Purpose of a Check Valve…

Imagine having an employee who constantly closes a valve whenever he sees unwanted reverse flow in a piping system.

Uses for a Check Valve

To allow flow in one direction only, to…

1. Prevent reverse flow.
2. Prevent liquids from mixing.
3. Prevent tainted liquids downstream from mixing with a pure supply, similarly…
4. Prevent treated liquids downstream from backing up into the original untreated source.

But a Diaphragm Check Valve Won't Get Eye Strain…

…and it doesn’t daydream.
It also closes before reverse flow occurs!
How it Works:

Series CKM has a unique, patented diaphragm. It is fixed in place, and is normally-closed. The diaphragm flexes open with 1 to 1.5 PSI inlet pressure.

The diaphragm is the only moving part in the valve. It moves between the normally closed position at the valve seat on the inlet, and the fully open position, where it is held in place by the internal stop.

Let’s See this Valve in Action...

Here’s the CKM after being installed in a piping system. No liquid is present, and the diaphragm – shown in black – is in the normally-closed position.

This diaphragm automatically returns to the closed position as soon as inlet flow ceases. No backflow is required to seal the valve.
Turn the pump on, and liquid is flowing through the system in the desired direction. When it reaches the check valve, the diaphragm is forced open and flow continues downstream.

As flow increases, the diaphragm is forced fully open. It is held in place by the internal stop.

Turn the pump off, and as soon as forward flow stops, the diaphragm returns to the normally-closed position. Thus it is closed before reverse flow has a chance to start.

Because the valve is closed before backflow begins, absolutely none of the undesirable downstream liquid will flow through and mix with the pure liquid upstream.
• Like all check valves, Series CKM is a “one-way” valve. It must be installed as the directional arrows indicate.

Installation, continued...
• As long as you’ve got the CKM pointed in the proper flow direction, it can be oriented in any position in the piping system…up, down, sideways, even on an angle! Because of the patented diaphragm, it has none of the restrictions common to ball checks or swing checks.

So what’s so bad about ball checks?
• Remember how we showed the Plast-O-Matic diaphragm check mounted horizontally? You can’t do it with a ball check…

• Under low pressures the ball simply doesn’t close; it just kind of lays in the valve while dirty downstream liquid mixes with the pure liquid upstream…the very thing a check valve is supposed to check! Some ball checks try to get around this by using a metal spring, which defeats the purpose of a thermoplastic valve.
Even in the vertical position, ball checks are problematic. Most ball check manufacturers readily admit that the design requires 5 psi reverse pressure to seal. That means your application must have at least 10” of head to guarantee closure.

Another problem inherent to ball checks is that very few balls are “perfect” spheres. They may seal fine at one point (left), but when normal flow returns (center), the ball floats free – as it should. Then when it comes time to check reverse flow (right), the ball is no longer in the same position, and will often re-seat where there is an imperfection or out-of-round condition.

Then again, too much head can create a whole different problem…some applications experience rapid backflow that actually “suspends” the ball in a cyclonic turbulence, and it continuously spins around in the open position.

A round ball is designed for constant motion. It has a natural propensity to spin and roll. Movement is great on a playing field, but not in a valve designed to close. To add insult to injury, ball checks often make rattling or chattering sounds.
Plast-O-Matic design engineers felt that **closing** was the most important aspect of a check valve...with no extraneous movement. It just didn’t make sense to use a round ball in a valve where positive repetitive sealing was required, so the patented diaphragm was developed. It is designed for opening and closing...not rolling and bouncing.

The real proof is at low pressures, when in side-by-side testing, ball checks leak while the CKM holds a bubble tight seal. Please click the center image to see the video...

---

**But wait...there’s more!**

Plast-O-Matic Series CKM is also noted for...

- **Purity & Corrosion Resistance** — No metal parts to corrode or release impurities.
- **Convenience** — Union nut on Series CKM simplifies valve inspection/removal with minimum piping breakdown.
- **Great Selection** — Series CKM is provided in a variety of corrosion-resistant thermoplastics: Geon® PVC, Kynar® PVDF, glass-filled Polypropylene, and Corzan® CPVC. A version with external fasteners is also offered in PTFE.
- **Key Sizes** — ½”, ¾” & 1” pipe sizes, socket or threaded connection, your choice.

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**And to review the key points...**

- **Patented Design:** Self-sealing - they are not dependent on gravity, mounting position or reverse flow, a significant improvement over ball check valves.
- **Silent Operation:** No internal sliding or loose parts to slam or vibrate, chattering is eliminated!
- **Dependability:** Leak-free sealing protects against the potential hazards created by reverse flow of corrosive liquids such as acids, caustics and chlorine solutions.
- **Repetitive Long Term Sealing:** Diaphragm automatically positions itself against seat in the identical location. Superior to ball check valves which often leak at lower pressures.
Series CKM Diaphragm Check Valve

Patented Design!

PLAST-O-MATIC
VALVES, INC.
The What, How, Where and Why of Check Valves

I. WHAT styles are available?
A. Series CKM Diaphragm Check (normally-closed)
B. Series CKS Encapsulated Spring Check (normally-closed)
C. Series CKD Disc Check

II. HOW do they operate?
Check valves (or one-way valves) typically come in two types; one that requires reverse pressure/flow to assure the valve seals or “checks,” and one that does not... referred to as normally-closed. Ball checks, for instance, are typical of those requiring reverse pressure, generally of 3 to 5 PSI. “Normally-closed” types typically involve the use of a spring which exerts its force onto a disc/seat that effects a positive seal. Although this style check valve does not require reverse pressure/flow for sealing and can be mounted in any position, it does require some minimum inlet or “cracking pressure” to open. The diaphragm check (Series CKM) utilizes a uniquely molded, energized elastomer diaphragm that is deflected against the seat, thus creating the normally-closed design. The PFA encapsulated spring style (Series CKS) utilizes the spring force to seal an elastomer O-ring on a poppet against the seat. In the elastomer disc check (Series CKD), the sealing element is a flexible, sensitive elastomer disc. Although it requires extremely minimal reverse pressure to seal, it cannot be termed as normally-closed.

III. WHERE would I use a check valve?
Typically, check valves are specified wherever the possibility of reverse flow of the process fluid is undesirable. Examples of such applications would be to protect against two incompatible solutions from mixing, as in a manifold, or “checking” against reverse flow back through the pump and overflowing the feed tank when the pump is turned off. Still another would be in dosing/chemical injection where you need to prevent the higher pressure main from flowing back through the smaller chemical feed line, or provide positive closure during the suction cycle. Whatever the application is, however the critical factor is that the check valve only allow flow in one direction.

IV. WHY would I use a check versus some other comparable function valve?
Generally speaking, the popularity of check valves is based upon their being simple, low cost and self-contained. Other more elaborate and expensive methods such as pressure and/or flow switches, automatic shut-off valves, etc., can be employed, but are not necessary so long as the check valve selected meets the system requirements. Probably the most important aspect in check valve selection is determining what, if any, reverse pressure is available for closing of the check valve. If there is any question, specifying a normally-closed style is the best course of action.
Series CKS Self-Closing Check Valves
In Sizes 1½", 2" and 3"

Features/Benefits:

• Designed to provide the same superior performance as the existing ½", ¾" and 1" sizes.
• Rugged thermoplastic construction meets highest industry standards.
• Normally-closed design, self-sealing, not dependent upon gravity, mounting position or reverse flow... a significant improvement over ball check valves.
• Leak-free sealing protects against the potential hazards created by reverse flow of corrosive liquids such as acids, caustics and chlorine solutions.
• Teflon® PFA encapsulated stainless steel spring provides bubble-tight seal mounted in any position.
• Rapid closure by spring-loaded poppet helps to eliminate sudden back-flow water hammer.
• Positive repetitive sealing: Poppet automatically positions itself against seat in the identical location each time for long cycle life dependability.

Materials of Construction:
Plast-O-Matic Series CKS Check Valves are available standard in PVC (Polyvinyl Chloride), Polypropylene and Kynar® PVDF in sizes 1½", 2" and 3".
Seals are in Buna-N, EPDM, or Viton®. Threaded or socket connections are standard.

Note: For information on ½", ¾" and 1" Self-Closing Check Valves, refer to Catalog CKL.

Design:
Series CKS Check Valves are normally-closed in design. They feature a corrosion resistant Teflon® PFA encapsulated spring which energizes a poppet seal that will neither stick nor chatter and is automatic in action. The valves are not dependent upon gravity or reverse flow and represent a significant improvement over ball check valves. They can be mounted in any position. Even in the absence of reverse flow or pressure, the poppet will automatically reposition itself to seal against the valve seat. The unique poppet will seal in the identical location every time, producing a reliable and repetitive seal.
**Operation:**
Flow entering the valve inlet will open the valve by pushing the poppet off the valve seat. In this position, the valve seat is kept clean by flushing action of the internal flow, keeping the entire sealing area free of particles which could cause leakage. If the inlet flow is stopped, or if a backflow of a higher pressure is sensed, the spring-loaded poppet will automatically reposition itself, closing off the valve seat. Reverse flow or pressure is not required to close the valve when the inlet flow stops. If reverse pressure is present it simply creates a tighter seal.

**Installation:**
Because of their normally-closed design Plast-O-Matic CKS Check Valves can be installed in any position. Concern over the valve seat closing due to gravity (as with ball check designs) is of no consequence since CKS valves seal in any position. Caution should be exercised to make certain that the direction of flow is correct. Threaded connections should never be made to metal piping and should always be wrapped with Teflon® or other acceptable pipe sealant to effect a seal. The assembly need only be made hand-tight followed by a one-quarter turn more with a strap wrench. **DO NOT** overtighten and **DO NOT** use a pipe wrench as a future valve fracture could result.

**Series CKS Performance Curve**

**pressure Drop vs. Flow**

![Graph showing pressure drop vs. flow for Series CKS Check Valves](image)

**Series CKS Pressure Ratings**

<table>
<thead>
<tr>
<th>Valve Body Material</th>
<th>Maximum Working Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>77°F (25°C)</td>
</tr>
<tr>
<td>Inlet &amp; Reverse</td>
<td>Inlet &amp; Reverse</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>PVC</td>
<td>150 PSI</td>
</tr>
<tr>
<td></td>
<td>10 BAR</td>
</tr>
<tr>
<td>POLYPRO</td>
<td>100 PSI</td>
</tr>
<tr>
<td></td>
<td>7 BAR</td>
</tr>
<tr>
<td>PVDF (KYNAR®)</td>
<td>150 PSI</td>
</tr>
<tr>
<td></td>
<td>10 BAR</td>
</tr>
</tbody>
</table>

**Notes:**
1. 140°F (60°C) is the maximum recommended temperature for PVC.
2. For information on ½", ¾" and 1" self-closing check valves request Catalog CKL.

**Series CKS Dimensions & Model Numbers**

<table>
<thead>
<tr>
<th>Pipe Size (NPT)</th>
<th>Cv Factor</th>
<th>A (In.)</th>
<th>B (In.)</th>
<th>C (In.)</th>
<th>Model Number*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1⅛&quot;</td>
<td>45</td>
<td>7.4</td>
<td>188</td>
<td>2.5</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td>45</td>
<td>8.4</td>
<td>213</td>
<td>3.3</td>
<td>83</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3&quot;</td>
<td>95</td>
<td>9.9</td>
<td>251</td>
<td>4.3</td>
<td>109</td>
</tr>
</tbody>
</table>

*Model numbers shown for valves with Viton seal, threaded connection and PVC body material.

1. For Buna-N seals, change first "V" to "B"; i.e. CKS150BT-NC-PV.
2. For EPDM seals, change first "V" to "EP"; i.e. CKS150EPT-NC-PV.
3. For socket connections, change "T" to "S"; i.e. CKS150VS-NC-PV.
4. For Natural Polypropylene body change "PV" to "PP".
5. For Kynar PVDF body change "PV" to "PF"; i.e. CKS150VT-NC-PF.

**Authorized Plast-O-Matic Distributor**

Plast-O-Matic Valves, Inc.
1384 Pompton Avenue, Cedar Grove, NJ 07009
(973) 256-3000 • Fax (973) 256-4745
www.plastomatic.com • info@plastomatic.com
**Series “CKD” Compact Diaphragm Check Valves**

**Designed To Prevent Reverse Flow of Extremely Corrosive and Ultra-Pure Liquids**

**Sizes 1/4” and 1/2”**

**OPERATION:**
The “CKD” Check Valves utilize a flexible elastomer disc for their sealing action. This sensitive disc offers very low pressure sealing. In addition, the disc requires extremely minimal pressure to move to the open position. Since these sealing discs are self-centering, they seal in the identical position every time, allowing more reliable sealing and prolonged life. The elastomer disc is kept clean by the constant flushing action of the inlet flow, keeping the sealing area free of particles which otherwise might cause leakage.

The minimum back pressure required to close Series “CKD” is 1/2 PSI.

When inlet pressure is sensed the sealing disc is pushed off the valve seat opening the valve. In this position the sealing disc is supported internally allowing the valve to operate under high flow conditions with relatively no force or stress on the disc.

**DIMENSIONS:**

In 1/2” piping systems where high flow is required, the 1/2” Series “CKD” Check Valves may not operate efficiently enough because of its orifice size, 5/16”. In such cases, the 1/2” Series “CKM” Check Valve should be used.

**INSTALLATION:**
The Series “CKD” Check Valves, unlike the Series “CK” and “CKM” Check Valves, depend on gravity for sealing assistance in low flow applications. Series “CKD” Check Valves should be installed so gravity will allow the disc to rest against the valve seat when flow is not present.

**IMPORTANT:** In liquids having high specific gravities the sealing discs may float. In these applications the valves should be piped so the disc floats against the seat.

**ORDERING INFORMATION:**
When ordering Series “CKD” Check Valves, order by model number and specify materials of construction.

<table>
<thead>
<tr>
<th>PIPE SIZE (NPT)</th>
<th>ORIFICE SIZE</th>
<th>“A”</th>
<th>“B”</th>
<th>Cv FACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4”</td>
<td>3/16”</td>
<td>4.8</td>
<td>28.6</td>
<td>2-1/16”</td>
</tr>
<tr>
<td>1/2”</td>
<td>5/16”</td>
<td>7.9</td>
<td>38.1</td>
<td>2-5/8”</td>
</tr>
</tbody>
</table>

Also available in EPDM. Substitute “EP” for “V” in part number.
Self-Closing Thermoplastic Check Valves...
Patented Diaphragm Design Assures Dependable, Repetitive, Bubble-Tight Sealing... and They Can Be Mounted in Any Position!
Sizes: 1/2", 3/4" and 1"

Features/Benefits:
• **Patented Design:** Self-sealing - are not dependent upon gravity, mounting position or reverse flow, a significant improvement over ball check valves.
• **Silent Operation:** No internal sliding or loose parts to slam or vibrate - chattering is eliminated!
• **Dependability:** Leak-free sealing protects against the potential hazards created by reverse flow of corrosive liquids such as acids, caustics and chlorine solutions.
• **Repetitive Long Term Sealing:** Diaphragm automatically positions itself against seat in the identical location. Superior to ball check valves which often leak at lower pressures.
• **Convenience:** Union nut on Series CKM simplifies valve inspection/removal with minimum piping breakdown.
• **Minimal Cracking Pressure:** Diaphragm begins to open at approximately 1.0 to 1.5 PSI.
• **Cost Efficient:** Designed to improve system performance and competitively priced.

Materials of Construction:
Plast-O-Matic Series CKM Check Valves are molded of Type 1, Grade 1, PVC (Polyvinyl Chloride), Glass-filled Polypropylene, Corzan® CPVC, and Kynar® PVDF in sizes 1/2", 3/4" and 1". A machined version, Series CK is available in PTFE in sizes 3/4" and 1". Diaphragms are of EPDM or FKM (Viton®). Threaded connections are standard on all models. Socket end connectors are available on all Series CKM models.

**Note:** For information on 1½", 2" and 3" models, refer to Catalog CKS.
Design
Series CKM & CK Check Valves, normally closed in design, feature a patented diaphragm seal that will neither stick nor chatter and is automatic in action. The valves are not dependent upon gravity so they can be mounted in any position. Even in the absence of reverse flow or pressure, the diaphragm will automatically reposition itself to seal against the valve seat. This is achieved with or without the presence of reverse flow. The unique and patented diaphragm will seal in the identical location every time producing a more reliable and repetitive seal. The molded Series CKM models have only one moving part – the diaphragm. This provides both design simplicity and maximum operating dependability.

Operation
Flow entering the valve inlet will open the valve by pushing the diaphragm off the valve seat until it comes to rest on the internal stop. This supports the diaphragm and eliminates force or stress under high flow condition. In this position both the diaphragm and valve seat are kept clean by the flushing action of the internal flow, keeping the entire sealing area free of particles which could cause leakage.

If the inlet flow is either stopped, or if a backflow of a higher pressure is sensed, the diaphragm will automatically reposition itself, closing off the valve seat. Reverse flow or pressure is not required to close the valve when the inlet flow stops. If reverse pressure is present it simply creates a tighter seal.

Installation
Because of its normally closed design the Plast-O-Matic CKM and CK Check Valves can be installed in any position; concern over the valve seat closing due to gravity (as with ball check designs) is of no consequence. Caution should be exercised to make certain that the direction of flow is correct. Threaded connections should never be made to metal piping and should always be wrapped with PTFE or other acceptable pipe sealant to effect a seal. The assembly need only be made hand tight followed by a one-quarter turn more with a strap wrench. DO NOT overtighten and DO NOT use a pipe wrench as a future valve fracture could result.

Dimensions and Material Availability

Series CKM – Molded Models: PVC, CPVC, GPP & PVDF

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>PVC</th>
<th>CPVC</th>
<th>GPP</th>
<th>PVDF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/4&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Series CK - Machined PTFE Models

<table>
<thead>
<tr>
<th>Material</th>
<th>Valve Seals</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTFE</td>
<td>40, 40, 40, 40, 40, 40, 5, 5</td>
</tr>
<tr>
<td>FKM</td>
<td>40, 40, 40, 40, 40, 40, 5, 5</td>
</tr>
</tbody>
</table>

Ordering Information For Series CKM & CK

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>CKM-PVC</th>
<th>CKM-PP</th>
<th>CKM-PF</th>
<th>CKM-CPPC</th>
<th>CKM-TF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>CKM050-PV</td>
<td>CKM050-PV</td>
<td>CKM050-PF</td>
<td>CKM050-CPPC</td>
<td>N.A.</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>CKM075-PV</td>
<td>CKM075-PV</td>
<td>CKM075-PF</td>
<td>CKM075-CPPC</td>
<td>CK075-TF</td>
</tr>
<tr>
<td>1&quot;</td>
<td>CKM100-PV</td>
<td>CKM100-PV</td>
<td>CKM100-PF</td>
<td>CKM100-CPPC</td>
<td>CK100-TF</td>
</tr>
</tbody>
</table>

Note: Threads are standard. For socket ends add “S” after seal material. (ex. CKM050VS-PV). For other body materials consult factory. Above shown with FKM (Viton®) Seals. For EPDM seals change “V” to “EP”. N.A. = Not Available.
NEW

For Exceptionally-High Quantities of Tubing Check Valves ...at an Exceptionally-Low Cost!

Series "MPC" Miniature Plastic Check Valves

For vacuum, pressure, liquids and gases!

Choose from a variety of body materials including: Nylon, Polypropylene & PVDF (Kynar®) and a broad range of diaphragm materials... Viton®, EPDM, Silicone, Kalrez® and Kel-F®.

Features/Advantages:
- Superior Sensitivity: Free-floating diaphragm responds to slightest pressure change.
- Very Rapid Response: Between free-flow and no-flow situations.
- Extremely Low Cost: Designed to perform at high industry standards but very economically priced.
- Application Flexibility: Can mount in any position.

- Materials Of Construction: Standard combinations include: 1. Nylon body with silicone diaphragm for pressures to 125 PSI. 2. Polypro body with Viton® diaphragm for corrosive or ultra-pure applications. 3. PVDF body with Viton diaphragm... combining the high performance of PVDF with the cost-effectiveness of Viton. 4. PVDF (Kynar®) body with Kalrez® diaphragm... the ultimate combination for high corrosion resistance and high-purity. Other material combinations can be supplied to meet high-volume requirements for special applications.
- Reliable Performance: With liquids, gases, pressure and vacuum applications.
Series “MPC” Miniature Plastic Check Valves

Operation:
The Series MPC tubing valves utilize a flexible elastomer diaphragm. Back pressure forces the diaphragm against a seat thus closing the orifice. Inlet pressure moves the diaphragm against a downstream side support completely opening the orifice. The support prevents damage to the diaphragm under high flow conditions. The inlet flow keeps the diaphragm and valve seat clean and free of particles which could cause leakage in the closed position.

Installation:
Because of its sensitive and free floating design, the Series “MPC” valve can be installed in any position. Caution however should be exercised to make certain that the direction of flow is correct; one side of the valve is stamped with “VAC” to identify the downstream or outlet side.

Maximum Pressure and Flow Ratings:

<table>
<thead>
<tr>
<th>Body &amp; diaphragm material</th>
<th>Tubing I.D. Size (Inches)</th>
<th>Water</th>
<th>Air</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CV</td>
<td>Max. Working Pressure at Max Flow at Max Pressure</td>
<td>Max. Working Pressure at Max Flow at Max Pressure</td>
</tr>
<tr>
<td></td>
<td>Inlet Reverse</td>
<td>GPM</td>
<td>PSI</td>
</tr>
<tr>
<td>Polypropylene (Polypro &amp; Viton)</td>
<td>3/8 1/4 5/16</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>3/16 3/16 1/4 5/16</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Polyvinylidene fluoride (PVDF &amp; Viton)</td>
<td>3/16 3/16 1/4 5/16</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Polyvinylidene fluoride (PVDF &amp; Kalrez)</td>
<td>3/16 3/16 1/4 5/16</td>
<td>12</td>
<td>15</td>
</tr>
</tbody>
</table>

CAUTION: Large number of flow/check cycles may cause diaphragm to fail due to fatigue.

Note: Pressures listed are at a maximum temperature of 90°F (32°C).
For pressure ratings at higher temperatures, consult factory.

Dimensions and Model Numbers:

<table>
<thead>
<tr>
<th>Tubing I.D. Size</th>
<th>Inlet Outlet Length</th>
<th>Polypro &amp; Viton</th>
<th>Nylon &amp; Silicone</th>
<th>PVDF &amp; Kalrez</th>
<th>PVDF &amp; Viton</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8</td>
<td>1/8</td>
<td>MPC012V-PP</td>
<td>MPC012SI-NY</td>
<td>MPC012K-PF</td>
<td>MPC012V-PF</td>
</tr>
<tr>
<td>3/16</td>
<td>1/8</td>
<td>MPC018V-PP</td>
<td>MPC018SI-NY</td>
<td>MPC018K-PF</td>
<td>MPC018V-PF</td>
</tr>
<tr>
<td>5/16</td>
<td>1/8</td>
<td>MPC025V-PP</td>
<td>MPC025SI-NY</td>
<td>MPC025K-PF</td>
<td>MPC025V-PF</td>
</tr>
<tr>
<td>5/16</td>
<td>1/8</td>
<td>MPC031V-PP</td>
<td>MPC031SI-NY</td>
<td>MPC031K-PF</td>
<td>MPC031V-PF</td>
</tr>
</tbody>
</table>

For information on other material combinations, consult factory.

Authorized Plast-o-Matic Distributor

Plast-o-Matic Valves, Inc.
1384 Pompton Ave., Cedar Grove, NJ 07009
(973) 256-3000 • FAX (973) 256-4745

Printed in USA
Compact, Self-Closing Vacuum Breakers Protect Against Hazards, Damage and Financial Losses Caused by Vacuum!

Features/Benefits with Proper Installation:
- Designed to protect enclosed tanks from collapse or structural damage during draining.
- Eliminates siphoning of dangerous fluids.
- Prevents vacuum which can cause damage to sensitive instruments and filters.
- Normally-closed design prevents fugitive emissions from leaving system.
- Insurance against replacement of damaged expensive equipment... avoids critical system downtime.
- Patented diaphragm design assures dependable, repetitive, bubble-tight sealing in VBM and VB; PFA encapsulated spring and special poppet provide identical performance in VBS design.
- For corrosive or ultra-pure liquid applications.
- Sizes: 1/2", 3/4", 1", 1 1/2", 2" and 3".

Materials of Construction:
Series VBM Vacuum Breakers are molded of type 1, grade 1, PVC (Polyvinyl Chloride), Glass-filled Polypropylene, Kynar® PVDF and Corzan® CPVC in sizes 1/2", 3/4" and 1". A machined version, Series VB is available in PTFE in sizes 3/4" and 1". Diaphragms are of EPDM or FKM (comparable to Viton® barnd). VBS Vacuum Breakers are available in standard PVC (Polyvinyl Chloride), Natural Polypropylene, Kynar® PVDF, and Corzan® CPVC in sizes 1 1/2", 2", and 3". Standard dust caps on PVDF models are natural polypropylene; PVDF is optional. Seals are EPDM or FKM. Threaded or socket connections are standard on all models.

Design:
The Plast-O-Matic VBM Vacuum Breakers have only one moving part – the patented self-sealing diaphragm, and this provides both design simplicity and maximum operating dependability. This normally-closed design seals in the identical location every time producing a very dependable, long-life seal. Series VBS Vacuum Breakers feature a corrosion resistant PFA encapsulated spring which acts on a poppet seal that neither sticks nor chatters. Maximum working pressure is 100 PSI @ 75°F (6,9 bar @ 24°C). See pressure/temperature ratings on reverse side.

Operation and Installation:
Plast-O-Matic Vacuum Breakers feature a patented, normally-closed, design that can be mounted in any position; however, upright is recommended. For enclosed tank applications, mounting should be at the highest point of the tank.
These Vacuum Breakers will begin to break a vacuum at approximately 2 inches of mercury (1.0 PSI or 0.07 Bar negative pressure). Full vacuum is 29 inches of mercury. For applications either draining or pumping from enclosed tanks, the tanks must be able to withstand much more than 2 inches of mercury of vacuum, as illustrated in the chart below. The chart is based upon a 3.5 times safety factor, and it clearly shows that as the rate of liquid flow leaving the tank increases, the resulting vacuum in the tank also increases.

Explanation of Graph:
1. The above graph relates liquid flow leaving an enclosed tank to the resulting vacuum created in the tank as air is entering the tank through the Vacuum Breakers. A safety factor of 3.5 times is used in constructing the graph.
2. To use the graph determine the rate of flow when draining the tank and from that location on the vertical axis read across to the graph of the proper vacuum breaker size. At this intersection of the graph read down to the horizontal axis and determine the vacuum for the tank. This is the recommended vacuum rating of the tank which must be checked with the tank manufacturer’s rating to be sure the tank is strong enough.

Anti-Siphon Applications:
For these applications the Vacuum Breakers must be installed in a “U-bend” at least 30 inches (2 1/2 feet or 76 cm) above the highest liquid level. Depending on the safety factor desired for Anti-Siphoning this height would become 60 inches (5 feet or 152 cm) at 2 times safety factor which is recommended by Plast-O-Matic.

Use Caution in Dangerous Applications:
In the event a diaphragm failure could cause spraying of a dangerous liquid onto nearby equipment or personnel, or simply into the atmosphere where breathing the vapors would be dangerous, it is strongly advised to use a Plast-O-Matic Check Valve in lieu of the Vacuum Breaker, and pipe the vent or inlet side of the check valve to a safe remote location. The Check Valve will have the same flow capabilities of the Vacuum Breaker, and contains the same design.

Elimination of Vacuum in a System:
To prevent instrument or system malfunction, the same considerations are involved as in the tank application. The vacuum breaker should be installed at the highest location in the system. Plast-O-Matic Vacuum Breakers can be mounted in any position since they are self-sealing and do not rely on gravity to operate; however, upright is preferred. Also see Anti-Siphon section.

Dimensions and Material Availability:

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Series VBS – PVC, PP, PVDF &amp; CPVC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1”</td>
<td>VBS100V-PV VBS100V-PP VBS100V-PF VBS100V-CP</td>
</tr>
<tr>
<td>2”</td>
<td>VBS200V-PV VBS200V-PP VBS200V-PF VBS200V-CP</td>
</tr>
<tr>
<td>3”</td>
<td>VBS300V-PV VBS300V-PP VBS300V-PF VBS300V-CP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Valve Body Material</th>
<th>Series VBM – Molded Models: PVC, GPP, PVDF &amp; CPVC</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC</td>
<td>EPDM 100 100 40 80 60 40 20 10 20 10</td>
</tr>
<tr>
<td>GPP</td>
<td>EPDM 100 100 40 80 60 40 20 10 20 10</td>
</tr>
<tr>
<td>PVDF</td>
<td>EPDM 100 100 40 80 60 40 20 10 20 10</td>
</tr>
<tr>
<td>CPVC</td>
<td>EPDM 100 100 40 80 60 40 20 10 20 10</td>
</tr>
</tbody>
</table>

Pressure/Temperature Rating:

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Series VBM-PVC FKM Seals</th>
<th>Series VBM-GPP FKM Seals</th>
<th>Series VBM-PVDF FKM Seals</th>
<th>Series VBM-CPVC FKM Seals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2”</td>
<td>VBM050V-PF VBM050V-PP VBM050V-PF VBM050V-CP</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3/4”</td>
<td>VBM075V-PF VBM075V-PP VBM075V-PF VBM075V-CP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1”</td>
<td>VBM100V-PF VBM100V-PP VBM100V-PF VBM100V-CP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2”</td>
<td>VBS150V-PF VBS150V-PP VBS150V-PF VBS150V-CP</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3”</td>
<td>VBS200V-PF VBS200V-PP VBS200V-PF VBS200V-CP</td>
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<td></td>
</tr>
</tbody>
</table>

Notes:
1. For socket end connectors specify “S” in part number (ex. VBS150V-PP).
2. For threaded ends connectors specify “T” in part number (ex. VBS150V-TP).” Natural Polypro is non-filled, non-pigmented 100% virgin resin

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