HAYWARD FLOW CONTROL

DAB SERIES DIAPHRAGM VALVE

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

WARRANTY TERMS AND CONDITIONS:

THREE YEAR WARRANTY: All products manufactured by Hayward are warranted against defects in material or workmanship for a period of three years from date of shipment. Our sole obligation under this warranty is to repair or replace, at our option, any product or any part or parts thereof found to be defective. HAYWARD MAKES NO OTHER REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. The warranty set forth above is the only warranty applicable to Hayward products and in no event shall Hayward be liable for any delay, work stoppage, cartage, shipping, loss of use of equipment, loss of time, inconvenience, loss of profits of any direct or indirect incidental resulting from or attributable to a breach of warranty. The remedies under this warranty shall be the only remedies available. OUR MAXIMUM LIABILITY SHALL NOT IN ANY EVENT EXCEED THE CONTRACT PRICE FOR THE PRODUCT.

NOTES:

Krytox™ is a trademark of The Chemours Company

PLEASE READ THE FOLLOWING INFORMATION PRIOR TO INSTALLING AND USING HAYWARD DIAPHRAGM VALVES. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PRODUCT DAMAGE, PROPERTY DAMAGE, PERSONAL INJURY, OR EVEN DEATH.

1. Hayward Flow Control (Hayward), a division of Hayward Industries, guarantees its products against defective material and workmanship only. Hayward assumes no responsibility for property damage or personal injury resulting from improper installation, misapplication, or abuse of any product.
2. Hayward assumes no responsibility for property damage or personal injury resulting from chemical incompatibility between its products and the process fluids to which they are exposed. Determining whether a particular PVC or CPVC product is suitable for an application is the responsibility of the user. Chemical compatibility charts provided in Hayward literature are based on ambient temperatures of 70°F and are for reference only.
3. Hayward products are designed for use with non-compressible liquids.

WARNING

Hayward PVC and CPVC products should NEVER be used or tested with compressible fluids such as compressed air or nitrogen. Use of PVC and CPVC products in compressible fluid applications may result in product damage, property damage, personal injury, or even death.

WARNING

The DAB Series Diaphragm Valve is intended for use in liquid service only. Do not attempt to use this valve for controlling air or gases. Use of this product in air or gas service may result in product damage, property damage, personal injury, or even death.

4. The maximum recommended fluid velocity through any Hayward product is eight feet per second (8 ft/s). Higher fluid velocity can result in damage due to the water hammer effect.
5. Piping systems must be designed and supported to prevent excess mechanical loading on Hayward products due to system misalignment, weight, shock, vibration, and the effects of thermal expansion and contraction.
6. The effect of temperature on plastic piping systems must be considered when the systems are initially designed. The pressure rating of plastic systems must be reduced with increasing temperature. Maximum operating pressure is dependent upon material selection as well as operating temperature. Before installing any Hayward product, consult Hayward product literature for pressure vs. temperature curves to determine any operating pressure or temperature limitations.
7. PVC and CPVC plastic products become brittle below 40°F. Use caution in their installation and operation below this temperature.

WARNING

Hayward PVC and CPVC products should not be used in services with operating temperature below 34°F.

8. Due to differential thermal expansion rates between metal and plastic, transmittal of pipe vibration and pipe loading forces, **DIRECT INSTALLATION OF PLASTIC VALVES INTO METAL PIPING SYSTEMS IS NOT RECOMMENDED**. Wherever installation of plastic valves into metal piping systems is necessary, it is recommended that at least 10 pipe diameters in length of plastic pipe be installed upstream and downstream of the plastic valve to compensate for the factors mentioned above.
9. Published operating requirements are based on testing of new valves using clean water at 70°F. Valve performance is affected by many factors including fluid chemistry, viscosity, specific gravity, flow rate, and temperature. These should be considered when sizing Hayward products.
10. Systems should always be depressurized and drained prior to installing or maintaining any Hayward product.

WARNING

Failure to depressurize and drain system prior to installing or maintaining valve may result in product damage, property damage, personal injury, or even death.

11. Always follow your site and/or company procedures for any safety training and/or site specific precautions or warnings in addition to those in this document.

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1. INSTALLATION:

1.1. **Transporting the Valve:**

1.1.1. Valve should be stored inside factory packaging until product is ready to be installed. Packaged valve should be stored indoors, at room temperature, and out of direct sunlight. Avoid storing packaged valve in location where packaging may become wet. Valve should be moved as close to installation site as possible prior to removing from packaging. Do not cut through tape on box any more than necessary to avoid damaging valve. After removing valve from carton, care must be taken not to damage valve or to allow debris to enter valve.

WARNING

System must be depressurized and drained prior to installing valve or performing maintenance. Failure to depressurize and drain system prior to installing or maintaining valve may result in product damage, property damage, personal injury, or even death.

CAUTIONS

Do not install valve directly to pump outlet. Allow a length of at least 5 pipe diameters between pump outlet and valve.

Do not install valve directly after a reducer / expansion fitting. Install at least 5 pipe diameters from an expansion or reducing fitting.

Pipe must be supported upstream and downstream of the valve. Sound piping system design principles should be applied when installing this valve.

Do not install valve directly into a metal system. Wherever installation of thermoplastic valves into metal piping systems is necessary, it is recommended that at least 10 pipe diameters in length of thermoplastic pipe be installed upstream and downstream of the thermoplastic valve.

When lifting valve do not lift by the handle.

1.2. **Installing the Valve into a System:**

NOTES

Hayward DAB Series diaphragm valves are bi-directional. There are no direction arrows or specific orientation requirements for proper operation.

1.2.1. Remove valve from packaging.

1.2.2. Verify that product is defect free and meets specifications.

1.2.2.1. Threaded End Connectors:

1.2.2.1.1. Remove the nut and end connector by rotating the nuts counter clockwise. Verify end connector o-rings are installed in their respective grooves.

1.2.2.1.2. Place nut over pipe end so that it can engage the end connector once the end connector is connected to the pipe end.

1.2.2.1.3. Wrap male threads of pipe end with PTFE tape. Proper application of PTFE tape will provide a sufficient seal for PVC and CPVC threaded joints.

WARNING

Do not use "pipe dope", liquid sealant, or thread sealant on any PVC or CPVC threaded connections. Pipe dope and thread sealants may react with the PVC or CPVC, weakening the material and potentially resulting in failure of the joint, product damage, property damage, personal injury, or even death.

1.2.2.1.4. Thread the end connector onto the threaded pipe end until "hand tight". Using a strap wrench only (never use a pipe wrench), tighten the end connector onto the pipe only to the point required to form a seal between the end connector and pipe thread; 1/2 turn past hand tight is typically sufficient to form a seal. **(Caution: Tightening beyond this point may introduce excessive stress that could cause failure of the end connector or the threaded end of the pipe.)**

1.2.2.1.5. Install valve cartridge between end connectors, match nuts to body threads and turn nut clockwise to thread onto body. Using a strap wrench only (never use a pipe wrench), nut can be tightened ¼ - ½ turn past hand tight, as needed.

1.2.2.2. Solvent-Weld End Connectors (PVC and CPVC only):

CAUTION

Valve center cartridge must be disassembled from nuts and end connectors prior to solvent cementing end connections into system, Avoid exposing valve cartridge and end connector o-rings to primer, solvent cement, or their fumes, as damage to the valve could result.

1.2.2.2.1. Remove the nut and end connector by rotating the nuts counter clockwise. Verify end connector o-rings are installed in their respective grooves.

1.2.2.2.2. Place nut over pipe end so that it can engage the end connector once the end connector is connected to the pipe end.

1.2.2.2.3. Refer to solvent-cement manufacturer's instructions and cure times.

1.2.2.2.4. **Do not install valve cartridge until solvent cement has fully cured.** Reinstall end connectors by threading nuts onto body by rotating in a clockwise direction.

1.2.2.2.5. Install valve cartridge between end connectors, match nuts to body threads and turn nut clockwise to thread onto body. Using a strap wrench only (never use a pipe wrench), nut can be tightened ¼ - ½ turn past hand tight, as needed.

1.2.2.3. Flange Connections:

1.2.2.3.1. Flange bolts should be tight enough to compress the gasket and make a good seal, without distorting or putting excessive stress on the flanges. Suitable washers should be used between the bolt head and flange and the nut and flange. Bolts should be tightened in alternating sequence (Figure 1). See Table 1 for recommended torque.

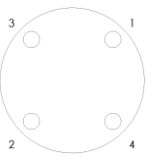

Fig. 1: 4 Bolt Tightening Sequence

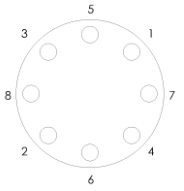

Fig. 2: 8 Bolt Tightening Sequence

Table 1: Recommended Flange Bolt Torque

Flange Size	Bolt Dia. (in.)	Torque (ft. lbs.)
1/2"	1/2	10 – 15
3/4"	1/2	10 – 15
1"	1/2	10 – 15
1-1/4"	1/2	10 – 15
1-1/2"	1/2	10 – 15
2"	5/8	15 – 20
2-1/2"	5/8	20 – 25
3"	5/8	20 – 25
4"	5/8	20 – 25
6"	3/4	30 – 40

1.2.3. Never install valve into system where assembly nuts or flanges have to be used to pull system together. This will apply undue loading on the valve body and assembly nuts or flanges. Piping system should be properly aligned prior to valve installation.

1.2.4. Never install valve into system that must be forcibly separated in order to allow space for body. This will apply undue loading on the valve body.

1.2.5. Valve with actuator:

1.2.5.1. Set the max stroke limiter as necessary.

1.2.5.2. On all 1/2" air actuated diaphragm valves and 3/4" Air to Air actuated diaphragm valves, the air connections are 1/8" NPT. All other air actuators have 1/4" NPT air connections.

1.2.5.3. The bottom air connection opens the valve on Air to Air or Air to Spring Actuators. The top connection closes the valve on Air to Air actuators.

1.2.5.4. Support weight of actuator as necessary.

1.2.5.5. Do not allow valve to support the weight of the pipe.

1.2.5.6. When using pneumatic or electric actuators, additional support directly to the actuator is recommended. When large actuation is used, weight of the actuator needs to be supported independent of the support given by the mounting flange of the valve.

2. STARTUP AND OPERATION:

WARNINGS

Hayward PVC and CPVC products should NEVER be used or tested with compressible fluids such as compressed air or nitrogen. Use of PVC and CPVC products in compressible fluid applications may result in product damage, property damage, personal injury, or even death.

The DAB Series Diaphragm Valve is intended for use in liquid service only. Do not attempt to use this valve for controlling air or gases. Use of this product in air or gas service may result in product damage, property damage, personal injury, or even death.

Hayward PVC and CPVC products should not be used in services with operating temperature below 34°F.

2.1. Operate the valve to the ½ open position.
2.2. Slowly purge air from system as line fills with liquid
2.3. Look for leaks around valve hand wheel, diaphragm, and end connections or flanges and check for proper valve operation. If any leaks are present, or valve does not perform properly, refer to troubleshooting guide. Depressurize and drain system prior to performing any maintenance.
2.4. Periodically check valve for leaks or external damage.
2.5. Periodically check true union nuts and / or flange connections.
2.6. Operation of valve to full closed:
2.6.1. Rotate the hand wheel clockwise about the hand wheel axis to close. The hand wheel will stop turning when valve is in fully closed position.
2.6.1.1. When fully closed, the position indicator will be at the bottom of the indicator dome.
2.7. Operation of valve to full open:
2.7.1. Rotate the hand wheel counter clockwise about the hand wheel axis to open. The hand wheel will stop turning when valve is in fully open position.
2.7.1.1. When fully open, the position indicator will be at the top of the indicator dome.
2.8. Periodic Operation
2.8.1. Where possible, for valves that are installed in locations where they are not operated frequently, it is recommended that valves are operated according to a routine maintenance schedule at least once every six months.

3. MAINTENANCE:

WARNINGS

System must be depressurized and drained prior to installing valve or performing maintenance. Failure to depressurize and drain system prior to installing or maintaining valve may result in product damage, property damage, personal injury, or even death.

Make sure operator or actuator, if any, has no stored energy and is in its' fail position if applicable. For valves supplied with electric actuators, follow lock out/tag out procedures and remove all power from device before performing maintenance.

Valve must only be removed from line when handle is in partially, but not fully, open position and when line is fully depressurized and drained. Valves that are in fully open or fully closed positions could have trapped cavity pressure.

3.1. Replacing the Diaphragm:
3.1.1. Depressurize and drain the system with the valve in the partially, but not fully, open position.
3.1.1.1. There is no need to remove the valve from the line to replace the diaphragm.
3.1.2. The diaphragm material should be selected for compatibility with the specific application.
3.1.3. Remove the bonnet bolts and where applicable the washers under the bolts.
3.1.4. Remove the bonnet with the diaphragm
3.1.5. Position the diaphragm in the fully closed position.
3.1.6. 1/2" and 3/4" Valves
3.1.6.1. Remove the diaphragm by pealing it out of the compressor.
3.1.6.2. Inspect the diaphragm for wear and replace as needed.
3.1.6.3. Replace the diaphragm by snapping it back into the bonnet assembly.
3.1.7. Valves larger than 3/4"
3.1.7.1. Unscrew the diaphragm by rotating it counter clockwise from the compressor.
3.1.7.2. Inspect the diaphragm for wear and replace as needed.
3.1.7.3. Replace the diaphragm by screwing it back clockwise into the compressor.
3.1.8. Make sure the holes in the diaphragm align with the holes in the bonnet. The line on the diaphragm will align with the weir in the body.
3.1.9. In most applications the diaphragm life can be greatly increased by the application of a small amount of Krytox on the compressor side of the diaphragm.
3.1.10. Reinstall the bonnet bolts and washers. Alternatively tighten the bolts incrementally to 20-25 ft.-lbs.
3.2. Replacing End Connector O-Rings:
3.2.1. Depressurize and drain system with the valve in the partially, but not fully, open position.
3.2.2. Remove assembly nuts from valve body by rotating counterclockwise.
3.2.3. Remove valve body from system.
3.2.4. Using a plastic pick, carefully remove the old seals. NOTE: Be very careful not to damage the o-ring grooves or valve body.
3.2.5. Clean o-ring grooves with a soft brush or cloth.
3.2.6. Install new o-rings by gently pressing o-ring into groove until o-ring is fully seated. See Table 2 for recommended replacement o-ring size.

Table 2: End Connector O-ring Sizes

Valve Size	Inner Dia. (mm)	Outer Dia. (mm)	Thickness (mm)	Reference
½"	18	24	3	G-18
¾"	25.2	32.2	3.5	P-25.5
1"	33.5	41.5	4	V-34
1-¼"	38.7	45.7	3.5	P-39
1-½"	46.99	57.67	5.34	AN-328
2"	54.6	66	5.7	P-55

3.2.7. Install valve cartridge between end connectors, match nuts to body threads and turn nut clockwise to thread onto body. Using a strap wrench only (never use a pipe wrench), nut can be tightened ¼ - ½ turn past hand-tight, as needed.
3.2.7.1. Never install valve into system where assembly nuts have to be used to pull system together. This will apply undue loading on the valve body and assembly nuts. Piping system should be properly aligned prior to valve installation.
3.2.7.2. Never install valve into system that must be forcibly separated in order to allow space for body. This will apply undue loading on the valve body

4. PRODUCT SPECIFICATIONS:

Maximum Pressure: 1/2"-4" Valves:150 psi @ 70ºF (see Chart 1 for operating pressures at elevated temperatures)
6" Valves: 75 psi @ 70ºF (see Chart 2 for operating pressures at elevated temperatures)

Operating Temperature:

Material	Min. Operating Temperature	Max. Operating Temperature
PVC	34ºF (1.1ºC)	140ºF (60.0ºC)
CPVC	34ºF (1.1ºC)	190ºF (82.2ºC)

Max. System Flow Velocity: 8 ft/s (2.4 m/s) for thermoplastic piping systems

Flow Coefficient, True Union DAB:

Size	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
Cv	5.0	8.0	10.0	18.0	26.0	56.0

Flow Coefficient, Flanged DAB:

Size	1/2"	3/4"	1"	1-1/4"	1-1/2"
Cv	5.0	8.0	10.0	18.0	26.0
Size	2"	2-1/2"	3"	4"	6"
Cv	56.0	80.0	115.0	190.0	400.0

WARNING

The maximum recommended fluid velocity through any plastic piping system is eight feet per second (8 ft/s). Higher fluid velocity can create excess water hammer effect, resulting in property damage, personal injury, or even death.

CAUTION

Published operating requirements are based on testing of new valves using clean water at 70°F. Valve performance is affected by many factors including fluid chemistry, viscosity, specific gravity, flow rate, and temperature. These should be considered when sizing systems using Hayward products.

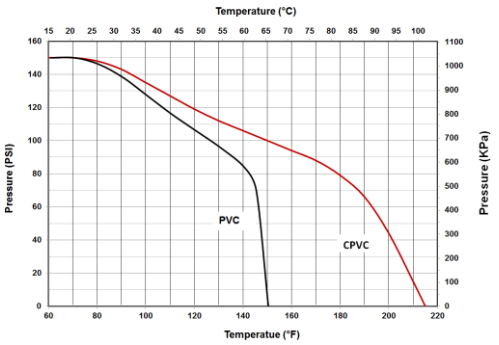

Chart 1: Operating Pressures at Elevated Temperatures

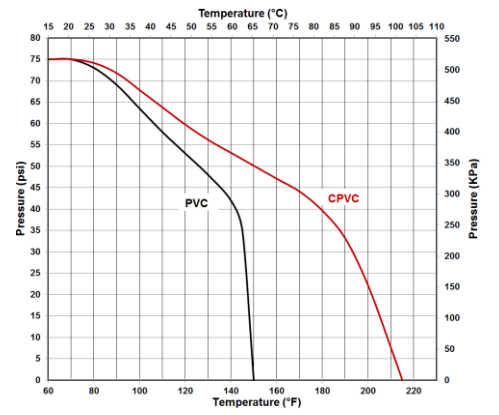

Chart 2: Operating Pressures at Elevated Temperatures

5. PARTS LIST:

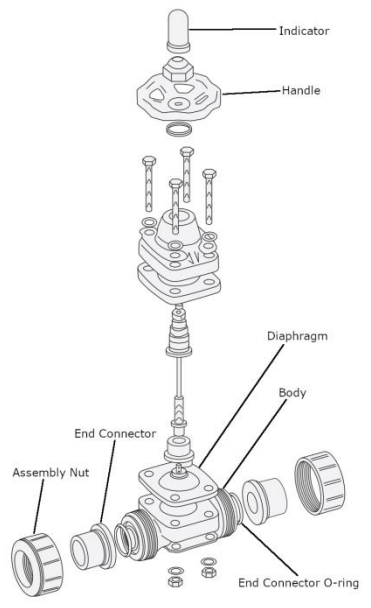

Fig. 3: Exploded View of DAB Series Diaphragm Valve

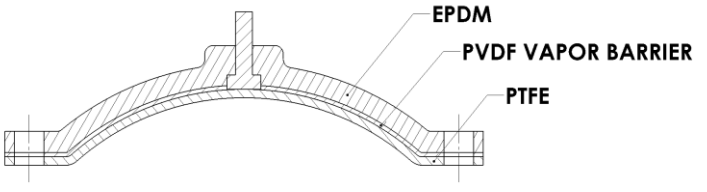

Fig. 4: PVDF Vapor Barrier of DAB Series Diaphragm Valve