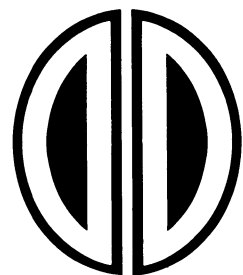
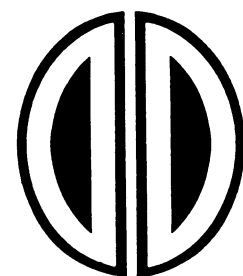


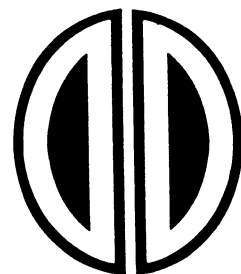
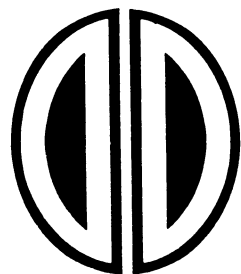
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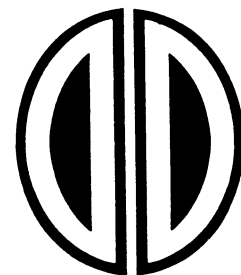
**DOUBLE  
DIAPHRAGM**



**Pump**



**OPERATION  
MAINTENANCE  
INSTRUCTIONS**



# Graymills

## SPECIFICATIONS

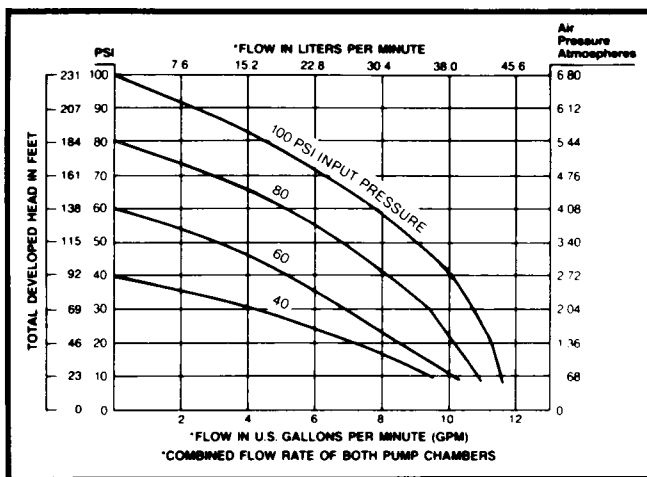
**Maximum Viscosity:**  
 with Delrin<sup>®</sup> check balls . . . . . 5,000 SSU  
 with stainless steel check balls . . . . . 5,000 to 10,000 SSU

**Dry Lift Capability, 100 PSI** . . . . . 16 feet  
**Dry Lift Capability, 60 PSI** . . . . . 10 feet

**Maximum Air Inlet Pressure** . . . . . 100 PSI  
**Recommended Air Inlet Pressure** . . . . . 60 PSI

**Air Consumption at Full Flow:**  
**80 PSI** . . . . . 12.7 SCFM  
**60 PSI** . . . . . 8.0 SCFM  
**40 PSI** . . . . . 5.3 SCFM

**NOTE:** Stainless steel check balls (10-11) CANNOT be used for viscosity under 5000 SSU.



## INSTALLATION AND OPERATING PRINCIPLES

**NOTE:** Double Diaphragm Pumps should only be connected to an air source equipped with a filter/water separator/oiler. Failure to do so can shorten the life of the pump.

1. Connect air source line to pump's 1/8" inlet (1-26).

**CAUTION:** Recommended inlet air pressure is 60 P.S.I. Maximum inlet air pressure is 100 P.S.I. and should not be exceeded.

2. Connect fluid carrying hoses to inlet and discharge barbed male fittings (2-14) and secure tightly with hose clamps.

**NOTE:** A square-cut hose will tend to draw itself to side and bottom of a fluid container, cutting off fluid flow. For best results, cut hose end being placed in container diagonally, with hose being long enough to reach container bottom.

3. Place intake hose(s) into container of fluid to be pumped. Engage discharge hose(s) at desired point of fluid delivery and gravity return hose(s) to fluid container

**NOTE:** Cut end of intake hose on a 45° angle.

4. Open air inlet valve (1-26) until desired flow rate is achieved.

**NOTE:** Further regulation of flow rate can be achieved by using pinch valve on intake hose(s). Flow regulation on discharge side of pump should only be employed if a pulse dampening standpipe is being used (see Step 5 below). Pump should prime immediately, or within one or two cycles depending on fluid viscosity and length of intake hose. Dry lift capability is 10 feet at 60 P.S.I., 16 feet at 100 P.S.I.

5. If additional pulse dampening is required, remove vertical discharge pipe plugs (2-12) at top of intake discharge manifold housing (2-16) and install 10" - 12" lengths of (capped) standpipe in their place.

## CLEANING (SEE FIG. 1)

Double Diaphragm Pumps should be cleaned after each use, especially when pump will be idle for any extended period. Cleanup is easily achieved by allowing unit to pump itself clean with a compatible cleaning material (i.e., water for latex paint, etc.).

**NOTE:** Do not use hot caustic fluid to clean pump.

## DIAPHRAGM REPLACEMENT (SEE FIG. 1)

If diaphragm(s) rupture, a drop in efficiency, pressure, and flow will become evident. Such loss of pump effectiveness indicates damaged or worn out diaphragms. To replace diaphragms (1-10), perform following procedures.

**NOTE:** Never replace only one diaphragm, always replace both. "O" rings (1-8), Multiseals (1-12), "U" cup seals (1-13), and manifold gaskets (1-29) should also be replaced.

**CAUTION:** Before performing any service or disassembly operations, disconnect air supply at pump and open air inlet valve (1-26) completely to bleed air from pump.

#### **DISASSEMBLY (SEE FIG. 1)**

1. Remove drain port plug (1-28) from bottom drain port of pump chamber (1-6) to completely drain pump of liquid.
2. Remove cap screws (1-31) which secure pump chamber (1-6) to check valve manifold assembly.
3. Remove gasket (1-29) at interface of check valve manifold assembly and pump chamber (1-6).
4. Remove eight cap screws (1-1 & 1-2), washers (1-3), and nuts (1-4) attaching pump chamber (1-6) to pump housing (1-30). Remove pump chamber (1-6).
5. Remove cap screw (1-7) from center of diaphragm (1-10).
6. Remove "O" ring (1-8) and back-up plate (1-9).
7. Remove diaphragm (1-10).

**NOTE:** It may be necessary to use a flat blade to loosen diaphragm from pump housing (1-30). Do so carefully to avoid damaging housing.

8. Remove back-up plate (1-9) "O" ring (1-8) and diaphragm (1-10) from inner side of diaphragm (1-10).

**NOTE:** Thoroughly clean all disassembled parts, inspecting for damage or excessive wear. Replace "O" rings (1-8) and diaphragm (1-10), as well as other parts, if necessary.

#### **REASSEMBLY (SEE FIG. 1)**

1. Slide "O" ring (1-8) and back-up plate (1-9) over cap screw (1-7).

**NOTE:** Be sure back-up plates (1-9) are positioned with their raised, rounded edge pointed away from diaphragm (1-10).

2. Place diaphragm (1-10) back-up plate (1-9), and "O" ring (1-8) over cap screw (1-7).

**NOTE:** A new Teflon diaphragm is orange in color and flat. It will form its own shape when it is subjected to air pressure.

3. Secure entire assembly to shaft (1-11).

**NOTE:** Take care to assure that screw holes in diaphragm (1-10) are aligned with screw holes in pump housing (1-30).

4. Install eight cap screws (1-1 & 1-2), washers (1-3), and nuts (1-4) that secure pump chamber (1-6) to pump housing (1-30).
5. Install a new gasket (1-29) at interface of pump chamber (1-6) and check valve manifold assembly.

**IMPORTANT:** Do not tighten screws sequentially. To insure a uniformly tight seal, tighten each screw in tandem with one diagonally opposite.

6. Install four cap screws (1-31) which secure pump chamber (1-6) to check valve manifold assembly.

**NOTE:** Check all screws for tightness after operating the pump, and periodically thereafter.

#### **REPLACEMENT PARTS KIT (SEE FIG. 1)**

A Diaphragm Replacement Parts Kit, part number C-27220, is available. The kit contains 2 diaphragms (1-10), 2 gaskets (1-29), and 4 "O" rings (1-8)

#### **CHECK VALVE MANIFOLD ASSEMBLY REBUILD**

All Graymills Double Diaphragm Pumps share the ability to accept any of the check valve manifold assemblies available. Also common to all pumps are the gaskets which seal the intake and discharge housing of the various check valve manifold assemblies. These assemblies, in fact, determine the differences between pump models.

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## DISASSEMBLY (SEE FIGS. 1-2)

1. Remove four cap screws (1-31) attaching check valve manifold assembly to pump housing (1-30).
2. Separate check valve manifold assembly from pump.
3. Remove gaskets (1-29).
4. Remove all cap screws (2-1, 2-2 or 2-3), nuts (2-5) and washers (2-4) that hold check valve manifold assembly together.
5. Complete disassembly as illustrated.
6. Carefully inspect check ball seats in valve seat plate (2-12), check balls (2-11) and spider ball stops (2-8) for signs of wear. If seats are worn, (egg shaped), balls or stops show wear spots, replace as necessary.

## REASSEMBLY (SEE FIGS. 1 & 2)

1. Reassemble check valve manifold assembly using new gaskets (2-7 & 2-10). Be sure gaskets, valve seat plate, etc., are positioned and installed exactly as shown in Fig. 2.
2. Reassemble assembly upside down from parts positioning shown in Fig. 2, using two cap screws (2-1, 2-2 or 2-3), and washers (2-4) at either end of upper intake/discharge housing (2-6) to serve as alignment guides for gasket (2-10), and lower intake/discharge housing (2-6). Secure assembly with nuts (2-5) and washers (2-4) finger tight.

3. Install remaining cap screws (2-1, 2-2 or 2-3) with washers (2-4) and nuts (2-5). Tighten all cap screws and nuts in tandem with those diagonally opposite to assure a uniformly tight seal.
4. Reinstall check valve manifold assembly to pump chamber (1-6), making sure to use new gaskets (1-29), and secure with cap screws (1-31).

## REPLACEMENT PARTS KITS (SEE FIGS. 1 & 2)

Kit Part No. C27221 includes 4 Delrin check balls (2-11) (2-11), 4 spider ball stops (2-8), 1 valve seat plate (2-12), 2 gaskets (2-10), and 1 gasket (2-7).

Kit Part No. C-27654 includes 4 stainless steel check balls (2-11), 4 solder ball stops (2-8), 1 valve seat plate (2-12), 2 gaskets (2-10), and 1 gasket (2-7)

**TROUBLESHOOTING GUIDE (SEE FIGS. 9 & 10)**

<b>Symptom</b>	<b>Possible Cause</b>	<b>Corrective Action</b>
<b>PUMP SLOWS, FLOW RATE DECREASES</b>	<ul style="list-style-type: none"> <li>• Inlet air pressure has decreased.</li> <li>• Loose pump fittings (screws, nuts, plugs, etc.)</li> <li>• Suction line restricted, hose collapsing or sucking itself toward side or bottom of fluid container</li> <li>• Discharge hose is kinked or otherwise restricted.</li> <li>• Viscosity of material being pumped has increased.</li> <li>• Diaphragm (1-10) has failed.</li> <li>• Pump has been idle too long without being properly cleaned.</li> <li>• Plant air system variations.</li> </ul>	<ul style="list-style-type: none"> <li>• Increase air pressure into pump - 60 PSI recommended minimum. Consider use of air pressure regulator.</li> <li>• Check all pump fittings. Tighten each properly. (Use Teflon tape on threads, if necessary.)</li> <li>• Carefully check all intake hose. Cut container ends of hose at 45° bevel.</li> <li>• Locate and free the restriction. Replace damaged hose.</li> <li>• Check and adjust to desired viscosity. Consider use of automatic viscosity control device.</li> <li>• Replace both diaphragms (1-10).</li> <li>• Thoroughly clean and flush pump with appropriate solvent or detergent.</li> <li>• Install air pressure regulator.</li> </ul>
<b>PUMP DOES NOT START WHEN AIR IS TURNED ON, OR PUMP STOPS RUNNING</b>	<ul style="list-style-type: none"> <li>• Inlet air pressure is too low.</li> <li>• Air inlet needle valve (1-26) closed.</li> <li>• Air inlet needle valve (1-26) plugged due to accumulation of contaminants.</li> <li>• Shaft seals (1-12) &amp; 1-13) have been damaged by dirt or other abrasive contaminants.</li> <li>• Plant air system variations.</li> </ul>	<ul style="list-style-type: none"> <li>• Increase air pressure into the pump - 60 PSI recommended minimum.</li> <li>• Open slowly and adjust to desired rate of flow.</li> <li>• Replace air inlet needle valve (1-26). Install air line filter/lubricator.</li> <li>• Replace shaft seals (1-12 &amp; 1-13).</li> </ul>
<b>PUMP SPEEDS UP, FLOW RATE INCREASES</b>	<ul style="list-style-type: none"> <li>• Air being drawn into suction line.</li> <li>• Viscosity of material being pumped has decreased.</li> </ul>	<ul style="list-style-type: none"> <li>• Install air pressure regulator.</li> <li>• Check all hoses for air leakage, holes, cracks, etc; and repair or replace as necessary.</li> <li>• Check and adjust to desired viscosity. Consider use of automatic viscosity control device.</li> </ul>
<b>AIR IN DISCHARGE LINE</b>	<ul style="list-style-type: none"> <li>• Loose suction line fittings.</li> <li>• Hole in diaphragms (1-10).</li> <li>• Loose pump fittings (Screws, nuts, plugs, etc.)</li> <li>• Loose diaphragm center cap screw (1-7) (inside pump chamber) and back-up plates (9-9).</li> </ul>	<ul style="list-style-type: none"> <li>• Tighten all suction line fittings.</li> <li>• Replace both diaphragms (1-10).</li> <li>• Check all pump fittings. Tighten each properly. (Use Teflon tape on threads, if necessary.)</li> <li>• Remove pump chamber (1-6) and tighten cap screw (1-7).</li> </ul>

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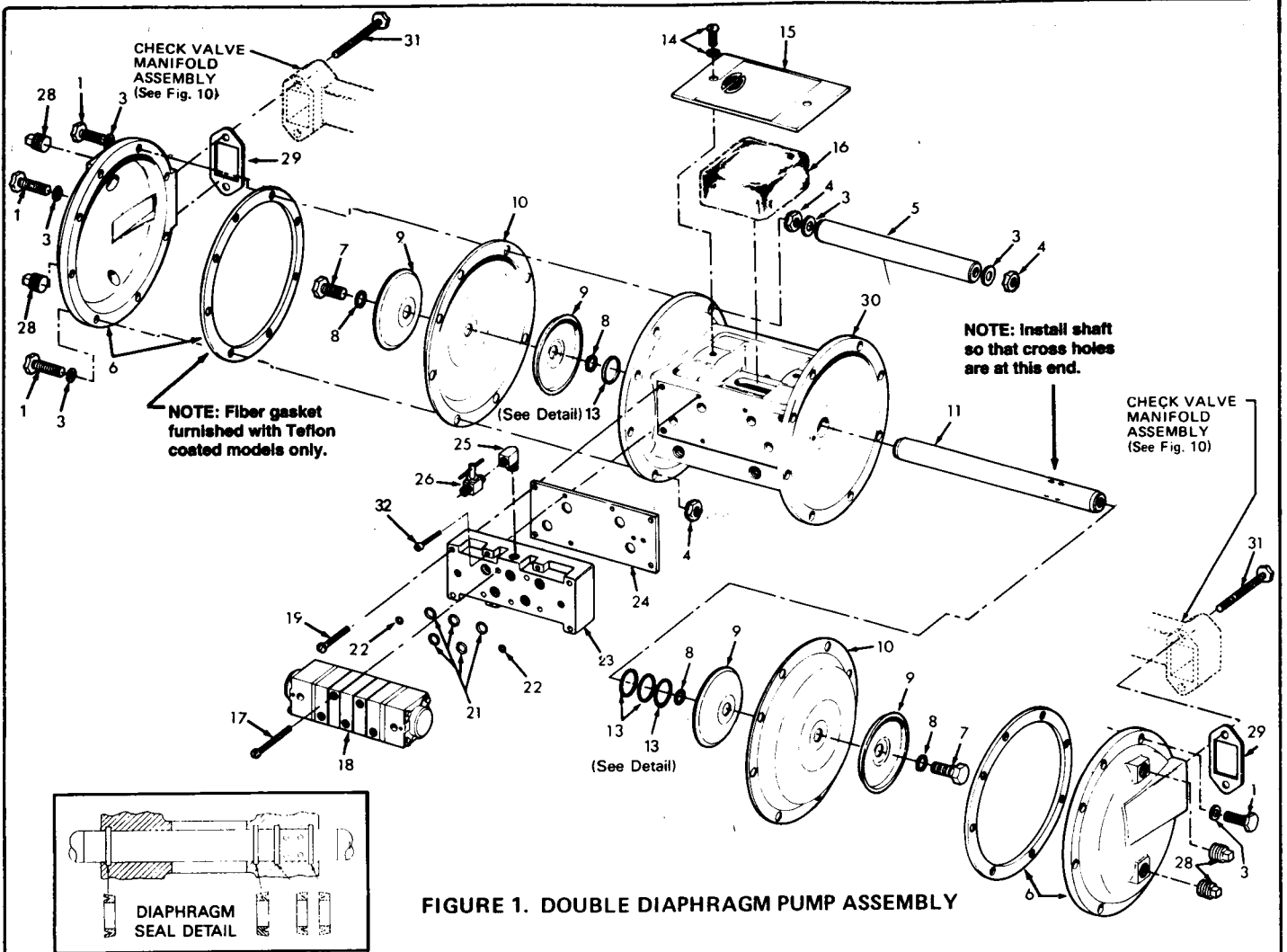


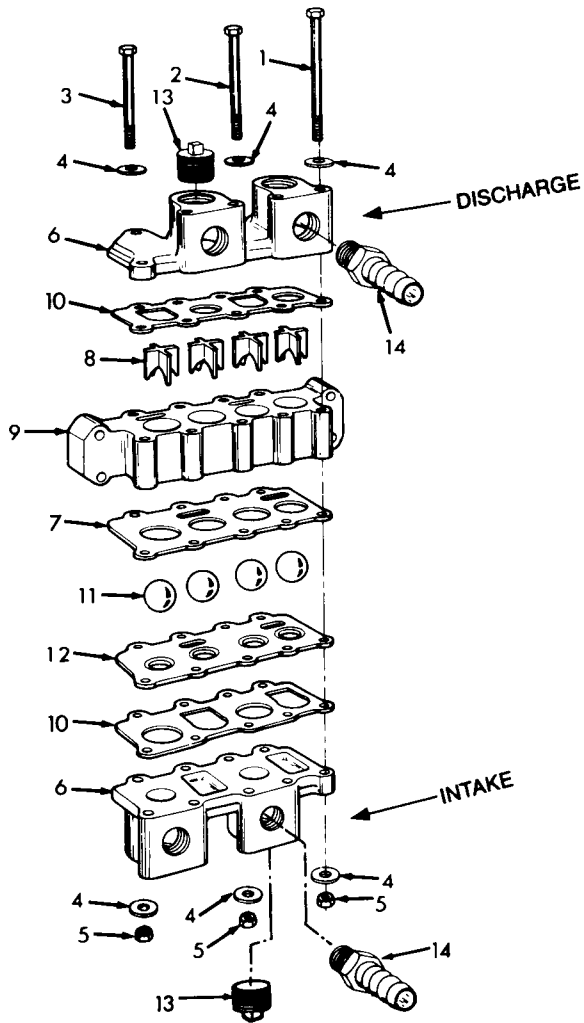
FIGURE 1. DOUBLE DIAPHRAGM PUMP ASSEMBLY

REF. NO.	PART NUMBER	DESCRIPTION	QTY.	REF. NO.	PART NUMBER	DESCRIPTION	QTY.
1	752-07851-12	SCREW, cap, 1/4"-28 x 1 1/4" hex	16	19	752-07653	SCREW, soc, 10-24 NC x 1 1/4"	4
3	754-00601-12	WASHER, flat, .265" ID	4	20	754-02622-12	WASHER, lock #10, split	
4	755-07849-12	NUT, 1/4"-28 hex keps	16	21	745-06477	"O" RING, 1/4" ID	5
5	570-28366-11	HANDLE		22	745-03091	"O" RING, 1/8" ID neoprene	2
6*	544-26313-23	CHAMBER, pump		23	544M28505	BLOCK, air manifold	
7	752-02729-81	SCREW, cap, 3/8"-16 x 3/4" hex	2	24	744-29391	GASKET, manifold	
8	745-05559	"O" RING, 3/8" ID teflon	4	25	724-04597-41	ELBOW, street, 1/8" NPT	
9	715-26703-81	PLATE, back-up, diaphragm	4	26	738-02977-41	VALVE, needle, 1/8	
10	727-26704	DIAPHRAGM, teflon	2	28	724-06902-43	PLUG, drain port, 3/8" NPT	4
11	571-28252-08	SHAFT		29	744-26640	GASKET, manifold	2
13	745-07188	SEAL, "U" cup	4	30	402-29226-08	HOUSING, pump	
14	751-00814-81	SCREW, machine, 8-32 x 1/2"	2	31	752-01273-12	SCREW, cap, 5/16"-18 x 1-3/4"	4
15	663-28364-81	PLATE, muffler cover		32	752-07736-12	SCREW, soc 8-32 x 1"	3
16	742-07457	MUFFLER, foam					
17	752-07708	SCREW, soc 8-32 x 2-1/2" - manifold	5				
18	738-07357	VALVE, air					
				<b>NOT SHOWN</b>			
				769-04099	RUBBER BUMPER		4
				644-28539-11	LEG		2

**NOTE:** This pump is Model:  
 1) DDPB11 when fitted with a 2-port check valve manifold assembly  
 2) DDPB22 when fitted with a 4-port check valve manifold assembly  
 3) DDPB12 when fitted with a 3-port check valve manifold assembly

\*Teflon coated models use a fiber gasket, 7-1/16 dia., 744-32331

FIGURE 2. CHECK VALVE MANIFOLD ASSEMBLY (4 PORT SHOWN)



REF. NO.	PART NUMBER	DESCRIPTION
1	752-07380-12	SCREW, cap, 1/4-28 x 7" (DDPB11 only)
1	752-07853-12	SCREW, cap, 1/4-28 x 6 3/4" (DDPB21, 12)
1	752-07309-12	SCREW, cap, 1/4-28 x 6 1/4" (DDPB22 only)
2	752-07311-12	SCREW, cap, 1/4-28 x 5" (DDPB22 only)
2	752-07381-12	SCREW, cap, 1/4-28 x 5-1/2" (DDPB11 only)
2	752-07852-12	SCREW, cap, 1/4-28 x 5 1/4" (DDPB12, 21)
3	752-07310-12	SCREW, cap, 1/4-28 x 3-1/2" (all models)
4	754-00601-12	WASHER, flat .265 ID
5	755-07849-12	NUT, 1/4"-28, hex keps
*6	544-26315-23	HOUSING, manifold, intake/discharge, single
	544-26316-23	HOUSING, manifold, intake/discharge, double
7	744-27249	GASKET, valve body
8	727-26691	STOP, ball, spider
*9	544-26314-23	BODY, valve, check
10	744-26701	GASKET, valve body
11	760-06898	BALL, check, Delrin
	760-07044	BALL, check, Stainless
12	744-26692-81	PLATE, valve seat
13	724-06901-43	PLUG, pipe, 3/4" NPT
14	730-03841-43	FITTING, male, barbed, 3/4"

- NOTE:** This check valve manifold assembly is available as a:
- 1) 2-port assembly when fitted with 2 single intake/discharge housings, part 544-26315-23, ref. 6\*
  - 2) 3-port assembly when fitted with 1 single intake/discharge housing, part 54426315-23, ref. 6\*; double intake/discharge housing, part 544-26316-23, ref. 6\*.
  - 3) 4-port assembly when fitted with 2 double intake/discharge housings, part 544-26316-23, ref. 6\*.

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Graymills Corporation warrants that the product contained herein conforms to the description in GRAYMILLS' catalog and that if this product shall fail to conform to the description thereof or to any express or implied warranty, GRAYMILLS CORPORATION shall, upon written notice of such nonconformity within one year of the date on which this product is first put to use or within thirteen months of the date of its shipment from GRAYMILLS CORPORATION'S plant, whichever of these dates shall occur sooner, repair or replace such non-conforming material at the original point of delivery, GRAYMILLS CORPORATION will furnish instructions for disposition of the goods. If, however, GRAYMILLS CORPORATION provides a written warranty, as to this specific product, which is not in conformity to the above warranty, then as to such specific product, the specific written warranty shall prevail.

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