV SERIES DIAPHRAGM VALVES

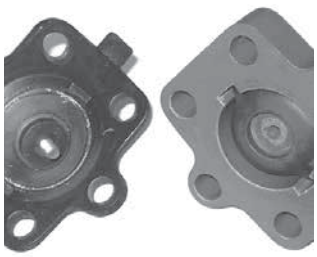
Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. **Be sure to depressurize and drain the isolated branch and valve before continuing**.
2. Loosen end of the valve from the pipe flanges. Please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" for a recommended bolt tightening pattern diagram. Follow the same pattern when disassembling the flanged joints then carefully remove the valve from the line.
3. Ensure that the valve is in the fully open position.
4. Loosen and remove the gauge cover (part #18 on previous page) and the sheet gasket (19) from the position indicator assembly.
5. Loosen and remove the stopper nut (16), spring washer (21), and set nut (17) from the stem (6).
6. Loosen and remove the cap (8) then the handwheel (4).
7. Loosen and remove all bolts (12), nuts (14), and washers, then remove the bonnet – diaphragm assembly from the body (1).
8. To remove the diaphragm (7) from the bonnet (2), grip and gently turn in a counterclockwise direction.
9. To remove the compressor (3) from the bonnet, temporarily replace the handwheel and turn in a clockwise direction. The compressor will start to emerge from the cavity in the bonnet and eventually become loose enough to remove.
10. To remove the sleeve (5), gently push it into the cavity of the bonnet from above.
11. The valve components can now be checked for problems and/or replaced.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities**.

1. Insert the sleeve (5) into the cavity of the bonnet (2) and push firmly into place.
2. Insert the compressor (3) into the bonnet (2) and gently rotate a few turns in a counterclockwise direction until the threads grip and the moldings line up with those on the bonnet.
3. Temporarily place the handwheel (4) on the bonnet assembly and rotate in a counterclockwise direction until the compressor is fully retracted into the cavity in the bonnet.
4. Insert the integral screw on the diaphragm (7) into the compressor and turn in a clockwise direction until tight then **back off two full turns**.
5. Line up the holes on the diaphragm with those on the bonnet then gently push on the center of the diaphragm to ensure that the sleeve is properly fitted in the bonnet cavity. **If the diaphragm is installed too tight, the sleeve will be pulled back into the bonnet cavity making installation of the handwheel impossible**.
6. Place the bonnet – diaphragm assembly on the body (1) then fasten with all bolts (12), nuts (14), and washers. It is recommended to tighten the bolts in a diagonal pattern to ensure even stress distribution and optimal sealing of the diaphragm.
7. Fit the handwheel on the bonnet, fasten in position with the cap (8), and then turn until the diaphragm completely seals.
8. Thread the stopper nut (16) onto the stem (6) then tighten down until it just touches the cap.
9. Place the spring washer (21) and set nut (17) on the stem and tighten down accordingly.
10. Fit the sheet gasket (19) over the stem and down onto the cap, then replace the gauge cover (18) and tighten.



CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system**.

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.
- **Use caution not to over-tighten the valve during cycling as it may cause permanent damage to the diaphragm. The valve is completely closed when the handwheel cannot turn any further without using excessive torque**.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

CM SERIES COMPACT DIAPHRAGM VALVES

IPEX CM Series Compact Diaphragm Valves have an efficient design and are ideal for OEMs. A variety of body and diaphragm materials plus the option of pneumatic actuation combine to make this valve the perfect choice in a wide range of applications. A standard position indicator and integrated mounting bushings complete the long list of features. CM Series Compact Diaphragm Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

ASTM D1784
ASTM D4101-86
ASTM D3222
ASTM D2466
ASTM D2467
ASTM F439

ISO 3609
ISO 10931

VALVE AVAILABILITY

Body Material:	PVC, CPVC, PP, PVDF
Size Range:	1/2", Metric 16mm & 20mm
Pressure:	90 psi
Diaphragm:	EPDM, Viton® (FKM), or PTFE (EPDM backed)
Control Style:	Manual Handwheel or Pneumatically Actuated
End Connections:	True Union (Socket) Socket (Metric) Spigot (Metric)

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

CM SERIES COMPACT DIAPHRAGM VALVES

Sample Specification

1.0 Diaphragm Valves - CM

1.1 Material

- The valve body, including end connectors and unions shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

or The valve body, including end connectors and unions shall be made of Corzan® CPVC compound which shall meet or exceed the requirements of 23447 according to ASTM D1784.

or The valve body, including end connectors and unions shall be made of stabilized PP homopolymer compound, also containing a RAL 7032 pigment, which shall meet or exceed the requirements of Type I Polypropylene according to ASTM D4101-86.

or The valve body, including end connectors and unions shall be made of virgin, non-regrind PVDF compound which shall meet or exceed the requirements of Table 1 according to ASTM D3222.

- These compounds shall comply with standards that are equivalent to NSF Standard 61 for potable water.
- The valve bonnet assembly shall be made of reinforced polyamide (nylon).

1.2 Diaphragm

- The diaphragm shall be made of EPDM which shall comply with standards that are equivalent to NSF Standard 61 for potable water.

or The diaphragm shall be made of Viton® (FKM) which shall comply with standards that are equivalent to NSF Standard 61 for potable water.

or The diaphragm shall be made of PTFE (backed with EPDM) which shall comply with standards that are equivalent to NSF Standard 61 for potable water.

1.3 All other wetted and non-wetted parts of the valves shall comply with standards that are equivalent to NSF Standard 61 for potable water.

2.0 Connections

2.1 Socket style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

or The IPS socket CPVC end connectors shall conform to the dimensional standard ASTM F439.

or The Metric socket PP end connectors shall conform to the dimensional standard ISO 3609.

or The Metric socket PVDF end connectors shall conform to the dimensional standard ISO 10931.

2.2 Spigot style

- The Metric spigot PP end connectors shall conform to the dimensional standard ISO 3609.

or The Metric spigot PVDF end connectors shall conform to the dimensional standard ISO 10931.

3.0 Design Features

- All valves shall be weir-style for throttling applications.
- All bodies to be used with EPDM or Viton® diaphragms shall feature raised molded sealing rings (concentric).
- All bodies to be used with PTFE diaphragms shall be machined flat.
- All PTFE diaphragms shall feature a raised molded ring to combine sealing performance and longer life.
- All through bolts shall be made of 304 stainless steel.
- Bolts will thread directly into integrally molded brass inserts in the bonnet.
- All manual valves shall have a rising position indicator.
- Bodies of all sizes and materials shall have mounting brass inserts.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

3.1 Actuators

- All actuators shall be made of reinforced polyamide (nylon).
- All actuators shall feature a smooth top (no nut holes) for cleanliness.
- The edge of the actuator membrane shall be inside of the actuator protective housing.
- All springs shall be cut from spring grade steel for maximum memory life and epoxy coated for maximum chemical resistance.
- The following accessories shall be available for all actuators: position indicator, stroke limiter, stroke limiter with position indicator, limit switch, limit switch box, 3-15 psi positioner, 4-20 mA positioner, solenoid pilot valve.

3.2 Pressure Rating

- All valves shall be rated at 90 psi at 73°F.

3.3 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.4 Colour Coding

- All PVC valves shall be colour-coded dark gray.

or All CPVC valves shall be colour-coded light gray.

or All PP valves shall be colour-coded beige gray.

or All PVDF valves shall not be colour-coded and be white in appearance.

4.0 All valves shall be Xirtec® PVC, Xirtec® CPVC, PP or PVDF by IPEX or approved equal.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

CM SERIES COMPACT DIAPHRAGM VALVES

Valve Selection

Valve Size (inches)	Body Material	Diaphragm Material	IPEX Part Number Manual True Union	IPEX Part Number Pneumatic True Union	Pressure Rating @ 73°F
1/2	PVC	EPDM	054127	054151	90 psi
		Viton®	054129	054152	
		PTFE	054131	054153	
	CPVC	EPDM	054128	054154	
		Viton®	054130	054155	
		PTFE	054132	054156	

Valve Size (mm)	Body Material	Diaphragm Material	IPEX Part Number Manual Socket	IPEX Part Number Pneumatic Socket	Pressure Rating @ 73°F
16	PP	EPDM	054133	054157	90 psi
		Viton®	054136	054160	
		PTFE	054139	054163	
	PVDF	EPDM	054142	054166	
		Viton®	054145	054169	
		PTFE	054148	054172	

Valve Size (mm)	Body Material	Diaphragm Material	IPEX Part Number Manual Spigot	IPEX Part Number Pneumatic Spigot	Pressure Rating @ 73°F
20	PP	EPDM	054134	054158	90 psi
		Viton®	054137	054161	
		PTFE	054140	054164	
	PVDF	EPDM	054143	054167	
		Viton®	054146	054170	
		PTFE	054149	054173	

Valve Size (mm)	Body Material	Diaphragm Material	IPEX Part Number Manual True Union	IPEX Part Number Pneumatic True Union	Pressure Rating @ 73°F
20	PP	EPDM	054135	054159	90 psi
		Viton®	054138	054162	
		PTFE	054141	054165	
	PVDF	EPDM	054144	054168	
		Viton®	054147	054171	
		PTFE	054150	054174	

Body Material:

☐ PVC ☐ PP
☐ CPVC ☐ PVDF

Size:

☐ 1/2" ☐ 20mm
☐ 16mm

Diaphragm:

☐ EPDM
☐ Viton® (FKM)
☐ PTFE

Control Style:

☐ Manual Handwheel
☐ Pneumatic (Normally Closed)

End Connections:

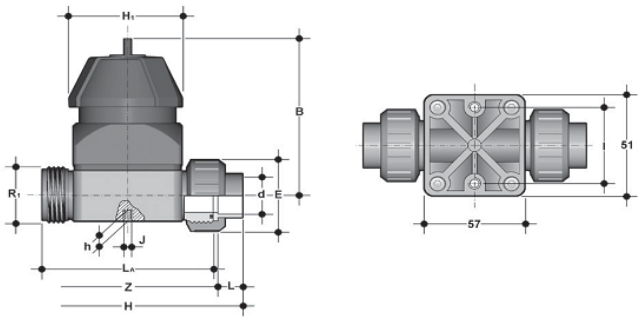
☐ True Union (Socket)
☐ Socket
☐ Spigot

IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Dimensions – Manual Control



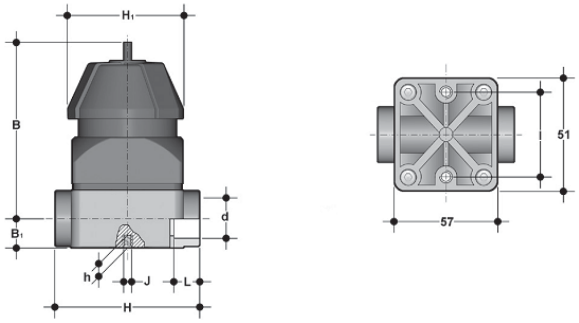
True Union Connections

Dimension (inches)

Size	H	Z	L	LA	R_1	E
1/2"	5.10	3.84	0.63	3.54	1"	1.61
20mm	5.10	3.84	0.63	3.54	1"	1.61

Dimension (inches)

Size	B	H_1	h	J	I
1/2"	3.33	2.32	0.31	M5	1.38
20mm	3.33	2.32	0.31	M5	1.38



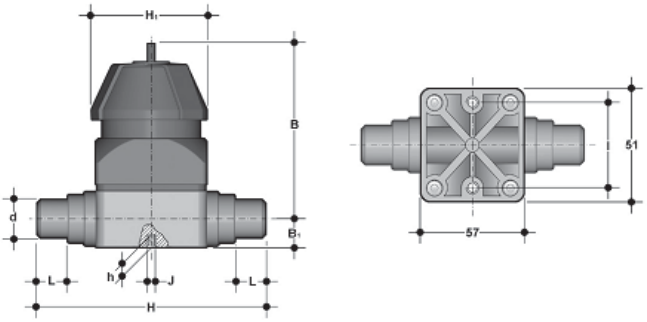
Socket Connections

Dimension (inches)

Size	d	H	L	B_1	B
16mm	0.68	2.95	0.55	0.59	3.33

Dimension (inches)

Size	H_1	h	J	I
16mm	2.32	0.31	M5	1.38



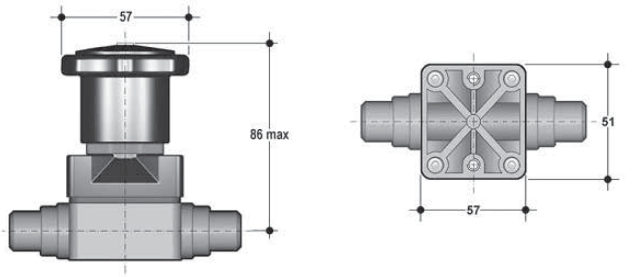
Spigot Connections

Dimension (inches)

Size	d	H	L	B_1	B
20mm	0.84	4.88	0.67	0.59	3.33

Dimension (inches)

Size	H_1	h	J	I
20mm	2.32	0.31	M5	1.38



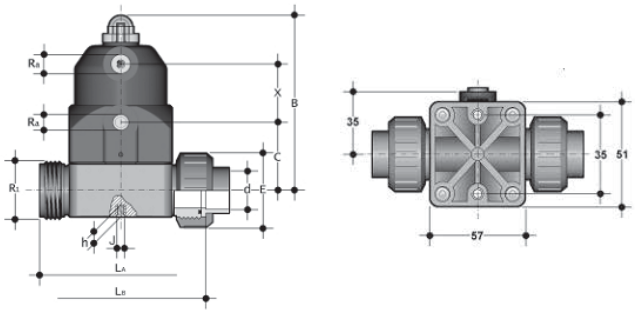
New Manual Bonnet

Note: As of July 2005, all new CM Manual valves are assembled with the bonnet shown on the side. The dimensions of the valve body and connections remain the same.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Dimensions – Pneumatic Control

True Union Connections



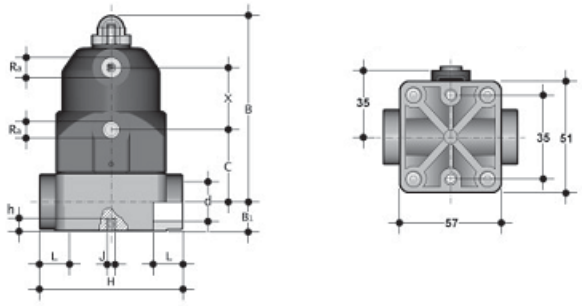
Dimension (inches)

Size	d	L_A	L_B	R_1	E	B
1/2"	0.84	3.54	3.78	1	1.61	3.86
20mm	0.84	3.54	3.78	1	1.61	3.86

Dimension (inches)

Size	C	X	R_a	h	J
1/2"	1.50	1.34	1/8	0.31	M5
20mm	1.50	1.34	1/8	0.31	M5

Socket Connections



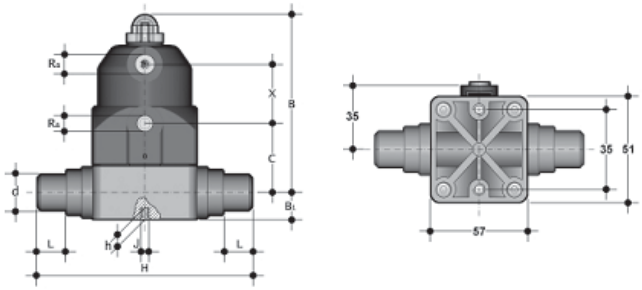
Dimension (inches)

Size	d	H	L	B_1	B
16mm	0.68	2.95	0.55	0.59	3.86

Dimension (inches)

Size	C	X	R_a	h	J
16mm	1.50	1.34	1/8	0.31	M5

Spigot Connections



Dimension (inches)

Size	d	H	L	B_1	B
20mm	0.84	4.88	0.63	0.49	3.86

Dimension (inches)

Size	C	X	R_a	h	J
16mm	1.50	1.34	1/8	0.31	M5

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

CM SERIES COMPACT DIAPHRAGM VALVES

Weights

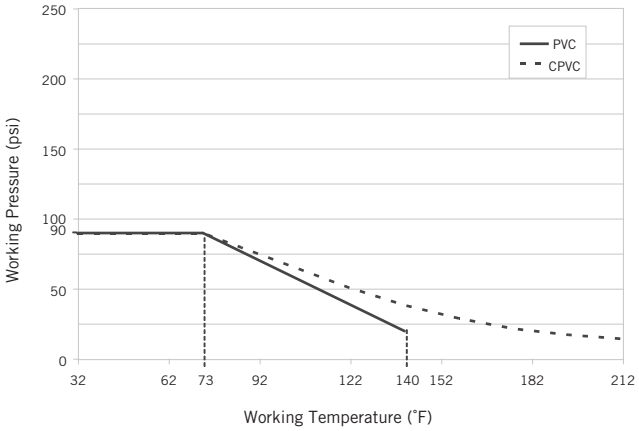
Approximate Weight (lbs) – Manual Control

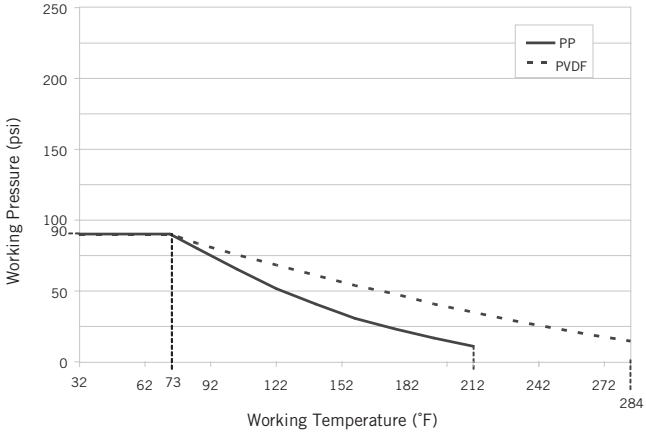
Style	Size	PVC	CPVC	PP	PVDF
True Union	1/2"	0.63	0.64	-	-
	20mm	-	-	0.54	0.69
Socket	16mm	-	-	0.52	0.64
Spigot	20mm	-	-	0.58	0.75

Approximate Weight (lbs) – Pneumatic Control

Style	Size	PVC	CPVC	PP	PVDF
True Union	1/2"	0.69	0.71	-	-
	20mm	-	-	0.61	0.75
Socket	16mm	-	-	0.59	0.71
Spigot	20mm	-	-	0.65	0.82

Pressure – Temperature Ratings

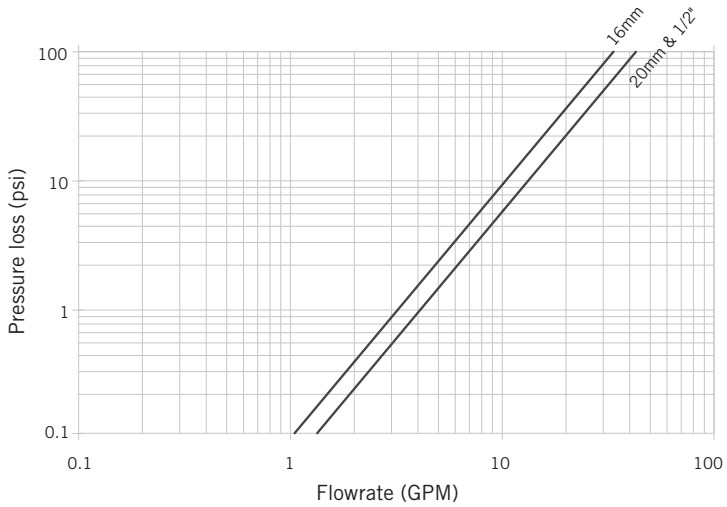




Flow Coefficients

Size	C_V
16mm	3.29
20mm	4.20
1/2"	4.20

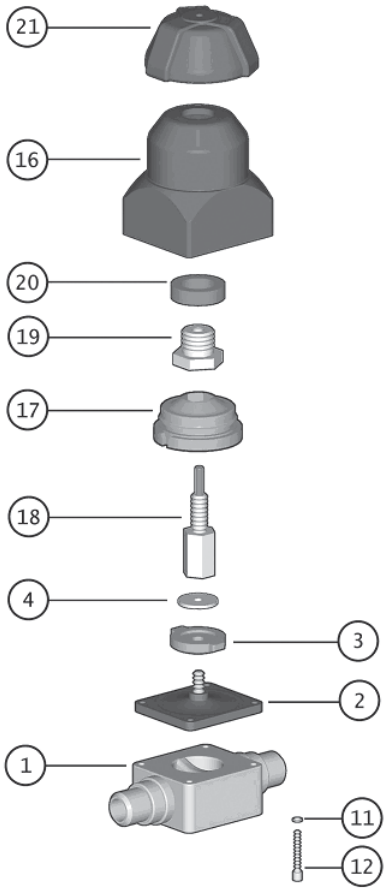
Pressure Loss Chart



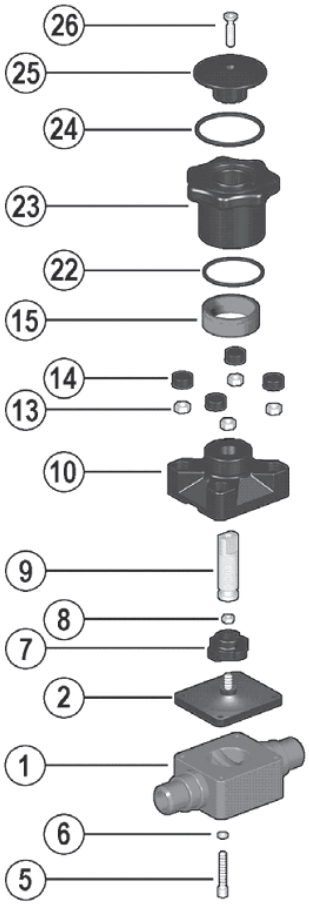
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Components

Manual Control



New Bonnet



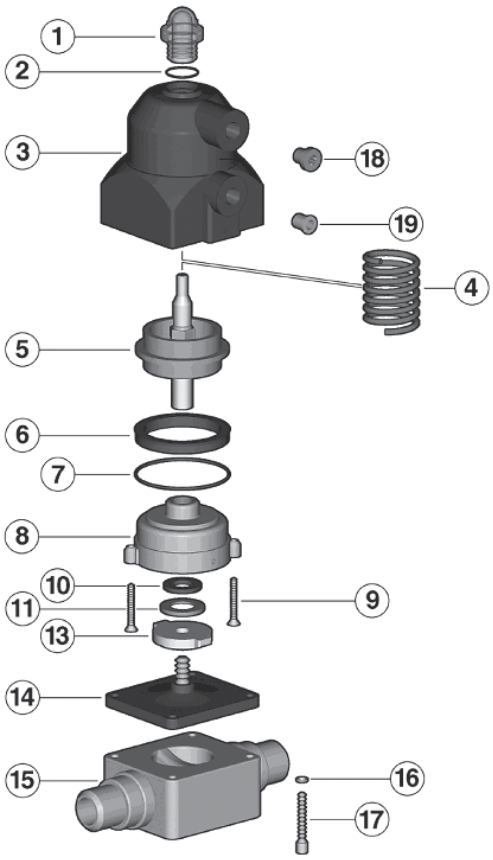
#	Component	Material	Qty
* 1	valve body	PVC / CPVC / PP / PVDF	1
2	diaphragm	EPDM / Viton® / PTFE	1
3	compressor	polyamide	1
4	washer	zinc plated steel	1
11	washer	SS	4
12	bolt	zinc plated steel	4
16	cover	polyamide	1
17	guide	polyamide	1
18	indicator – stem	brass	1
19	bushing	zinc plated steel	1
20	bonnet	brass	1
21	handwheel	GRPP	1

#	Component	Material	Qty
* 1	valve body	PVC / CPVC / PP / PVDF	1
2	diaphragm	EPDM / Viton® / PTFE	1
5	bolt	SS	4
6	washer	SS	4
7	compressor	GRPP	1
8	nut	SS	1
9	stem	SS	1
10	bonnet	GRPP	1
13	nut	SS	4
14	protective cap	POM	4
15	position indicator	PVDF	1
22	o-ring	NBR	1
23	handwheel	GRPP	1
24	o-ring	NBR	1
25	handwheel plate	GRPP	1
26	bolt	SS	1

* Spare parts available. Contact IPEX for availability of spare components for True Union style valves.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Pneumatic Control



#	Component	Material	Qty
1	protective cap	PVC	1
2	o-ring	NBR	1
3	cover	polyamide	1
4	spring1	steel	1
5	stem – piston	SS - polyamide	1
6	gasket2	NBR	1
7	o-ring	NBR	1
8	guide	polyamide	1
9	bolt	zinc plated steel	2
10	gasket	NBR	1
11	washer	zinc plated steel	1
12	washer	zinc plated steel	1
13	compressor	polyamide	1
14	diaphragm	EPDM / Viton® / PTFE	1
* 15	valve body	PVC / CPVC / PP / PVDF	1
16	washer	zinc plate steel	4
17	bolt	SS	4

* Spare parts available.
Contact IPEX for availability of spare components for True Union style valves.
[1] for NC and NO versions only.
[2] o-ring for DA version.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Installation Procedures

1. The valve may be installed in any position or direction.
2. Please refer to the appropriate connection style sub-section:
   a. For true union style, remove the union nuts and slide them onto the pipe.
      i. For socket style, solvent cement the end connectors onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". **Ensure that excess solvent does not run into the body of the valve. Be sure to allow sufficient cure time before continuing with the valve installation.**
      ii. For threaded style, thread the end connectors onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
      iii. Ensure that the socket o-rings are properly fitted in their grooves then carefully place the valve in the system between the two end connections.
      iv. Tighten both union nuts. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack.
   b. For socket style, solvent cement the pipe into the end connections of the valve. For correct joining procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". **Ensure that excess solvent does not run into the body of the valve. Be sure to allow sufficient cure time before continuing with the valve installation.**
   c. **For spigot style, solvent cement each pipe onto the ends of the valve body. Ensure that excess solvent does not run into the body of the valve.**
3. If anchoring is required, fix the valve to the supporting structure using the mounting holes on the bottom of the valve body.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the line. **Be sure to depressurize and drain the valve and isolated branch**.
2. If necessary, detach the valve from the support structure by disassembling the threaded connections on the bottom of the valve body.
3. Please refer to the appropriate connection style sub-section:
    a. For true union connections, loosen both union nuts and drop the valve out of the line. If retaining the socket o-rings, take care that they are not lost when removing the valve from the line.
    b. For socket style, cut the pipe on either side of the valve and remove from the line.
    c. For spigot style, cut the pipe on either side of the valve and remove from the line.
4. Loosen and remove the bolts and washers from the bottom of the valve body. Removal of protective caps is necessary to access the nuts on the manual version.
5. Loosen and remove the diaphragm from the compressor assembly
6. Rotate the handwheel clockwise until the stem-compressor assembly is released.
7. The valve components can now be checked for problems and/or replaced.

Note: It is not recommended to attempt to further disassemble the handwheel/bonnet assembly as it may cause irreversible damage to the components.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.**

1. Insert the stem-compressor assembly into the bonnet and tighten by threading in a counterclockwise (left-hand thread) direction. Ensure that the guide tabs on the bonnet line up with the compressor grooves before cycling the handwheel to further retract the compressor.
2. Insert the diaphragm into the compressor and turn in a clockwise direction until sufficiently tight. Ensure that the tab lines up with the notched side of the bonnet then cycle the handwheel counterclockwise until the diaphragm is fully retracted.
3. Place the bonnet and diaphragm onto the valve body taking care to properly line up the sealing surfaces.
4. Insert the bolts and washers and tighten in an even (cross-like) pattern.
5. For the manual version, replace the protective caps on the nuts.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system**.

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

NOTES

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SXE SERIES CHECK VALVES

The IPEX EasyFit SXE Series Ball Check Valves represent the latest innovation in thermoplastic valve manufacturing technology. The SXE introduces an advanced method of installation, providing trouble free service for industrial, OEM and water service applications. This popular style of check valve features a true union design allowing for easy removal and maintenance of the valve without disturbing the rest of the pipe assembly. Positive shutoff of the valve in both vertical and horizontal installations is achieved with just 3 psi of back pressure. The innovative SXE EasyFit design features a custom labelling system, and the optional EasyFit multifunctional handle allows for union nut rotational control and safe blocked carrier tightening.

SXE Ball Check Valves are part of our complete system of IPEX pipe, valves and fittings, engineered and manufactured to our strict quality, performance and dimensional standards.

VALVE AVAILABILITY

Body Material	PVC, CPVC
Size Range	1/2" through 4"
Pressure	232 psi
Seals	EPDM or Fluoropolymer (FKM)
End Connections	Socket (IPS),Threaded (FNPT)

ASTM D1784
ASTM F441
ASTM D2464
ASTM D2466
ASTM D2467
ASTM F439
ASTM F437
ASTM F1498

ANSI B1.20.1
ANSI B16.5

Certified to NSF/ANSI 61 & 372

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SXE SERIES CHECK VALVES

Sample Specification

1.0 Check Valves – SXE

1.1 Material

- The valve body, ball, end connectors, and unions shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

or The valve body, ball, end connectors, and unions shall be made of Corzan CPVC compound which shall meet or exceed the requirements of 23447 according to ASTM D1784.

1.2 Seals

- The o-ring seals shall be made of EPDM.

or The o-ring seals shall be made of FKM.

2.0 Connections

2.1 Socket style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

or The IPS socket CPVC end connectors shall conform to the dimensional standard ASTM F439.

2.2 Threaded style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1.

or The female NPT threaded CPVC end connectors shall conform to the dimensional standards ASTM F437, ASTM F1498, and ANSI B1.20.1.

3.0 Design Features

- The valve shall have true union ends.
- The valve cavity shall feature an optimized profile design to reduce ressure drop and improve the Cv value
- The valve cavity shall feature full body guide ribs to reduce chatter and improve seal quality.
- The ball shall be fully machined to achieve high surface finish and accurate dimensional tolerance.
- The valve body and union nuts shall have deep square style threads for increased strength.
- The Main-seal carrier shall be a safe blocked design and allow for safe disconnection of the union nuts for maintenance. The main-seal carrier shall be compatible with the EasyFit multifunctional handle and EasyFit Torque Wrench (1/2" – 2" valves) for precise component tightening.
- The union nuts shall be compatible with the EasyFit multifunctional handle and EasyFit Torque Wrench (1/2" – 2" valves) for precise tightening.
- The valve shall have a transparent plug housing for use with EasyFit Labelling System for valve identification.

3.1 Pressure Rating

- All valves shall be rated at 232 psi at 73°F.
- All valves shall be suitable for use with liquids having a specific gravity less than 0.05 lb/in3.

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Colour Coding

- All PVC valves shall be colour-coded dark gray.

or All CPVC valves shall be colour-coded light gray.

4.0 NSF Listings

- 1/2" to 2" valves shall be listed with NSF to Standard 61 for potable water.
- 1/2" to 2" valves shall be listed with NSF to Standard 372 for lead content requirements.

5.0 All valves shall be Xirtec® PVC or Xirtec® CPVC by IPEX or approved equal.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SXE SERIES CHECK VALVES

Valve Selection

Size (inches)	Body Material	O-ring Material	IPEX Part Number IPS Socket	IPEX Part Number FNPT Threaded	Pressur Rating
1/2	PVC	EPDM	052013		
		FKM	052022		
	CPVC	EPDM	052121		
		FKM	052127		
3/4	PVC	EPDM	052014		
		FKM	052023		
	CPVC	EPDM	052122		
		FKM	052128		
1	PVC	EPDM	052015		
		FKM	052027		
	CPVC	EPDM	052123		
		FKM	052133		
1-1/4	PVC	EPDM	052016		
		FKM	052028		
	CPVC	EPDM	052124		
		FKM	052134		
1-1/2	PVC	EPDM	052017		
		FKM	052030		
	CPVC	EPDM	052125		232 psi
		FKM	052135		
2	PVC	EPDM	052018		
		FKM	052120		
	CPVC	EPDM	052126		
		FKM	052136		
2-1/2	PVC	EPDM	052478	–	
		FKM	052481	–	
	CPVC	EPDM	052484	–	
		FKM	052487	–	
3	PVC	EPDM	052479	–	
		FKM	052482	–	
	CPVC	EPDM	052485	–	
		FKM	052488	–	
4	PVC	EPDM	052480	–	
		FKM	052483	–	
	CPVC	EPDM	052486	–	
		FKM	052489	–	

Body Material:

- ☐ PVC
- ☐ CPVC

Size (inches):

- ☐ 1/2
- ☐ 3/4
- ☐ 1
- ☐ 1-1/4
- ☐ 1-1/2
- ☐ 2
- ☐ 2-1/2
- ☐ 3
- ☐ 4

Seals:

- ☐ EPDM
- ☐ Fluoropolymer® (FKM)

End Connections:

- ☐ Socket (IPS)
- ☐ Threaded (FNPT)

IPEX Part Number:

_____

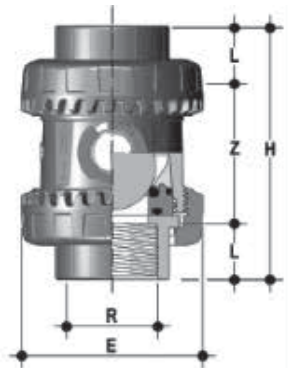
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SXE SERIES CHECK VALVES

Dimensions

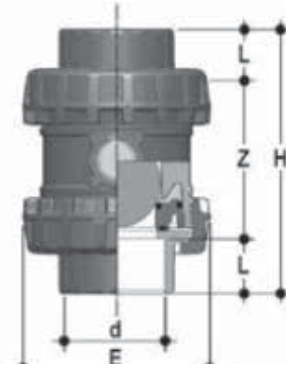
SXE IPS Socket (inches)

Size	d	L	Z	H	E
1/2	0.84	0.89	2.01	3.78	2.13
3/4	1.05	1.00	2.13	4.13	2.48
1	1.315	1.13	2.34	4.61	2.83
1-1/4	1.66	1.26	2.83	5.35	3.35
1-1/2	1.9	1.38	3.03	5.79	3.94
2	2.38	1.50	3.84	6.85	4.65



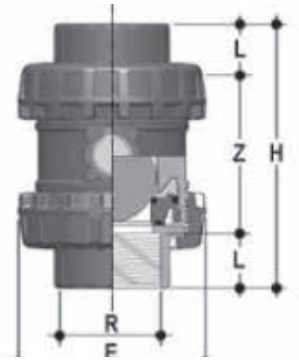
SXE NPT Female (inches)

Size	R	L	Z	H	E
1/2	1/2-NPT	0.70	2.14	3.54	2.13
3/4	3/4-NPT	0.71	2.24	3.66	2.48
1	1-NPT	0.89	2.55	4.33	2.83
1-1/4	1-1/4-NPT	0.99	3.02	5.00	3.35
1-1/2	1-1/2-NPT	0.97	3.21	5.16	3.94
2	2-NPT	1.17	4.01	6.34	4.65



SXE IPS Socket (inches)

Size	d	L	Z	H	E
2-1/2	2.875	1.75	4.80	8.31	6.18
3	3.5	1.89	5.98	9.76	6.85
4	4.5	2.26	6.61	11.14	8.35



SXE NPT Female (inches)

Size	R	L	Z	H	E
2-1/2	2-1/2-NPT	1.31	5.69	8.31	6.18
3	3-NPT	1.40	6.97	9.76	6.85
4	4-NPT	1.48	8.18	11.14	8.35

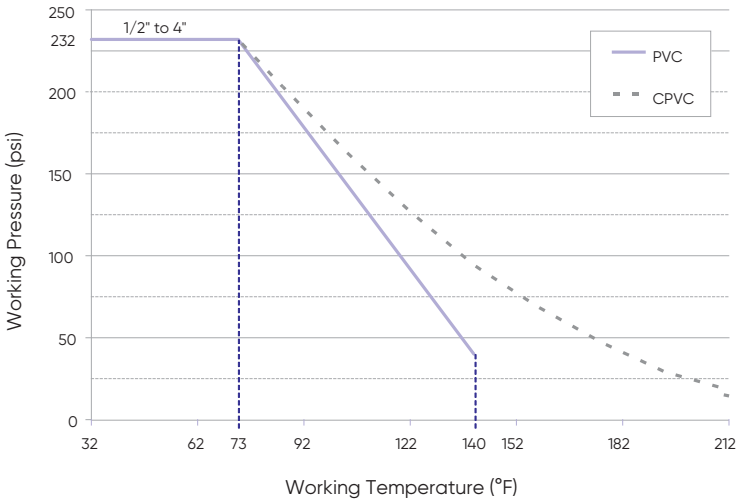
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SXE SERIES CHECK VALVES

Weights

Size	PVC		CPVC	
	IPS Socket	FNPT Threaded	IPS Socket	FNPT Threaded
1/2	0.33	0.33	0.33	0.33
3/4	0.42	0.42	0.42	0.42
1	0.66	0.66	0.66	0.66
1-1/4	1.01	1.01	1.01	1.01
1-1/2	1.49	1.49	1.49	1.49
2	2.38	2.38	2.38	2.38
2-1/2	5.74	–	5.74	–
3	7.28	–	7.28	–
4	12.72	–	12.72	–

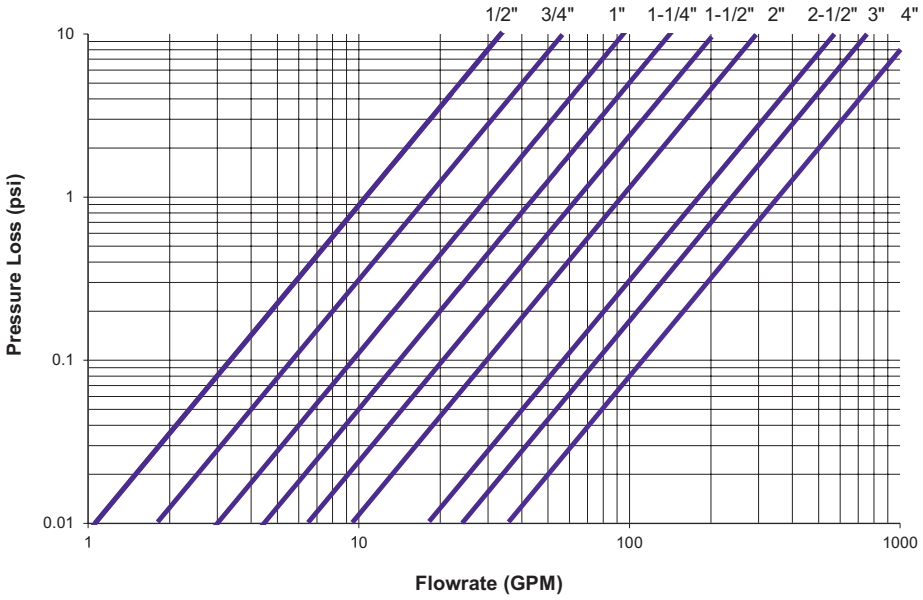
Pressure – Temperature Ratings



Flow Coefficients

Size	C_V
1/2	10.6
3/4	17.9
1	30.0
1-1/4	44.6
1-1/2	64.4
2	93.2
2-1/2	179.4
3	238.9
4	353.3

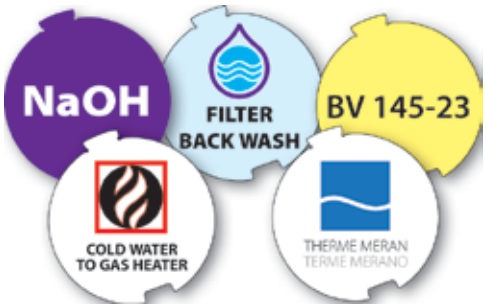
Pressure Loss Chart



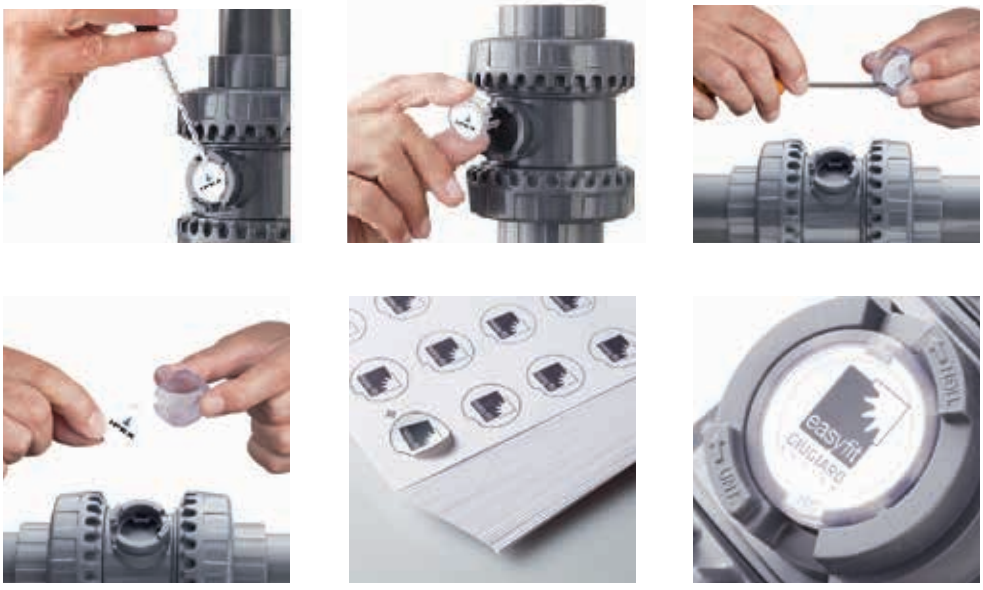
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Customize SXE EasyFit

It is often necessary to customize a valve by labelling or tagging it in order to mark, protect and identify it.



SXE EasyFit valves are therefore equipped with a plastic water-resistant module designed to meet this specific need. The module is composed of a transparent PVC service plug and a white circle tag holder, with IPEX branded on one side. The tag holder is embedded in the plug and can be easily removed to be used for self labelling on its blank side. Self labelling can be done in several ways, but we recommend designing and printing custom labels through the EasyFit Labelling System (LSE).

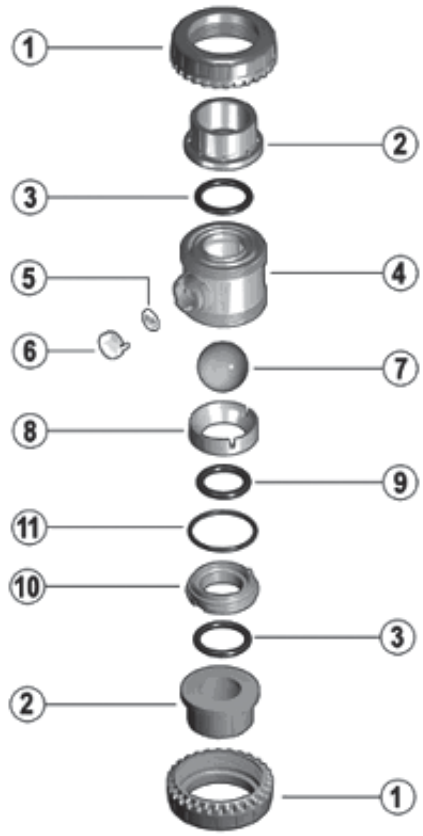


Please contact IPEX customer service for options and pricing on customization of SXE valves with LSE sets.

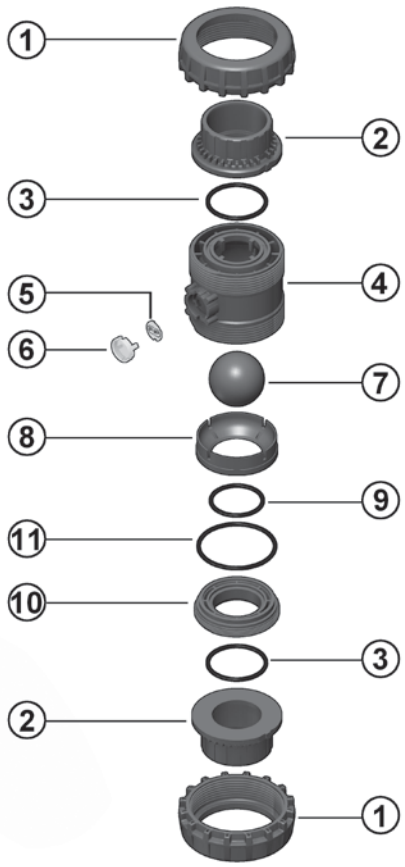
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Components

1/2" to 2"



2-1/2" to 4"



#	Component	Material	Qty
1	Union Nut	PVC	2
2	End Connector	PVC	2
3	Socket Seal (O-ring)	EPDM, FKM	2
4	Body	PVC	1
5	Tag Holder	PVC	1
6	Transparent Service Plug	PVC	1
7	Ball	PVC	1
8	Packing-presser Ring	PVC	1
9	Ball Seal (O-ring)	EPDM, FKM	1
10	Support for Ball Seat	PVC	1
11	Radial Seal (O-ring)	EPDM, FKM	1

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SXE SERIES CHECK VALVES

Installation Procedures

1. For socket and threaded style connections, remove the union nuts (part #1 on previous page) and slide them onto the pipe. **It is important to first check the pipe flow direction and corresponding valve orientation as installing the valve backward will prevent it from functioning as intended.**
2. Please refer to the appropriate connection style sub-section:
   a. For socket style, solvent cement the end connectors (2) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". **Be sure to allow sufficient cure time before continuing with the valve installation.**
   b. For threaded style, thread the end connectors (2) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
3. Ensure that the valve is in the correct orientation, and that the main seal safe blocked carrier and o-rings are properly fitted in the valve. A flow direction indicator is located on the side of the valve body. Carefully place the valve in the system between the two end connections.
4. Tighten both union nuts by hand. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. If additional tightening is required, use the EasyFit multifunctional handle tool to tighten the union nuts an additional 1/4 turn. The Easyfit torque wrench (available as an accessory for 1/2" – 2" valves) may also be used to complete the nut tightening in accordance to the torques indicated on instructions included; following this procedure will ensure the best installation.

Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack. It is recommended to use the EasyFit handle to prevent damage.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SXE SERIES CHECK VALVES

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. Be sure to depressurize and drain the isolated branch and valve before continuing.
2. Loosen both union nuts (1) and drop the valve out of the line. If retaining the socket o-rings (3), take care that they are not lost when removing the valve from the line.
    a. For 1/2" to 2" valves, remove the transparent service plug from the EasyFit multifunctional handle tool. Turn the handle over and seat on the top of the valve, ensuring the integrated gear teeth on the handle mesh with the union nut teeth. Turn clockwise to loosen.
    b. For 2-1/2" to 4" valves, remove the EasyFit multifunctional tool from the bottom of the handle, turn it over and re-install it. Engage the tool with the outer ring profile of the union nut and loosen.

3. To disassemble, locate the main seal carrier adjustment tool on the multifunctional handle. This is found on the bottom of 1/2" to 2" handles and on the top of 2-1/2" to 4" handles.
4. Line up the moldings on the handle with the slots in the main seal carrier. Loosen and remove the main seal carrier (10) by turning it in a counter-clockwise direction.
5. Remove the Radial Seal (11), Ball Seal (9), Packing-presser Ring (8), and the Ball (7).

6. The valve components can now be checked for problems and/or replaced.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.**

1. Insert the Remove the Ball (7), Packing-presser Ring (8), Ball Seal (9), and the Radial Seal (11) in the valve body.
2. Slightly hand tighten the main seal carrier (10) into the valve body. Line up the moldings on the handle with the slots in the main seal carrier then tighten by turning in a clockwise direction. The Easyfit torque wrench key can also be used to tighten the main seal carrier in accordance with the tightening torque values indicated on the included instructions.
3. Properly fit the socket o-rings (3) in their respective grooves.
4. Place the end connectors (2) into the union nuts (1), then thread onto the valve body taking care that the socket o-rings remain properly fitted in their grooves.
    a. For 1/2" to 2" valves, remove the transparent service plug from the EasyFit multifunctional handle tool. Turn the handle over and seat on the top of the valve, ensuring the integrated gear teeth on the handle mesh with the union nut teeth. Turn counter-clockwise to tighten. The Easyfit torque wrench can also be used to tighten the union nuts in accordance with the tightening torque values indicated on the included instructions.

    b. For 2-1/2" to 4" valves, remove the EasyFit multifunctional tool from the bottom of the handle, turn it over and re-install it. Engage the tool with the outer ring profile of the union nut and tighten.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system**.

Important Points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SSE SERIES SPRING ASSISTED CHECK VALVES

The IPEX EasyFit SSE Series Spring Assisted Check Valves represent the latest innovation in thermoplastic valve manufacturing technology. The all new SSE complements our SXE ball check valves, which introduce an advanced method of installation, providing trouble free service for industrial, OEM and water service applications. The internal profile of the SSE, combined with the spring assisted contoured ball, gives the advantage of trouble-free vertical and horizontal installations, even if only very low backpressure is available. The innovative SSE EasyFit design features a custom labelling system, and the EasyFit multifunctional handle allows for union nut rotational control and safe blocked carrier tightening. SSE Spring Assisted Check Valves are part of our complete system of IPEX pipe, valves and fittings, engineered and manufactured to our strict quality, performance and dimensional standards.

ASTM D1784
ASTM D2464
ASTM D2466
ASTM D2467
ASTM F1498

ANSI B1.20.1
ANSI B16.5

VALVE AVAILABILITY

Body Material	PVC
Size Range	1/2" through 4"
Pressure	232 psi
Seals	EPDM or Fluoropolymer (FKM)
Spring Material	1/2" through 4" 316 Stainless Steel (SS), 1-1/4" through 4" PTFE Encapsulated 316SS 1/2" through 1" Hastelloy®
End Connections	Socket (IPS), Threaded (FNPT)

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SSE SERIES SPRING ASSISTED CHECK VALVES

Sample Specification

1.0 Check Valves – SSE

1.1 Material

- The valve body, ball, end connectors, and unions shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

1.2 Seals

- The o-ring seals shall be made of EPDM.

or The o-ring seals shall be made of FKM.

1.3 Spring Material

- The spring material shall be made of 316SS.

or The spring material shall be made of PTFE encapsulated 316SS.

or The spring material shall be made of Hastelloy®.

2.0 Connections

2.1 Socket style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

2.2 Threaded style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1.

3.0 Design Features

- The valve shall have true union ends.
- The valve cavity shall feature an optimized profile design to reduce pressure drop and improve the Cv value
- The valve body and union nuts shall have deep square style threads for increased strength.
- The Main-seal carrier shall be a safe blocked design and allow for safe disconnection of the union nuts for maintenance. The main-seal carrier shall be compatible with the EasyFit multifunctional handle for precise component tightening. (2-1/2" – 4" valves)
    - The union nuts shall be compatible with the EasyFit multifunctional handle and EasyFit Torque Wrench (1/2" – 2" valves) for precise tightening.
    - The valve shall have a transparent plug housing for use with EasyFit Labelling System for valve identification.

3.1 Pressure Rating

- All valves shall be rated at 232 psi at 73°F.
- All valves shall be suitable for use with liquids having a specific gravity less than 0.05 lb/in^3.

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Colour Coding

- All PVC valves shall be colour-coded dark gray.

4.0 All valves shall be Xirtec® PVC by IPEX or approved equal.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SSE SERIES SPRING ASSISTED CHECK VALVES

Valve Selection

Size (inches)	Body Material	Seal Material	Spring Material	Socket/Threaded Product Code	Socket/Threaded Universal Number	Socket Product Code	Socket Universal Number
1/2	PVC	EPDM	316SS	052490	SSEBV103S	–	–
			Hastelloy	052152	SSEBV103H	–	–
			PTFE/316SS	–	–	–	–
		FKM	316SS	052499	SSEBV203S	–	–
			Hastelloy	052163	SSEBV203H	–	–
			PTFE/316SS	–	–	–	–
3/4	PVC	EPDM	316SS	052491	SSEBV104S	–	–
			Hastelloy	052153	SSEBV104H	–	–
			PTFE/316SS	–	–	–	–
		FKM	316SS	052500	SSEBV204S	–	–
			Hastelloy	052177	SSEBV204H	–	–
			PTFE/316SS	–	–	–	–
1	PVC	EPDM	316SS	052492	SSEBV105S	–	–
			Hastelloy	052154	SSEBV105H	–	–
			PTFE/316SS	–	–	–	–
		FKM	316SS	052501	SSEBV205S	–	–
			Hastelloy	052178	SSEBV205H	–	–
			PTFE/316SS	–	–	–	–
1–1/4	PVC	EPDM	316SS	052493	SSEBV106S	–	–
			Hastelloy	–	–	–	–
			PTFE/316SS	052347	SSEBV106P	–	–
		FKM	316SS	052502	SSEBV206S	–	–
			Hastelloy	–	–	–	–
			PTFE/316SS	052362	SSEBV206P	–	–
1–1/2	PVC	EPDM	316SS	052494	SSEBV107S	–	–
			Hastelloy	–	–	–	–
			PTFE/316SS	052348	SSEBV107P	–	–
		FKM	316SS	052503	SSEBV207S	–	–
			Hastelloy	–	–	–	–
			PTFE/316SS	052396	SSEBV207P	–	–
2	PVC	EPDM	316SS	052495	SSEBV108S	–	–
			Hastelloy	–	–	–	–
			PTFE/316SS	052358	SSEBV108P	–	–
		FKM	316SS	052504	SSEBV208S	–	–
			Hastelloy	–	–	–	–
			PTFE/316SS	052397	SSEBV208P	–	–
2–1/2	PVC	EPDM	316SS	–	–	052496	SSEAV109S
			Hastelloy	–	–	–	–
			PTFE/316SS	–	–	052359	SSEAV109P
		FKM	316SS	–	–	052505	SSEAV209S
			Hastelloy	–	–	–	–
			PTFE/316SS	–	–	052398	SSEAV209P
3	PVC	EPDM	316SS	–	–	052497	SSEAV110S
			Hastelloy	–	–	–	–
			PTFE/316SS	–	–	052360	SSEAV110P
		FKM	316SS	–	–	052506	SSEAV210S
			Hastelloy	–	–	–	–
			PTFE/316SS	–	–	052399	SSEAV210P
4	PVC	EPDM	316SS	–	–	052498	SSEAV111S
			Hastelloy	–	–	–	–
			PTFE/316SS	–	–	052361	SSEAV111P
		FKM	316SS	–	–	052507	SSEAV211S
			Hastelloy	–	–	–	–
			PTFE/316SS	–	–	052414	SSEAV211P

Body Material:

☐ PVC

Size (inches):

☐ 1/2
☐ 3/4
☐ 1
☐ 1-1/4
☐ 1-1/2
☐ 2
☐ 2-1/2
☐ 3
☐ 4

Seals:

☐ EPDM
☐ Fluoropolymer® (FKM)

Spring Material:

☐ 316SS
☐ PTFE/316SS
☐ Hastelloy®

End Connections:

☐ Socket (IPS)
☐ Threaded (FNPT)

IPEX Part Number:

_____

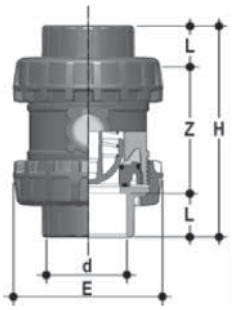
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SSE SERIES SPRING ASSISTED CHECK VALVES

Valve Selection

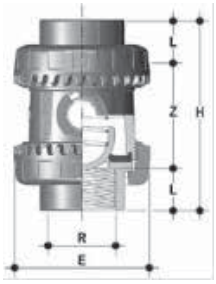
SSE IPS Socket (inches)

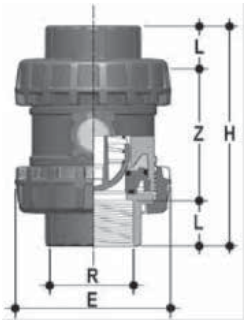
Size	d	L	Z	H	E
1/2	0.84	0.89	2.01	3.78	2.13
3/4	1.05	1.00	2.13	4.13	2.48
1	1.315	1.13	2.34	4.61	2.83
1-1/4	1.66	1.26	2.83	5.35	3.35
1-1/2	1.9	1.38	3.03	5.79	3.94
2	2.375	1.50	3.84	6.85	4.65
2-1/2	2.875	1.75	4.8	8.31	6.18
3	3.5	1.89	5.98	9.76	6.85
4	4.5	2.26	6.61	11.14	8.35



SSE NPT Female (inches)

Size	d	L	Z	H	E
1/2	1/2-NPT	0.70	2.14	3.54	2.13
3/4	3/4-NPT	0.71	2.24	3.66	2.48
1	1-NPT	0.89	2.55	4.33	2.83
1-1/4	1-1/4-NPT	0.99	3.02	5.00	3.35
1-1/2	1-1/2-NPT	0.97	3.21	5.16	3.94
2	2-NPT	1.17	4.01	6.34	4.65
2-1/2	2-1/2-NPT	1.31	5.69	8.31	6.18
3	3-NPT	1.4	6.97	9.76	6.85
4	4-NPT	1.48	8.18	11.14	8.35





Weights

Approximate Weight (lbs)

Size	PVC	
	IPS Socket	FNPT Threaded
1/2	0.33	0.33
3/4	0.41	0.41
1	0.64	0.64
1-1/4	0.98	0.98
1-1/2	1.41	1.41
2	2.23	2.23
2-1/2	5.47	5.47
3	6.81	6.81
4	11.84	11.84

Minimum Back Pressure to Seal

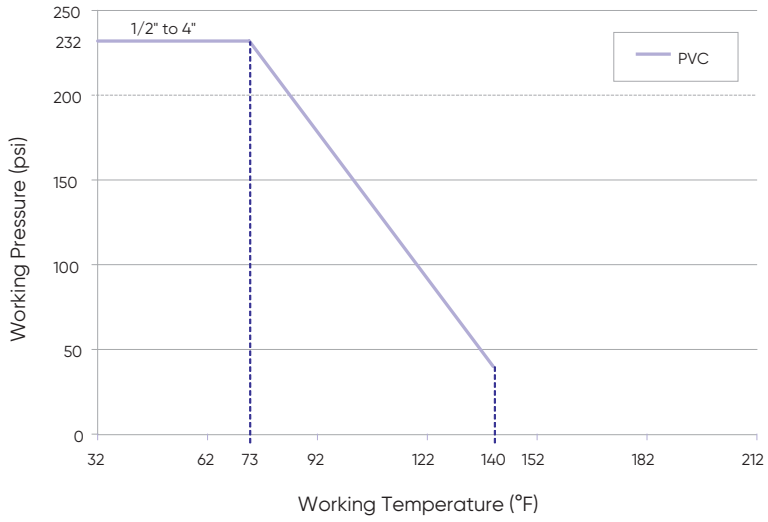
Size	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4
psi	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16

Minimum Pressure to Open Spring

Size	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4
psi	1.99	1.00	0.71	0.71	0.71	0.43	0.21	0.21	0.21

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Pressure



Flow Coefficients

The flow coefficient (C_v) represents the flow rate in gallons per minute (GPM) at 68°F for which there is a 1 psi pressure drop across the valve in the fully open position. These values are determined from an industry standard testing procedure which uses water as the flowing media (specific gravity of 1.0). To determine specific flow rate and pressure loss scenarios, one can use the following formula:

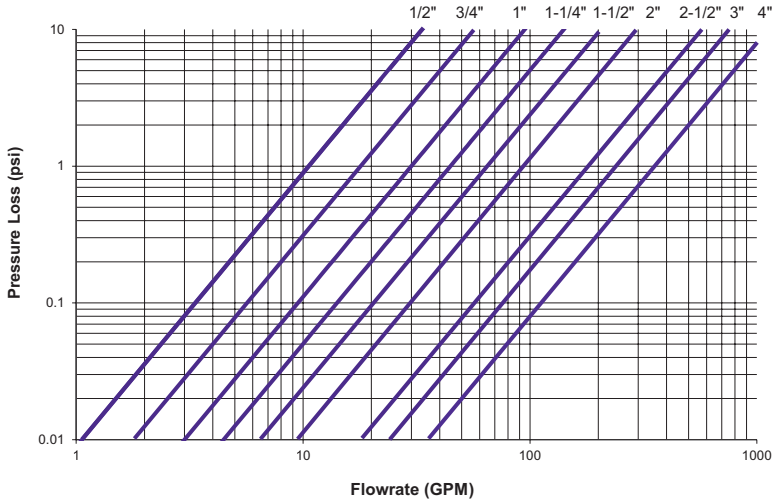
$$f = sg \times \left(\frac{Q}{C_V}\right)^2$$

Where,

- f is the pressure drop (friction loss) in psi,
- sg is the specific gravity of the fluid,
- Q is the flow rate in GPM,
- C_V is the flow coefficient.

Size	C_v
1/2	10.6
3/4	17.9
1	30.0
1-1/4	44.6
1-1/2	64.4
2	93.22
2-1/2	179.4
3	238.9
4	353.3

Pressure Loss Chart



CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Customize SSE EasyFit

It is often necessary to customize a valve by labelling or tagging it in order to mark, protect and identify it.

SSE EasyFit valves are therefore equipped with a plastic water-resistant module designed to meet this specific need. The module is composed of a transparent PVC service plug and a white circle tag holder, with IPEX branded on one side. The tag holder is embedded in the plug and can be easily removed to be used for self labelling on its blank side. Self labelling can be done in several ways, but we recommend designing and printing custom labels through the EasyFit Labelling System (LSE).

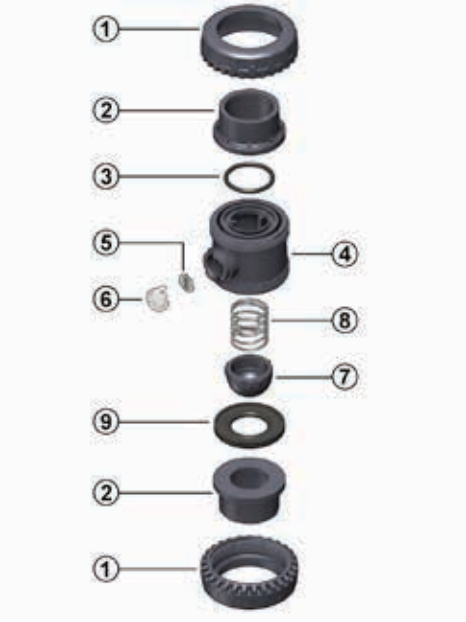
Please contact IPEX customer service for options and pricing on customization of SSE valves with LSE sets.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SSE SERIES SPRING ASSISTED CHECK VALVES

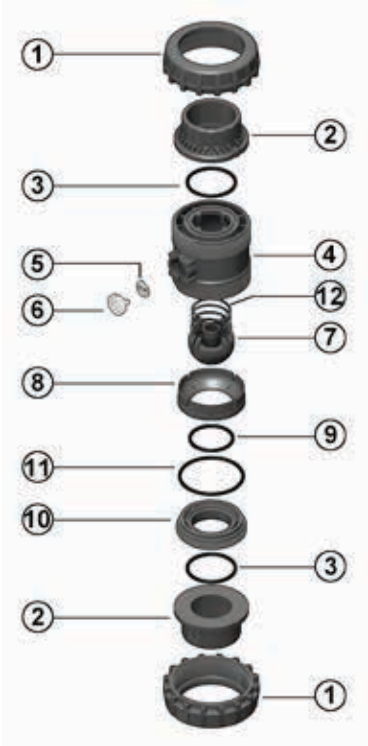
Components

1/2" to 2"



#	Component	Material	Qty
1	Union Nut	PVC	2
2	End Connector	PVC	2
3	Socket Seal (O-ring)	EPDM, FKM	1
4	Body	PVC	1
5	Tag Holder	PVC	1
6	Transparent Service Plug	PVC	1
7	Contoured Ball	PVC	1
8	Spring	316SS, PTFE/316SS, Hastelloy	1
9	Contoured Ball Seal (O-ring)	EPDM, FKM	1

2-1/2" to 4"



#	Component	Material	Qty
1	Union Nut	PVC	2
2	End Connector	PVC	2
3	Socket Seal (O-ring)	EPDM, FKM	2
4	Body	PVC	1
5	Tag Holder	PVC	1
6	Transparent Service Plug	PVC	1
7	Contoured Ball	PVC	1
8	Packing Presser Ring	PVC	1
9	Contoured Ball Seal (O-ring)	EPDM, FKM	1
10	Support for Ball Seat	PVC	1
11	Radial Seal (O-ring)	EPDM, FKM	1
12	Spring	316SS, PTFE/316SS	1

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SSE SERIES SPRING ASSISTED CHECK VALVES

Installation Procedures

1. For socket and threaded style connections, remove the union nuts (part #1 on previous page) and slide them onto the pipe. **It is important to first check the pipe flow direction and corresponding valve orientation as installing the valve backward will prevent it from functioning as intended.**
2. Please refer to the appropriate connection style sub-section:
   a. For socket style, solvent cement the end connectors (2) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". **Be sure to allow sufficient cure time before continuing with the valve installation**.
   b. For threaded style, thread the end connectors (2) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
3. Ensure that the valve is in the correct orientation, and that the main seal safe blocked carrier and o-rings are properly fitted in the valve. A flow direction indicator is located on the side of the valve body. Carefully place the valve in the system between the two end connections.
4. Tighten both union nuts by hand. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. If additional tightening is required, use the EasyFit multifunctional handle tool to tighten the union nuts an additional 1/4 turn. The Easyfit torque wrench (available as an accessory for 1/2" – 2" valves) may also be used to complete the nut tightening in accordance to the torques indicated on instructions included; following this procedure will ensure the best installation.

Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack. It is recommended to use the EasyFit handle to prevent damage.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SSE SERIES SPRING ASSISTED CHECK VALVES

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. **Be sure to depressurize and drain the isolated branch and valve before continuing**.
2. Loosen both union nuts (1) and drop the valve out of the line. If retaining the socket o-rings (3), take care that they are not lost when removing the valve from the line.
    a. For 1/2" to 2" valves, remove the transparent service plug from the EasyFit multifunctional handle tool. Turn the handle over and seat on the top of the valve, ensuring the integrated gear teeth on the handle mesh with the union nut teeth. Turn clockwise to loosen.
    b. For 2-1/2" to 4" valves, remove the EasyFit multifunctional tool from the bottom of the handle, turn it over and re-install it. Engage the tool with the outer ring profile of the union nut and loosen.
4. Line up the moldings on the handle with the slots in the main seal carrier. Loosen and remove the main seal carrier (10) by turning it in a counter-clockwise direction.
5. For 1/2" to 2" valves, remove the Radial Seal (11), Contoured Ball Seal (O-ring) (9), Packing-presser Ring (8), Contoured Ball (7), and the Spring (12)
6. For 2-1/2" to 4" valves, remove the Contoured Ball Seal (O-ring) (9), Contoured Ball (7), and the Spring (8).
7. The valve components can now be checked for problems and/or replaced.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities**.

1. For 1/2" to 2" valves, insert the Spring (8), Contoured Ball (7), and Contoured Ball Seal (O-ring) (9) in the valve body.
2. For 2-1/2" to 4" valves, insert the Spring (12), Contoured Ball (7), Packing Presser Ring (8), Contoured Ball Seal (O-ring) (9), and the Radial Seal (11) in the valve body.
3. For 2-1/2" to 4" valves, slightly hand-tighten the main seal carrier (10) into the valve body. Line up the moldings on the handle with the slots in the main seal carrier then tighten by turning in a clockwise direction.
4. Properly fit the socket o-rings (3) in their respective grooves.
5. Place the end connectors (2) into the union nuts (1), then thread onto the valve body taking care that the socket o-rings remain properly fitted in their grooves.
    a. For 1/2" to 2" valves, remove the transparent service plug from the EasyFit multifunctional handle tool. Turn the handle over and seat on the top of the valve, ensuring the integrated gear teeth on the handle mesh with the union nut teeth. Turn counter-clockwise to tighten. The Easyfit torque wrench key can also be used to tighten the union nuts in accordance with the tightening torque values indicated on the included instructions.
    b. For 2-1/2" to 4" valves, remove the EasyFit multifunctional tool from the bottom of the handle, turn it over and re-install it. Engage the tool with the outer ring profile of the union nut and tighten.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system.**

Important Points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VR SERIES PISTON CHECK VALVES

The IPEX VR Piston Check Valve is an ideal solution for process back-flow prevention. These valves feature all PVC high performance components allowing for increased flow rate yet a low-return pressure for positive seal. With installation possible in both horizontal and vertical orientations, the top-entry design provides for simple in-line maintenance. VR Piston Check Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

ASTM D1784
ASTM D2464
ASTM D2466
ASTM D2467
ASTM F1498

ANSI B1.20.1
ANSI B16.5

VALVE AVAILABILITY

Body Material	PVC
Size Range	1/2" through 4"
Pressure	232 psi (1/2" to 1"), 150 psi (1-1/4" to 2"), 90 psi (3" to 4")
Seals	EPDM, or FKM
End Connections	Socket (IPS), Threaded (FNPT), Flanged (ANSI 150)

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VR SERIES PISTON CHECK VALVES

Sample Specification

1.0 Check Valves - VR

1.1 Material

- The valve body, end connectors, and unions shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

1.2 Seals

- The o-ring seals and shutter shall be made of EPDM.

or The o-ring seals and shutter shall be made of FKM.

2.0 Connections

2.1 Socket style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

2.2 Threaded style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1.

2.3 Flanged style

- The ANSI 150 flanged PVC end connectors shall conform to the dimensional standard ANSI B16.5..

3.0 Design Features

- Valve sizes 1/2" through 2" shall have true union ends.
- Valve sizes 3" through 4" shall have either socket or threaded ends.
- All valves shall be y-pattern globe style in design.
- All valves shall be gravity operated.
- The weight shall be totally encapsulated inside the piston.
- The valve shall function in both horizontal and vertical lines with no minimum column requirements.
- Servicing of the valves shall be possible without removal from the line.

3.1 Pressure Rating

- Valve sizes 1/2" through 1" shall be rated at 232 psi at 73°F.
- Flanged valve sizes 1/2" through 1" shall be rated at 150 psi at 73°F.
- Valve sizes 1-1/4" through 2" shall be rated at 150 psi at 73°F.
- Valve sizes 3" through 4" shall be rated at 90 psi at 73°F.

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Colour Coding

- All PVC valves shall be colour-coded dark gray.

4.0 All valves shall be Xirtec® PVC by IPEX or approved equal.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VR SERIES PISTON CHECK VALVES

Valve Selection

Size (inches)	Body Material	O-ring Material	IPEX Part Number IPS Socket	IPEX Part Number FNPT Threaded	IPEX Part Number ANSI Flanged	Pressure Rating
1/2	PVC	EPDM	053346		053879	232 psi for S/T
		FKM	053289		053885	
3/4	PVC	EPDM	053347		053880	
		FKM	053290		053886	150 psi for F
1	PVC	EPDM	053348		053881	
		FKM	053291		053887	
1-1/4	PVC	EPDM	053349		053882	
		FKM	053292		053888	
1-1/2	PVC	EPDM	053350		053883	150 psi
		FKM	053293		053889	
2	PVC	EPDM	053351		053884	
		FKM	053294		053890	
3	PVC	EPDM	053295	053352	053925	90 psi
4	PVC	EPDM	053296	053353	053926	

Note: Sizes 3" and 4" are not true union style.

Size (inches):

- ☐ 1/2
- ☐ 3/4
- ☐ 1
- ☐ 1-1/4
- ☐ 1-1/2
- ☐ 2
- ☐ 3
- ☐ 4

Seals:

- ☐ EPDM
- ☐ FKM

End Connections:

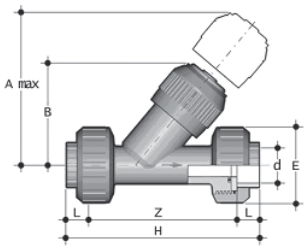
- ☐ Socket (IPS)
- ☐ Threaded (FNPT)
- ☐ Flanged (ANSI 150

IPEX Part Number:

Dimensions

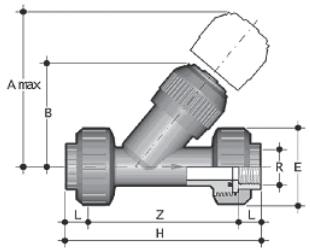
IPS Socket Connections – Dimension (inches)

Size	d	L	Z	H	E	B	A_{MAX}
1/2	0.84	0.63	4.06	5.31	2.17	2.83	4.92
3/4	1.05	0.75	4.72	6.22	2.60	3.31	5.71
1	1.32	0.87	5.20	6.93	2.95	3.74	6.50
1-1/4	1.66	1.02	6.10	8.15	3.43	4.37	7.48
1-1/2	1.90	1.22	7.13	9.57	3.94	4.72	8.27
2	2.38	1.50	8.72	11.73	4.72	5.47	9.45



Female NPT Threaded Connections – Dimension (inches)

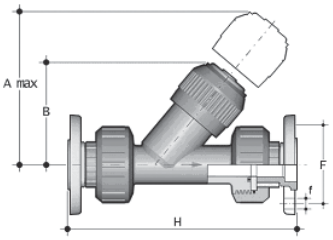
Size	R	L	Z	H	E	B	A_{MAX}
1/2	1/2-NPT	0.59	4.45	5.63	2.17	2.83	4.92
3/4	3/4-NPT	0.64	5.02	6.30	2.60	3.31	5.71
1	1-NPT	0.75	5.70	7.20	2.95	3.74	6.50
1-1/4	1-1/4-NPT	0.84	6.74	8.43	3.43	4.37	7.48
1-1/2	1-1/2-NPT	0.84	7.57	9.25	3.94	4.72	8.27
2	2-NPT	1.01	9.20	11.22	4.72	5.47	9.45



CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

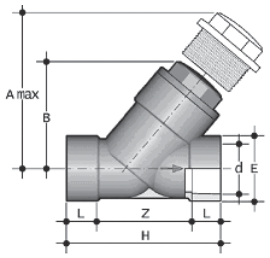
VR SERIES PISTON CHECK VALVES

Dimensions



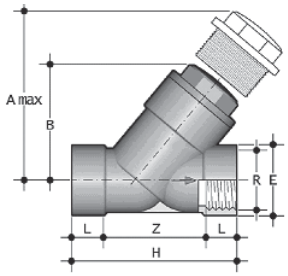
ANSI 150 Flanged (Vanstone) Connections – Dimension (inches)

Size	# holes	f	F	H	B	A_{MAX}
1/2	4	5/8	2-3/8	7.13	2.83	4.92
3/4	4	5/8	2-3/4	8.16	3.31	5.71
1	4	5/8	3-1/8	9.05	3.74	6.50
1-1/4	4	5/8	3-1/2	10.34	4.37	7.48
1-1/2	4	5/8	3-7/8	12.07	4.72	8.27
2	4	3/4	4-3/4	14.48	5.47	9.45



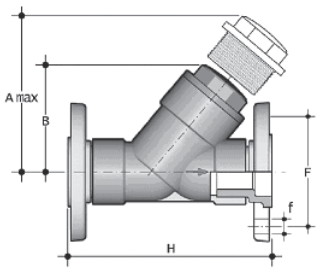
IPS Socket Connections – Dimension (inches)

Size	R	L	Z	H	E	B	AMAX
3	3.50	2.01	6.30	10.31	4.57	7.56	12.80
4	4.50	2.40	7.99	12.80	5.43	9.09	15.16



Female NPT Threaded Connections – Dimension (inches)

Size	R	L	Z	H	E	B	AMAX
3	3-NPT	1.31	7.69	10.31	4.57	7.56	12.80
4	4-NPT	1.55	9.70	12.80	5.43	9.09	15.16



ANSI 150 Flanged (Vanstone) Connections – Dimension (inches)

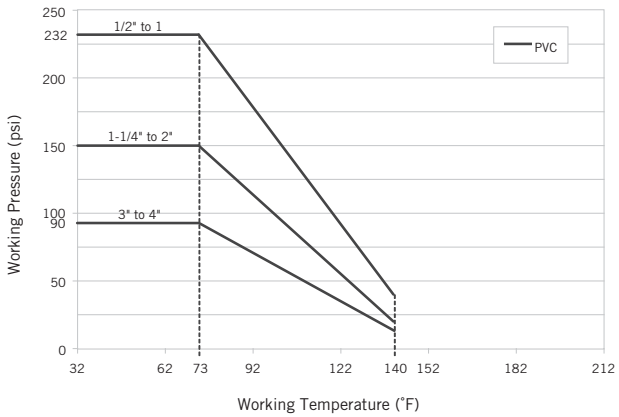
Size	# holes	f	F	H	B	AMAX
3	4	3/4	6	12.81	7.56	12.80
4	8	3/4	7-1/2	15.62	9.09	15.16

Weights

Approximate Weight (lbs)

Size	IPS Socket	FNPT Threaded	ANSI Flanged
1/2	0.50	0.51	0.90
3/4	0.86	0.86	1.44
1	1.34	1.33	2.12
1-1/4	2.03	2.05	3.04
1-1/2	2.94	2.96	4.14
2	5.10	5.18	6.98
3	9.99	9.96	13.73
4	15.81	15.36	21.80

Pressure – Temperature Ratings



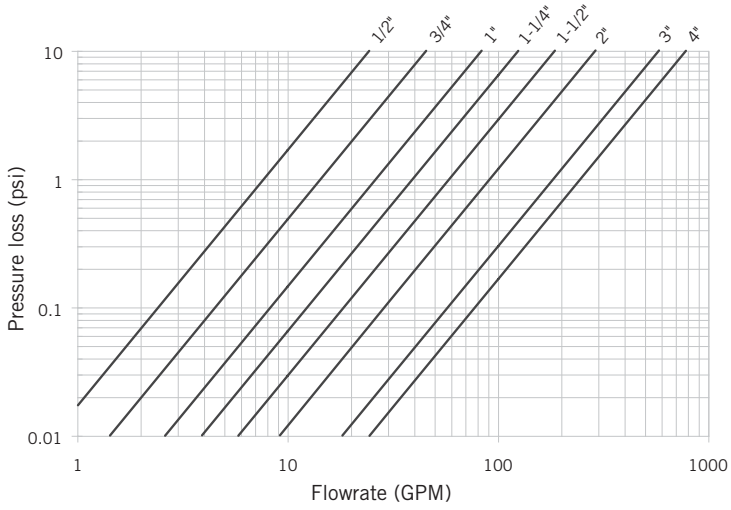
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VR SERIES PISTON CHECK VALVES

Flow Coefficients

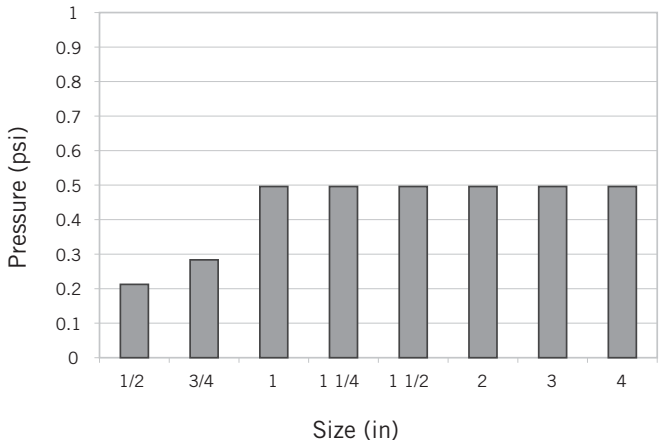
Size	C_V
1/2	7.70
3/4	14.4
1	26.3
1-1/4	39.2
1-1/2	58.5
2	91.0
3	182
4	245

Pressure Loss Chart



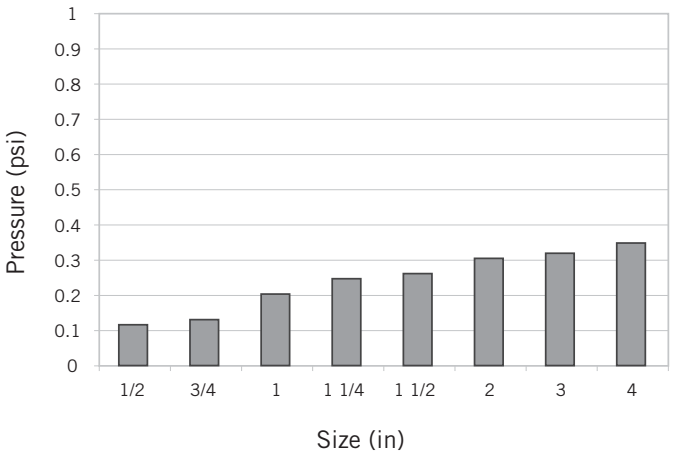
Minimum Back Pressure to Seal

Size (inches)	P (psi)
1/2	0.21
3/4	0.28
1	0.50
1-1/4	0.50
1-1/2	0.50
2	0.50
3	0.50
4	0.50



Minimum Pressure to Open

Size (inches)	P (psi)
1/2	0.12
3/4	0.13
1	0.20
1-1/4	0.25
1-1/2	0.26
2	0.30
3	0.32
4	0.35

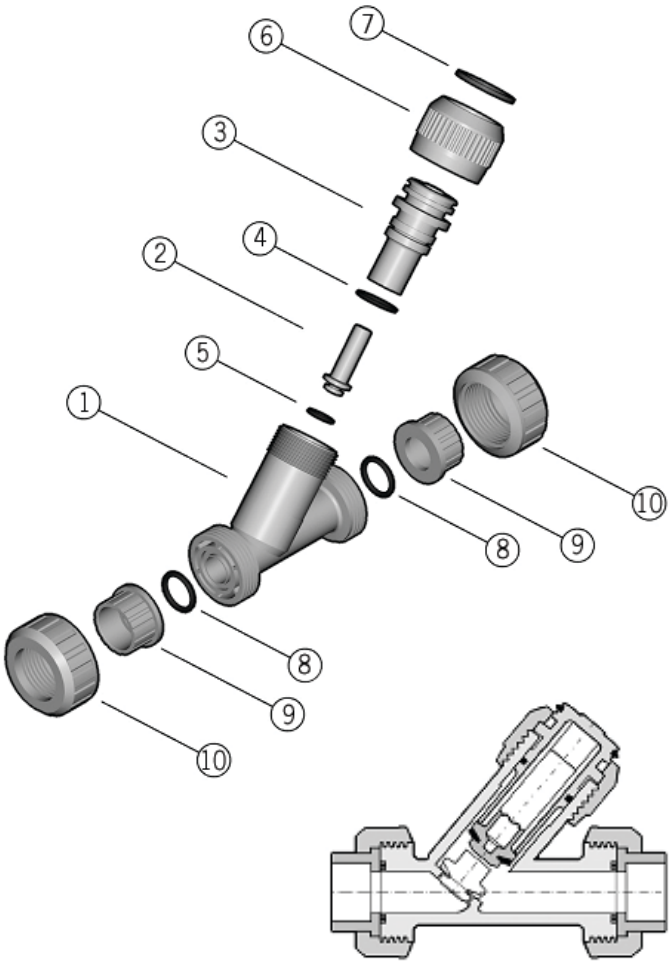


CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VR SERIES PISTON CHECK VALVES

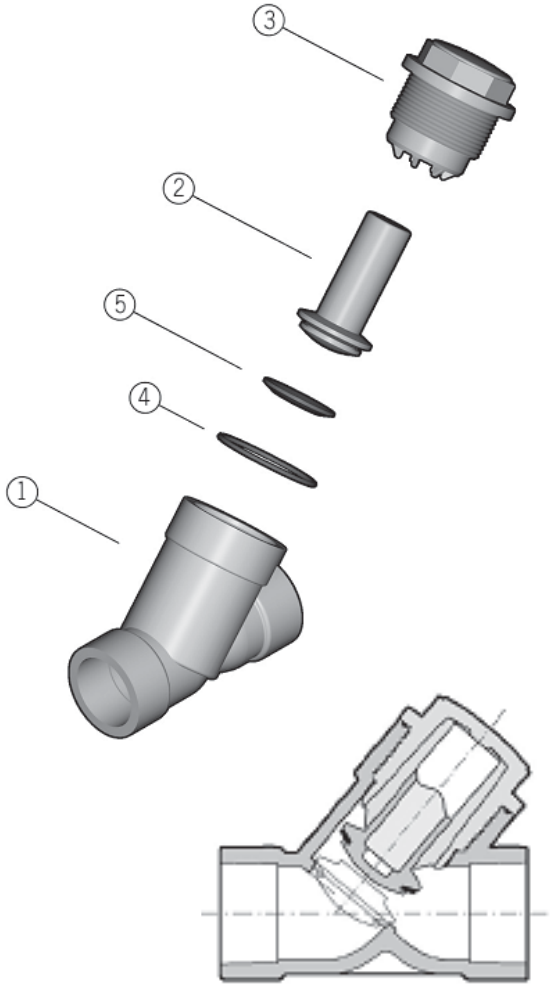
Components

Sizes 1/2" through 2"



#	Component	Material	Qty
1	body	PVC	1
2	piston	PVC	1
3	bonnet	PVC	1
4	o-ring seal	EPDM or FKM	1
5	flat gasket	EPDM or FKM	1
6	lock nut	PVC	1
7	split ring	PVC	1
8	socket o-ring	EPDM or FKM	2
9	end connector	PVC	2
10	union nut	PVC	2

Sizes 3"

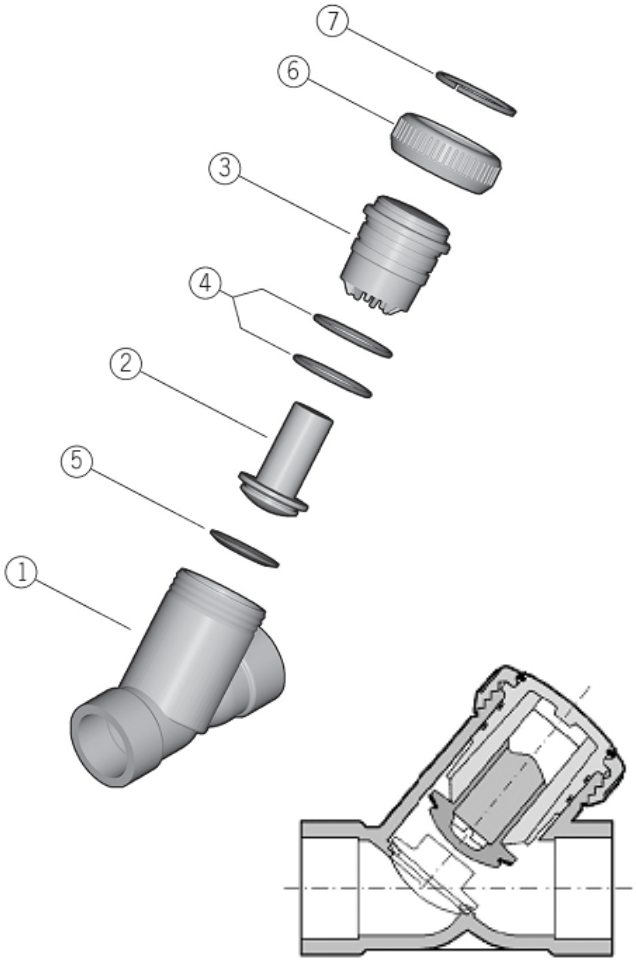


#	Component	Material	Qty
1	body	PVC	1
2	piston	PVC	1
3	bonnet	PVC	1
4	o-ring seal	EPDM or FKM	1
5	flat gasket	EPDM or FKM	1

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VR SERIES PISTON CHECK VALVES

Sizes 4"



#	Component	Material	Qty
1	body	PVC	1
2	piston	PVC	1
3	bonnet	PVC	1
4	o-ring seal	EPDM or FKM	2
5	flat gasket	EPDM or FKM	1
6	lock nut	PVC	1
7	split ring	PVC	1

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Installation Procedures

True Union Style

1. For socket and threaded style connections, remove the union nuts (part #10 on previous pages) and slide them onto the pipe. For flanged connections, remove the union nut / flange assemblies from the valve.
2. Please refer to the appropriate connection style sub-section:
    a. For socket style, solvent cement the end connectors (9) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". **Be sure to allow sufficient cure time before continuing with the valve installation.**
    b. For threaded style, thread the end connectors (9) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
    c. For flanged style, join the union nut / flange assemblies to the pipe flanges. For correct joining procedure, please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
3. Ensure that the valve is in the correct orientation, and that the socket o-rings (8) are properly fitted in their grooves. Carefully place the valve in the system between the two end connections.
4. Tighten both union nuts and the lock nut (6). Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. **Over-tightening may damage the threads on the valve body and/or the nut, and may even cause the nut to crack.**

Non True Union Style

1. Please refer to the appropriate connection style sub-section:
    a. For socket style, ensure that the valve is in the correct orientation then solvent cement the end connections of the valve body (1) to the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". **Be sure to allow sufficient cure time before continuing with the valve installation.**
    b. For threaded style, ensure that the valve is in the correct orientation then thread the pipe ends into the valve body (1). For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
    c. For flanged style, ensure that the valve is in the correct orientation then join to the pipe flanges. For correct joining procedure, please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
2. Ensure that the bonnet (3, size 3") or lock nut (6, size 4") is sufficiently tightened. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. **Over-tightening may damage the threads on the valve body and/or the nut, and may even cause the nut to crack.**

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VR SERIES PISTON CHECK VALVES

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. **Be sure to depressurize and drain the isolated branch and valve before continuing**.
2. For true union style, loosen both union nuts (10) and drop the valve out of the line. If retaining the socket o-rings (8), take care that they are not lost when removing the valve from the line.
3. For sizes 1/2" through 2" and 4":
   a. Loosen the lock nut (6) – bonnet (3) assembly and remove from the valve body (1).
   b. Remove the split ring (7) to separate the lock nut from the bonnet.
   c. Remove the o-ring seal(s) (4) from the bonnet.
4. For size 3":
   a. Loosen the bonnet (3) and remove from the valve body (1).
   b. Remove the o-ring seal (4) from the groove on the valve body.
5. Remove the piston (2) from the valve body and then the flat gasket (5) from the piston.
6. The valve components can now be checked for problems and/or replaced.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.**

1. Properly fit the flat gasket (5) in the groove on the piston (2) then insert into the valve body (1).
2. For sizes 1/2" through 2" and 4":
   a. Properly fit the o-ring seal(s) (4) onto the bonnet.
   b. Place the lock nut (6) over the bonnet (3) then fit the split ring (7) in the groove to lock in position.
   c. Insert the lock nut (6) – bonnet (3) assembly into the valve body and tighten.
3. For size 3":
   a. Properly fit the o-ring seal (4) in the groove on the valve body.
   b. Tighten the bonnet (3) into the valve body.
4. For true union style, ensure that the socket o-rings (8) are properly fitted in their grooves, place the end connectors into the union nuts (10), then tighten onto the valve body.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Testing and Operating

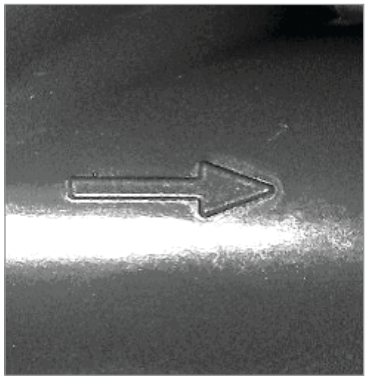
The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system**.

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.



CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SC SERIES SWING CHECK VALVES

IPEX SC Swing Check Valves combine superior flow rate with maximum versatility. Stainless wetted parts and hardware, a top entry design, and integral flanged ends are just a few key features. With extremely low back pressure requirements, these valves are ideal for back-flow prevention in large diameter lines, both horizontal and vertical. SC Swing Check Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

ASTM D1784

ANSI B16.5

VALVE AVAILABILITY

Body Material	PVC
Size Range	3″ – 8″
Pressure	100 psi (3″) 70 psi (4″ to 8″)
Seals	EPDM, or Viton® (FKM)
End Connections	Flanged (ANSI 150)

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SC SERIES SWING CHECK VALVES

Sample Specifications

1.0 Ball Valves – SC

1.1 Material

- The valve body, bonnet, swing arm, and disc shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

1.2 Seals

- The o-ring seals and shutter shall be made of EPDM.

  or

- The o-ring seals and shutter shall be made of FKM.

1.3 Bolts

- The bolts, nuts, and washers shall be made of 304 stainless steel.

2.0 Connections

2.1 Flanged style

- The ANSI 150 flanged PVC end connections shall conform to the dimensional standard ANSI B16.5.

3.0 Design Features

- All swing check valves shall be full flow.
- All valves shall be gravity operated.
- The valve shall have a full face disc seal.
- The valve shall have a full open disc stop to prevent over-travel.
- The valve shall have no wetted metal parts.
- Service of the valve shall be possible without removal from the system line.
- All check valves may be installed in either horizontal or vertical orientations.

3.1 Pressure Rating

- Valve sizes 3" shall be rated at 100 psi at 73°F.
- Valve sizes 4" through 8" shall be rated at 70 psi at 73°F.

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Colour Coding

- All PVC valves shall be colour-coded dark gray.

4.0 All valves shall be Xirtec® PVC by IPEX or approved equal.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SC SERIES SWING CHECK VALVES

Valve Selection

Size (inches)	Body Material	O-ring Material	IPEX Part Number Flanged	Pressure Rating @ 73°F
3	PVC	EPDM	052289	100 psi
		Viton®	053875	
4	PVC	EPDM	052290	70 psi
		Viton®	053876	
6	PVC	EPDM	052291	70 psi
		Viton®	053877	
8	PVC	EPDM	052292	70 psi
		Viton®	053878	

Size (inches):

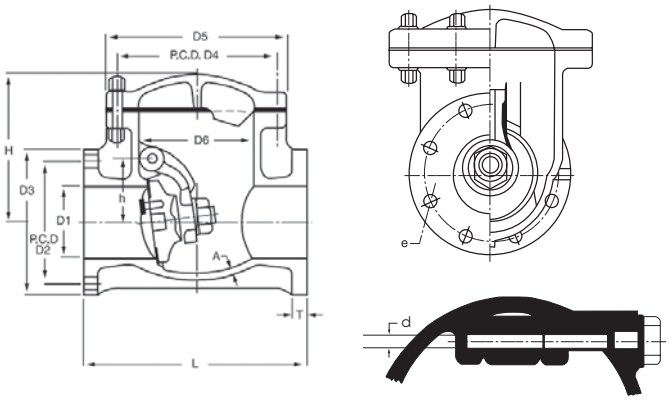
☐ 3 ☐ 6
☐ 4 ☐ 8

Seals:

☐ EPDM
☐ Viton® (FKM)

IPEX Part Number:

Dimensions and Weights



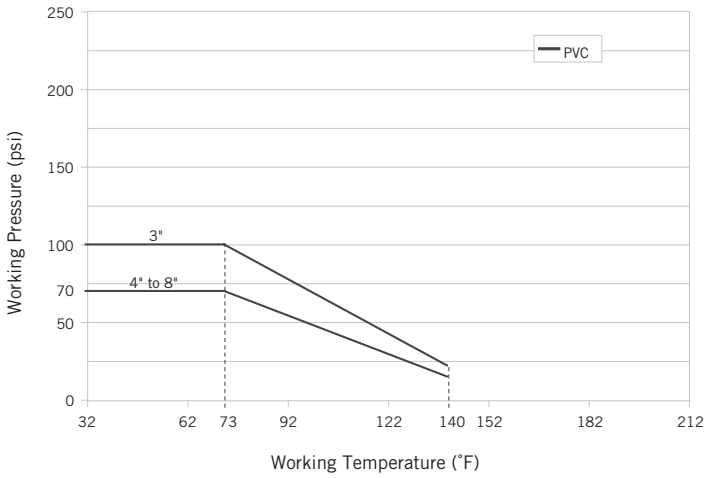
Dimension (inches)

Size	D1	D2	D3	D4	D5	D6	e	# holes
3	3.16	6.00	7.50	7.13	8.06	5.13	0.75	4
4	3.94	7.50	9.00	9.25	10.44	6.69	0.75	8
6	5.53	9.50	11.00	13.00	14.56	9.84	0.88	8
8	7.88	11.75	13.50	15.31	16.71	11.81	0.88	8

Dimension (inches)

Size	L	T	A	h	H	d	W (lbs)
3	10.25	0.79	0.34	2.75	6.72	0.47	8.25
4	11.82	0.90	0.41	3.53	8.38	0.63	19.40
6	15.75	1.20	0.63	5.31	10.56	0.78	28.66
8	16.69	1.22	0.72	6.69	12.06	0.78	46.30

Pressure – Temperature Ratings



Minimum Back Pressure to Seal

Size	PSI
3	8.5
4	9.7
5	9.7
6	11.9
8	11.9

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Flow Coefficients

The flow coefficient (C_v) represents the flow rate in gallons per minute (GPM) at 68°F for which there is a 1 psi pressure drop across the valve in the fully open position. These values are determined from an industry standard testing procedure which uses water as the flowing media (specific gravity of 1.0). To determine specific flow rate and pressure loss scenarios, one can use the following formula:

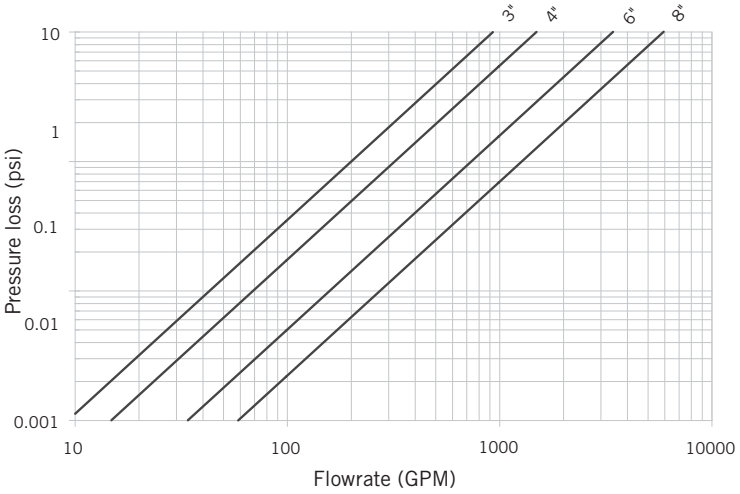
Size	C_V
3	300
4	480
6	1100
8	1900

$$f = sg \times \left(\frac{Q}{C_V}\right)^2$$

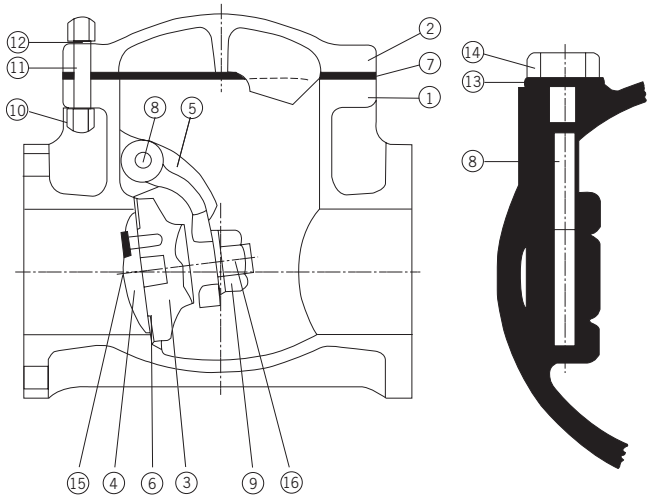
Where,

- f is the pressure drop (friction loss) in psi,
- sg is the specific gravity of the fluid,
- Q is the flow rate in GPM,
- C_V is the flow coefficient.

Pressure Loss Chart



Components



#	Component	Material	Qty
1	body	PVC	1
2	bonnet	PVC	1
3	disc	PVC	1
4	gasket holder	PVC	1
5	swing arm	PVC	1
6	disc gasket	EPDM or Viton®	1
7	bonnet gasket	EPDM or Viton®	1
8	shaft	PVC	1
9	disc holder	PVC	1
10	bolts	SUS 304	6 (3"), 8 (4" to 8")
11	nuts	SUS 304	6 (3"), 8 (4" to 8")
12	washers	SUS 304	6 (3"), 8 (4" to 8")
13	o-ring	EPDM or Viton®	1
14	shaft holder	PVC	1
15	set bolts	PVC	3 (3"), 4 (5" to 6"), 8 (8")
16	set pin	PVC	1

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SC SERIES SWING CHECK VALVES

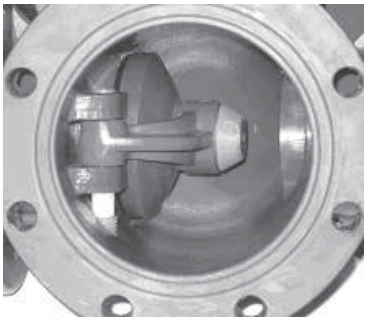
Installation Procedures

1. Ensure that the valve is in the correct orientation then carefully place the valve in the system between the two pipe flanges.
2. Join each end of the valve to the pipe flanges. For correct joining procedure, please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. **Be sure to depressurize and drain the isolated branch and valve before continuing**.
2. Loosen end of the valve from the pipe flanges. Please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" for a recommended bolt tightening pattern diagram. Follow the same pattern when disassembling the flanged joints.
3. Carefully remove the valve from the line.
4. Loosen and remove the nuts (10), bolts (11), and washers (12) then remove the bonnet (2) and gasket (7) from the top of the valve body (1).
5. Loosen the shaft holder (14) and remove the o-ring (13).
6. Remove the shaft (8) then take the swing arm (5) assembly out of the valve.
7. To disassemble the swing arm, loosen the set bolt(s) (15) then remove the gasket holder (4) and disc gasket (6) from the disc (3).
8. The valve components can now be checked for problems and/or replaced.

Note: The disc and disc holder (9) are permanently fixed to the swing arm by the set pin (16) and cannot be disassembled.



Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities**.

1. Assemble the swing arm (5) components by placing the disc gasket (6) and gasket holder (4) on the disc (3) then tightening the set bolt(s) (15).
2. Place the swing arm assembly into the valve body (1) then insert the shaft (8) through the mounting holes.
3. Fit the o-ring (13) on the shaft holder (14) then sufficiently tighten into the valve body.
4. Taking care to line up all the holes, place the gasket (7) and bonnet (2) onto the valve body.
5. Insert and tighten all nuts (10), bolts (11), and washers (12) according to a proper flange bolt tightening pattern.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system**.

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

VA SERIES AIR RELEASE VALVES

IPEX VA Air Release Valves are of a unique design, controlled by media and not pressure. Intended for use with tanks, slurries, and start-ups amongst other things, these 232 psi pressure rated valves will economically and efficiently eliminate air or gas pockets. This no-spill valve also relieves potentially dangerous vacuums that may build up in the piping system. VA Air Release Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

ASTM D1784
ASTM D2464
ASTM F437
ASTM F1498

ANSI B1.20.1

VALVE AVAILABILITY

Body Material	PVC
Size Range	3/4", 1-1/4", 2"
Pressure	232 psi
Seals	EPDM or FKM
End Connections	Bottom – Threaded (FNPT) Top – Socket (IPS), Threaded (FNPT)

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VA SERIES AIR RELEASE VALVES

Sample Specification

1.0 Air Release Valves – VA

1.1 Material

- The valve body, piston, end connectors, and union shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

1.2 Seals

- The o-ring seals shall be made of EPDM.

or The o-ring seals shall be made of FKM.

2.0 Connections

2.1 Threaded style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1.

3.0 Design Features

- The valve shall be of single union design.
- The valve sealing mechanism shall be a hollow piston.
- Opening and closing of the valve shall not be affected by pressure.
- The valve shall close when liquid is in contact with the piston.
- The valve shall open when air or gas is in contact with the piston.
- The valve shall also function as a vacuum breaker.
- The valve body and union nut shall have deep square style threads for increased strength.

3.1 Pressure Rating

- All valves shall be rated at 232 psi at 73°F.

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Colour Coding

- All PVC valves shall be colour-coded dark gray.

4.0 All valves shall be Xirtec® PVC by IPEX or approved equal.

Valve Selection

Valve Size (inches)	Body Material	O-ring Material	IPEX Part Number FNPT Threaded	Pressure Rating @ 73°F
3/4	PVC	EPDM	053559	232 psi
		FKM	153845*	
1-1/4	PVC	EPDM	053560	
		FKM	153846*	
2	PVC	EPDM	053561	
		FKM	153847*	

* Part numbers are for FKM o-ring sets only.
The EPDM version must be ordered to obtain the valve.

Size (inches):

☐ 3/4
☐ 1-1/4
☐ 2

Seals:

☐ EPDM
☐ FKM

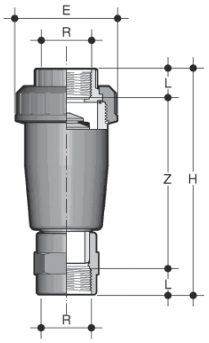
IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VA SERIES AIR RELEASE VALVES

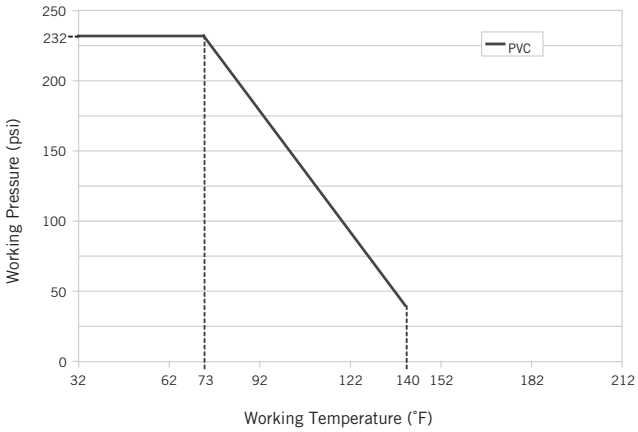
Dimensions and Weights



Dimension (inches)

Size	R	E	L	Z	H	W (lbs)
3/4	3/4 NPT	2.60	0.64	4.58	5.87	0.45
1-1/4	1-1/4 NPT	3.43	0.84	6.19	7.87	1.05
2	2 NPT	4.72	1.01	7.74	9.76	2.49

Pressure – Temperature Ratings



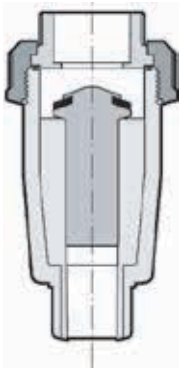
Air Flow Chart

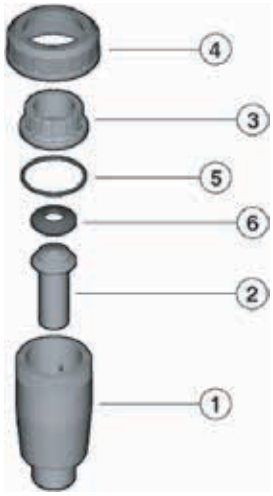
Maximum Air Flow / Air Velocity Relationship

Size	20 psig		40 psig		60 psig		80 psig		100 psig		120 psig	
(inches)	F	V	F	V	F	V	F	V	F	V	F	V
3/4	19	39	36	47	54	52	72	54	91	57	110	58
1-1/4	67	54	127	65	188	70	250	74	313	76	376	78
2	177	69	331	82	491	89	652	93	814	96	980	99

F = Air Flow (scfm), V = Air Velocity (ft/s)

Components





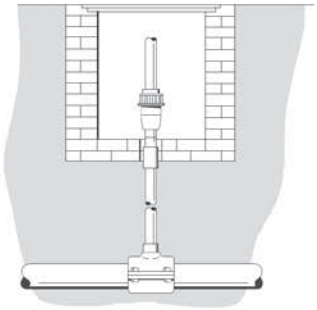
#	Component	Material	Qty
1	body	PVC	1
2	piston	PVC	1
3	end connector	PVC	1
4	union nut	PVC	1
5	body o-ring	EPDM or FKM	1
6	piston o-ring	EPDM or FKM	1

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VA SERIES AIR RELEASE VALVES

Installation Procedures

1. Remove the union nut (part #4 on previous page) and slide it onto the outlet stack pipe. **The valve must always be installed in a vertical orientation with the union nut joint at the top**.
2. Please refer to the appropriate connection style sub-section:
   a. For socket style, solvent cement the end connector (3) onto the outlet stack pipe end. For correct joining procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". **Be sure to allow sufficient cure time before continuing with the valve installation**.
   b. For threaded style, thread the end connector (3) onto the outlet stack pipe end. For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".



3. Remove the piston (2) then thread the valve body (1) onto the inlet pipe and sufficiently tighten with a wrench.
4. Ensure that the piston o-ring (6) is properly fitted in its groove, then replace the piston inside the valve body.
5. Ensure that the body o-ring (5) is properly fitted in its groove, then install the outlet stack pipe and tighten the union nut. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. **Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack**.

Note: When used for corrosive chemical applications, a minimum 18 inch outlet stack must be installed.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

VA SERIES AIR RELEASE VALVES

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. **Be sure to depressurize and drain the isolated branch and valve before continuing.**
2. Loosen the union nut (4) and remove the outlet stack pipe. If retaining the body o-ring (5), take care that it is not lost when removing the valve from the line.
3. Remove the piston (2) from the valve body (1).
4. Loosen and remove the valve body from the inlet pipe.
5. Remove the piston o-ring (6) from the piston.
6. The valve components can now be checked for problems and/or replaced.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities**.

1. Properly fit the piston o-ring (6) in the groove on the piston (2).
2. Insert the piston into the valve body (1).
3. Properly fit the body o-ring (5) in the groove on the valve body.
4. Position the end connector (3) on the valve body.
5. Position the union nut (4) on the valve body and tighten.

Dimensions and Weights

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series,
"Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system**.

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

NOTES

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

RV SERIES SEDIMENT STRAINERS

IPEX RV Sediment Strainers protect critical pipeline components by removing solids and suspended impurities. Clear PVC construction allows for inspection of the screen while in service, whereas the bottom-entry design permits maintenance on the valve while in-line. This Y-pattern strainer is also available in Xirtec® CPVC. RV RV Sediment Strainers are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

VALVE AVAILABILITY

Body Material	PVC, CPVC
Size Range	1/2" – 4"
Pressure	232 psi (1/2" to 1"), 150 psi (1-1/4" to 2"), 60 psi (3" to 4")
Seals	EPDM or FKM
End Connections	Socket (IPS), Threaded (FNPT), Flanged (ANSI 150)

ASTM D1784
ASTM F441
ASTM D2464
ASTM D2466
ASTM D2467
ASTM F437
ASTM F439
ASTM F1498

ANSI B1.20.1
ANSI B16.5

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

RV SERIES SEDIMENT STRAINERS

Sample Specification

1.0 Sediment Strainers – RV

1.1 Material

- The valve body, end connectors, and unions shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

or The valve body, end connectors, and unions shall be made of Corzan® CPVC compound which shall meet or exceed the requirements of 23447 according to ASTM D1784.

1.2 Seals

- The o-ring seals shall be made of EPDM.

or The o-ring seals shall be made of FKM.

1.3 Mesh Screen

- The mesh screen shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

or The mesh screen shall be made of stabilized PP homopolymer compound, also containing a RAL 7032 pigment, which shall meet or exceed the requirements of Type I Polypropylene according to ASTM D4101-86.

or The mesh screen shall be made of corrosion resistand 304 stainless steel.

2.0 Connections

2.1 Socket style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

or The IPS socket CPVC end connectors shall conform to the dimensional standard ASTM F439.

2.2 Threaded style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1

or The female NPT threaded CPVC end connectors shall conform to the dimensional standards ASTM F437, ASTM F1498, and ANSI B1.20.1.

2.3 Flanged style

- The ANSI 150 flanged PVC end connectors shall conform to the dimensional standard ANSI B16.5.

or The ANSI 150 flanged CPVC end connectors shall conform to the dimensional standard ANSI B16.5

3.0 Design Features

- Strainers shall be Y-pattern in style.
- Sizes 1/2" through 2" shall have true union ends.
- Sizes 3" and 4" shall have solid threaded or socket ends.
- It shall be possible to service the valve without removing it from the line.
- PVC strainers shall have a transparent body for evaluation of filter screen condition.
- The filter screens shall be available in ASTM 18, 20, 30, 35, 40, 45 and 70 mesh sizes.

3.1 Pressure Rating

- PVC valve sizes 1/2" through 1" shall be rated at 232 psi at 73°F.
- CPVC valve sizes 1/2" through 2" shall be rated at 232 psi at 73°F.
- PVC valve sizes 1-1/4" through 2" shall be rated at 150 psi at 73°F
- PVC valve sizes 3" through 4" shall be rated at 60 psi at 73°F.
- All sizes of flanged valves shall be rated at no greater than 150 psi at 73°F.

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Colour Coding

- All PVC valves shall have transparent bodies with end connections colour-coded dark gray.

or All CPVC valves shall be colour-coded light gray.

4.0 All valves shall be Xirtec® PVC or Xirtec® CPVC by IPEX or approved equal.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

RV SERIES SEDIMENT STRAINERS

Valve Selection

Size (inches)	Body Material	O-ring Material	IPEX Part Number			Pressure Rating
			IPS Socket	FNPT Threaded	ANSI Flanged	
* 1/2	PVC	EPDM	053261		053935	232 psi
		FKM	053233		053941	
	CPVC	FKM	053334		n/a	
* 3/4	PVC	EPDM	053262		053936	
		FKM	053234		053942	
	CPVC	FKM	053335		n/a	
1	PVC	EPDM	053263		053937	
		FKM	053235		053943	
	CPVC	FKM	053336		n/a	
1-1/4	PVC	EPDM	053264		053938	150 psi
		FKM	053236		053944	
	CPVC	FKM	053337		n/a	232 psi
1-1/2	PVC	EPDM	053265		053939	150 psi
		FKM	053237		053945	
	CPVC	FKM	053338		n/a	232 psi
2	PVC	EPDM	053266		053940	150 psi
		FKM	053238		053946	
	CPVC	FKM	053339		n/a	232 psi
3	PVC	EPDM	053211	053267	n/a	60 psi
		FKM	054012	053239	n/a	
4	PVC	EPDM	053212	053268	n/a	
		FKM	054013	053240	n/a	

Note: Standard screens are 40 mesh PVC for PVC strainers and 20 mesh PP for CPVC strainers

* 18 mesh PP

Body Material:

☐ PVC ☐ CPVC

Size (inches):

☐ 1/2 ☐ 1-1/2
☐ 3/4 ☐ 2
☐ 1 ☐ 3
☐ 1-1/4 ☐ 4

Seals:

☐ EPDM
☐ FKM

End Connections:

☐ Socket (IPS)
☐ Threaded (FNPT)
☐ Flanged (ANSI 150)

IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

RV SERIES SEDIMENT STRAINERS

Mesh Availability

ASTM Mesh Size	Hole Pitch (in)	Material		
		PVC	PP	304 SS
18	0.059	-	✓	-
20	0.059	-	✓	-
30	0.098	✓	-	-
35	0.079	✓	-	-
40	0.059	✓	-	-
45	0.028	-	-	✓
70	0.039	✓	-	-

PVC 30 Mesh

Strainer Size	Part Number
1/2	053947
3/4	053948
1	053949
1-1/4	053950
1-1/2	053951
2	053952
3	053953
4	053954

PVC 70 Mesh

Strainer Size	Part Number
1/2	053971
3/4	053972
1	053973
1-1/4	053974
1-1/2	053975
2	053976
3	053977
4	053978

PVC 35 Mesh

Strainer Size	Part Number
1/2	053955
3/4	053956
1	053957
1-1/4	053958
1-1/2	053959
2	053960
3	053961
4	053962

PP 20 Mesh

Strainer Size	Part Number
* 1/2	053332
* 3/4	053340
1	053341
1-1/4	053342
1-1/2	053343
2	053344

* PP 18 Mesh

PVC 40 Mesh

Strainer Size	Part Number
1/2	053963
3/4	053964
1	053965
1-1/4	053966
1-1/2	053967
2	053968
3	053969
4	053970

304 SS 45 Mesh

Strainer Size	Part Number
1/2	053979
3/4	053980
1	053981
1-1/4	053982
1-1/2	053983
2	053984
3	053985
4	053986

Strainer Size (inches):

- ☐ 1/2
- ☐ 3/4
- ☐ 1
- ☐ 1-1/4
- ☐ 1-1/2
- ☐ 2
- ☐ 3
- ☐ 4

Screen Material:

- ☐ PVC
- ☐ 304 SS
- ☐ PP

Mesh Size:

- ☐ ASTM 18
- ☐ ASTM 20
- ☐ ASTM 30
- ☐ ASTM 35
- ☐ ASTM 40
- ☐ ASTM 45
- ☐ ASTM 70

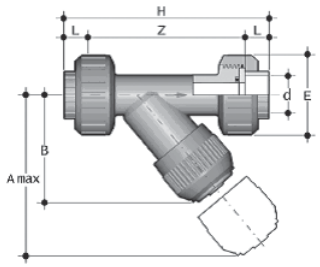
IPEX Part Number:

_____

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

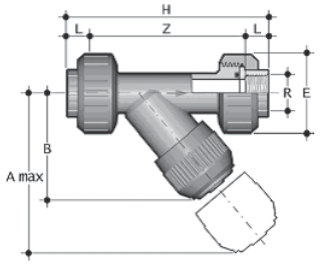
RV SERIES SEDIMENT STRAINERS

Dimensions



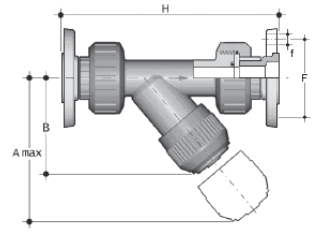
IPS Socket Connections – Dimension (inches)

Size	d	L	Z	H	E	B	AMAX
1/2	0.84	0.63	4.06	5.31	2.17	2.83	4.92
3/4	1.05	0.75	4.72	6.22	2.60	3.31	5.71
1	1.32	0.87	5.20	6.93	2.95	3.74	6.50
1-1/4	1.66	1.02	6.10	8.15	3.43	4.37	7.48
1-1/2	1.90	1.22	7.13	9.57	3.94	4.72	8.27
2	2.38	1.50	8.72	11.73	4.72	5.47	9.45



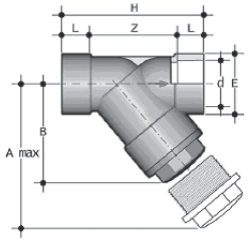
Female NPT Threaded Connections – Dimension (inches)

Size	R	L	Z	H	E	B	AMAX
1/2	1/2-NPT	0.59	4.45	5.63	2.17	2.83	4.92
3/4	3/4-NPT	0.64	5.02	6.30	2.60	3.31	5.71
1	1-NPT	0.75	5.70	7.20	2.95	3.74	6.50
1-1/4	1-1/4-NPT	0.84	6.74	8.43	3.43	4.37	7.48
1-1/2	1-1/2-NPT	0.84	7.57	9.25	3.94	4.72	8.27
2	2-NPT	1.01	9.20	11.22	4.72	5.47	9.45



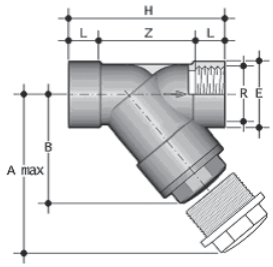
ANSI 150 Flanged (Vanstone) Connections – Dimension (inches)

Size	# holes	f	F	H	B	AMAX
1/2	4	5/8	2-3/8	7.13	2.83	4.92
3/4	4	5/8	2-3/4	8.16	3.31	5.71
1	4	5/8	3-1/8	9.05	3.74	6.50
1-1/4	4	5/8	3-1/2	10.34	4.37	7.48
1-1/2	4	5/8	3-7/8	12.07	4.72	8.27
2	4	3/4	4-3/4	14.48	5.47	9.45



IPS Socket Connections – Dimension (inches)

Size	R	L	Z	H	E	B	AMAX
3	3.50	2.01	6.30	10.31	4.57	7.56	12.80
4	4.50	2.40	7.99	12.80	5.43	9.09	15.16



Female NPT Threaded Connections – Dimension (inches)

Size	R	L	Z	H	E	B	AMAX
3	3-NPT	1.31	7.69	10.31	4.57	7.56	12.80
4	4-NPT	1.55	9.70	12.80	5.43	9.09	15.16

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

RV SERIES SEDIMENT STRAINERS

Screen Data

Valve Size	Total Strainer Area (in²)
1/2	2.48
3/4	3.64
1	5.58
1-1/4	8.22
1-1/2	10.70
2	15.66
3	38.29
4	61.38

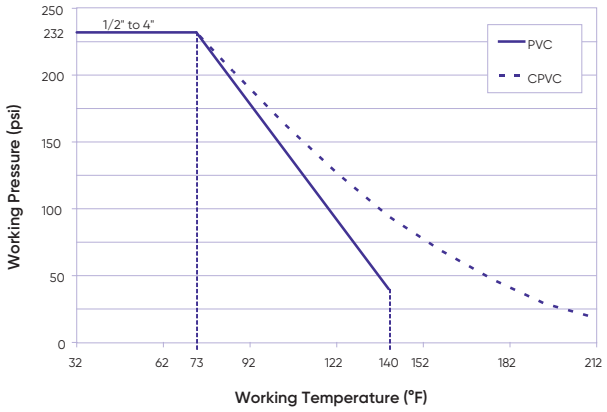
ASTM Mesh Size	Hole Pitch (in)	Hole Diameter Microns (µm)	Screen Material
18	0.059	1,016	PP
20	0.059	889	PP
30	0.098	580	PVC
35	0.079	550	PVC
40	0.059	420	PVC
45	0.028	370	304 SS
70	0.039	200	PVC

Weights

Approximate Weight (lbs)

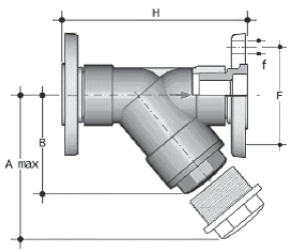
Size (in)	PVC			CPVC	
	IPS Socket	FNPT Threaded	ANSI Flanged	IPS Socket	FNPT Threaded
1/2	0.47	0.46	0.87	0.51	0.51
3/4	0.79	0.78	1.37	0.86	0.86
1	1.16	1.15	1.94	1.27	1.27
1-1/4	1.62	1.64	2.62	1.77	1.79
1-1/2	2.41	2.44	3.61	2.64	2.67
2	4.06	4.13	5.94	4.45	4.52
3	6.56	6.54	n/a	n/a	n/a
4	10.16	9.71	n/a	n/a	n/a

Pressure – Temperature Ratings

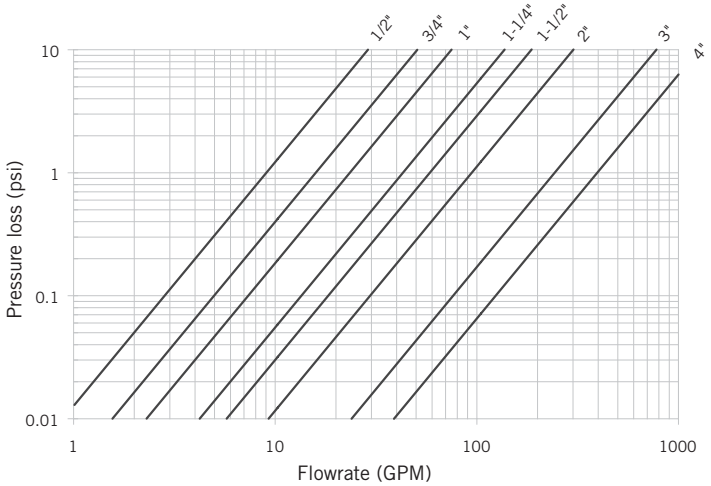


Flow Coefficients

Size	C_V
1/2	2.80
3/4	4.90
1	7.21
1-1/4	13.2
1-1/2	17.9
2	28.7
3	73.5
4	119



Pressure Loss Chart



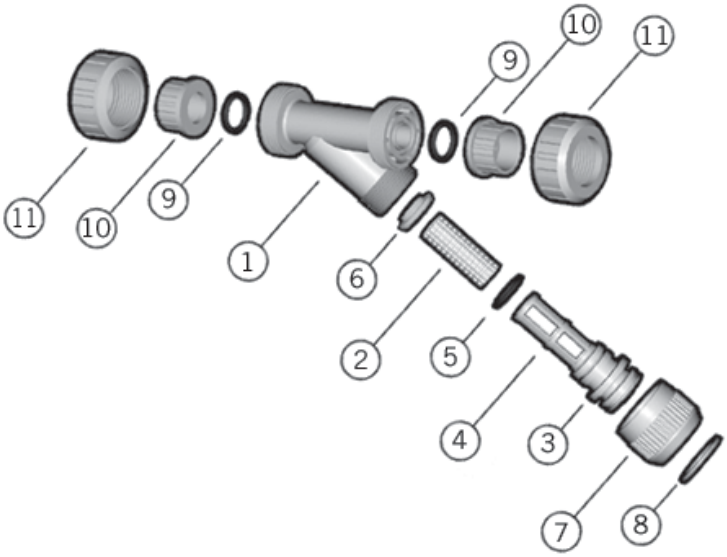
SPECIALTY VALVES

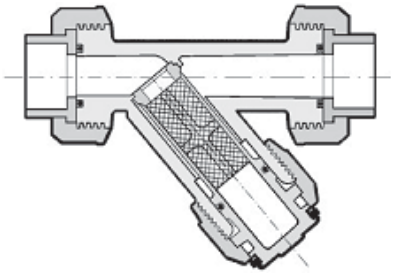
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

RV SERIES SEDIMENT STRAINERS

Components

Sizes 1/2" – 2"

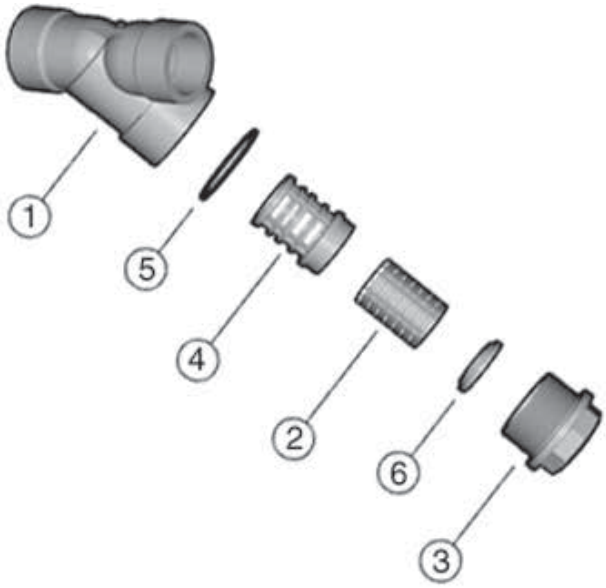


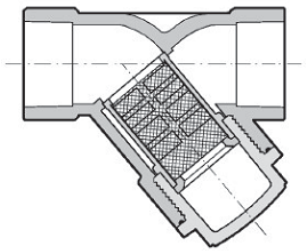


#	Component	Material	Qty
1	body	PVC / CPVC	1
* 2	screen mesh	PVC / PP / 304 SS	1
* 3	bonnet	PVC / CPVC	1
* 4	screen support	PVC / CPVC	1
* 5	o-ring seal	EPDM or FKM	1
* 6	retaining ring	PVC / CPVC	1
* 7	lock nut	PVC / CPVC	1
* 8	split ring	PVC / CPVC	1
* 9	socket o-ring	EPDM or FKM	2
* 10	end connector	PVC / CPVC	2
* 11	union nut	PVC / CPVC	2

* Spare parts available.

Sizes 3"





#	Component	Material	Qty
1	body	PVC / CPVC	1
* 2	screen mesh	PVC / 304 SS	1
* 3	bonnet	PVC	1
* 4	screen support	PVC	1
* 5	o-ring seal	EPDM or FKM	1
* 6	retaining ring	PVC	1

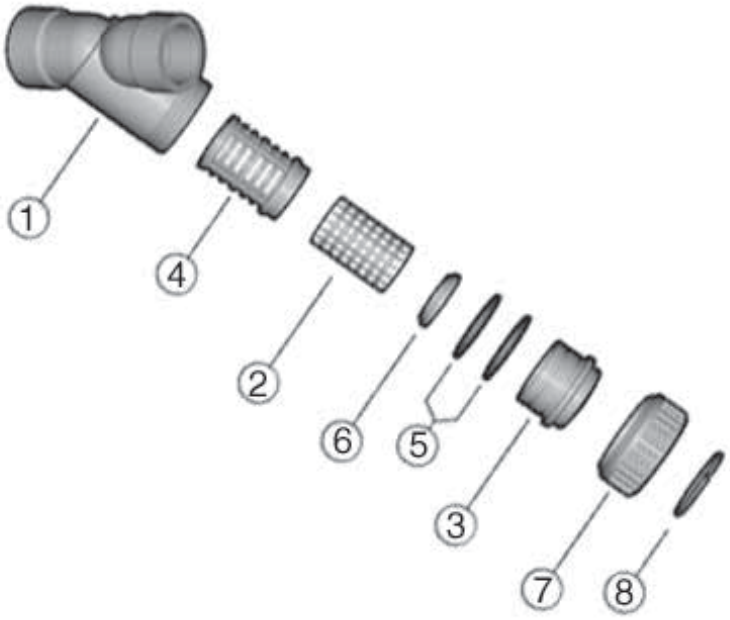
* Spare parts available.

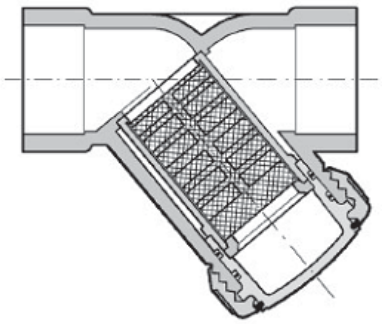
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

RV SERIES SEDIMENT STRAINERS

Components

Size 4"





#	Component	Material	Qty
1	body	PVC / CPVC	1
* 2	screen mesh	PVC / 304 SS	1
* 3	bonnet	PVC	1
* 4	screen support	PVC	1
* 5	o-ring seal	EPDM or FKM	1
* 6	retaining ring	PVC	1
* 7	lock nut	PVC	1
* 8	split ring	PVC	1

* Spare parts available.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

RV SERIES SEDIMENT STRAINERS

Installation Procedures

True Union Style

1. For socket and threaded style connections, remove the union nuts (part #11 on previous pages) and slide them onto the pipe. For flanged connections, remove the union nut / flange assemblies from the valve.
2. Please refer to the appropriate connection style sub-section:
    a. For socket style, solvent cement the end connectors (10) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". **Be sure to allow sufficient cure time before continuing with the valve installation**.
    b. For threaded style, thread the end connectors (10) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
    c. For flanged style, join the union nut / flange assemblies to the pipe flanges. For correct joining procedure, please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
3. Ensure that the valve is in the correct orientation (the bonnet should be suspended in a downward direction), and that the socket o-rings (9) are properly fitted in their grooves. Carefully place the valve in the system between the two end connections.
4. Tighten both union nuts and the lock nut (7). Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. **Over-tightening may damage the threads on the valve body and/or the nut, and may even cause the nut to crack**.

Non True Union Style

1. Please refer to the appropriate connection style sub-section:
    a. For socket style, ensure that the valve is in the correct orientation (the bonnet should be suspended in a downward direction) then solvent cement the end connections of the valve body (1) to the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". Ensure that no excess solvent runs into the body as this would cause severe damage to internal components and render the strainer inoperative. Be sure to allow sufficient cure time before continuing with the valve installation.
    b. For threaded style, ensure that the valve is in the correct orientation (the bonnet should be suspended in a downward direction) then thread the pipe ends into the valve body (1). For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
    c. For flanged style, ensure that the valve is in the correct orientation (the bonnet should be suspended in a downward direction) then join to the pipe flanges. For correct joining procedure, please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".

2. Ensure that the bonnet (3, size 3") or lock nut (7, size 4") is sufficiently tightened. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. **Over-tightening may damage the threads on the valve body and/or the nut, and may even cause the nut to crack**.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

RV SERIES SEDIMENT STRAINERS

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. **Be sure to depressurize and drain the isolated branch and valve before continuing**.
2. For true union style, loosen both union nuts (11) and drop the valve out of the line. If retaining the socket o-rings (9), take care that they are not lost when removing the valve from the line.
3. For sizes 1/2" through 2" and 4":
   a. Loosen the lock nut (7) – bonnet (3) assembly and remove from the valve body (1).
   b. Remove the split ring (8) to separate the lock nut from the bonnet.
   c. Remove the retaining ring (6) and slide the screen mesh (2) out of the screen support (4).
   d. Remove the o-ring seal(s) (5) from the bonnet.
4. For size 3":
   a. Loosen the bonnet (3) and remove from the valve body (1).
   b. Remove the retaining ring (6) and slide the screen mesh (2) out of the screen support (4).
   c. Remove the o-ring seal(s) (5) from the groove on the valve body.
5. The valve components can now be checked for problems and/or replaced.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities**.

1. For sizes 1/2" through 2" and 4":
   a. Properly fit the o-ring seal(s) (5) onto the bonnet (3).
   b. Insert the screen mesh (2) into the screen support (4) and fasten with the retaining ring (6).
   c. Place the lock nut (7) over the bonnet then fit the split ring (8) in the groove to lock in position.
   d. Insert the screen and lock nut – bonnet assembly into the valve body (1) and tighten.
2. For size 3":
   a. Properly fit the o-ring seal (5) onto the bonnet (1).
   b. Insert the screen mesh (2) into the screen support (4) and fasten with the retaining ring (6).
   c. Insert the screen assembly into the valve body.
   d. Tighten the bonnet (3) into the valve body.
3. For true union style, ensure that the socket o-rings (9) are properly fitted in their grooves, place the end connectors (10) into the union nuts (11), then tighten onto the valve body.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system**.

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.
- **To eliminate any possible damage to the filter screen, the design of the system should ensure that reverse flow conditions cannot occur**.
- **Transparent PVC strainers:**

  Allow light into the process flow facilitating the growth of micro-organisms.

  Are not protected against UV radiation, reducing its lifetime in open air use.

  Must be protected against vibrating stresses in proximity to pumping stations.

- Always check the cleanliness of the filtering screen.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

LV SERIES LAB VALVES

IPEX LV Lab Valves are an ingenious PVC quarter turn product ideal for many simple plumbing applications. These compact, economical valves are supplied with an assortment of connections that match up with any kind of existing pipe or hose. LV Lab Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

ASTM D1784
ASTM D2466
ASTM F1498

ANSI

VALVE AVAILABILITY

Body Material	PVC, CPVC
Size Range	1/4"
Pressure	150 psi
Seals	Teflon® (PTFE)
End Connections	Threaded (MNPT) Hose Adaptor

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

LV SERIES LAB VALVES

Sample Specification

1.0 Lab Valves - LV

1.1 Material

- The valve body and ball shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

1.2 Seats

- The ball seats shall be made of Teflon® (PTFE).

1.3 Seals

- The o-ring seals shall be made of EPDM.

2.0 Connections

2.1 Threaded style

- The male NPT threaded PVC end connections shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1.

2.2 Hose adaptor style

- Hose adaptors may be substituted for the male NPT threaded PVC end connections.

3.0 Design Features

- The valve shall have a double stop polypropylene handle.
- The valve shall allow for bi-directional flow.

3.1 Pressure Rating

- All valves shall be rated at 150 psi at 73°F.

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

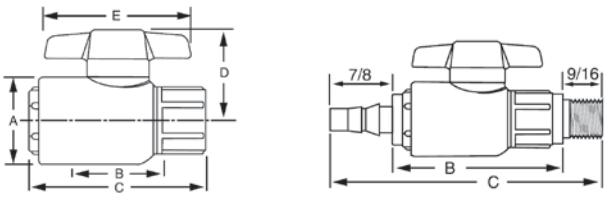
3.3 Colour Coding

- All PVC valves shall be colour-coded dark gray.
- 4.0 All valves shall be Xirtec® PVC by IPEX or approved equal.

Valve Selection

Size (inches)	Body Material	O-ring Material	IPEX Part Number IPS Socket	Pressure Rating at 73°F
1/4	PVC	EPDM	052308	150 psi
1/4 w/kit	PVC	EPDM	052308	150 psi

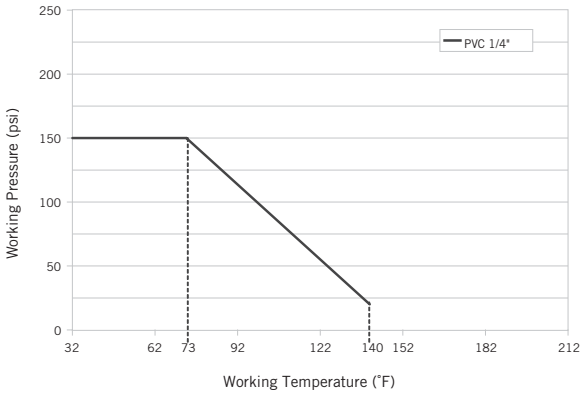
Dimensions and Weights



Dimension (inches)

Size	A	B	C	D	E	W (lbs)
1/4	1.06	0.938	2.13	1.06	1.75	0.10
1/4 w/kit	1.06	2.44	3.88	1.06	1.75	0.14

Pressure – Temperature Ratings



SPECIALTY VALVES

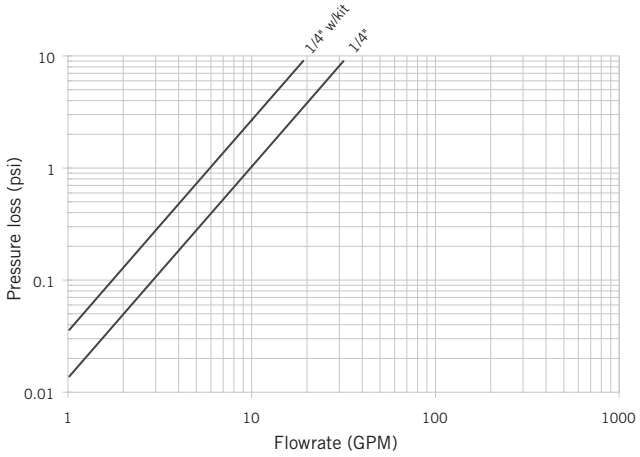
CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

LV SERIES LAB VALVES

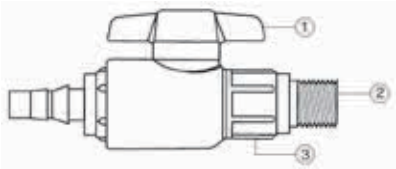
Flow Coefficients

Size	C_V
1/4	10.0
1/4 w/kit	6.00

Pressure Loss Chart



Components

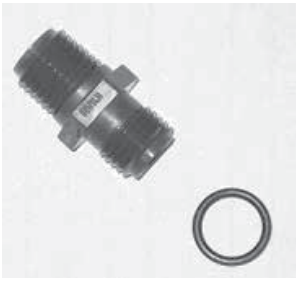


#	Component	Material	Qty
1	handle	PP	1
2	end connector	PVC	1
3	body	PVC	2

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

LV SERIES LAB VALVES

Installation Procedures



1. Install the o-ring in the groove at the base of the threads on the desired end connector (part #2 on previous page).
2. Hand-tighten each end connector into the valve body (3).
   Do not use Teflon® tape or thread sealant.
3. Tighten down the end connectors using the supplied plastic wrench.
   Caution: Over-tightening may cause damage to the valve body and/or end connectors.
4. Use the appropriate fittings or tube and ring clamps to connect the valve to the system.

Removal from the System

1. If removing the valve from an operating system, isolate the valve from the rest of the system. **Be sure to depressurize and drain the isolated branch and valve before continuing**.
2. Depending on the connection type, either loosen the fittings or ring clamps to remove the valve.
3. The valve can now be reused and/or replaced.

Note: The LV Lab Valve has a one piece valve body. It cannot be disassembled.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system**.

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

S12/22 SERIES SOLENOID VALVES

The IPEX S12/22 Series True Union Solenoid Valves represent the latest innovation in valve manufacturing technology. The S12/22 Series replaces the well-received SF Series with a number of new features and is designed for industrial, OEM and water service applications. The S12/22 is direct acting, 2 way-2 position flow control valve, ideal for precise control and high-cycle service. The new high-performance electric solenoid actuator has been redesigned to exceed 5 million cycles without having to perform maintenance and a 100% duty cycle means no issues with overheating or "burnout". With their lever type shutter design, standard manual override, and LED position indicator, these valves will outlast and outperform more conventional diaphragm-style solenoid valves.

S12/22 Solenoid Valves are part of our complete system of IPEX pipe, valves and fittings, engineered and manufactured to our strict quality, performance and dimensional standards.

ASTM D1784
ASTM D2464
ASTM D2466
ASTM D2467
ASTM F1498

ANSI B1.20.1

VALVE AVAILABILITY

Body Material	PVC
Size Range	1/4" through 1/2"
Pressure	up to 90 psi
Seals	EPDM or FKM
End Connections	Socket (IPS),Threaded (FNPT)

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

S12/22 SERIES SOLENOID VALVES

Sample Specification

1.0 Solenoid Valves – S12/22

1.1 Material

- The valve body, end connectors, and unions shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

1.2 Seals

- The o-ring seals and shutter shall be made of EPDM.

or The o-ring seals and shutter shall be made of FKM.

2.0 Connections

2.1 Socket style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

2.2 Threaded style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1.

3.0 Design Features

- The valve shall have true union ends.
- The valve opening and closing mechanism shall be a lever type shutter.
- The valve shall have a standard LED indicator.
- The valve shall have an integrated manual override in the event of a loss of power to the valve.
- The electric solenoid actuator shall be designed to exceed 5 million cycles without having to perform maintenance.
- All metallic valve parts shall be isolated from fluids and the external environment.
- All screws shall be protected by polyethylene caps.

3.1 Pressure Rating

- Valve sizes ND 0.16" (1/4) and ND 0.31" (1/2) shall be rated at 90 psi at 73°F.
- Valve sizes ND 0.24" (1/4) and ND 0.39" (1/2) shall be rated at 60 psi at 73°F.
- Valve sizes ND 0.31" (1/4) and ND 0.59" (1/2) shall be rated at 30 psi at 73°F.

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Colour Coding

- All PVC valves shall be colour-coded dark gray.

4.0 All valves shall be Xirtec® PVC by IPEX or approved equal.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

S12/22 SERIES SOLENOID VALVES

Valve Selection

Size (inches)		Body Material	O-ring Material	IPEX Part Number		Pressure Rating
				IPS Socket	FNPT Threaded	
1/4	0.16	PVC	EPDM	353687	353723	90 psi
			FKM	353711	353699	
1/4	0.24	PVC	EPDM	353688	353724	60 psi
			FKM	353712	353698	
1/4	0.31	PVC	EPDM	353689	353725	30 psi
			FKM	353713	353697	
1/2	0.31	PVC	EPDM	353696	353734	90 psi
			FKM	353722	353708	
1/2	0.39	PVC	EPDM	353709	353733	60 psi
			FKM	353721	353707	
1/2	0.59	PVC	EPDM	353710	353732	30 psi
			FKM	353720	353706	

Size (inches):

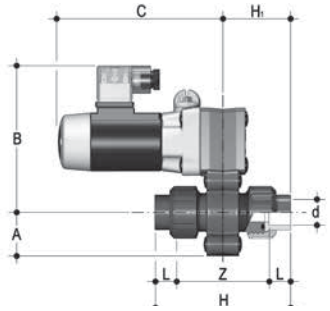
- ☐ 1/4" – ND 0.16"
- ☐ 1/4" – ND 0.24"
- ☐ 1/4" – ND 0.31"
- ☐ 1/2" – ND 0.31"
- ☐ 1/2" – ND 0.39"
- ☐ 1/2" – ND 0.59"

Seals:

- ☐ EPDM
- ☐ FKM

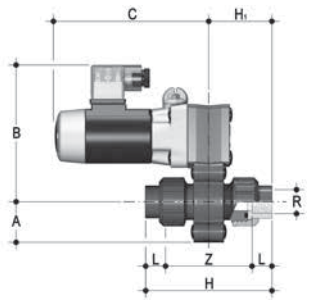
IPEX Part Number:

Dimension and Weights



IPS socket connections – Dimension (inches)

Type	Size	d	ND	A	B	C	E	H	H1	L	M	Z	Weight (lbs)
S12	1/4	0.54	0.16	0.94	3.94	4.06	1.65	3.62	1.81	0.63	2.05	2.36	0.88
S12	1/4	0.54	0.24	0.94	3.94	4.06	1.65	3.62	1.81	0.63	2.05	2.36	0.88
S12	1/4	0.54	0.31	0.94	3.94	4.06	1.65	3.62	1.81	0.63	2.05	2.36	0.88
S22	1/2	0.84	0.31	1.34	4.53	5.12	2.13	4.57	2.28	0.87	2.64	2.80	2.20
S22	1/2	0.84	0.39	1.34	4.53	5.12	2.13	4.57	2.28	0.87	2.64	2.80	2.20
S22	1/2	0.84	0.59	1.34	4.53	5.12	2.13	4.57	2.28	0.87	2.64	2.80	2.20



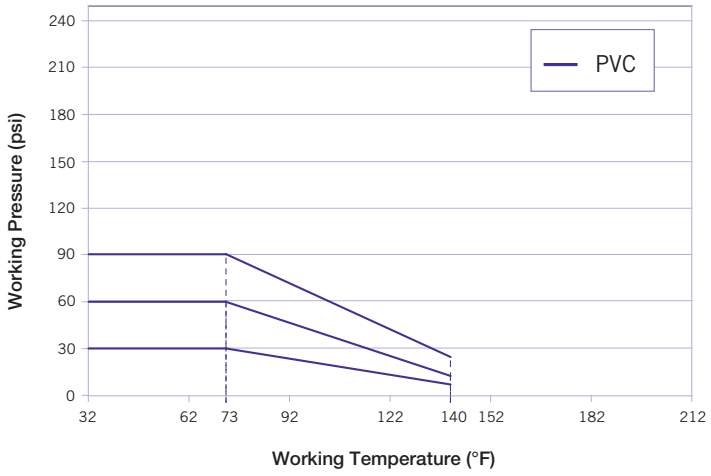
Female NPT threaded connections – Dimension (inches)

Type	Size	R	ND	A	B	C	E	H	H1	L	M	Z	Weight (lbs)
S12	1/4	1/4-NPT	0.16	0.94	3.94	4.06	1.65	3.58	1.77	0.59	2.05	2.40	0.88
S12	1/4	1/4-NPT	0.24	0.94	3.94	4.06	1.65	3.58	1.77	0.59	2.05	2.40	0.88
S12	1/4	1/4-NPT	0.31	0.94	3.94	4.06	1.65	3.58	1.77	0.59	2.05	2.40	0.88
S22	1/2	1/2-NPT	0.31	1.34	4.53	5.12	2.13	4.41	2.20	0.81	2.64	2.80	2.20
S22	1/2	1/2-NPT	0.39	1.34	4.53	5.12	2.13	4.41	2.20	0.81	2.64	2.80	2.20
S22	1/2	1/2-NPT	0.59	1.34	4.53	5.12	2.13	4.41	2.20	0.81	2.64	2.80	2.20

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

S12/22 SERIES SOLENOID VALVES

Pressure & Temperature Ratings



Note: The maximum ambient temperature allowed for the solenoid is 122°F (50°C).

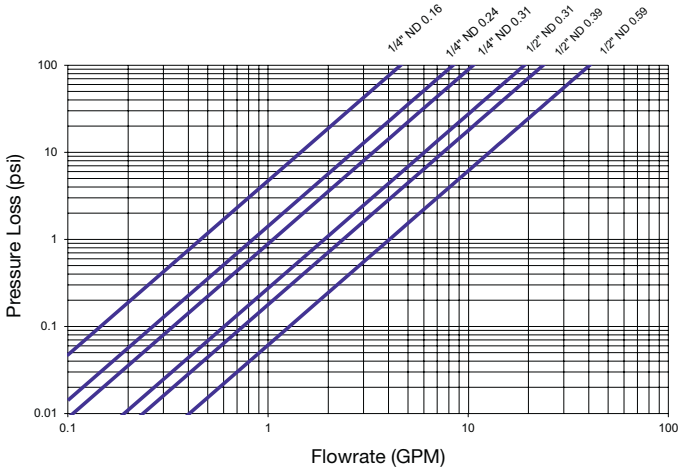
Electrical Data

Duty Cycle	100% ED
Closing Time	~ 20 ms
Opening Time	~ 20 ms
AC Voltage	110 V
Frequency	50/60 Hz
Voltage Allowances	± 10%
Power Consumption, S12	10W
Power Consumption, S22	20W
Protection Class	IP65
Electrical Connection	DIN 43650 connector with LED (1)

Flow Coefficients

Size	ND	C_V
1/4	0.16	0.46
1/4	0.24	0.84
1/4	0.31	1.06
1/2	0.31	1.91
1/2	0.34	2.37
1/2	0.59	4.04

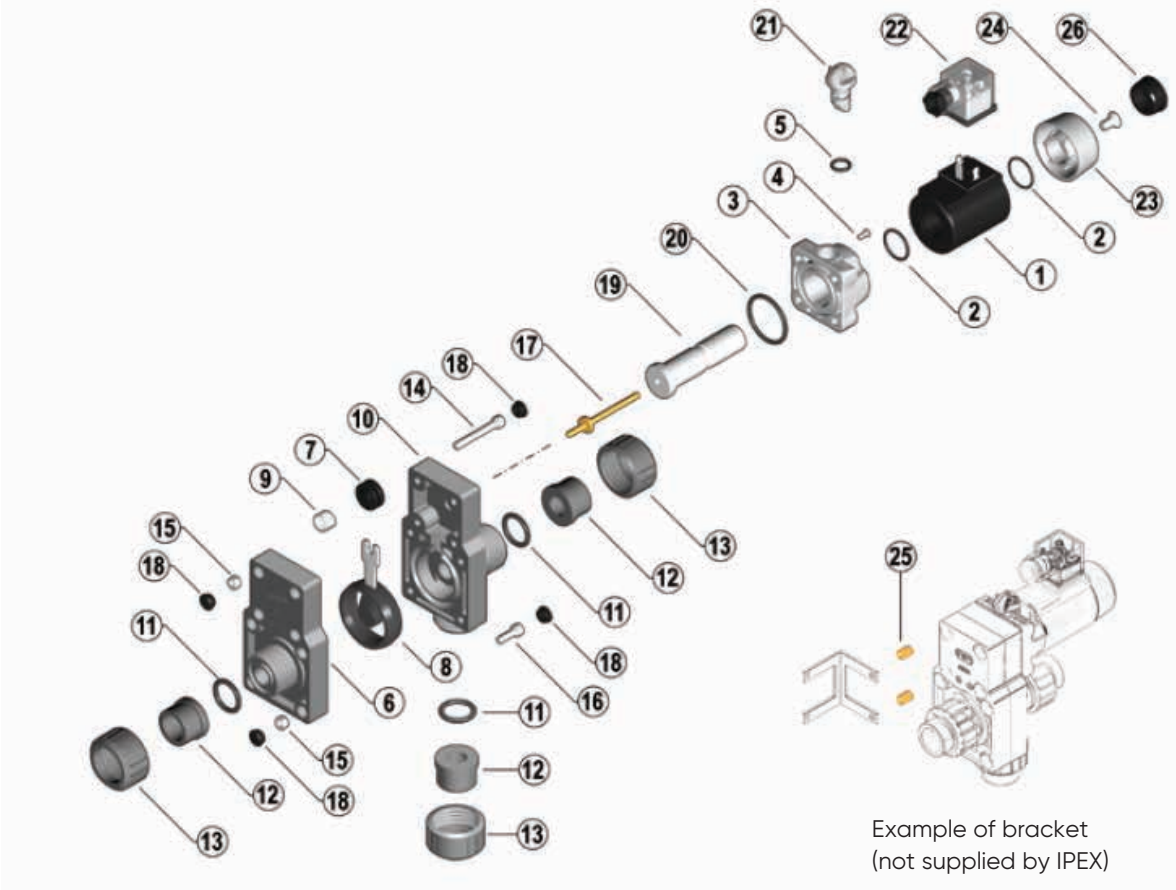
Pressure Loss Chart



SPECIALTY VALVES

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

S12/22 SERIES SOLENOID VALVES



#	Component	Material	Qty
1	Coil	PA-GR	1
2	O-ring	EPDM	2
3	Housing for manual override	PP-GR	1
4	Screw	SS	1
5	O-ring	EPDM	1
6	Upper body	PVC	1
7	Spring slide	PP-GR	1
8	Shutter	EPDM or FKM	1
9	Return spring	SS	1
10	Lower body	PVC	1
11	O-ring	EPDM or FKM	2
12	End connector	PVC	2
13	Union nut	PVC	2
14	Screw	Zinc plated steel	4

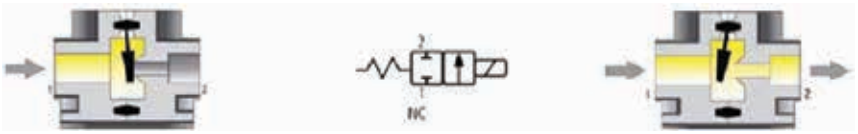
#	Component	Material	Qty
15	Nuts	Zinc plated steel	8
16	Screw	Zinc plated steel	4
17	Control Spindle	Brass	1
18	Protection caps	PE	8
19	Operator	SS	1
20	O-ring	EPDM	1
21	Manual override	PP-GR	1
22	Connector	-	1
23	Coil cap	PPP-GR	1
24	Screw	SS	1
25	Bracketing nuts	Brass	2
26	Protection cap	PE	1

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Installation Procedures

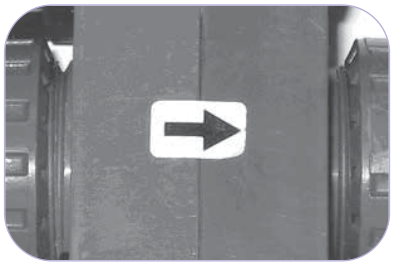
1. Remove the union nuts (part #13 on previous page) and slide them onto the pipe ends.
2. Solvent cement or thread the end connectors (12) onto the pipe ends. For correct joining procedures, please refer to the sections entitled, "Joining Methods – Solvent Cement" and "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piing Systems".
3. Ensure that the desired direction of pipe flow matches the indicated direction on the valve and that the socket o-rings (11) are properly fitted in their grooves. Carefully place the valve in the system between the two end connections.
4. Tighten both union nuts. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. **Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack.**
5. Remove the connector (22) from the solenoid coil (1), disassemble, and then connect the electrical leads.
6. Reassemble the connector and reattach to the solenoid coil.

Note: It is advisable to support the valve with a mounting bracket as the weight of the solenoid may cause the pipeline to sag.



De-Energized Solenoid

Energized Solenoid



Where,

f is the pressure drop (friction loss) in psi,

sg is the specific gravity of the fluid,

Q is the flow rate in GPM,

C_V is the flow coefficient.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

S12/22 SERIES SOLENOID VALVES

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. **Be sure to depressurize and drain the isolated branch and valve before continuing.**
2. Remove the connector (22) from the solenoid coil and detach the electrical leads. **Be sure to shut off the electrical source before detaching the leads.**
3. Loosen both union nuts (13) and drop the valve out of the line. If retaining the socket o-rings (11), take care that they are not lost when removing the valve from the line.
4. Remove the protection cap (26), unscrew the screw of the coil (24) and remove the cover of the coil (23).
5. Remove the coil (1) and the O-ring (2).
6. Remove the protective caps (18) and unscrew the screws (14).
7. Separate the actuator group from the valve body, remove the control spindle (17) and the O-ring (20).
8. Unscrew the screw (4) and remove the manual override (21) and the O-ring (5). Remove the operator (19) from the housing of the manual override (3).
9. Unscrew the screws (16) and separate the two half bodies (6 -10) and remove the shutter (8).
10. Remove the spring (9) from the spring slide (7) and then detach the spring slide from the shutter (8).

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities**.

1. Insert the spring slide (7) on the shutter rod (8) and the spring (9) onto the spring slide housing (7).
2. Put the shutter (8) on the upper body (6) taking care that the spring (9) is properly positioned into its groove.
3. Assemble the two half-bodies (6-10) tightening the screws (16) observing a cross pattern and the torque values suggested on the instruction sheet.
4. Insert the operator (19) into the housing for the manual override (3) up to the stop.
5. Place the O-ring (5) on the manual override (21) and tighten the screw (4). Verify that the manual override is free to rotate. Set it in "close" position.
6. Insert the control spindle (17) into the hole of the operator (19), place the o-ring (20) on the housing of the manual override groove.
7. Reassemble the actuator group on the valve body by tightening the screws (14) observing a cross pattern and the torque values suggested on the instruction sheet.
8. Insert all protective caps (18), place the coil (1), the coil cap (23) and fix it by tightening the screw (24). Refer to the maximum torque recommendation on the instruction sheet. Replace the protection cap (26).
9. Ensure that the socket o-rings (11) are properly fitted in their grooves then attach the end connectors (12) and union nuts (13).

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation In any test or operating condition, **it is important to never exceed the pressure rating of the lowest rated appurtenance in the system**.

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

STANDARDS

Standards exist to ensure that thermoplastic piping systems meet the required level of performance for a particular application. IPEX engineers and technical staff actively participate in thermoplastic standards development throughout North America. These activities result in new standards and improvements to existing standards for thermoplastic piping.

Standards Organizations

IPEX products comply with standards developed by several standards organizations. Additional information on standards and compliance can be obtained by contacting the following organizations.

ASTM International, www.astm.org
100 Barr Harbor Drive, West Conshohocken, Pennsylvania USA 19428-2959

ANSI, www.ansi.org
1819 L Street, NW., Suite 600, Washington DC USA 20036

ISO, www.iso.org
1 rue de Varembé, Case postale 56, CH-1211 Geneva 20, Switzerland

NSF International, www.nsf.org
P.O. Box 130140, 789 N. Dixboro Rd, Ann Arbor, Michigan USA 48113-014

Applicable Standards

The following is a list of applicable standards for IPEX thermoplastic valves and related piping systems.
This list is up-to-date at the time of printing.

ASTM

D1784	Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
D1785	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
D2464	Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
D2466	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
D2467	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
D3222	Standard Specification for Unmodified Poly(Vinylidene Fluoride) (PVDF) Molding Extrusion and Coating Materials
D4101	Standard Specification for Polypropylene Injection and Extrusion Materials
F437	Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
F439	Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
F441/F441M	Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80
F1498	Standard Specification for Taper Pipe Threads 60° for Thermoplastic Pipe and Fittings

ANSI

B1.20.1	Pipe Threads, General Purpose
B16.5	Pipe Flanges and Flanged Fittings

ISO

10931	Plastics piping systems for industrial applications – Poly(vinylidene fluoride) (PVDF) – Specifications for components and the system
11922-1	Thermoplastics pipes for the conveyance of fluids – Dimensions and tolerances – Part 1: Metric series

NSF

NSF 14	Plastic Piping System Components and Related Materials
NSF 61	Drinking Water System Components - Health Effects

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

NOTES

CAUTION: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters.

SALES AND CUSTOMER SERVICE

IPEX Inc.
Toll Free: (866) 473-9462
ipexna.com

About IPEX by Aliaxis

As leading suppliers of thermoplastic piping systems, IPEX by Aliaxis provides our customers with some of the world's largest and most comprehensive product lines. All IPEX by Aliaxis products are backed by more than 50 years of experience. With state-of-the-art manufacturing facilities and distribution centers across North America, we have established a reputation for product innovation, quality, end-user focus and performance.

Markets served by IPEX by Aliaxis products are:

- Electrical systems
- Telecommunications and utility piping systems
- Industrial process piping systems
- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- PE Electrofusion systems for gas and water
- Industrial, plumbing and electrical cements
- Irrigation systems
- PVC, CPVC, ABS, PE, PEX, PVCO, PP and PVDF pipe and fittings (1/2" to 60")

Xirtec® is a registered trademark used under license.
Xirtec® CPVC piping systems are made with Corzan® CPVC compounds.
Corzan® is a registered trademark of the Lubrizol Corporation.

This literature is published in good faith and is believed to be reliable. However it does not represent and/or warrant in any manner the information and suggestions contained in this brochure. Data presented is the result of laboratory tests and field experience.

A policy of ongoing product improvement is maintained. This may result in modifications of features and/or specifications without notice.

IPEX by aliaxis

MNINVLIP210204R4C
© 2023 IPEX IND00311C