

Series 786V, 787V, and 790V Manual Balancing Valves

⚠ WARNING



- Read and understand all instructions before attempting to install any Victaulic products.
- Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
- Confirm that any equipment, branch lines, or sections of piping that may have been isolated for/during testing or due to valve closures/positioning are identified, depressurized, and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.

Failure to follow these instructions could result in death or serious personal injury and property damage.

IMPORTANT INFORMATION

The Series 786V, 787V, and 790V Manual Balancing Valves contain PT ports to measure differential pressure across an integrated fixed orifice plate of known value by valve size.

VALVE SELECTION

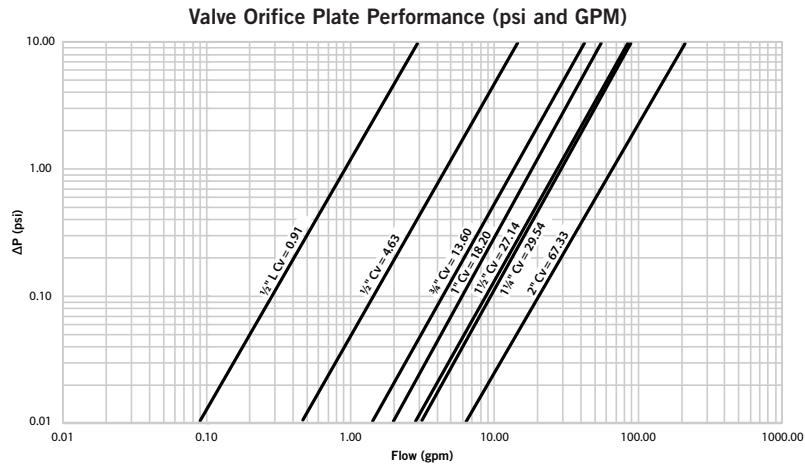
Nominal Size inches DN	Actual Outside Diameter inches mm	Absolute Minimum Flow Rate GPM LPM	Nominal Minimum Flow Rate GPM LPM	Nominal Maximum Flow Rate GPM LPM	Absolute Maximum Flow Rate GPM LPM
½ L DN15 L	0.840 21.3	0.10 0.38	0.15 0.57	0.86 3.26	2.53 9.58
½ DN15	0.840 21.3	0.07 0.26	0.10 0.38	3.09 11.7	9.09 34.4
¾ DN20	1.050 26.9	0.32 1.21	0.49 1.85	6.54 24.8	19.3 72.9
1 DN25	1.315 33.7	0.26 0.98	0.39 1.48	10.1 38.1	29.6 112
1¼ DN32	1.660 42.4	0.53 2.01	0.81 3.07	17.4 65.9	51.2 194
1½ DN40	1.900 48.3	0.68 2.57	1.03 3.90	25.2 95.5	74.3 281
2 DN50	2.375 60.3	1.38 5.22	2.09 7.91	39.5 150	116 440

L = Low flow (**NOTE:** Series 790V does not have this low-flow option.)

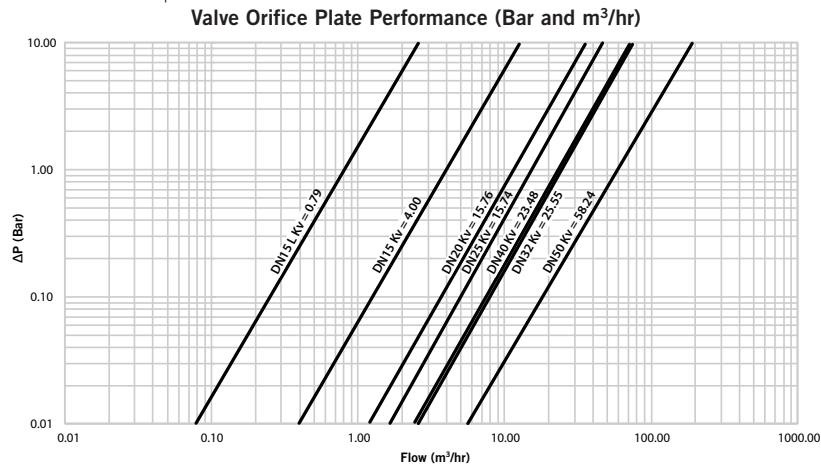
Sizing may be accomplished by using the nominal range of flows provided. Nominal flow rates are based on 1-psi pressure drop with minimum at half turn and maximum at fully open. Absolute flow rates are established by calculating the flow through the valve at its minimum recommended opening position (half turn) with a pressure drop of 1-ft of water and maximum opening position (fully open) with a pressure drop of 20-ft of water. These ranges were chosen as they are achievable by most systems and common measurement equipment.

Flows outside this the nominal range are achievable. It is the responsibility of the system designer to determine whether system conditions such as available differential pressure, maximum component pressure drop and velocity limits, and measurement accuracy will allow valve sizing outside this nominal range. However, it is not recommended to exceed the maximum flow rates listed above. Excessive pressure drop may cause excessive noise or cavitation within the system.

VALVE SELECTION (CONTINUED)



NOTE: Series 790V does not have the low-flow option.



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INSTALLATION REQUIREMENTS

1. Consult with the chemical manufacturer and reference Victaulic publication 05.01 to verify fluids or additives are compatible with valve seals and all other seal materials in the system.
2. The Series 786V, 787V, and 790V can be installed in the supply or return line to maintain flow. However, Victaulic recommends installing the valve in the return line to reduce noise, flow instability, cavitation risk, and entrapped air.
3. Victaulic recommends that a strainer be installed in the supply side of the coil kit to protect the coil, control valve, and other kit components from blockage due to debris.
4. Verify that the flow direction arrow on the valve body is facing the direction of flow and that the valve body is rotated to the desired position for hand wheel access.

THREADED CONNECTIONS: All threaded connections shall be clean and free of any burrs. Apply a small amount of pipe joint compound or PTFE thread sealant tape to the external threads of male threaded pipe connections. **DO NOT** use a combination of tape and pipe joint compound. Avoid getting any foreign material into the flow path.

SWEAT CONNECTIONS: Place the valve in the fully open position before attempting to solder the ends. Heat sink the valve body with a wet cloth or putty at the closest joint to protect internal components, and direct the flame away from the center of the valve body. Sweat connections shall be soft soldered with 95/5 (95% tin, 5% antimony) type solder. **DO NOT** exceed the temperature rating of the valve (+248°F/+120°C). To prevent damage to internal components, the valve body shall be allowed to cool to room temperature before attempting operation.

CHECKING FLOW THROUGH THE VALVE

To check flow through the valve, use:

$$Q = C_{vOP} * \sqrt{\Delta P}$$

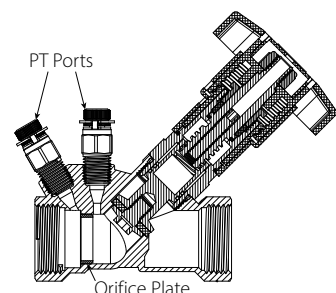
Q = Flow rate in gallons per minute (GPM)

ΔP = Pressure differential across orifice in pounds per square inch (psi)

C_{vOP} = C_v of Orifice Plate

Example: With a pressure loss of 2 psi and a C_{vOP} of 3, calculated flow is:

$$Q = C_{vOP} * \sqrt{\Delta P} = 3 * \sqrt{2} = 3 * 1.414 = 4.24 \text{ gpm}$$



The table below lists the C_v by size of the orifice plate alone. This is not to be confused with the C_v of the entire valve assembly, which is a value that is dependent on hand wheel position.

Flow Values Across Fixed Orifice for Sizes Listed Below – C_v/K_v

Nominal Size – inches/DN						
$\frac{1}{2}$ L DN15 L	$\frac{1}{2}$ DN15	$\frac{3}{4}$ DN20	1 DN25	1 $\frac{1}{4}$ DN32	1 $\frac{1}{2}$ DN40	2 DN50
0.91 0.79	4.63 4.00	13.6 11.8	18.2 15.7	29.5 25.6	27.1 23.5	67.3 58.2

L = Low flow (**NOTE:** Series 790V does not have this low-flow option.)

Flow Values Across Valve for Sizes Listed Below¹ – C_v/K_v

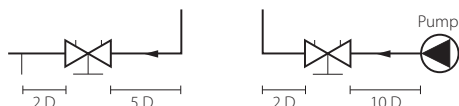
Number of Turns	Nominal Size – inches/DN						
	$\frac{1}{2}$ L DN15 L	$\frac{1}{2}$ DN15	$\frac{3}{4}$ DN20	1 DN25	1 $\frac{1}{4}$ DN32	1 $\frac{1}{2}$ DN40	2 DN50
0.50	0.15	0.10	0.49	0.39	0.81	1.03	2.09
	0.13	0.09	0.42	0.34	0.70	0.89	1.81
1.00	0.44	0.44	0.84	1.13	2.57	3.97	4.22
	0.38	0.38	0.73	0.98	2.22	8.24	3.65
1.50	0.64	0.74	1.97	3.64	6.03	8.17	11.1
	0.55	0.64	1.70	3.15	5.22	12.5	9.58
2.00	0.73	1.10	2.86	5.46	9.19	13.2	18.1
	0.63	0.95	2.47	4.72	7.95	11.5	15.6
2.50	0.80	1.41	3.55	6.89	12.1	15.9	24.7
	0.69	1.22	3.07	5.96	10.5	13.8	21.4
3.00	0.84	1.92	4.74	8.15	14.4	19.7	30.5
	0.73	1.66	4.10	7.05	12.5	17.0	26.4
3.50	0.86	2.52	5.90	9.37	16.2	22.6	35.2
	0.74	2.18	5.10	8.11	14.0	19.6	30.4
4.00 ²	0.86	3.09	6.54	10.1	17.4	25.2	39.5
	0.74	2.67	5.66	8.70	15.1	21.8	34.2

L = Low flow (**NOTE:** Series 790V does not have this low-flow option.)

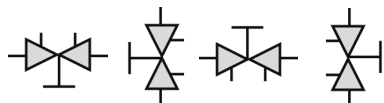
¹ C_v = GPM at ΔP of 1 psi across the valve at any given setting. 1 psi = 2.31 feet of water.

² Full open valve.

Use the valve position C_v and expected differential pressure across the entire valve to preset expected flow, then verify flow using the differential pressure across the orifice plate and the orifice plate C_{vOP} .

MEASURING ACCURACY


For accuracy of measurement, it is recommended that the valve be installed (10) pipe diameters downstream of a pump or (5) pipe diameters downstream of elbows, valves, or other pipe fittings. In all cases, (2) pipe diameters should be located downstream of the valve.



Valve may be installed in any orientation.

The hand wheel zero position is calibrated and shall not be changed. Valves have a flow measurement accuracy of 2% to 3% when used within their recommended flow range and installed in accordance with the figure below. **NOTE:** For the most accurate results, a differential pressure meter should be used.

For optimal flow accuracy, the valve should be installed with the hand wheel toward the downstream end.

CORRECTION FACTORS

$$\text{Actual Flow} = \frac{Q}{\sqrt{SG}}$$

For liquids other than water, the flow value can be adjusted as follows:

Divide the flow rate by the square root of the specific gravity.

This applies to liquids having the same viscosity as water (i.e. most water/glycol mixtures at room temperature).

When the flow setting is verified or changed to the final setting, the memory stop should be set (refer to the "Setting the Memory Stop" section on the following page).

Series 786V, 787V, and 790V Manual Balancing Valves

USING THE PRESSURE/TEMPERATURE PORTS



WARNING

- DO NOT touch any hot, non-insulated surfaces of the Series 786V, 787V, or 790V.
- Proceed with caution when using differential pressure measurement device to prevent burns from hot water that may be released during hookup.

• Always refer to the operating manual for the differential pressure measurement device for complete hookup and safety requirements.

Failure to follow these instructions could result in serious personal injury.

The pressure/temperature (PT) ports of the Series 786V, 787V, and 790V can be connected to a differential pressure measurement device to determine flow through the fixed orifice. Always refer to the operating manual for the differential pressure measurement device for complete hookup and safety requirements.

NOTE: When PT ports are not in use, the caps shall be replaced.

SETTING THE MEMORY STOP

The memory stop shall be set once the required flow rate setting is determined.

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1. Gently pry the cap out from the center of the hand wheel.
 - 2a. To set the memory stop initially, hold the hand wheel in position while using the 3-mm hex key wrench (provided, part number P000787V3M) to rotate the memory stop adjustment screw clockwise until it stops. DO NOT over-tighten this memory stop screw. This will limit the maximum opening position for the valve.
 - 2b. If the valve needs to be opened further than the maximum opening position set in step 2, turn the memory stop adjustment screw counterclockwise sufficiently to allow the valve to open to the desired open setting. Then adjust the memory stop screw clockwise until it stops.
 3. Replace the cap in the center of the hand wheel.

The valve can still be fully closed after the memory stop is set. The open position will stop at the point where the memory stop was set in Step 2.

MAINTENANCE



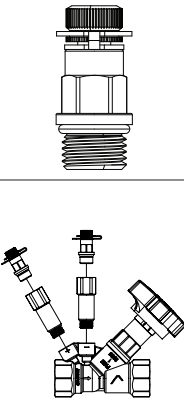
WARNING

- Depressurize and drain the piping system before attempting to maintain any Victaulic products.
- Allow the system temperature to cool to below 100°F/38°C before attempting to remove the valve for maintenance.

Failure to follow these instructions could result in death or serious personal injury.

Replacement PT Ports and Extensions (Sold Separately)

Depressurize and drain the piping system before attempting to replace and/or extend PT ports.



Series 786V/787V Standard PT Ports:
Part Number P000787RPT (Red)², Part Number P000787BPT (Blue)²

Series 790V Standard PT Ports:
Part Number P000790RPT (Red)², Part Number P000790BPT (Blue)²

² When ordering, the part code includes only one PT port. Each valve requires two PT ports (one red, one blue).

Series 786V/787V PT Port Extensions
2-inch/51-mm Clearance (Shown to the left) – Part Number P0007872PT³
4-inch/102-mm Clearance – Part Number P0007874PT³

Series 790V PT Port Extensions
2-inch/51-mm Clearance (Shown to the left) – Part Number P0007902PT³
4-inch/102-mm Clearance – Part Number P0007904PT³

³ When ordering, the part code includes only one PT port extension. Each valve requires two PT port extensions.

The PT ports are field-replaceable. Remove the existing PT port(s) and thread the new port(s) into the valve body. DO NOT use PTFE thread sealant tape or pipe dope on the threads.

In applications where the valve will be insulated, PT port extensions are available to provide clearance for 2 inches/51 mm or 4 inches/102 mm of insulation. Remove the standard PT port(s) and thread the new extension(s) into the valve body. Thread the standard PT port(s) into the new extension(s), as shown. DO NOT use PTFE thread sealant tape or pipe dope on any of the threads.

IDENTIFICATION

2026 Rev. 1

Project: _____

Unit Name: _____

Valve Type: _____

Valve Size: _____

Valve Setting: _____

Handle Position: _____

Design Flow Rate: _____

Δp: _____

Options: _____

Replacement tags are available and can be filled out and attached to the valve for future reference. **NOTE:** A blank tag is included with each valve from the factory.

For complete contact information, visit victaulic.com

