

# SKIMERATOR®

with Air Pump

## Installation Instructions & Parts List #6540

(Model 3200AP, 3717 and 3717F)

Note: This manual covers the following models:

- Model 3200AP Skimerator with low temperature air pump (Wil-flex diaphragms) and shallow draft skimmer box.
- Model 3717 Skimerator with high temperature air pump (Teflon diaphragms) and shallow draft skimmer box.
- Model 3717F Skimerator with high temperature air pump (Teflon diaphragms) and shallow draft floating head.

See page 2 for Skimerator model application.

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Manufactured in U.S.A by: Design & Manufacturing, Inc. Fisher, IL 61843

[www.design-mfg.net](http://www.design-mfg.net) or phone (217) 897-1172

# IMPORTANT SAFETY INSTRUCTIONS

Read and understand all instructions before using.

The symbol shown here is the safety-alert symbol. When this symbol appears in this manual or on the product, be alert for the potential for personal injury.



Always follow recommended precautions and safe operating procedures.

Whenever you see the safety-alert symbol a signal word is used to identify the most serious hazards.

The word CAUTION warns of possible injury. The Caution signal word appears in black text on yellow on the decal.



The word WARNING warns of serious injury or possible death! The word Warning appears in black text on orange on the decal.



The word DANGER warns of imminent death or critical injury! The word Danger appears in white text on red on the decal.



## **SAVE THESE INSTRUCTIONS!**

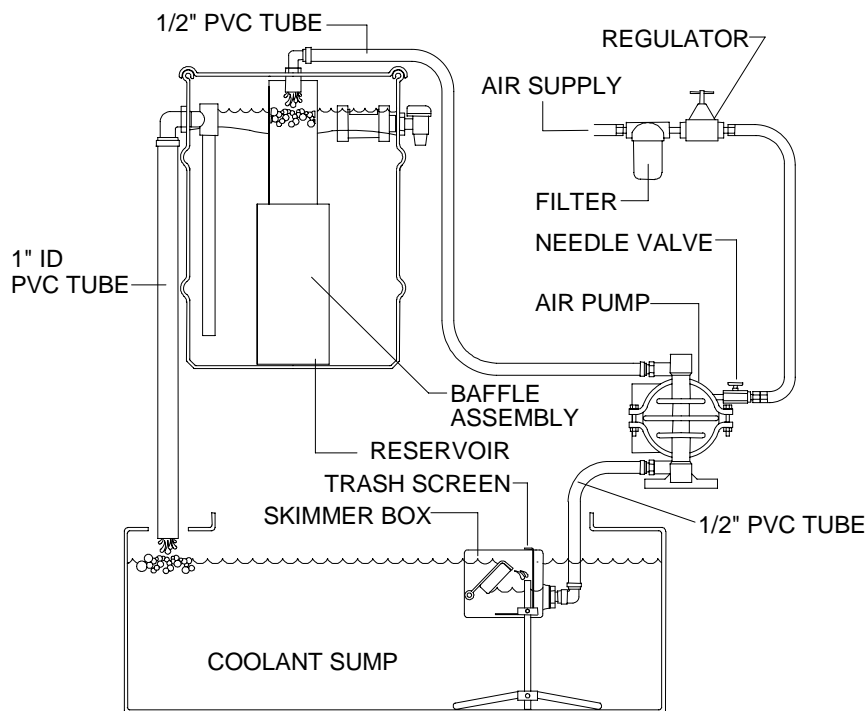
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### SKIMERATOR MODEL APPLICATION

<b>Model #</b>	<b>Description</b>	<b>Application</b>
<b>3200AP</b>	Shallow Draft Skimmer Box with low temperature air pump.	Use in sumps where the coolant level varies no more than 3". The skimmer box will accommodate a coolant depth of 1-1/2" to 4-1/2" with the skimmer box on the floor of the sump and 2-1/4" to 15-7/8" using the adjustable skimmer foot and 12" post.
<b>3717</b>	Shallow Draft Skimmer Box with high temperature air pump.	Application is the same as Model 3200. The high temperature air pump can be used in coolants with temperatures up to 180 degrees F.
<b>3717F</b>	Shallow Draft Skimmer Box with high temperature air pump and floating head.	Use in sumps where coolant level fluctuates more than range of a fixed mount skimmer box. The skimmer box will function at any coolant level. The high temperature air pump can be used in coolants with temperatures up to 180 degrees F.

## OVERVIEW

The Skimerator Coolant Aeration and Oil Removal System was designed to separate tramp oil from machining coolant while aerating the coolant to retard the growth of bacteria. In operation, floating oil is skimmed off the top of the coolant in the sump and into the skimmer box where it is pumped to the reservoir (see Fig. 1). A float in the skimmer box allows only a small amount of surface coolant and oil to enter the pump inlet hose. A removable trash screen prevents larger metal particles from entering the pump. The compressed air driven pump forces the oil/coolant mixture into the reservoir where the first stage of aeration takes place as the fluid pours into the baffle assembly. As the coolant/oil mixture settles in the baffle, the oil floats to the top of the reservoir and the cleaner coolant settles to the bottom. As more fluid enters the reservoir, clean coolant flows through the stand tube to the hose where it returns to the sump. As the coolant pours into the sump the second stage of aeration takes place. When a significant amount of oil has accumulated in the reservoir, the oil is drained off by opening the faucet and removing oil until coolant flows from the faucet.

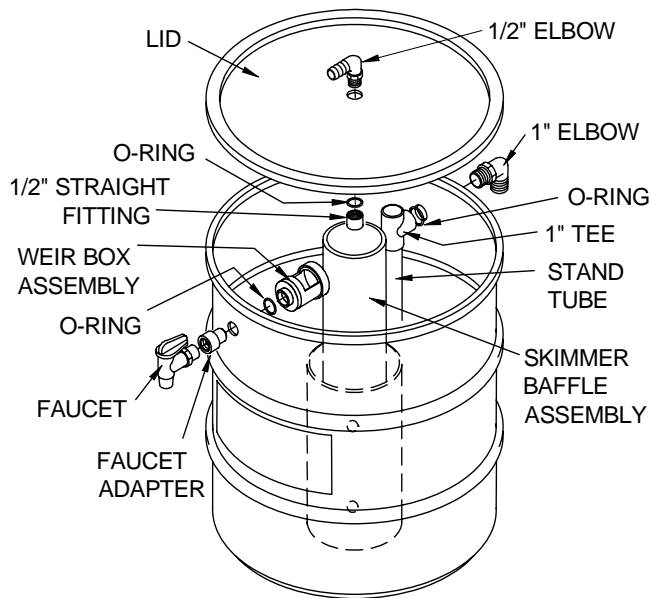


**Figure 1**

The Air Pump is installed outside the coolant sump to pump coolant from the skimmer box to the reservoir. This makes it possible to use the Skimerator in situations where there is not enough room for a submersible pump or where compressed air is preferable to electricity for operation.

**Note:** When the machine's coolant sump has more than one compartment or is separated by weirs, one Skimerator system will be required for each area. Coolant/oil from one compartment can also be moved to the Skimerator compartment by using a second pump. The surface area of coolant/oil being separated by any single Skimerator must be unobstructed. When a large surface area is being skimmed or a heavy concentration of oil is being removed, more than one Skimerator system may be required. Position the return hose so the returning coolant forces the surface oil toward the skimmer box.

## RESERVOIR ASSEMBLY



**Figure 2**

1. Install the Faucet Adapter to the 3/4" Faucet. Install the assembly through the smaller of the two holes in the side of the reservoir. Install a 3/4" O-Ring on the inside of the reservoir over the faucet adapter threads. Install the Weir Box Assembly on the faucet adapter. The Weir Box opening must be at the top when tightened (see Fig. 2).

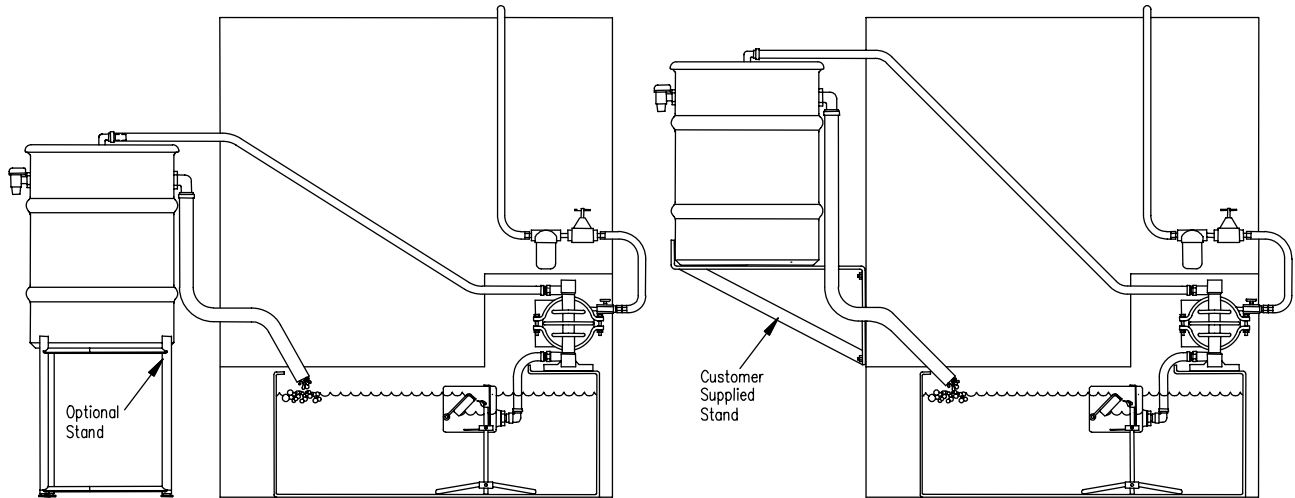
**Note:** When tightening the Weir Box and fittings against the O-Rings, tighten enough to seal around the opening but not enough to force the O-Ring into the opening. Install the 1" Male Elbow in the 1" hole opposite the Weir Box. Install a 1" O-Ring over the threads on the inside of the reservoir and install the 1" Tee. Position the Tee as shown and press the Stand Pipe into the bottom of the Tee until seated (See Fig. 2).

3. Install the 1/2" Male Elbow in the reservoir lid. Install the 1/2" O-Ring and 1/2" Straight Fitting inside the reservoir lid (see Fig. 2).

4. Place the Skimmer Baffle Assembly in the reservoir so it is centered on the bottom of the reservoir (see Fig. 2).

## INSTALLATION

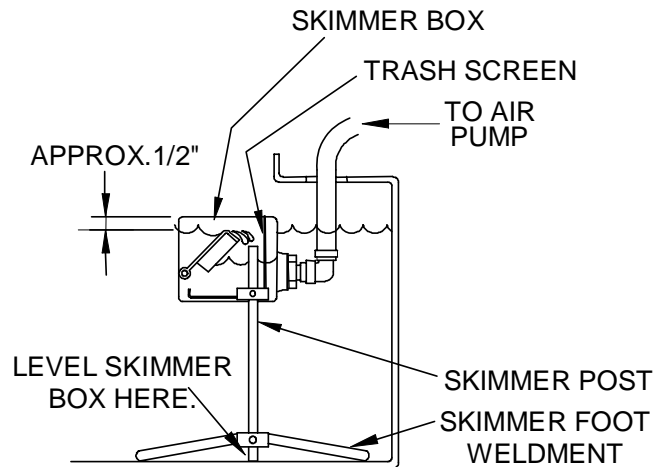
1. Mount the reservoir on or near the machine so the coolant level in the reservoir is above the coolant level in the machine sump. The reservoir tank can be mounted on the machine itself or on the optional stand (see Fig. 3). Mount the reservoir tank as close to the coolant sump as possible to minimize the distance the coolant must be pumped. Position the reservoir tank to allow easy access to the oil drain faucet. Make sure the tank is level.



**Figure 3**

2. Connect one end of the 1" ID PVC tube to the 1" elbow on the side of the reservoir tank. Secure the end with a hose clamp. Route the tube to the sump so the fluid can flow downhill from the reservoir tank to the sump (See Fig. 1). Do not submerge the end of the hose in the coolant. Keep the end of the hose above the fluid to allow aeration to take place as the fluid enters the tank and to assure proper draining.

**Note:** Five feet of 1" ID tube is included. Cut to length as needed. Longer lengths are available.



**Figure 4**

3. Install the skimmer box in the sump. The skimmer box can be set on the floor of the sump or mounted on the skimmer foot and post. If the foot and post is used, install the box on the post and adjust the height of the box. Level the box by adjusting the amount of the post protruding below the Skimmer foot (see Fig. 4). The top of the box should be about 1/2" above the coolant level at the coolant's highest point. The coolant/oil mixture must flow freely under the cross bar at the top of the box. The post can be shortened as needed. The shallow draft box used in sump depths of 5" to 7" will require cutting the post length to approximately 4". When it is used in deeper sumps with restricted access, a longer length may be required.

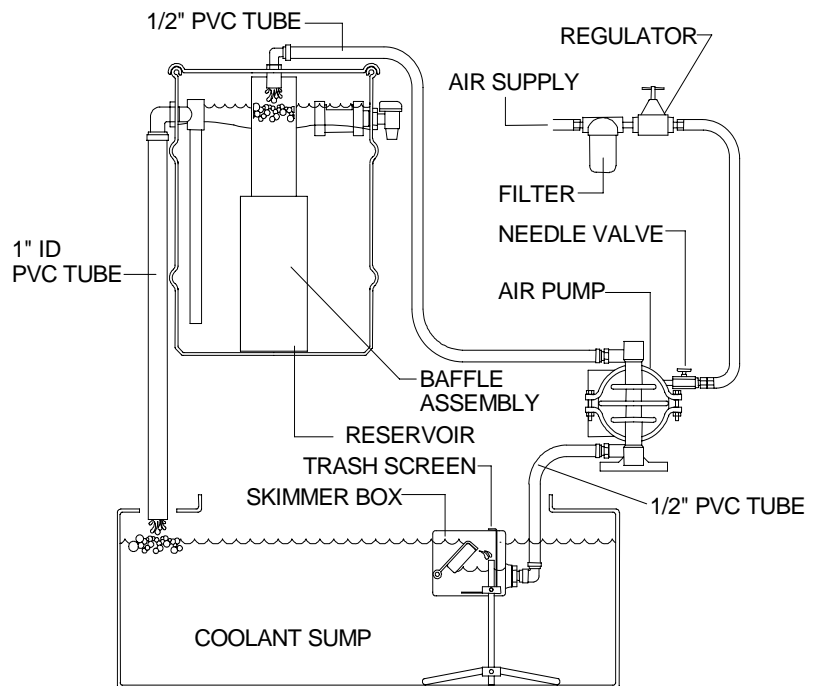
**Note:** An optional floating head is available. See page 9 for installation instructions. See page 13 for dimensions to determine if there is enough room in the sump for a floating head.

4. Mount the Air Pump in a suitable location. The pump must be mounted securely to prevent movement during operation. Connect the inlet port of the Pump to the elbow on the box with a length of 1/2" ID PVC tube cut from the 10' length provided. Adjust the tube length to keep the pump inlet angled upward if possible (see Fig. 5).

**Note: Do not submerge the air pump in the coolant sump!** Operating the pump while submerged will void the warranty.

5. Connect the pump outlet to the elbow in the reservoir tank lid with a length of 1/2" ID PVC tube cut from the remainder of the 10' length. Secure the ends with hose clamps (see Fig. 5). For best results the pump should use an air filter and regulator. The Air Pump is permanently lubricated and does not require in-line lubrication.

The discharge rate is controlled by limiting the volume and/or pressure of the air supply to the pump. The regulator is used to regulate air pressure. The needle valve is used to regulate air volume. To prolong pump life use higher air volume and lower air pressure settings. **The air pressure should not exceed 90 psi!**



**Figure 5**

The recommended pressure is 70-80 psi with the needle valve open 1 ½ turns to start. If more flow is needed slowly open the needle valve until the desired flow is achieved. Increase the psi only when pumping coolant excessive distances or when pumping higher viscosity fluids. To stop pump operation simply shut off the air supply to the pump. Refer to the instruction manual supplied with the Air Pump for complete installation and maintenance instructions.

**Note:** The Air Pump is self-priming and does not need to be installed below the level of the skimmer box.

6. Check the distance between the top of the baffle and the reservoir lid when the lid is installed. The distance should be 1/2" or less. Install the lid, check all hose connections and plug the pump into an outlet. The pump will fill the reservoir and coolant will flow into the sump.

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## **MAINTENANCE**

Normal maintenance involves draining the tramp oil collected in the reservoir and removing trash and sludge from the skimmer box screen. To clean the screen, shut off the pump and lift the float to the up position. Lift the screen out (see Fig. 6). Clean the screen and reinstall in the skimmer box. Clean frequently to maintain a free flow of fluid to the pump. Occasionally lifting the float and agitating the fluid near the screen to break up congested matter will also improve performance.

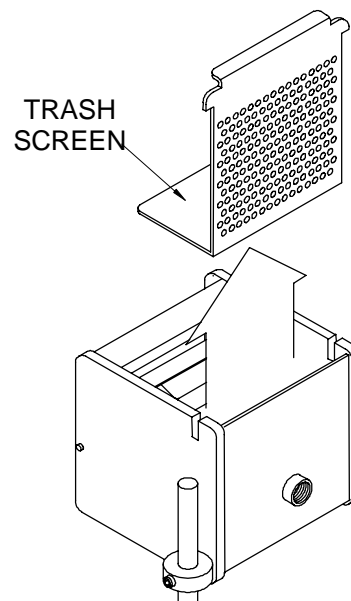
**Note: Do not operate the system without the screen in place.**

An optional external screen is also available. See page 14.

When the reservoir is first set up, rotate the weir box (see Fig. 7) so one side of the opening is slightly lower than the other. After the reservoir fills and the skimmer has operated for several minutes, check to see if coolant has filled the weir box. If not rotate the weir box slightly to allow coolant to flow into the box. No further adjustment should be necessary.

Under normal circumstances, the oil/coolant level in the reservoir will be approximately 1/4" above the cutout in the weir box (see Fig. 7). When at least 3/4" of tramp oil has accumulated on the surface of the coolant, place a bucket under the weir valve and open the valve. The oil level will lower until it reaches the top of the weir opening. When relatively oil-free coolant begins to flow into the trap, close the valve.

**Note:** When the valve is opened and the drain tube continues to drain coolant, the coolant level will drop slightly.

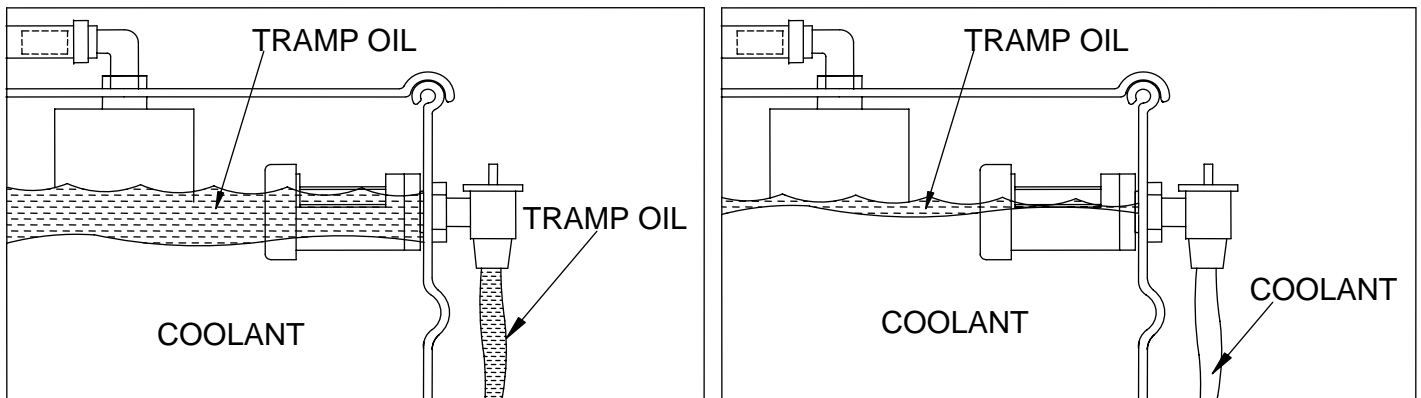


**Figure 6**

**Note:** When the valve is opened and the drain tube continues to drain coolant, the coolant level will drop slightly.

**Note:** When new coolant fills the reservoir, the weir box will fill with coolant before oil begins to collect on the surface. When draining the oil a small amount of coolant will pour out before the oil begins to flow. Do not expect to drain all of the oil off of the surface of the coolant. A small amount of oil will remain on the surface after clear coolant begins to flow from the faucet.

**Note:** If the faucet or stand tube must be replaced, make sure the O-Ring is installed on the inside of the reservoir to insure a proper seal.



**Figure 7**

## TROUBLESHOOTING

1. Pump will not run or runs slowly.
  - A. Check for proper air pressure
  - B. Check for inlet blockage and clean out trash screen
  - C. Check for air leakage in line to pump or in the pump itself.
  - D. Disassemble the pump and check for obstructions in air passageways or objects that would obstruct the movement of internal parts.

Note: Pumps still under warranty must be returned to Design & Manufacturing, Inc. Disassembly of pump under warranty will void warranty.
  - E. Check for sticking ball valves. If the coolant being pumped is not compatible with pump elastomers, swelling may occur. Ball check valves wear and can be reduced in size and become stuck in their seats. The balls must then be replaced.

Note: This is a common problem that occurs when air pressure and air volume are set to high and result in a high speed hammering effect on the pump.
  
2. Pump runs but little coolant flows or no coolant flows at all
  - A. Air pressure is set too low. Recommended pressure is 70-80 psi. **Do not exceed 90 psi.**
  - B. Not enough air volume. Open the needle valve 1 ½ turns to start then adjust to achieve the flow required to move coolant.
  - C. Blockage in the inlet line. This can result in a collapse of the inlet hose. Check for debris in the skimmer box screen or foreign material blocking the rear opening of the skimmer box.
  - D. Low coolant level. This may cause cavitation in the pump. Restricted flow to the pump will cause premature pump failure.
  - E. Make sure all connection on suction side of the pump are tight. Leakage will affect the pumps ability to draw coolant from the skimmer box.
  - F. Check viscosity of fluid being pumped. Coolant, that is excessively heavy may stick in check valves and pump will not function.
  
3. Liquid exits through the air exhaust.
  - A. Determine if the fluid is coolant or moisture from the air line. If it is moisture from the air line, install a coalescing filter before the pump air inlet. If it is coolant the pump may have a ruptured diaphragm and will require rebuilding.
  
4. Air bubbles appear in pump discharge.
  - A. Check for a ruptured diaphragm, the tightness of the clamp band or the condition of the “o-rings and seals, especially on the intake side of the pump. Insure that all hose connections are tight.

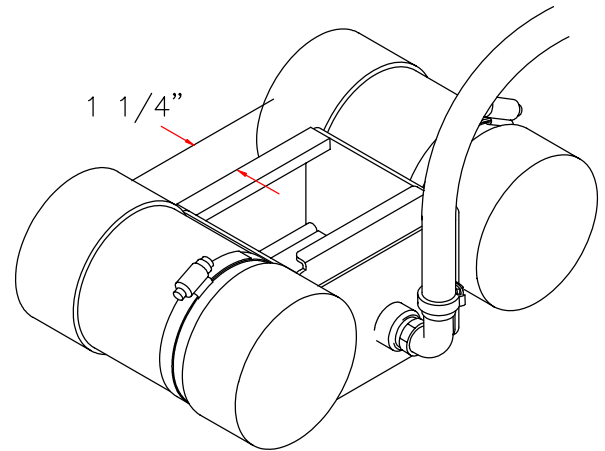
## OPTIONAL SKIMMER FLOATING HEAD INSTALLATION

1. Connect the hose from the skimmer box elbow to the pump as shown in Fig. 8 and place the assembly in the sump. Refer to installation instructions for the remainder of the installation.

**Important:** The floats are positioned on the box at the factory to keep the box level. Minor adjustment may be required to level the box after placing in the sump.

**Note:** Never remove the Floating Head Assembly while the pump is running.

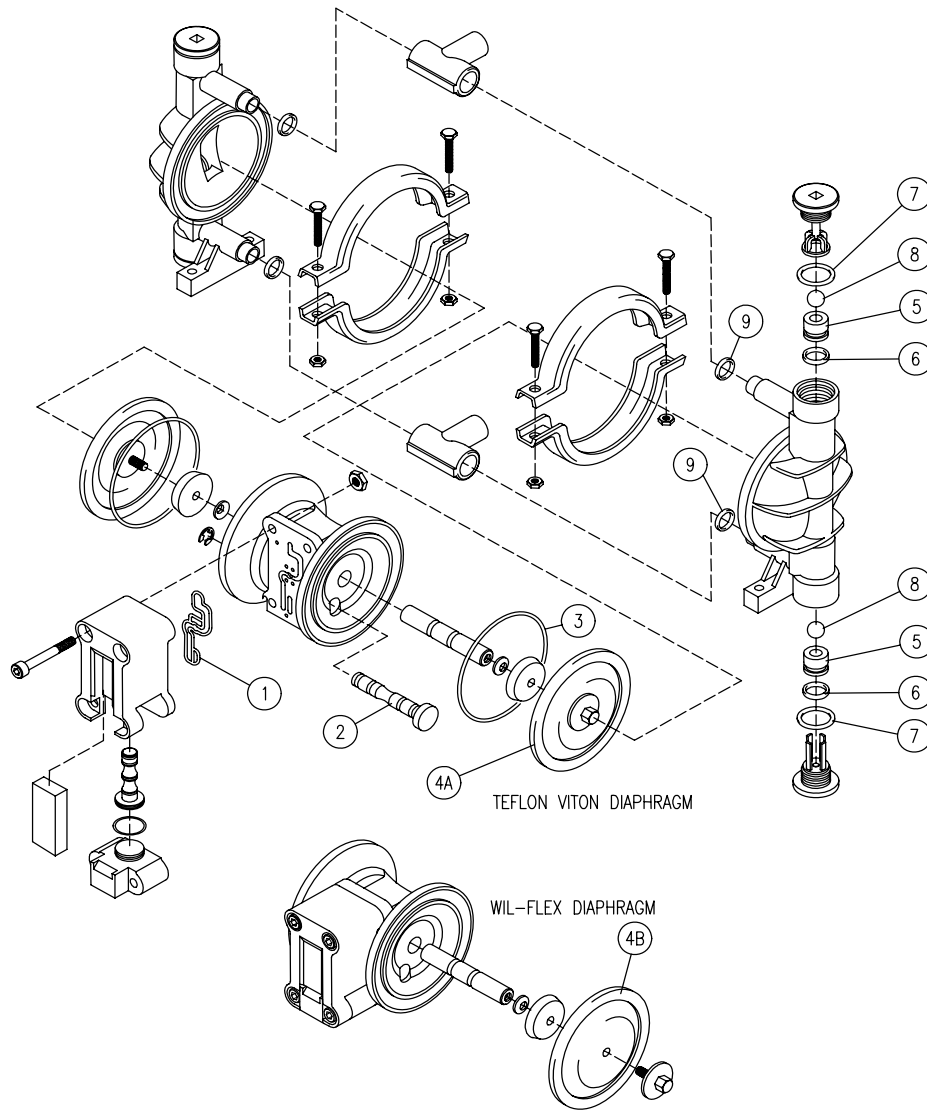
See page 13 for more complete specifications.



**Figure 8**



## AIR PUMP REPLACEMENT PARTS



ITEM	DESCRIPTION	#6734 (Hi-Temp)	#5413 (Std. Operation)
		P.025-PPPP-TX-TF-PVT	P.025-0000-WF-TF-PWF
1	Air Valve Gasket	6869	6869
2	Pilot Spool Assembly	6870	6870
3	Back-up O-Ring (Teflon-Fitted)	6871	N/A
4A	Diaphragm (Teflon Fitted)	6872	N/A
4B	Diaphragm (Wil-Flex)	N/A	6873
5	Valve Seat	6178	6178
6	Valve Seat O-Ring	6874	6879
7	Combo Retainer O-Ring	6875	6876
8	Valve Ball	6877	6877
9	Tee-Section O-Ring	6878	6181

# **SKIMERATOR WARRANTY**

**DESIGN & MANUFACTURING, INC.** warrants that the Skimerator is in working condition when it leaves our factory. The Skimerator is warranted against defective materials and workmanship for a period of twelve (12) months. If the Skimerator fails and is still within the warranty period, then the Skimerator will be repaired or replaced if returned, shipping prepaid, to our factory. All defective parts returned under warranty will be fully inspected to determine the cause of failure before any warranty is approved.

The expressed warranty will be void if any of the following conditions are found:

1. The pump is used to circulate anything other than water-soluble lubricants, light oils, or other mild liquids at no higher temperature than 120 degrees F (no higher than 180 degrees for Hi-Temp Air Pump model).
2. The pump inlet screen is removed.
3. The air powered pump is submerged in coolant.

**DESIGN & MANUFACTURING, INC.** makes no representations, conditions or warranties, expressed or implied, including, without limitation the implied condition and/or warranties of merchantability and fitness for a particular purpose, regarding the Skimerator except as provided above.

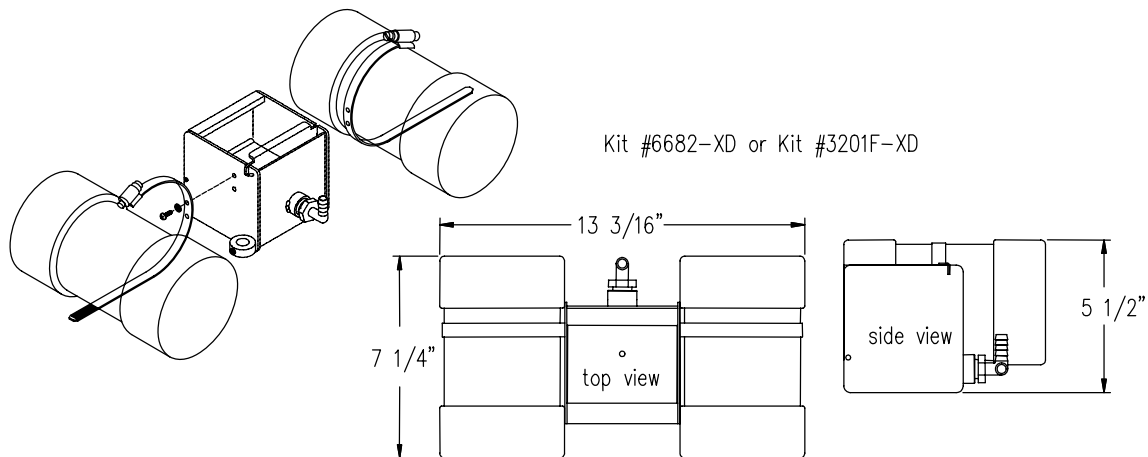
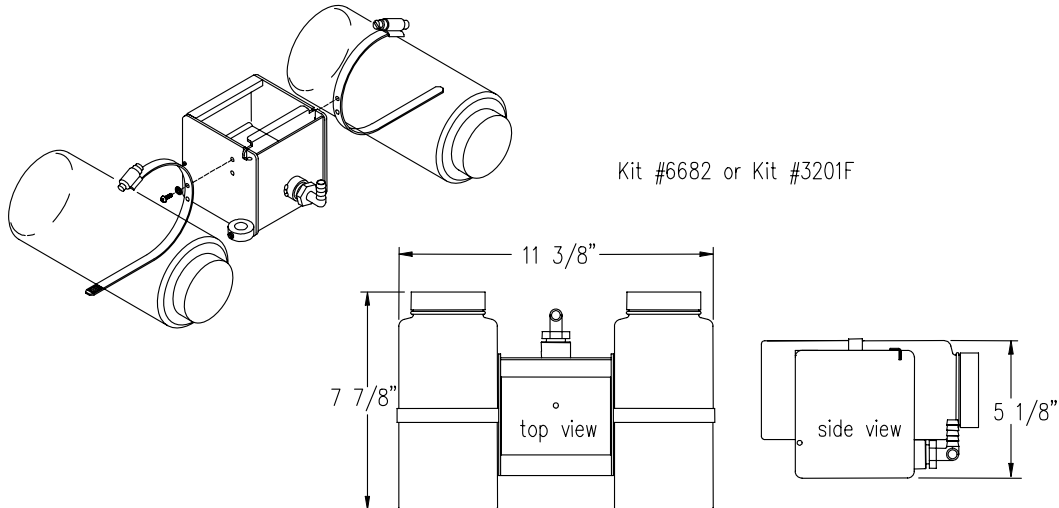
In no event will **DESIGN & MANUFACTURING, INC.**, its directors, officers, employees or agents be liable to you for any consequential, incidental or indirect damages (including damages for loss of business profits, business interruption, and the like) arising out of the use of or inability to use the Skimerator.

For further information regarding warranty service contact your dealer.

## AVAILABLE SKIMERATOR ACCESSORIES

### SKIMMER FLOAT OPTION

- ◆ A Floating Skimmer box can be used where coolant levels fluctuate more than the range of a fixed mount skimmer box.
- ◆ A Skimmer Box can be converted to a Floating Skimmer Box without modifications if the existing box has two small holes on each side of the box.  
**Order Kit # 6682 (standard duty) or Kit #6682-XD (extreme duty).**
- ◆ If the box doesn't have these holes, the holes will have to be drilled or a kit with a Skimmer Box can be ordered.  
**Order Kit # 3201F (standard duty) or Kit #3201F-XD (extreme duty)**



## SKIMMER SCREEN OPTION

Increases filtering area and prevents large chips from entering the skimmer box. Can be used on any shallow draft skimmer box except the floating skimmer box. For use on models 3200AP or 3717.

**Order #6698**

