

**HAYWARD FLOW CONTROL
FLV SERIES FILTER VESSEL
INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS**



Brisbane, Australia
www.monarchindustrial.com.au
www.monarchasiapacific.com.au

PLEASE READ THE FOLLOWING INFORMATION PRIOR TO INSTALLING AND USING HAYWARD FLV SERIES FILTER VESSELS. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PRODUCT DAMAGE, PROPERTY DAMAGE, PERSONAL INJURY, OR EVEN DEATH.

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 PP 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. Hayward products are designed for use with non-compressible liquids.

WARNING

Hayward PVC and CPVC products should NEVER be used or tested with compressible fluids such as compressed air or nitrogen. Use of PVC and CPVC products in compressible fluid applications may result in product damage, property damage, personal injury, or even death.

WARNING

The Series FLV Filter Vessel is intended for use in liquid service only. Do not attempt to use this vessel for filtering 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 and CPVC 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 FILTER VESSELS INTO METAL PIPING SYSTEMS IS NOT RECOMMENDED.** Wherever installation of plastic filter vessels 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 vessels using clean water at 70°F. Vessel 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 filter vessel may result in product damage, property damage, personal injury, or even death.

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1.0 INSTALLATION:

1.1 Transporting the Vessel:

Filter vessel should be stored inside factory packaging until product is ready to be installed. Filter vessel should be moved as close to installation site as possible prior to removing from packaging. Packaging is designed to be lifted by two people (one person on each end of carton, with carton in horizontal position).

After removing filter vessel from carton, a hoist should be used to transport vessel to installation site. Care must be taken not to damage vessel, threads, or basket (inside vessel) with pipe, chain, strap, or other lifting equipment. Use of straps for lifting vessel assembly is highly recommended to prevent damage. In order to protect threads, Hayward recommends leaving cover and assembly nuts on body while moving assembly.

CAUTION
Hayward FLV-Series Filter Vessels require two people to lift or move. Attempting to lift or move filter vessel alone could result in property damage or personal injury.

1.2 Mounting the Vessel to Floor or Skid:

Hayward FLV-Series filter vessels are equipped with a slotted bolt circle on the base so that the vessel may be directly mounted to a skid or to the floor. The bolt circle diameter is 7.5 inches. Hayward recommends using 3/4" diameter bolts or studs with flat washers and lock washers for mounting the vessel. The bolts (or studs) should be torqued to 5 ft-lb in an alternating sequence in order to securely mount the vessel without damaging the base and to ensure that the vessel is installed as level as possible.

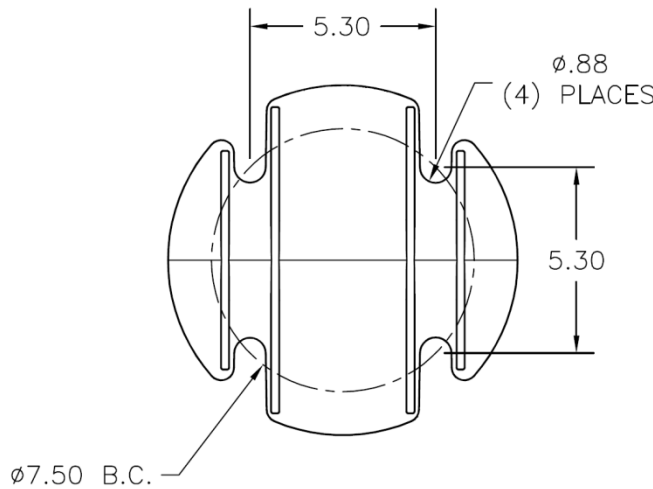


Fig. 1: FLV-Series base mounting pad (bottom view)

1.3 Installing the Vessel into a System:

CAUTION

Hayward FLV-Series filter vessel must be installed in an upright position.

Do not install unsupported piping or risers onto end connectors or vessel body.

Do not use vessel as a pipe support or system anchor. Sound piping system design principles should be applied when installing this vessel.

Do not install metal pipe directly into end connectors or vessel body (see pg. 1).

Use of expansion joints or expansion loops in piping system connected to vessel may be necessary to keep differential thermal expansion / contraction stresses to a minimum.

It is highly recommended that valves are installed upstream and downstream of vessel to allow for routine maintenance (i.e. bag changes / cleanout).

1.3.1 Vessels Provided with True Union End Connections:

- 1.3.1.1 Units with true union end connections are equipped with two inlet ports and two outlet ports for installation flexibility. Either upper port may be used as an inlet and either lower port may be used as an outlet. The two unused ports should be sealed with an end cap and assembly nut (included).
- 1.3.1.2 Remove the nut and end connector by rotating the nuts counter clockwise.
- 1.3.1.3 Place nut over pipe end so that it can engage the end connector once the end connector is connected to the pipe end.

1.3.1.4 Threaded End Connectors:

- 1.3.1.4.1 Wrap male threads of pipe end with PTFE tape. Proper application of PTFE tape will provide a sufficient seal for PVC, CPVC and PP threaded joints.

WARNING

Do not use "pipe dope", liquid sealant, or thread sealant on any PVC, CPVC, or Polypropylene, threaded connections. Pipe dope and thread sealants may react with the PVC, CPVC, or Polypropylene, weakening the material and potentially resulting in failure of the joint, product damage, property damage, personal injury, or even death.

- 1.3.1.4.2 Thread the pipe end into the vessel end connector until "hand tight". Using a strap wrench only (never use a pipe wrench), tighten the pipe into the vessel end connector only to the point required to form a seal between the end connector and pipe thread; 1/2 turn past hand tight is typically sufficient to form a seal. **(Caution: Tightening beyond this point may introduce excessive stress that could cause failure of the end connector or the threaded end of the pipe.)**

1.3.1.5 Solvent-Weld End Connectors (PVC and CPVC only):

- 1.3.1.5.1 Refer to solvent-weld manufacturer's instructions and cure times.
 1.3.1.5.2 Only solvent cement end connector to pipe end with nut and end connector removed from filter vessel body.
 1.3.1.5.3 Reinstall end connector by threading nut onto body by rotating in a clockwise direction. Do not install solvent cemented end connectors until solvent cement has fully cured.

1.3.1.6 Flange Connections:

- 1.3.1.6.1 PVC and CPVC flanges connections are provided with a GFPP nut, and a PVC or CPVC end connector solvent cemented to a mating flange.
 1.3.1.6.1.1 Thread nut onto body by rotating in a clockwise direction.
 1.3.1.6.1.2 Connect flange to mating system flange.
 1.3.1.6.2 GFPP flanges are provided with a male thread that must be threaded into the end connectors.
 1.3.1.6.2.1 Wrap male threads of flange with Teflon[®] tape. Proper application of Teflon[®] tape will provide a sufficient seal for PP threaded joints.

WARNING

Do not use "pipe dope", liquid sealant, or thread sealant on any PVC, CPVC, or Polypropylene, threaded connections. Pipe dope and thread sealants may react with the PVC, CPVC, or Polypropylene, weakening the material and potentially resulting in failure of the joint, product damage, property damage, personal injury, or even death.

- 1.3.1.6.2.2 Thread the flange into the end connector until "hand tight". Using a strap wrench only (never use a pipe wrench), tighten the flange into the end connector only to the point required to form a seal between the end connector and flange thread; 1/2 turn past hand tight is typically sufficient to form a seal. **(Caution: Tightening beyond this point may introduce excessive stress that could cause failure of the end connector or the threaded end of the flange.)**
- 1.3.1.6.3 Reinstall end connector by threading nut onto body by rotating in a clockwise direction. Align bolt holes on both flanges before fully tightening nut.
- 1.3.1.6.4 Flange bolts should be tight enough to slightly compress the gasket and make a good seal, without distorting or putting excessive stress on the flanges. Suitable washers should be used between the bolt head and flange and the nut and flange. Bolts should be tightened in alternating sequence. See Table 1 for recommended torque.

TABLE 1:

RECOMMENDED FLANGE BOLT TORQUE

FLANGE SIZE	BOLT DIA. (IN)	TORQUE (FT. LBS.)
1-1/4	1/2	10-15
1-1/2	1/2	10-15
2	5/8	15-25
2-1/2	5/8	20-25
3	5/8	20-25
4	5/8	20-25

NOTE: USE WELL LUBRICATED METAL BOLTS AND NUTS. USE SOFT RUBBER GASKETS.

1.3.2 Vessels Provided with 2" NPT Tapped Inlet and Outlet Ports:

- 1.3.2.1 Units provided with 2" NPT threaded body ports are equipped with one inlet port and two outlet ports. On these models, all four true union ports are sealed with end caps and union nuts (included). The upper threaded body port is the inlet. Either lower threaded body port can be used as the outlet. The lower threaded body port that is not used as an outlet should be sealed with a 2" NPT pipe plug (included). This body port can be used as a drain while maintaining the vessel and/or filter media.

1.3.2.2 Threaded Connections:

- 1.3.2.2.1 Wrap male threads of pipe end with Teflon[®] tape. Proper application of PTFE tape will provide a sufficient seal for PVC, CPVC and PP threaded joints.

WARNING

Do not use “pipe dope”, liquid sealant, or thread sealant on any PVC, CPVC, or Polypropylene, threaded connections. Pipe dope and thread sealants may react with the PVC, CPVC, or Polypropylene, weakening the material and potentially resulting in failure of the joint, product damage, property damage, personal injury, or even death.

- 1.3.2.2.2 Thread the pipe end into the threaded ports in the vessel body until “hand tight”. Using a strap wrench only (never use a pipe wrench), tighten the pipe into the vessel body only to the point required to form a seal between the vessel body and pipe thread; 1/2 turn past hand tight is typically sufficient to form a seal. **(Caution: Tightening beyond this point may introduce excessive stress that could cause failure of the vessel body or the threaded end of the pipe.)**

WARNING

Do not install metal pipe directly into vessel body. Installing metal pipe directly into end connectors or vessel body could create excess stress resulting in failure of the joint, product damage, property damage, personal injury, or even death.

If install unit into metal system, install a length of plastic pipe at least 10 times the nominal pipe diameter between the vessel and the metal pipe.

1.3.2.3 Flange Connections:

- 1.3.2.3.1 GFPP flanges are provided with a male thread that must be threaded into the vessel ports.
1.3.2.3.2 Wrap male threads of flange with PTFE tape. Proper application of PTFE tape will provide a sufficient seal for PP threaded joints.

WARNING

Do not use “pipe dope”, liquid sealant, or thread sealant on any PVC, CPVC, or Polypropylene, threaded connections. Pipe dope and thread sealants may react with the PVC, CPVC, or Polypropylene, weakening the material and potentially resulting in failure of the joint, product damage, property damage, personal injury, or even death.

- 1.3.2.3.3 Thread the flange into the vessel until “hand tight”. Using a strap wrench only (never use a pipe wrench), tighten the flange into the vessel only to the point required to form a seal between the threaded end of the flange and the threaded port of the body; 1/2 turn past hand tight is typically sufficient to form a seal. **(Caution: Tightening beyond this point may introduce excessive stress that could cause failure of the vessel or the threaded end of the flange.)**
- 1.3.2.3.4 Flange bolts should be tight enough to slightly compress the gasket and make a good seal, without distorting or putting excessive stress on the flanges. Suitable washers should be used between the bolt head and flange and the nut and flange. Bolts should be tightened in alternating sequence. (See Table 1.)

1.4 Installing Differential Pressure Gauges:

Hayward FLV-Series filter vessels are capable of having differential pressure gauges / pressure transducers mounted directly to the vessel body. However, the vessel must be purchased from the factory with drilled and tapped differential pressure gauge ports.

WARNING

Differential pressure ports should never be drilled and tapped outside of Hayward factory. Modifying differential pressure ports in any way will void the product warranty. Modifying differential pressure ports could result in property damage, personal injury, or even death.

1.4.1 To install differential pressure gauges / pressure transducers:

- 1.4.1.1 Relieve pressure from system and drain all media from filter vessel. **(See “Depressurizing and Draining the Vessel”.)**
1.4.1.2 Remove threaded pipe plugs from upper and lower differential pressure ports (if vessel provided with drilled and tapped differential pressure ports). (See fig. 2.)
1.4.1.3 Wrap male threads of gauge / transducer with PTFE tape. Proper application of PTFE tape will provide a sufficient seal for PVC, CPVC and PP threaded joints. **[Caution: Gauge / transducer threads must be 1/4” NPTM. Use of any other threads will permanently damage vessel and void warranty.]**

WARNING

Do not use “pipe dope”, liquid sealant, or thread sealant on any PVC, CPVC, or Polypropylene, threaded connections. Pipe dope and thread sealants may react with the PVC, CPVC, or Polypropylene, weakening the material and potentially resulting in failure of the joint, product damage, property damage, personal injury, or even death.

- 1.4.1.4 Thread the gauge / transducer into the threaded ports on the body until “hand tight”. Tighten the gauge / transducer into the differential pressure port only to the point required to form a seal between the gauge / transducer and the port thread; 1/2 turn past hand tight is typically sufficient to form a seal. **(Caution: Tightening beyond this point may introduce excessive stress that could cause failure of the body or the gauge / transducer.)**

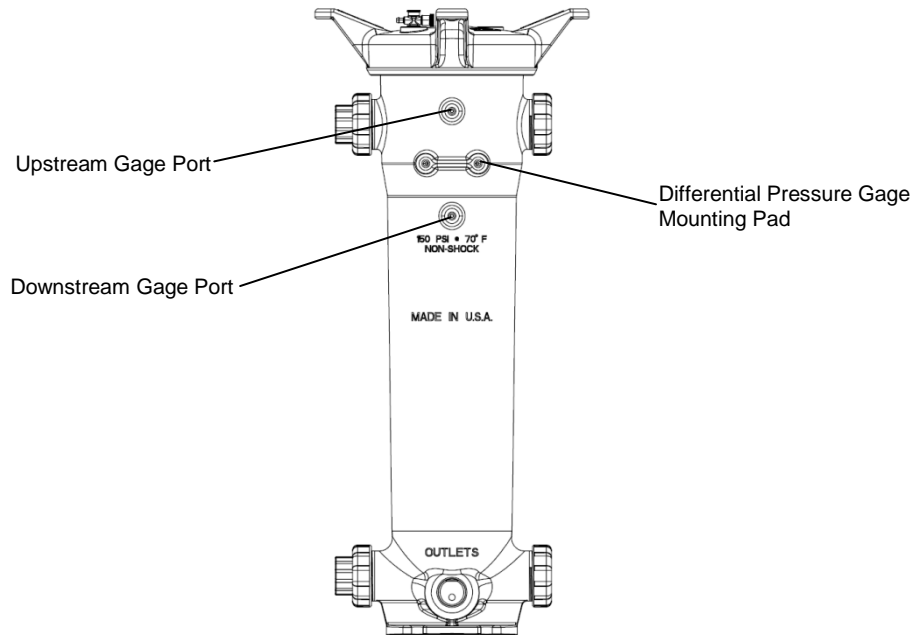


Fig. 2: Differential pressure gauge ports (back view)

1.5 Installing a System Pressure Gauge:

Hayward FLV-Series filter vessels are capable of having system pressure gauges / pressure transducers mounted directly to the vessel cover.

- 1.5.1 To install system pressure gauges / pressure transducers:
 - 1.5.1.1 Relieve pressure from system and drain all media from filter vessel. (See “Depressurizing and Draining the Vessel”.)
 - 1.5.1.2 Remove threaded pipe plug from vent valve located on top of filter vessel cover. (See fig. 3.)
 - 1.5.1.3 Wrap male threads of gauge / transducer with PTFE tape. Proper application of PTFE tape will provide a sufficient seal for PVC, CPVC and PP threaded joints. NOTE: Gauge / transducer threads must be 1/4” NPTM. Use of any other threads will permanently damage vent valve and will void warranty.

WARNING

Do not use “pipe dope”, liquid sealant, or thread sealant on any PVC, CPVC, or Polypropylene, threaded connections. Pipe dope and thread sealants may react with the PVC, CPVC, or Polypropylene, weakening the material and potentially resulting in failure of the joint, product damage, property damage, personal injury, or even death.

- 1.5.1.4 Thread the gauge / transducer into the threaded port on the vent valve until “hand tight”. Tighten the pipe into the threaded port of the vent valve only to the point required to form a seal between the gauge / transducer and the port thread; 1/2 turn past hand tight is typically sufficient to form a seal. (Caution: Tightening beyond this point may introduce excessive stress that could cause failure of the vent valve or the gauge / transducer.)

NOTE: Hayward FLV-Series filter vessels are available from the factory with an alternate port drilled and tapped into the cover. This port can be used for additional gauges or instrumentation. Consult factory for more details.

WARNING

Alternate cover ports should never be drilled and tapped outside of Hayward factory. Modifying cover in any way will void the product warranty. Modifying cover could result in property damage, personal injury, or even death.

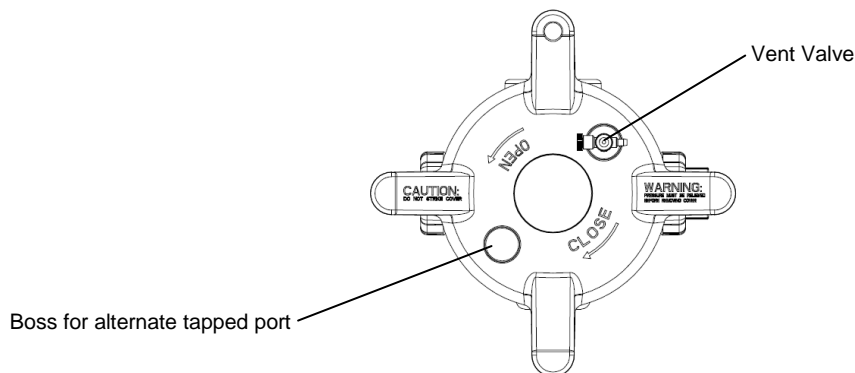


Fig. 3: Vent valve and additional boss on cover (top view)

2.0 OPERATION:

2.1 Installing a Bag and Basket:

- 2.1.1 To install a bag into the FLV Series filter basket:
 - 2.1.1.2 Place basket on a level surface (basket will stand on its own), lay handle against basket ring in the “unlocked” position. (See fig. 7.)
 - 2.1.1.3 Remove bag retention ring from basket assembly, by lifting the edge opposite the handle and pulling ring out at an approximately 20° angle. (See fig. 8.)
 - 2.1.1.4 Install new filter bag into filter basket, being careful to fit bag flange or ring inside of the counter bore in the top of the basket ring. (NOTE: Folding bag lengthwise prior to inserting bag into basket will ease installation.)
 - 2.1.1.5 Place bag retaining ring over bag and inside of bore of basket ring.
 - 2.1.1.6 Rotate handle approximately 90° upwards to lightly seat bag retaining ring inside basket ring.
- 2.1.2 To install the basket into the FLV Series filter vessel:
 - 2.1.2.1 Place basket inside vessel. Tapered walls inside vessel body, and tapered shoulder on basket ring will center basket inside vessel body. It is recommended to position the basket with the handle positioned away from the inlet port.
 - 2.1.2.2 Rotate basket handle approximately 90° to “locked” position. The camming action of the handle will push down on the bag retaining ring. This will ensure that the open end of the filter bag is securely retained between the basket ring and the bag retaining ring.
 - 2.1.2.3 Fill vessel, re-install cover onto vessel body and re-pressurize system. (See “Filling and Pressurizing the Vessel” below.)

2.2 Filling and Pressurizing the Vessel:

- 2.2.1 To fill and pressurize Hayward FLV-Series filter vessel:
 - 2.2.1.1 Verify that cover o-ring, cover o-ring groove, and cover sealing surface are clean.
 - 2.2.1.2 Verify that cover o-ring is seated inside o-ring groove.
 - 2.2.1.3 Open vent valve on top of cover (valve is opened by rotating thumbwheel counter-clockwise). NOTE: Process media will be allowed to escape through outlet of vent valve as vessel is filled. If needed, install ¼” drain tubing on outlet of vent valve to prevent property damage or personal injury due to contact with process media. Dispose of vented chemicals properly.
 - 2.2.1.4 Install cover firmly onto vessel body
 - 2.2.1.5 Do not strike cover.
 - 2.2.1.6 Do not attempt to over-tighten cover.
 - 2.2.1.7 Cover is sealed by means of a pressure energized face sealing o-ring. **Tighten cover hand-tight plus approximately 1/8-turn (i.e. 45°). It is not necessary to tighten cover beyond hand tight plus 1/8-turn.**
 - 2.2.1.8 Slowly open valve upstream of vessel and start system pump (if necessary).
 - 2.2.1.9 Allow process media to fill vessel, air will be purged through vent valve on top of cover. After all air has been purged, process media will start flowing through vent valve. Close vent valve by rotating thumbwheel clockwise.
 - 2.2.1.10 Allow pressure to slowly increase until system operating pressure is reached.

WARNING

Open and close valves upstream and downstream of the FLV-Series filter vessel slowly. Rapid increases in pressure or flow can create excess water hammer effect, resulting in property damage, personal injury, or even death.

- 2.2.1.11 Carefully inspect vessel at cover, end connectors, end caps, and vent valve to verify no leaks are present. If any leaks are present, shut down system, relieve system pressure, and drain vessel prior to tightening any connections.

WARNING

If vessel is leaking, never try to stop the leak while vessel is under pressure. Doing so can result in property damage, personal injury, or even death.

WARNING

Failure to fill vessel with vent valve installed and open can result in buildup of pressure and compression of air in the system, resulting in property damage, personal injury, or even death.

2.3 Operating the Vessel:

- 2.3.1 Valves upstream and downstream of the vessel should be opened and closed slowly to prevent water hammer on the vessel.

WARNING

Open and close valves upstream and downstream of the FLV-Series filter vessel slowly. Rapid increases in pressure or flow can create excess water hammer effect, resulting in property damage, personal injury, or even death.

- 2.3.2 Hayward recommends the installation and use, or monitoring, of gauges upstream and downstream of each vessel in order to monitor the increase in differential pressure that will occur as the bag becomes fouled. (See Section 1.4)
- 2.3.3 Replace filter bags at 10 p.s.i. differential pressure. Filter bags lose efficiency above this level. (See Section 2.5)
- 2.3.4 Applications requiring greater than 10 p.s.i. differential pressure must use solid basket. Consult factory.

2.4 Depressurizing and Draining the Vessel:

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 filter vessel may result in product damage, property damage, personal injury, or even death.

- 2.4.1 To depressurize and drain Hayward FLV-Series filter vessel:
 - 2.4.1.1 Slowly close valves upstream and downstream of filter vessel.

WARNING

Open and close valves upstream and downstream of the FLV-Series filter vessel slowly. Rapid increases in pressure or flow can create excess water hammer effect, resulting in property damage, personal injury, or even death.

- 2.4.1.2 Slowly open vent valve on top of cover (valve is opened by rotating thumbwheel counter-clockwise). NOTE: Process media will be allowed to escape through outlet of vent valve as vessel depressurizes. If needed, install 1/4" drain tubing on outlet of vent valve to prevent property damage or personal injury due to contact with process media. Dispose of vented chemicals properly.
- 2.4.1.3 After all pressure has been relieved, remove plug from drain port and allow vessel to drain completely. Capture and dispose of drained chemicals properly. (See fig. 4.)
- 2.4.1.4 For faster draining, the nut of the lower end cap port can be loosened to allow drainage from this port. Alternatively, a Hayward TB-Series ball valve can be installed to drain the vessel via this lower port. **Caution:** Do not lose o-ring that seals port cap to vessel body.

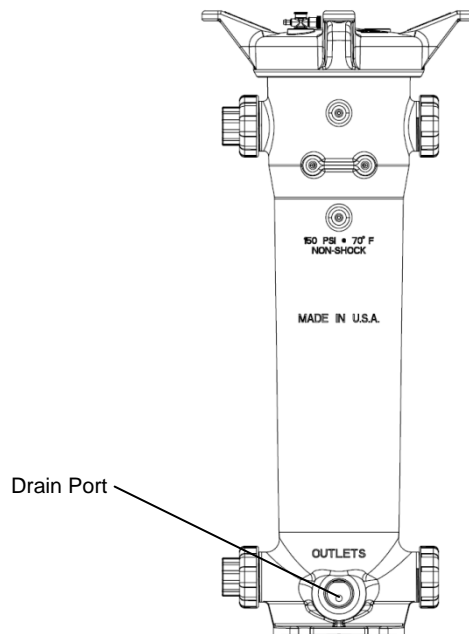


Fig. 4: Drain port location.
(back view)

2.5 Removing and Replacing Filter Bag:

- 2.5.1 To remove and replace filter bag from Hayward FLV-Series filter vessel:
 - 2.5.1.1 Depressurize and drain filter vessel. (See "Depressurizing and Draining the Vessel" above.)
 - 2.5.1.2 Remove cover from filter vessel and place in a clean location. NOTE: Cover is supplied with 7/8" diameter hole suitable for hanging cover during maintenance. Inspect cover threads and o-ring for damage or debris. Replace if needed.
 - 2.5.1.3 Rotate basket handle approximately 90° upwards (towards top of vessel). This motion will unlock the bag retaining ring. (See fig. 6.)

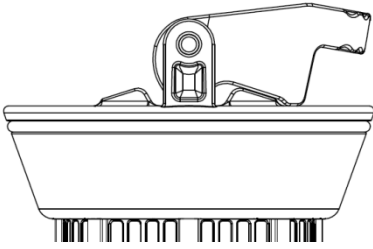


Fig. 5: Handle in "locked" position (side view)

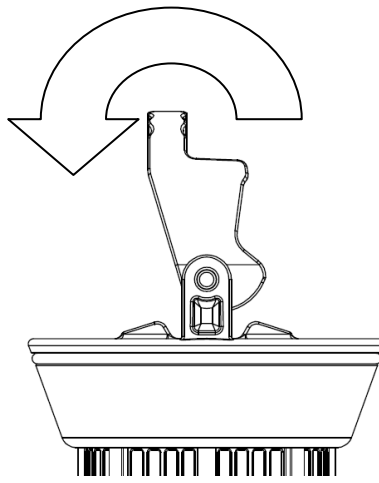


Fig. 6: Handle rotated 90° (side view)

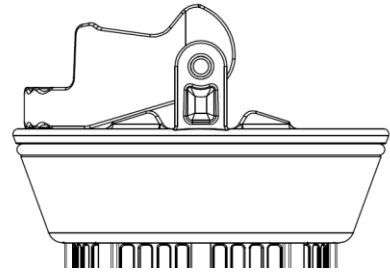


Fig. 7: Handle in "unlocked" position (side view)

2.5.1.4 Grip basket handle firmly and lift basket out of vessel body. Alternatively, an overhead hoist can be attached to handle to lift basket and bag from vessel body.

CAUTION
Basket, bag, and filtered media combined can weigh in excess of 75 pounds. Exercise care while lifting or handling basket so as to avoid personal injury or property damage.

2.5.1.5 After removing basket from body, place basket on a level surface (basket will stand on its own), lay handle against basket ring in the "unlocked" position. (See fig. 7.)

2.5.1.6 Remove bag retention ring from basket assembly, by lifting the edge opposite the handle and pulling ring out at an approximately 20° angle. (See fig. 8.)

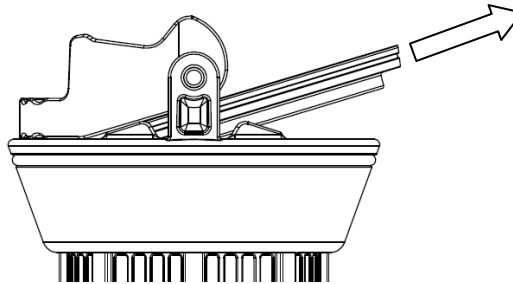


Fig. 8: Removal of bag ring from basket ring (side view)

2.5.1.7 **HINGED BASKET:** If vessel is equipped with hinged basket and hinged feature is to be used to expand basket for easier bag removal;

2.5.1.7.1 Rotate basket ring counter-clockwise (as viewed from top of basket) approximately 25° to allow slots in basket ring to align with runner ribs on basket. (Note: Alignment slots of basket ring not visible from top of ring.) (See fig. 9A and fig. 9B.) **[NOTE: Basket ring will first encounter "soft" stops used to lock basket ring in place, basket ring will then encounter "hard" stops. Do not force basket ring to rotate past "hard" stops.]**

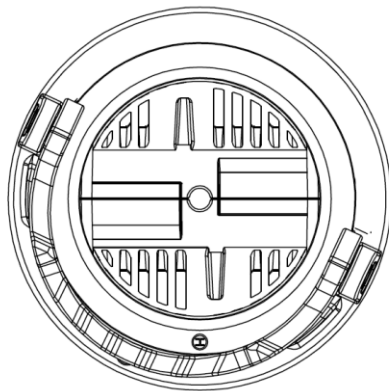


Fig. 9A: Basket ring in "locked" position (top view)

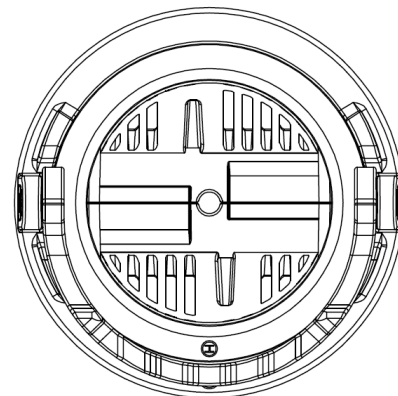


Fig. 9B: Basket ring rotated 25° CCW to "unlocked" position (top view)

2.5.1.7.2 Once slots in basket ring are aligned with runner ribs of basket, push down on basket ring to lower basket ring to bottom of basket. (See fig. 11A, 11B, and 11C.) **[NOTE: Lowering basket ring will allow basket halves to separate from each other. Be careful not to allow basket to fall over as this could damage basket or injure operator.]**

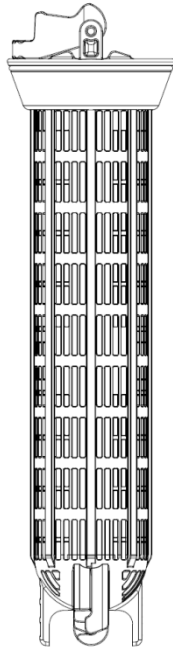


Fig. 11A: Basket ring at top of basket (side view)

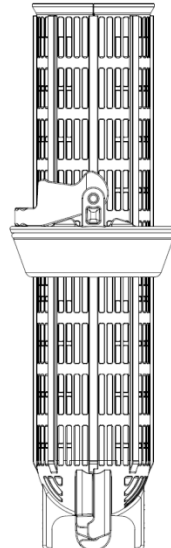


Fig. 11B: Basket ring lowered on basket (side view)

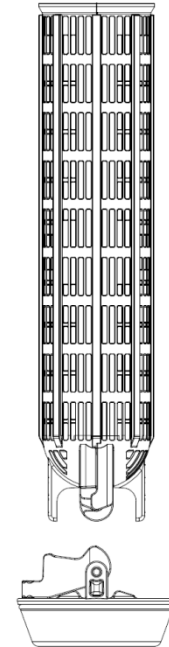


Fig. 11C: Basket ring removed from basket (side view)

2.5.1.7.3 Pivot basket halves away from each other. This will allow bag to be easily removed from basket. Remove and properly dispose of used filter bag. (Note: Hinge is designed so that basket can be fully opened and will not allow halves to disengage.) (See fig. 12A and fig. 12B.)

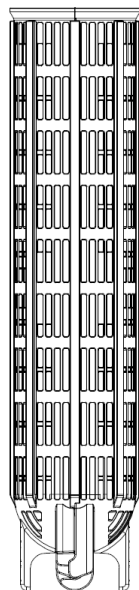


Fig. 12A: Basket in "closed" position

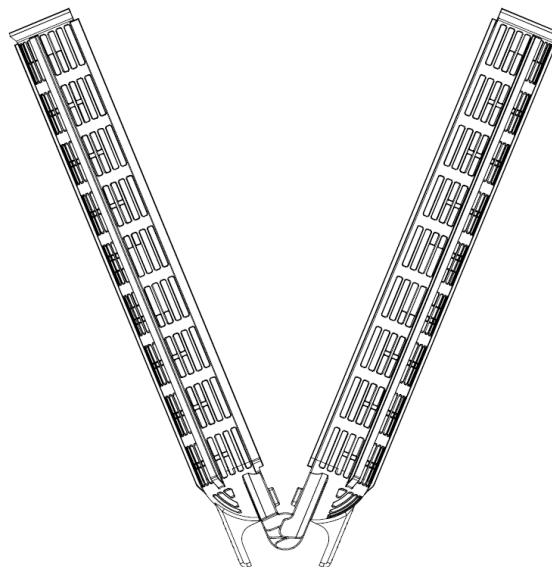


Fig. 12B: Basket 45° "open"

2.5.1.7.4 Pivot basket halves so that they are in full contact with each other.

2.5.1.7.5 Re-install basket ring by aligning slots in basket ring with runner ribs on basket. (It may be easier to reassemble by first turning basket up-side down and pushing basket ring down onto basket.) Slide basket ring to the top of the basket and rotate approximately 25° clockwise (as viewed from the top). **[NOTE: Basket ring will encounter "soft" stops used to lock basket ring into place, then "hard" stops used to prevent basket ring from over-rotating. Do not force basket ring to rotate past "hard" stops.]**

2.5.1.8 **SOLID BASKET:** If vessel is equipped with a solid basket, or if vessel is equipped with hinged basket, but hinge feature is not required for bag removal;

- 2.5.1.8.1 Remove bag by pulling bag upwards in relation to basket. (NOTE: There is no need to remove basket ring for bag removal.)
- 2.5.1.9 Install new filter bag into filter basket, being careful to fit bag flange or ring inside of the counter bore in the top of the basket ring. (NOTE: Folding bag lengthwise prior to inserting bag into basket will ease installation.)
- 2.5.1.10 Place bag retaining ring over bag and inside of bore of basket ring.
- 2.5.1.11 Rotate handle approximately 90° upwards to lightly seat bag retaining ring inside basket ring.
- 2.5.1.12 Place basket inside vessel.
- 2.5.1.13 Rotate basket handle approximately 90° to “locked” position. The camming action of the handle will push down on the bag retaining ring. This will ensure that the open end of the filter bag is securely retained between the basket ring and the bag retaining ring.
- 2.5.1.14 Fill vessel, re-install cover onto vessel body and re-pressurize system. (See “Filling and Pressurizing the Vessel” above.)

3.0 VESSEL MAINTENANCE:

- 3.1 Clean internal cover threads and external body threads each time cover is removed. Threads should be cleaned with a soft brush or cloth. Care should be taken not to damage threads. If cover or nut threads are damaged due to normal “wear and tear”, replace damaged cover or nuts. If body threads are damaged, replace entire unit.

WARNING
 Filter vessel should never be pressurized with damaged threads on cover, body, or assembly nuts. Use of filter vessel with damaged threads could result in property damage, personal injury, or even death.

WARNING
 If nuts or cover ever fail due to over pressurization or water-hammer failure, entire unit needs to be replaced. Failure to replace unit after water-hammer failure, or failure due to over pressurization could result in property damage, personal injury, or even death.

- 3.2 Clean and inspect o-ring grooves and o-rings each time the cover or end connector is removed. Damaged o-rings should be replaced immediately.

4.0 TROUBLESHOOTING:

Problem	Cause	Solution
Leak between cover and body	Damaged o-ring	Remove cover and carefully inspect o-ring for cuts, impressions, or other damage. Replace o-ring if damaged.
	Debris in o-ring groove	Remove cover and o-ring. Clean o-ring groove using care not to scratch sealing surface. O-ring groove is tapered to center of vessel, and has four drain slots to allow rinsing of groove during vessel maintenance.
	Loose cover / Over-tightened cover	Tighten cover hand tight plus 1/8-turn (45°). Cover should not require tightening beyond this point. Never strike cover. Never use “cheater” bar to tighten or loosen cover.
	Missing o-ring	Remove cover, clean groove, and install new o-ring.
Leak between end connector and body	Damaged o-ring	Remove assembly nut and end connector. Carefully inspect o-ring for cuts, impressions, or other damage. Replace o-ring if damaged.
	Loose assembly nut	Tighten assembly nut hand tight. Using strap wrench, gently tighten assembly nut an additional ¼-turn (90°).
	Missing o-ring	Remove assembly nut and end connector. Clean o-ring groove and install new o-ring.
Increase in pressure drop	Fouled bag	Replace fouled bag with new bag. Never allow differential pressure across vessel to exceed 10 p.s.i.d.
Reduction in flow through unit	Fouled bag	Replace fouled bag with new bag. Never allow differential pressure across vessel to exceed 10 p.s.i.d.
Bypass of filtered media	Missing or damaged basket ring o-ring	Inspect basket ring o-ring. Replace if damaged or missing.
	Missing bag ring	Install bag ring and engage lockdown handle. If bag ring is lost, consult factory for replacement part.
	Improperly seated bag / bag ring	Check alignment and fit of bag with counter bore of basket ring. See Section 2.5 for bag installation instructions.
	Lock-down handle not engaged against bag ring	Verify that lock-down handle engages bag ring and is in “locked” position.
	Improper bag selection	Review system requirements, use next lowest micron rated bag.

5.0 PRODUCT SPECIFICATIONS:

Max. Pressure: 150 psi @ 70°F (see Chart 1 for operating pressures at elevated temperatures)

Max. Temperature: GFPP: 240°F (see Chart 1)
 CPVC*: 190°F (see Chart 1)
 PVC*: 140°F (see Chart 1)

*** NOTE: PVC and CPVC available as end connections only. Vessels only provided with GFPP housing. Service temperature limited by end connector material selection.**

Max. Flow Rate: 1-1/4" – 2": 100 GPM, Size 1 (16") and Size 2 (32") vessels
 2-1/2" – 4": 150 GPM, Size 2 (32") vessels

NOTE: Flow rate may be limited by bag selection.

WARNING

The maximum recommended fluid velocity through any plastic piping system is eight feet per second (8 ft/s). Higher fluid velocity can create excess water hammer effect, resulting in property damage, personal injury, or even death.

CAUTION

Published operating requirements are based on testing of new vessels using clean water at 70°F. Vessel performance is affected by many factors including fluid chemistry, viscosity, specific gravity, flow rate, and temperature. These should be considered when sizing Hayward products.

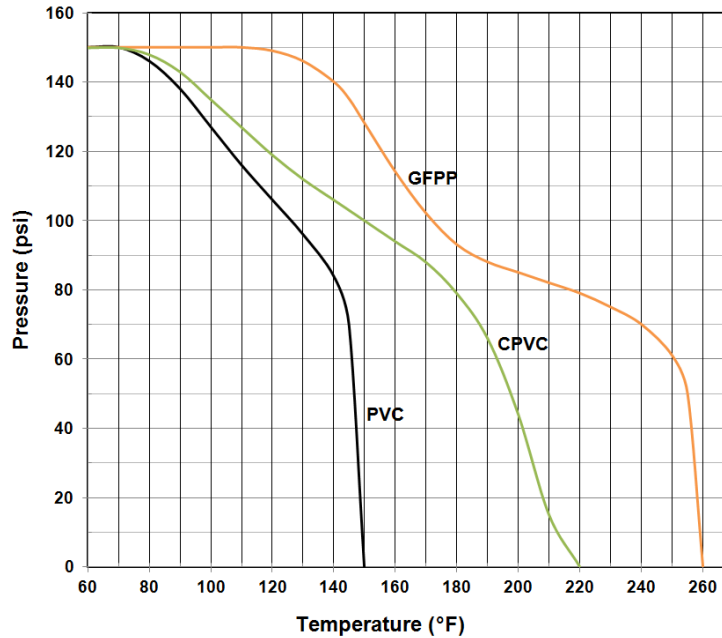


Chart 1: Operating pressures at elevated temperatures

6.0 PARTS LIST:

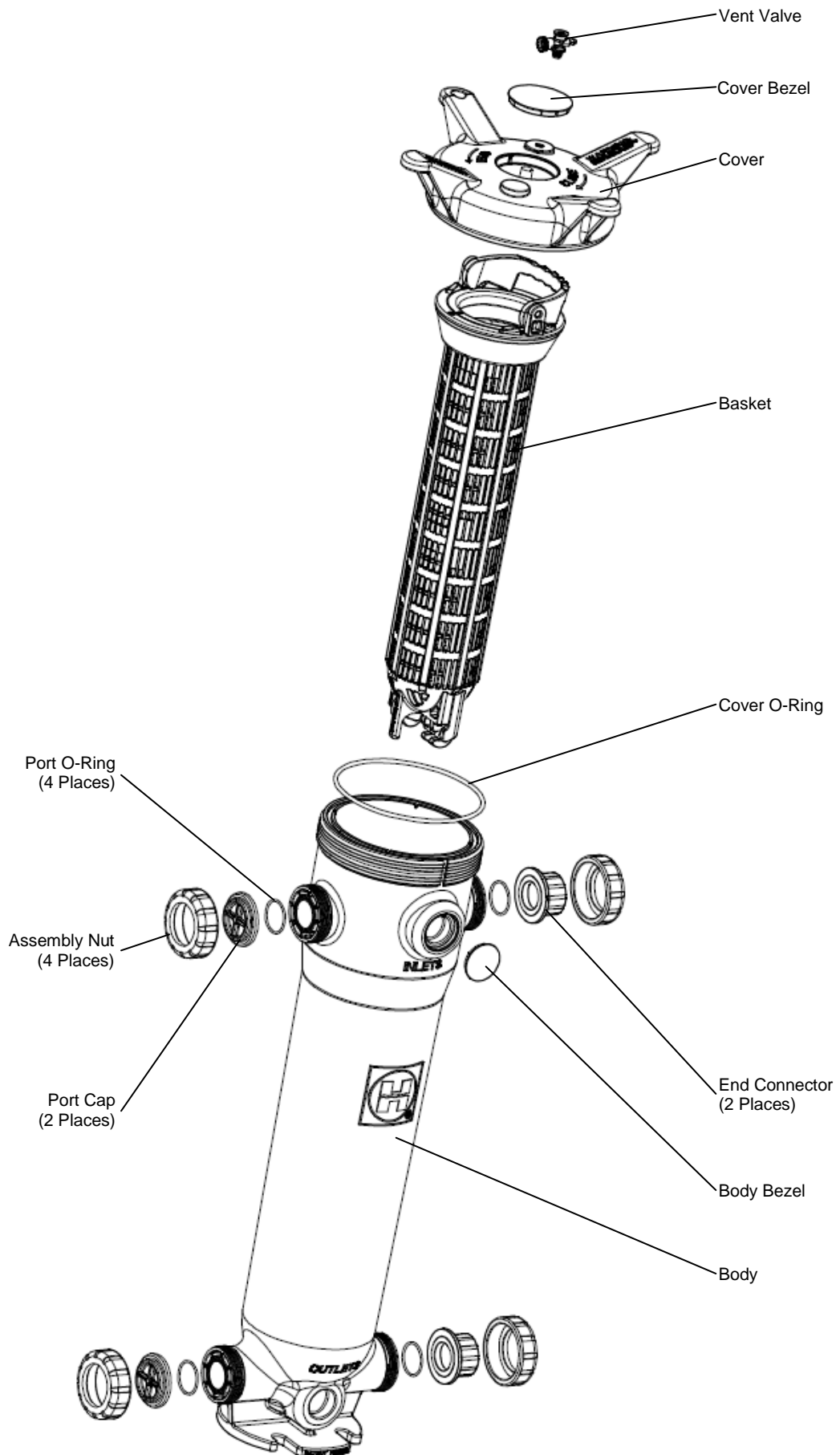


Fig. 13: Exploded view of FLV-Series Filter
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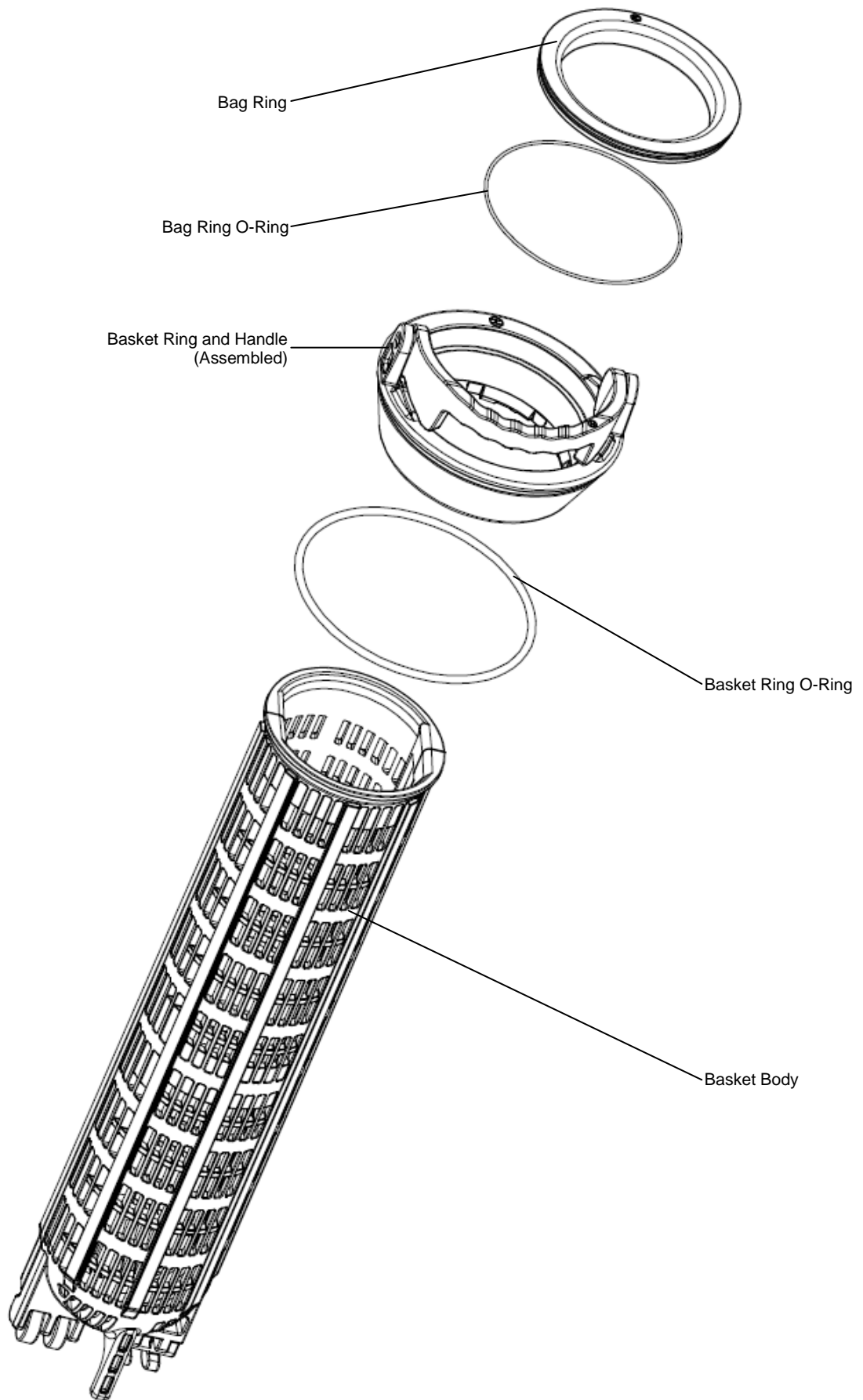


Fig. 14: Exploded view of FLV-Series Basket

7.0 WARRANTY TERMS AND CONDITIONS:

TWO YEAR WARRANTY: All products manufactured by Hayward are warranted against defects in material or workmanship for a period of two years from date of shipment. 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.**