Series RPV Reducing Pressure Valve is used where cost and/or space limitations are the primary concern. Series RPV is a highly sensitive, compact, moderately priced steam, water or gas regulator designed to handle the majority of lower capacity process requirements.

Other notable features of the Reducing Pressure Valve include: spherical seating surface on floating stainless steel disc for tight shutoff and three spring ranges, integral stainless steel strainer. The RPV is direct acting and has an ANSI/FCI 70-2 Class IV shut-off. Another unique feature of the Reducing Pressure Valve is an adjustable aspirator. It is designed to improve the performance and capacity, this feature also permits the user to tune the valve to a specific installation. The capacity and sensitivity are enhanced while minimizing droop by utilizing different adjusting spring ranges.

### SPECIFICATIONS

**Service:** Compatible steam, water or gas.  
**Line Size:** See model chart.  
**End Connections:** Female NPT.  
**Pressure Limit:** Iron: 200 psig (13.8 bar) @ 400°F (204.4°C).  
**Wetted Materials:** Body: Cast Iron; Stem: 304 SS; Disc: 316 SS; Seat: 304 SS; Gasket: PTFE; Diaphragm: 304 SS; Spring: 302 SS.  
**Temperature Limit:** Iron: 400°F (204.4°C).

### Model Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPV-C102-3</td>
<td>1/2˝ Reducing Pressure Valve, Cast Iron, Spring Range: 25-80 PSI</td>
</tr>
<tr>
<td>RPV-C103-3</td>
<td>3/4˝ Reducing Pressure Valve, Cast Iron, Spring Range: 25-80 PSI</td>
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<td>RPV-C104-3</td>
<td>1˝ Reducing Pressure Valve, Cast Iron, Spring Range: 25-80 PSI</td>
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<td>RPV-C106-5</td>
<td>1-1/2˝ Reducing Pressure Valve, Cast Iron, Spring Range: 30-100 PSI</td>
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<tr>
<td>RPV-C107-5</td>
<td>2˝ Reducing Pressure Valve, Cast Iron, Spring Range: 30-100 PSI</td>
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</table>
Caution: Steam, or other hazardous fluids, may be handled by this valve. Only qualified personnel who are familiar with your installation should be permitted to install, readjust, inspect or maintain valve.

A. Intended Purpose
The RPV Reducing Pressure Valve is a compact, moderately priced steam, water, or gas regulator intended to satisfy most fundamental requirements for pressure reduction.

B. Planning the Installation
1. Locate the Reducing Pressure Valve in a straight run of horizontal pipe. (See Fig. 1).
2. Allow access room above and below the valve for inspection and maintenance.
3. For steam service, in order to prevent water hammer and erratic operation, install properly sized traps to provide proper drainage of condensate before and after the Reducing Pressure Valve.
4. Avoid the damaging effects of scale and dirt in pipe lines by installing a strainer as shown in Fig. 1.
5. Provide a 3-valve by-pass to facilitate inspection and maintenance without interrupting service.
6. If the pressure rating of the downstream piping or connected equipment is less than the initial pressure, install a safety valve as shown in Fig. 1.
7. Install initial and delivery pressure gauges to indicate performance. When long runs of piping are involved, the delivery pressure gauge should be located as close to the process or equipment controlled as is practical.
8. To eliminate excessive noise and enhance the stability with steam and other compressible fluids:
   a. Avoid single pressure reduction in excess of 5 to 1 ratio.
   b. Enlarge the delivery pipe size to effect a reasonable flow velocity at the reduced pressure. A concentric tapered transition is recommended.
   c. Avoid sharp turns close to the regulator outlet as well as bull-headed tee connections to low pressure mains.

C. Installing the Valve
1. Flush the piping system thoroughly to clear it of any debris.
2. Mount the valve between unions with the arrows under the diaphragm flange pointing in the direction of the

D. Adjusting the Delivery Pressure
1. When received, the RPV Reducing Pressure Valve is preset to the delivery pressure listed on the box label.
   a) Loosen the lock nut on the adjusting screw.
   b) Turn adjusting screw clockwise to increase the delivery pressure.
   (or) c) Turn the adjusting screw counterclockwise to decrease the delivery.
   d) Retighten the lock nut.

E. Troubleshooting
1. Failure to open or excessive delivery pressure fall-off:
   a. Adjusting Spring, Fig. 3, may have been tampered with, or broken.
   b. Initial pressure may be down due to partially closed supply valve, clogged strainer, or other obstruction.
2. Failure to close or over-riding delivery pressure:
   a. Adjusting Spring, Fig. 3, may have been tampered with.
   b. By-Pass Valve may be leaking or open.
   c. Valve Diaphragm may be broken.
   d. Valve may be held open by foreign matter.
3. Valve chatter or noise.
   Certain critical flow conditions may create valve chatter as evidenced by a humming noise as the valve closes. Readjustment of the Aspirator Adjustment feature of the RPV Reducing Pressure Valve permits the user to desensitize the valve in order to reduce or eliminate valve chatter. When received, Fig. 2, the Aspirator Adjustment is in the vertical position. If adjusting is necessary, loosen the locking nut and turn the adjusting screw slowly within the range shown in Fig. 2, until the valve chatter is eliminated or minimized.

F. Maintenance
Do not over-adjust.
1. Under normal operating conditions, complete dismantling at regular intervals is not recommended.

2. Before inspection, cleaning or replacement of worn or broken parts, make certain that the Reducing Pressure Valve has been isolated from the initial and delivery pressures. Make sure also that any internal pressure in the regulator has been relieved. If hot or otherwise hazardous fluid is handled by the valve, appropriate precaution should be taken prior to disassembling the valve or removing it from the line.

3. When disassembling the valve, first remove the compression from the adjusting spring.

4. Minor damage to the seat ring, and disc may be repaired by light grinding with 400 grit or finer lapping compound.

5. Before reassembling the valve, the old gasket material and sealing compound should be removed. Metal to metal joints should be sealed with Copalite, Permatex or equal plastic gasket compound compatible with the service of the valve.

Sizing RPV Reducing Pressure Valve

Example 1: For Conditions Within Capacity Table

Given an initial steam pressure of 100 psig and a required flow of 500 #/hr. at a reduced pressure of 30 psig, determine droop, minimum controllable flow pressure and valve size. In the Capacity Table opposite, the droop has been fixed at 25% of the maximum range of the adjusting spring. Therefore, for a 30 psig delivery pressure, a 25-80 adjusting spring would be selected. Thus, the droop is \((25\% \times 80 = 20)\) 20 PSI.

Minimum controllable flow pressure = Reduced Pressure + Droop = 30 + 20 = 50 psig.

Entering the Capacity Table at a minimum controllable flow pressure (OUT) of 50 psig, an initial pressure (IN) of 100 psig, the smallest valve size capable of delivering 500 #/hr is the 1˝ size.

Example 2: For Conditions Outside Capacity Table

Given an initial steam pressure of 150 psig and a required flow of 900 #/hr at a reduced pressure of 25 psig, determine the valve size, droop and minimum controllable flow pressure.

Therefore, we use Critical Flow Cv formula:

\[
CV = \frac{W}{1.71P_1} = \frac{900}{1.71(150 + 14.7)} = \frac{900}{1.71(164.7)} = 3.2
\]

Referring to the Cv line of the Capacity Table opposite, the 3/4˝ valve size (Cv= 3.3) is the smallest valve with the required capacity. Droop is a function of valve size (3/4˝), regulator capacity in percent \([\frac{3.2}{3.3} \times 100 = 97\%]\) and adjusting spring range (10-30). Enter the 3/4˝ Valve Droop Chart (below) at 97% and draw a line upward until you intersect the 10-30 curve. From there, draw a line left to the vertical axis. Droop in this case is 11 psig.

Minimum Controllable Flow Pressure = Reduced Pressure + Droop = 25 + 11 = 36 psig.

Repeating the above procedure substituting a 1˝ valve size with a maximum Cv of 4.9, droop would be 8 psig and minimum controllable flow pressure would be 33 psig.
## Rated Steam, Air, and Water Capacity Table

**Series RPV Reducing Pressure Valve**

<table>
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<tr>
<th>VALVE SIZE</th>
<th>1/2&quot;</th>
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<th>1&quot;</th>
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<td>PSI</td>
<td>S</td>
<td>A</td>
<td>W</td>
<td>S</td>
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S – Steam (#/hr.)  
A – Air (SCFM)  
W – Water (GPM)