



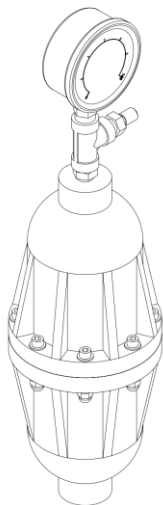
HAYWARD®

Hayward Flow Control

HPD Series Pulsation Dampener

Installation, Operation and Maintenance

Instructions



Made in the USA

TABLE OF CONTENTS

Safety Precautions:

Introduction:

Description

Installation and Operation:

Transporting

Dampener Sizing

Installation

Startup

Typical Installation

Maintenance:

General

Replacing the Bladder

Parts List:

Technical Data:

Operating Pressures at Elevated Temperatures

Notes:

Limited Warranty:

**PLEASE READ THE FOLLOWING INFORMATION PRIOR TO
INSTALLING HAYWARD PRODUCTS. FAILURE TO
FOLLOW THESE INSTRUCTIONS MAY RESULT IN INJURY**

Safety Symbols:



WARNING: Hazardous or unsafe practices could cause serious injury, death or severe property damage.



CAUTION: Hazardous or unsafe practices could cause injury, death or equipment damage.

**Dampeners should only be installed and
maintained by trained personnel.**

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, CPVC, or PVDF 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. *The Hayward HPD Series Pulsation Dampener requires a pre-charge during installation using air, which is contained by the upper hosing and the bladder. The lower housing is connected to the process piping. The lower hosing is intended for liquid service only and should never be connected to air, nitrogen or any other compressible fluid source.*

WARNING

The lower housing of the Hayward HPD Series Pulsation Dampener in PVC, CPVC, and PVDF should NEVER be used or tested with compressible fluids such as compressed air or nitrogen. The use of the Hayward HPD Series Pulsation Dampener in PVC, CPVC, or PVDF to control compressible fluids may result in product damage, property damage, personal injury, or even death.

WARNING

The HPD Series Pulsation dampener 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, CPVC, PVDF 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 PULSATION DAMPENERS 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. Pulsation dampener 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.

10. *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.*
11. *Hayward pulsation dampeners are designed to be charged with compressed air only. Do not use oxygen.*
12. *Before starting a chemical feed system ensure all downstream valves are open and that the Hayward Flow Control relief valve is in working order.*

13. *Do not operate a chemical feed system that has damaged or leaking equipment.*
14. *Ensure internal dampener pressure is released, isolation valves are closed, the chemical feed system is shut down and system pressure released before performing any maintenance or dampener removal.*
15. *Do not use with flammable liquids*



CAUTION

Hazardous Misuse of Equipment:

1. **DO NOT USE OXYGEN TO CHARGE PULSATION DAMPENER.** *Misuse could result in injury, death, explosion or property and equipment damage.*
2. *Temperature and pressure limits as outlined in the Hayward Flow Control technical literature and on the equipment label must be adhered to.*
3. *Install the pulsation dampener before charging or pressurizing. Charge the dampener before pressurizing the chemical feed system. Do not over pressurize the dampener.*
4. *Dampener bladders break down over time. Failures allow the system fluid into the air chamber and will cause damage to the charging assembly. Routine maintenance should be performed.*
5. *Do not overtighten dampener at the connection to the chemical feed system. Overtightening can weaken the dampener housing at that point.*



WARNING

Important Information:

1. *Do not use oxygen to charge pulsation dampener due to risk of explosion. Use only compressed air.*
2. *Never exceed maximum pressure as indicated on the dampener label.*
3. *Never exceed the maximum temperature as indicated on the dampener label.*
4. *Ensure chemical compatibility before installing and pressurizing dampener.*
5. *Always follow OSHA safety requirements. Wear protective clothing and eyewear when working on any equipment in the chemical feed system.*
6. *Never operate a chemical feed system that has components that are leaking, corroded, damaged or in need of service.*
7. *Refer to the MSDS for all chemicals used*
8. *Use only Genuine Hayward Flow Control parts for service. Use of other parts may result in damage to equipment or injury and invalidate the warranty.*
9. *Flush all components that are in contact with chemicals prior to servicing.*
10. *Dispose all chemicals and waste according to all local, state and federal regulations.*
11. *Always install a pressure relief valve in the system.*

INTRODUCTION

Hayward HPD Series Pulsation Dampeners are used to enhance the performance of chemical feed pumps and systems by minimizing vibrations in the chemical lines and reducing the wear on the chemical feed pump. The dampener operates by having a compressible gas on one side of the diaphragm; the other side is connected to the process fluid. As the pump discharge occurs, the compressed gas absorbs the pressure surge. As the pump moves into the suction stroke, the compressed gas expands forcing liquid out of the dampener and keeps the fluid moving in the discharge line. In this way, the pressure spikes are kept out of the chemical dosing system.

The operation of the pulsation dampener is achieved by applying a pressure equal to 80% of the system pressure to the gas side of the dampener. The dampening effect requires a minimum of 7 to 10 psi downstream pressure. Maximum performance is achieved when the downstream pressure is constant, which can be obtained with the installation of a Hayward PBV Series Back Pressure Valve.

INSTALLATION

Transporting:

The pulsation dampener should be stored inside factory packaging until the product is ready to be installed. Packaged pulsation dampener should be stored indoors, at room temperature, and out of direct sunlight. Avoid storing packaged pulsation dampener in location where packaging may become wet. Pulsation dampener 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 pulsation dampener. After removing pulsation dampener from carton, care must be taken not to damage pulsation dampener or to allow debris to enter pulsation dampener.

Dampener Sizing:

$$\text{Dampener Size (in}^3\text{)} = \frac{V \times K \times \left(\frac{SP}{P_{min}}\right)^y}{1 - \left(\frac{SP}{P_{max}}\right)^y}$$

K = Type of Pump

Simplex: Single Acting = 0.60; Double Acting = 0.25

Duplex: Single Acting = 0.25; Double Acting = 0.15

Triplex: Single Acting = 0.13; Double Acting = 0.06

V = Volume/Stroke of dosing pump (in³)

SP = System Mean Operating Pressure

P_{min} = Minimum Operating Pressure

P_{max} = Maximum Operating Pressure

y = 0.714 = Compressed Charge in Dampener

Installation:

Turn off and lock out the chemical feed pump. Bleed off all pressure from the system before starting to install the dampener. Remove any pressure from the dampener.

Use compressed air to charge the dampener. **DO NOT USE OXYGEN.** Do not exceed the maximum allowable pressure for the dampener as stated on the dampener label. Always follow OSHA procedures and wear protective eyewear and clothing.

Charge dampener to 80% of system pressure before testing.

It is not recommended threading metal pipe or pipe fittings into plastic components.

Startup:

As a general rule, installation should follow the layout as outlined in the TYPICAL INSTALLATION drawing.

The dampener should be installed as close to the pump discharge as possible, but downstream of the pressure relief valve. Generally, the dampener should be mounted in the vertical position, however it will work in a horizontal position. Keep the piping as short as possible as longer pipe lines will reduce dampening effectiveness.

Dampeners should be mounted with a support bracket whenever possible and always when using flexible tubing.

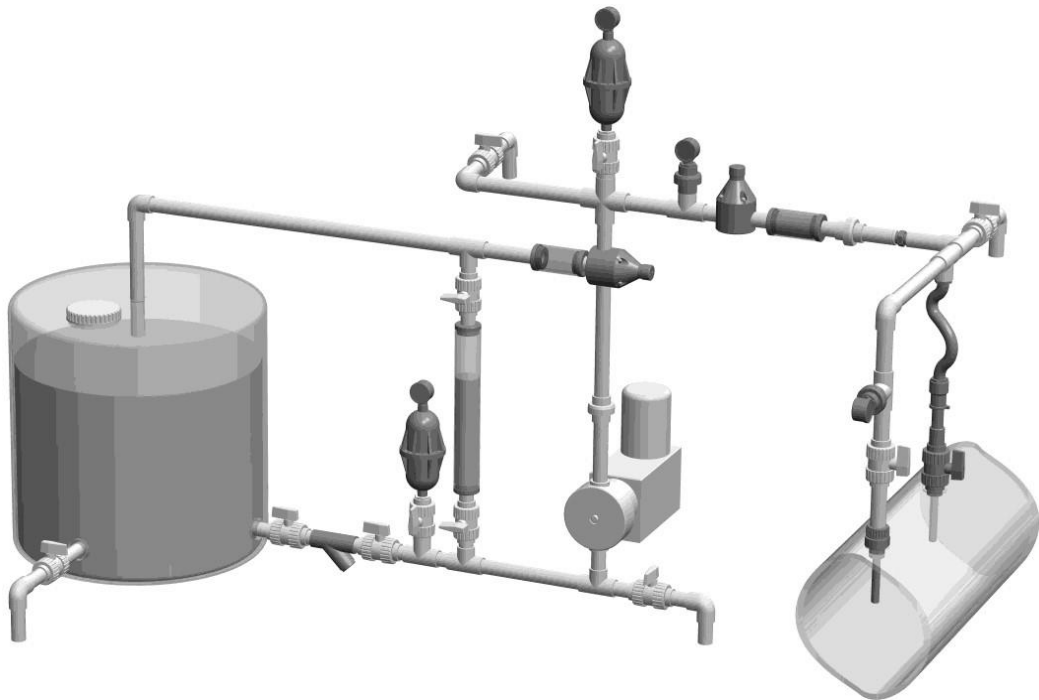
Mount a pressure gauge downstream of the dampener and before the installation of a Hayward PBV Series Back Pressure Valve. The adjustable back pressure valve will ensure a constant upstream pressure and will facilitate the fine adjustment of the pressure to minimize the pulsations from the pump.

Pre-charge the dampener to 80% of the anticipated injection pressure with compressed air, and replace the air valve cap, hand tighten. Using a soapy solution check the charging assembly and connection to the dampener for any air leaks. If no leaks are present, check that all downstream valves are open; then turn on chemical feed pump.

Check the gauge installed between the dampener and the back pressure valve. It should initially bounce as pressure is built up and stabilize once the charge pressure is equalized. **Use the back pressure valve adjustment screw to fine tune the dampening effect. If a back pressure valve is not installed adjust the air pressure to minimize the needle movement.**

Use / installation of isolation valves is recommended to allow replacement of the bladder without removing the pulsation dampener from the line.

TYPICAL INSTALLATION:



MAINTENANCE

General:

Hayward HPD Series Pulsation Dampeners were designed with a minimum amount of maintenance required to keep the equipment in operation. However, periodic replacement of the bladder is required.

The design permits routine inspection and repair without removing the dampener from the pump line, provided an isolation valve is installed.



Warning

Ensure that the chemical feed system is not under pressure and in the absence of an isolation valve, that the chemical lines have been flushed with water before starting disassembly. Always wear protective clothing and eyewear when working on the chemical feed system. Use only genuine Hayward parts in your Hayward Pulsation Dampener.

Replacing the Bladder:

If an isolation valve is installed ensure it is open; then increase the pressure in the dampener to 5 psi higher than the system pressure. This will force most of the chemicals out of the dampener. Close the isolation valve. Release the air from the dampener via the charging assembly.

If an isolation valve is not installed, depressurize the entire chemical feed system, drain the system and flush with water. Release the air from the dampener via the air charging system.

Check the pressure gauge to ensure it is reading zero pressure.

Undo the bolts holding the 2 halves of the dampener together and remove the top half of the dampener. Remove the old bladder.

Place a small amount of suitable grease (such as PTFE) on the bladder seat of both the upper and lower housings of the dampener.

Install the new bladder into the lower housing.

Reinstall the upper housing of the dampener ensuring the bladder o-ring is correctly positioned. Reinstall the bolts and nuts. Torque to 1 ft-lb for pulsation dampener

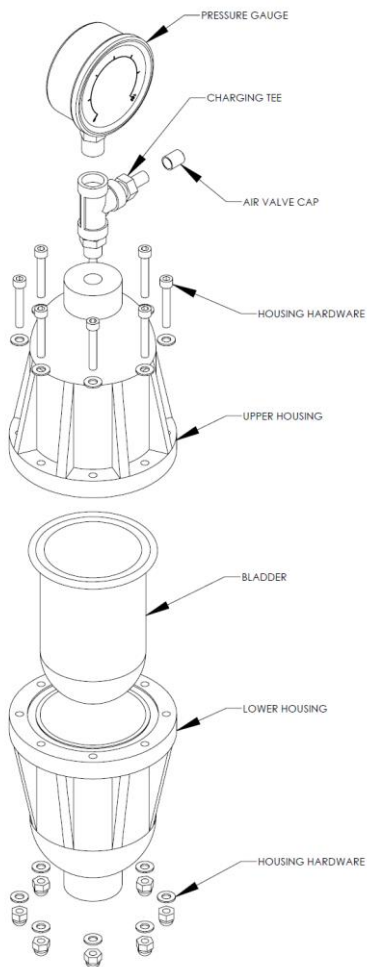
sizes 006in³, 010in³, 015in³, 029in³, and 042in³. Torque to 6 ft-lb for pulsation dampener sizes 036in³, 080in³, and 125in³.

With the isolation valve still closed pre-charge the dampener via the charging assembly to 80% of the anticipated system pressure. **DO NOT USE OXYGEN due to risk of explosion.**

Using a soapy solution check the charging assembly and connection to the dampener for any air leaks. If no leaks are present, check that all downstream valves are open; then turn on chemical feed pump.

Once the chemical feed system is up to pressure, open the isolating valve under the pulsation dampener. Using the back pressure valve, adjust the upstream pressure to maximize the dampening effect.

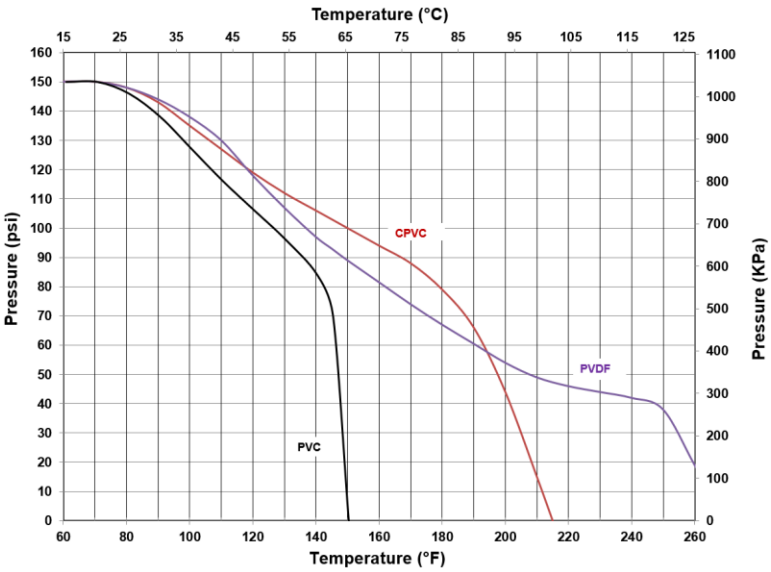
PARTS LIST



TECHNICAL DATA

Materials of Construction:	Lower Housing: PVC, CPVC, PVDF Upper Housing: Noryl® or PVDF
Connection Sizes:	1/2", 3/4", and 1"
Connections:	NPT, BSPT, Union, Flange
Gauge Port Sizes	1/4"
Max Temperature: (°F)	PVC: 140°F; CPVC: 190°F; PVDF: 240°F
Max Operating Pressure (psi) @ 70°F	PVC, CPVC, PVDF: 150 psi
Diaphragm Material	Std: EPDM Optional: Viton®, Hypalon, PTFE
Gauge and Charging Valve Materials	316 SS
Dampening Effect	± 2.5%
Gauges	0 – 160 psi

Operating Pressures at Elevated Temperatures:



NOTES

Pulsation Dampener Information:

Product Code: _____

Serial Number: _____

Body Material: _____

Bladder Material: _____

Installation Date: _____

Vendor: _____

Contact: _____

Phone: _____

Email: _____



Hayward Flow Control
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WARRANTY TERMS AND CONDITIONS

All products manufactured by Hayward are warranted against defects in material or workmanship for a period of 18 months from date of purchase or 1 year after installation whichever occurs first. 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.



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Authorised Distributor of Hayward Flow Control, a Division of Hayward Industries, Inc

Hayward Flow Control has been a leading manufacturer of industrial thermoplastic valves and process control products for more than 60 years. In fact, Hayward was one of the originators of the first thermoplastic ball valves. Since then, we have remained committed to producing the highest quality products while providing outstanding service.

Liquid Filters and Strainers



Bag Filter vessel

- GFPP
- PVC
- CPVC



Y Strainers

- PVC
- CPVC
- Clear PVC
- PVDF



Simplex Strainers

- PVC
- CPVC
- GFPP
- PVDF
- Eastar® (Clear)



Duplex Strainers

- PVC
- CPVC
- GFPP
- Eastar® (Clear)

Valves and Flow Control



Ball Valves

- PVC
- CPVC
- GFPP
- PVDF



Check Valves

- Ball Check Valves
- Y-Check Valves
- Wafer Check Valves
- Swing Check Valves



Pressure & Chemfeed

- Injection Quills
- Back Pressure
- Pressure Relief
- Diaphragm Valves
- Needle Valves
- Angle Globe Valves



Butterfly Valves

- PVC
- CPVC
- GFPP
- PP
- PVDF



Actuation

- Electric
- Pneumatic



Solenoid Valves

- PVC
- CPVC
- PVDF



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