Watts Series PVS-1000 Pre-Engineered Valve Stations

WATTS®

Table of Contents

As easy as 1, 2, 3... Drop, Bolt, & Go!

General Information

Watts Series PVS-1000 Pre-Engineered Valve Stations are custom configured water flow control systems assembled from proven, reliable Watts components to meet exacting project application requirements. Watts pre-engineered valve stations are factory pre-assembled, tested, and optionally certified by independent agencies to ensure flow performance for critical building demands.

Benefits

Watts pre-engineered valve stations provide the following benefits:

- Reduction of installation time from days to hours, minimizing installation costs
- Multiple flow paths provide uninterrupted water flow while any one device is being tested or maintained, reducing overtime labor costs and operational problems
- Minimizes operational noise levels as mandated by OSHA
- Corrosion resistant design reduces component maintenance costs
- Optional pre-installation performance certification ensures conformance to design criteria at site
- Reduction in the number of overall components needed through Watts' innovative design program
- One supplier of components, one source of responsibility, Watts, a leader in valve technology for over 130 years

Features:

- Uninterrupted water flow during maintenance and emergency conditions.
- Maximum flow performance with low pressure drops
- Wide flow control ranges meet standard and emergency peak flow requirements
- Standard flow design to 10,000gpm
- Integral backflow prevention devices, meters, pressure regulators, automatic control valves, strainers, headers, shutoff valves, and instrumentation as needed to suit specific applications
- UL/FM, ASSE, IAPMO, USC certified or listed components as required for service
- Single point of connection for fire protection, potable water and irrigation services (where approved by local codes)
- Corrosion resistant material construction
- Multiple flow path design
- Standard vault, vertical, and horizontal mounting configurations
- Integral slip and alignment flanges correct for site variations and relieve pipe stress
- Field proven in over 100 installations and years of history
- Expansion capability
- Built-in protection for system upsets

Applications

Watts pre-engineered valve stations are custom fit to your specifications and are ideal for a wide variety of flow control applications including:

- Hospitals
- Schools
- Multi-Family Dwellings
- Restaurants
- Industrial Facilities

And other similar buildings

Best Practice Guide

Watts has developed six best practices that we follow when designing and developing pre-engineered valve stations for our customers. These six items should be considered when deciding to choose a Watts valve station.

1. Provision of Uninterrupted Flow

When designing a pre-engineered valve station, one must consider the need for uninterrupted water flow. Watts systems provide two flow paths so that when station components are being tested or serviced, water flow to the end user does not have to be shut off. Uninterrupted flow is often necessary in critical systems, such as fire protection applications and domestic buildings. One must also determine if uninterrupted flow is needed based on: health codes & requirements in your area, loss of business, potential damage caused by interruption or difficulty with notification of disruption.

Here are some things to consider:

- Because regulations and requirements for Fire Protection design may be substantially different than Domestic and Irrigation systems, a valve installation for fire applications will often be separate from others. For smaller systems, it may be economical to review the use of a combined system.
- Because Domestic and Irrigation system requirements are generally similar, these valve functions can be combined into one system.
- For maintenance purposes, each valve should be removable from the line without interrupting the flow. In general, an entire line should be capable of replacement when combinations of valves are used, such as Watts stations are.
- Sizing should provide for “reliable” or “adequate” flow as determined by the application.

2. Obtaining Maximum Performance

When designing a pre-engineered valve station, one must consider how to obtain the maximum performance with the most consistent pressure profile possible. The valve station maximum flow rate is defined as when the outlet pressure falls below 10% of the desired constant outlet pressure, this is ideal. Watts valve stations meet this requirement.

One must also consider the noise level. Ideally the system should be designed so that the maximum flow rate is limited to a constant flow rate that produces no more than 80dba noise level. Watts valve stations meet this requirement.

Low flow characteristics are also a critical factor in many applications. A valve station must meet the low flow demand with no more than a 10% variation in desired outlet pressure for flow rates of 0 to maximum flow rate on opening and closing. Watts valve stations meet this requirement.

Here are some things to consider:

- Diaphragm actuated automatic control valves (ACV's) should be installed for pressure reducing applications and a head loss curve should be made and reviewed to ensure that the flow and pressure requirements are met over the entire range of flow rates.
- Backflow preventers follow the same standard, so their ratings have no bearing on maximizing performance. In those cases where a low supply pressure exists, a combined head loss curve should be made and reviewed to ensure that the combined loss is the lowest possible. The type of valve selected is critical in these cases and a double check or double check detector assembly should be used whenever the site hazard review allows.
- The use of in-line strainers increases head loss variation as flow increases. Unless required for equipment protection of devices in the system, they may be eliminated from the design when ACV pressure reducing valves are used.
- For combined backflow protection and pressure reducing applications, locate the ACV downstream (after) the backflow preventer in those cases where a very constant station outlet pressure is required. Locate the ACV upstream (before) the backflow preventer in those cases where the station outlet is not critical.
- For pressure reducing valves, the ability to “adjust” the operating speed of the valve is critical.

3. Reduction in Number of Components

When designing a pre-engineered valve station, one should consider how to reduce the overall number of components in the system. The more components there are to a system, the costlier the system becomes and the more chances for one of them to fail costing you money. Station components include, but are not limited to: strainers, backflow preventers, automatic control valves, shut-off valves and gauges. Watts valves stations can be designed to combine many system components into one main station with as few parts as necessary.

Here are some things to consider:

- Utilize the fewest number of flow lines possible that still allow for uninterrupted flow.
- Size the smaller line to provide good performance down to 0 gpm and at least up to the low performance range of the larger line.
- Eliminate the use of in-line strainers except when specific needs require them.
- Utilize one of the shut-offs for backflow preventers as a maintenance shut-off except for threaded backflow preventers.

4. Extension of Station Life and Ease of Maintenance

When designing a pre-engineered valve station, one should consider how to design the most easily maintainable and longest lasting system. Field experience indicates that following the best practices greatly reduces the amount of time and money spent on maintenance of the system after installation. Watts stations incorporate easy maintenance features and utilize materials such as high quality stainless steel to extend the station's life.

Here are some things to consider:

- Incorporate corrosion resistant materials to the largest extent possible.

  All piping should be stainless steel whenever economical and available.

  All connections should be flanged whenever possible.

  The use of isolation bolt kits is recommended when connecting steel, stainless steel, or CI/DI to copper.

  The use of fusion bonded epoxy coating on both internal and external surfaces of CI/DI valve bodies is recommended.

  The use of 304/316 stainless steel valve bodies is recommended when economical and available.

  The use of 304/316 stainless steel or an engineered plastic is recommended for all internal/moving valve parts.
- Ensure that all individual valves or strainers can be removed from the line without interrupting the flow through the station. In general, this requires individual shut-off's on each individual line, and the use of flanged or union fittings.
- Provide all "shut-off" valves with a means to control and avoid water hammer.
- Provide all pressure control valves with operating speed controls to allow "tuning" of the system response to sudden flow rate changes or pressure surges.
- Provide some means to allow "trouble shooting" of all valves externally on each major component (without opening the valve for inspection).
- Utilize materials which provide for "On-Line" repair of any leaks which may appear in the station headers over time.

5. Reduction in Total Installation Cost

When designing a pre-engineered valve station, one should consider how to reduce the total installation costs while meeting best practices. Watts valve stations accomplish this by reducing the station footprint, on-site installation time (including test and certification), effort to design the station and obtain parts, effort to test, tune and modify the station to meet the actual system requirements and eliminating rework due to non-compliant installation practices.

Here are some things to consider:

- Combine as many valves for as many functions as allowed by local codes into each station. For example, domestic and irrigation systems should utilize one station, also pressure reducing and backflow prevention valves should be combined onto one station.
- Utilize pre-assembled, pre-tested valve stations which are certified by the manufacturer to deliver the required flow rates under the specified pressure conditions.
- In critical applications, you may specify a flow test as an additional verification of performance.
- Compensation for riser misalignment must be provided for in the station design.

6. Quality and Craftsmanship

When designing a pre-engineered valve station, one should consider the quality and reliability of the station. Watts stations utilize only the best materials and construction designs to ensure the best station possible.

Here are some things to consider:

- All connections should be stress free, well aligned, and clearly mated
- Flanges should be flat and parallel or perpendicular to the primary mounting plane
- All joints should be clean, without gaps or crevices
- There should be no interference between parts
- All equipment and piping should be clean, straight, smooth and even
- Designs should utilize as few joints as possible
- The assembly should include exactly the materials specified
- The assembly should be within close manufacturing tolerances of the approved/specified dimensions.
- Lifting and handling lugs should be available
- The assembly should be hydro-tested to ensure good joints prior to shipment
- Whenever possible, one manufacturer should supply as many components as possible.
- All settings should be made and verified with flow through each individual line (isolated) as well as through the entire station after installation.
- A method to eliminate "line to line" stress within the valve station assembly must be provided for in the station design.
- Compensation for riser misalignment must be provided for in the station design.

Additional Information

For additional information on Watts Series PVS-1000 Pre-Engineered Valve Stations visit our website at www.watts.com or request a valve station information packet from you local authorized Watts representative.

Optional System Component Information

Automatic Control Valves

Automatic Control Valves are installed to regulate flow for various applications. Pressure Reducing ACV's take incoming high pressure water and reduce it to a constant lower pressure regulated flow.

Watts offers a wide variety of automatic control valves for use on our pre-engineered valve stations. For more specific product information, visit our website at www.watts.com.

Backflow Preventers – General

Backflow preventers prevent the reverse flow a liquid, or backflow, from entering the potable water supply system. Backflow is a serious condition that is addressed by all major code bodies and must be considered when designing your pre-engineered valve station. Watts offers two backflow prevention devices: double check assemblies and reduced pressure assemblies for installation or pre-engineered valve stations.

Double Check Assemblies

Double Check Assemblies are designed for use in accordance with water authority containment requirements. Double Check Assemblies contain two independent check valves which allow water to flow through in only one direction, the spring loaded check valves prevent the reverse flow by closing the ports when downstream pressure approaches the supply pressure. Double Check Assemblies are for use on all cross-connections subject to backpressure or back siphonage where there is a non-health hazard.

Watts offers a variety of double check assemblies for use on our pre-engineered valve stations. For more specific information, visit our website at www.watts.com.

Reduced Pressure Assemblies

Reduced Pressure Assemblies are designed for use in accordance with water authority-containment programs. Reduced Pressure Assemblies allow fluid to pass through their two check valves one way, but in the case of loss of supply pressure or backpressure, the spring loaded checks shut, effectively closing the valve. Reduced Pressure Assemblies are for use on all cross connections subject to backpressure or back siphonage where there is a potential heath hazard.

Watts offers a variety of reduced pressure assemblies for use on our pre-engineered valve stations. For more specific product information, visit our website at www.watts.com.

Strainers

Strainers are installed on piping systems to prevent dirt, gravel and contaminants from entering the system, thus protecting fixtures and equipment from fouling. Strainers contain an internal screen that captures any particles and other contaminates.

Watts offers a wide variety of strainers for use on our pre-engineered valve stations. For more specific product information, visit our website at www.watts.com.

Butterfly Valves

Butterfly valves are used on a variety of applications as shut-off, balancing and throttling valves. A butterfly valve is operated by means of a lever, a gear operator, or by pneumatic or electric actuation which rotates the valve disc 90° to the open or closed position or any throttled position within this 90° turn. These valves are available in either full lug or wafer styles.

Watts offers a variety of butterfly valves for use on our pre-engineered valve stations. For more specific product information, visit our website at www.watts.com.

Ball Valves

Ball valves are used on a variety of applications to start, stop and regulate liquid flow Ball valves contain a ball with a through hole that is rotated 90° between two resilient seats to open and close the water flow.

Watts offers a variety of ball valves for use on our pre-engineered valve stations. For more specific product information, visit our website at www.watts.com.

Accessories

Watts offers a variety of accessories for use on our pre-engineered valve stations, including gauge kits, pressure relief valves, test cocks and service kits. For more specific product information, visit our website at www.watts.com.

Retrofit Applications

Fireline

Before

- Un-Interrupted Flow
- Code Compliant
  - UL/FM Approved Strainer
  - UL/FM Approved Backflow Assemblies
  - UL/FM Approved Shutoff Valves
- Stainless Steel Construction
- Seismic Flexibility
- Fabricated to Fit – No Digging Necessary

After

Pressure Regulation

Before

- Un-Interrupted Flow
- Reduced Maintenance
- Low Noise Level
- Maximized flow capabilities
- Reliable pressure control with ACV's (single or dual)
- System protection with easy to clean strainers

After

Pressure Regulation & Backflow

Before

- Un-Interrupted Flow
- Reduced Maintenance
- Small Footprint
- Stainless Steel Construction
- Fabricated to Fit – No Digging Necessary
- Reliable pressure control with ACV's (single or dual)
- System protection with easy to clean strainers

After

Configuration Chart

PVS-100 Quick Sizing Selection Chart

Line Sizes			Equipment			
Inlet/Outlet	Line A	Line B	ACV	Strainer	Backflow	Typical Design Flowrate GPM*
2	2	1	X			250
			X	X		250
			X	X	X	230
				X	X	230
					X	230
2½	2	1	X			250
			X	X		250
			X	X	X	230
				X	X	230
					X	230
3	2	1	X			250
			X	X		250
			X	X	X	230
				X	X	230
					X	230
3	2	2	X			400
			X	X		400
			X	X	X	320
				X	X	320
					X	320

Line Sizes			Equipment			
Inlet/Outlet	Line A	Line B	ACV	Strainer	Backflow	Typical Design Flowrate GPM*
4	2	2	X			400
			X	X		400
			X	X	X	320
				X	X	320
					X	320
4	3	2	X			650
			X	X		650
			X	X	X	510
				X	X	510
					X	510
6	3	2	X			650
			X	X		650
			X	X	X	510
				X	X	510
					X	510
6	4	2	X			1050
			X	X		1050
			X	X	X	660
				X	X	660
					X	660

NOTE: For Larger sizes or other configurations-contact factory.
* In general, max intermittent flow rate is double the design flow rate.

Available From:

WATTS®

Backflow Prevention Products

ISO 9001 CERTIFIED

USA: 815 Chestnut St., No. Andover, MA 01845-6098; www.watts.com
Canada: 5435 North Service Rd., Burlington, ONT. L7L 5H7; www.wattscanada.ca