VacuFlush® Installer's Guide

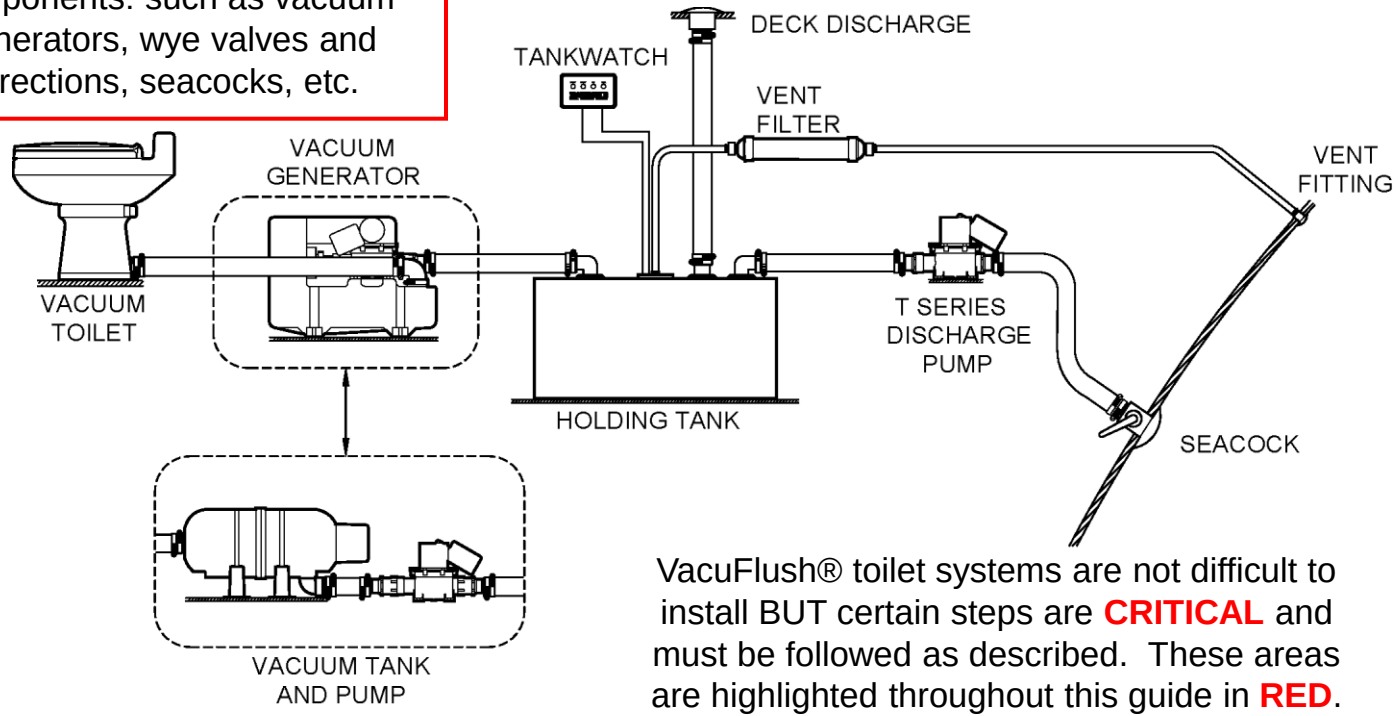
This book belongs to _____

Sealand BRAND

Dometic®

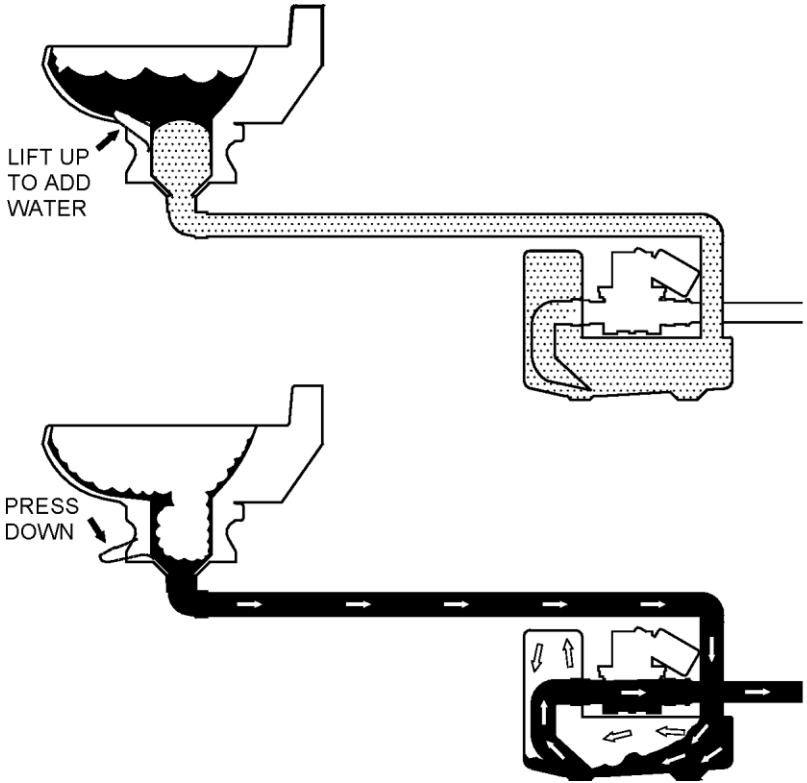
VacuFlush® System Components

SeaLand recommends that the OEM label key sanitation system components: such as vacuum generators, wye valves and directions, seacocks, etc.



VacuFlush® toilet systems are not difficult to install BUT certain steps are **CRITICAL** and must be followed as described. These areas are highlighted throughout this guide in **RED**.

VacuFlush® Principles of Operation



- Uses pressure difference between atmosphere and vacuum in the tank.
- The vacuum pump is activated by the loss of vacuum in the vacuum tank.
- Vacuum is maintained at all times. The “leak-down” time period should be approximately three hours. (The pump should not come on within a three hour window of non-use.)
- Recharging vacuum takes less than a minute.

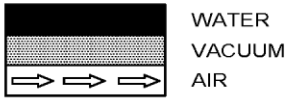
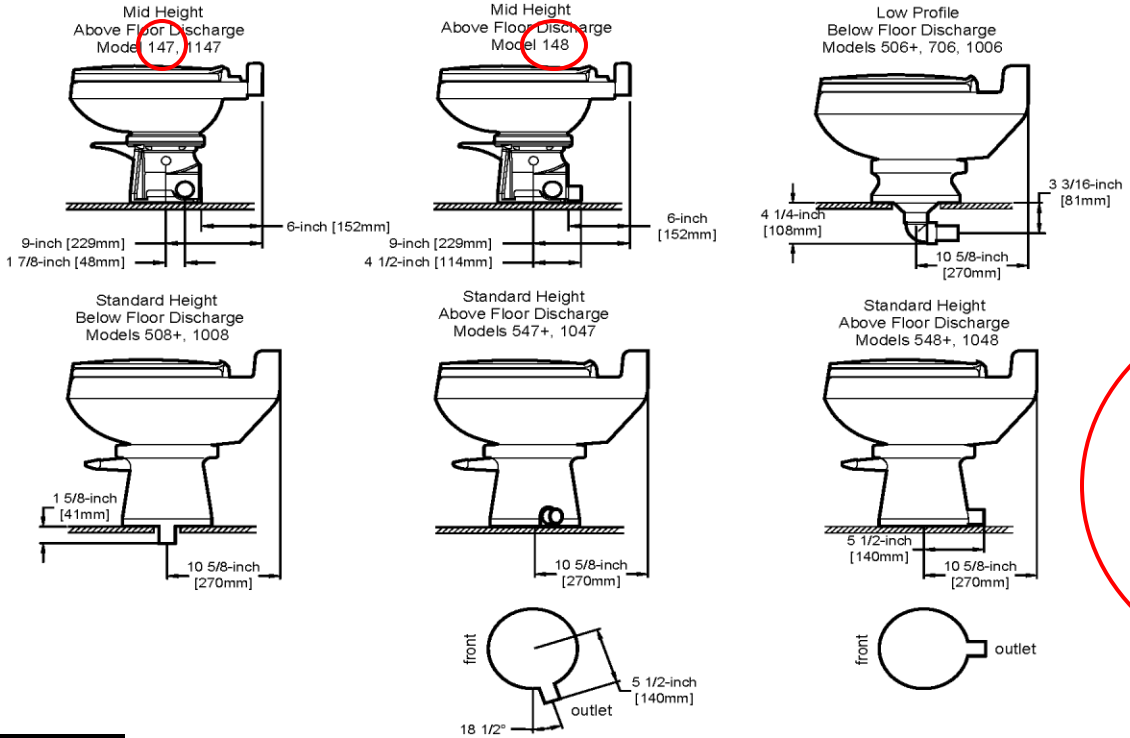


Table of Contents

Note: Magnum Opus and VHT Installations are shown in other Installation Guides

Section I: Toilet Installations

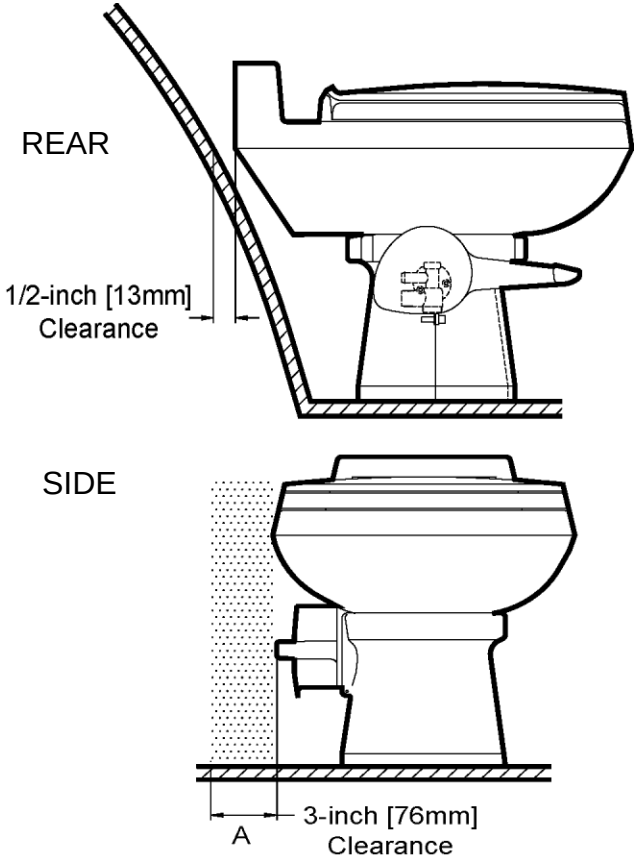
SeaLand toilets are available in many different outlet configurations.
Please review a SeaLand brochure for current model information.

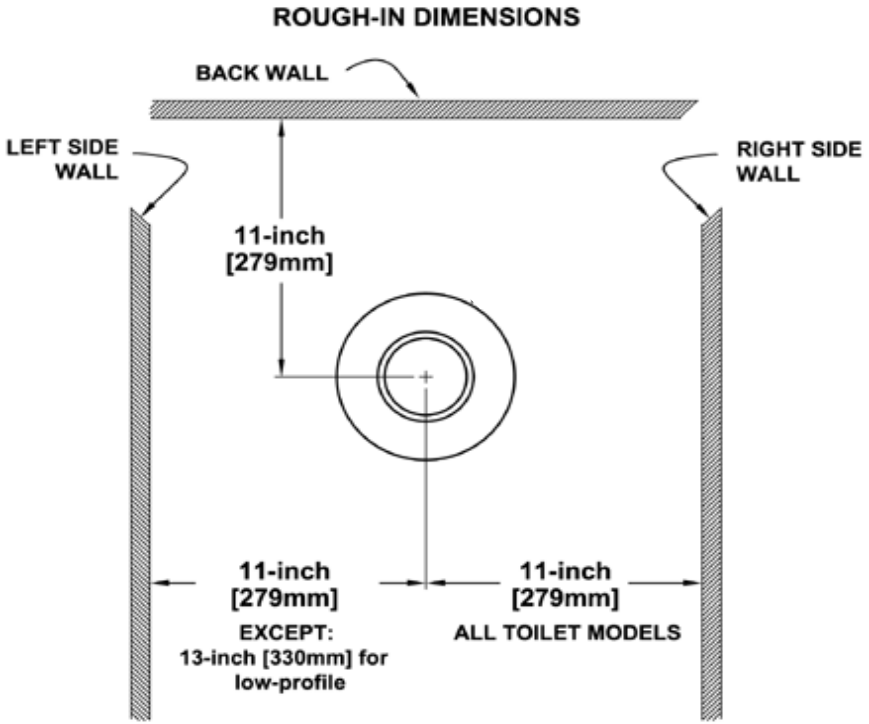


HINT: If the Model Number has a zero in the middle, the toilet discharges through the floor.

For models with 147 or 148 the connection must be a hose connection, not a glued joint.

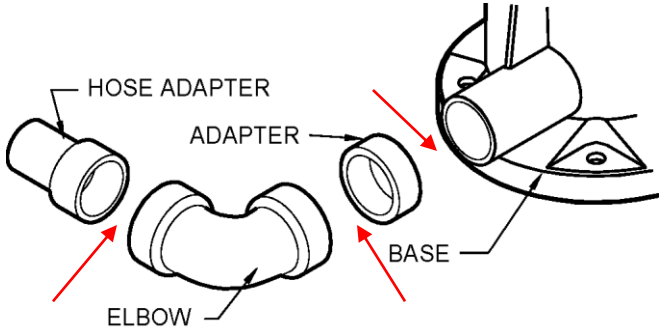
Critical Toilet Mounting Clearances





Location of the floor hole
for the toilet discharge

Above the Floor Discharge - Side and Rear

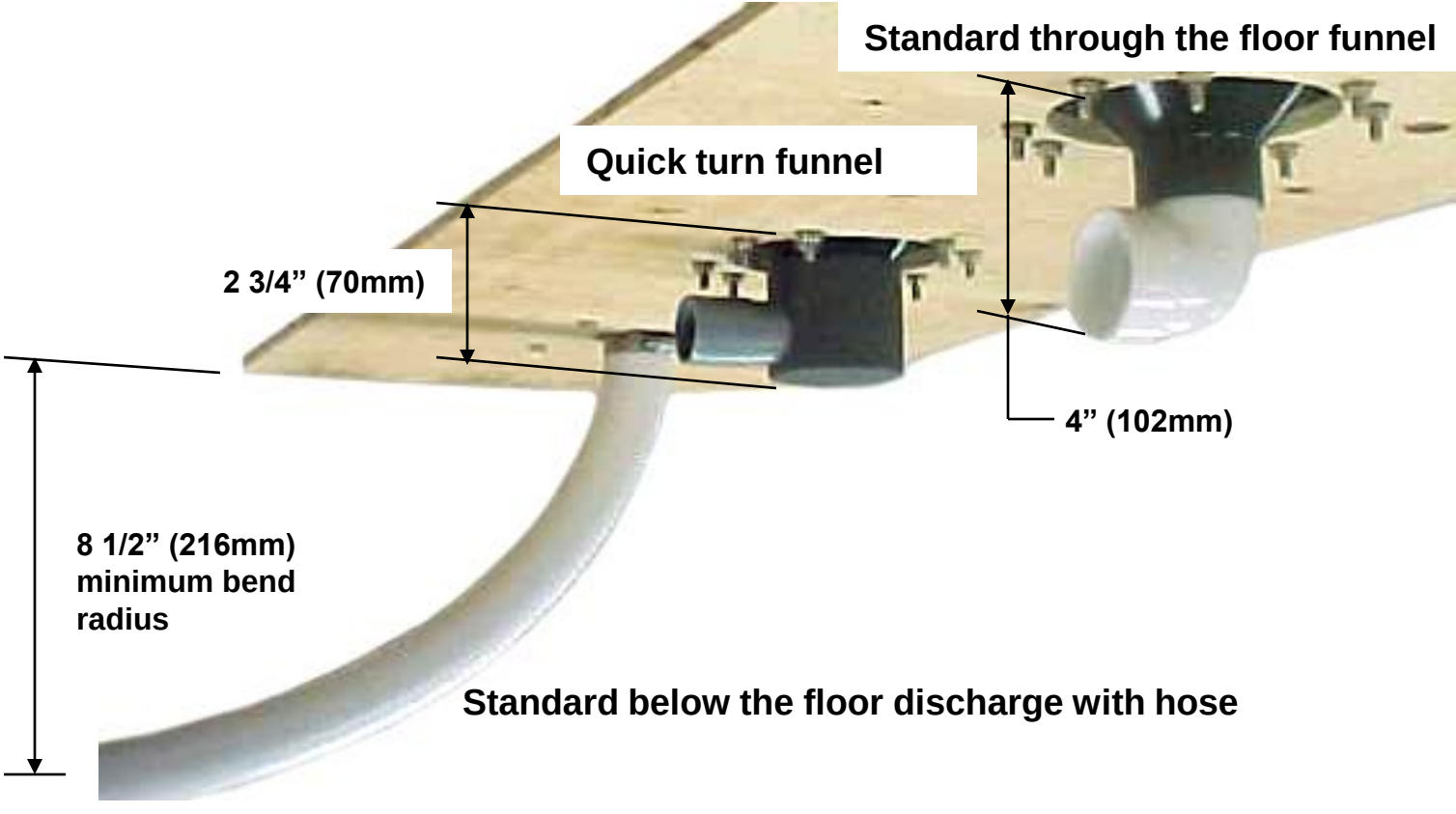


Kit P/N 385310580

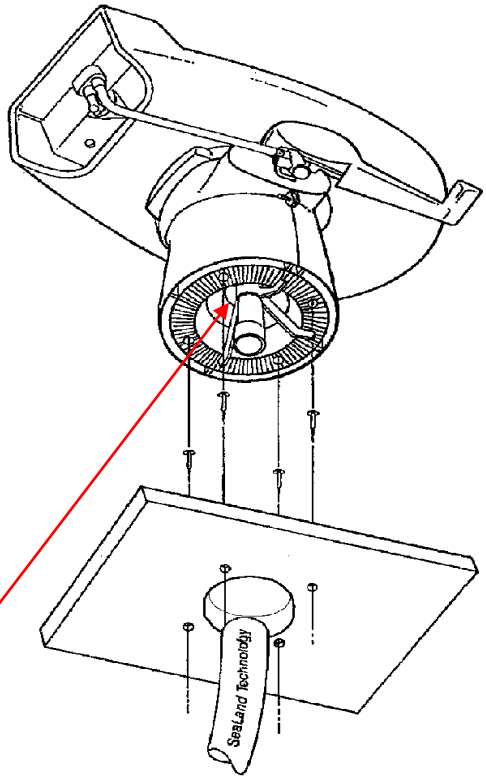
These joints require SOLVENT BONDING per procedure on page 11!

90 Elbow Detail
Cannot be used with models ending in 147 or 148.

Through Floor Funnel Comparison



Below the Floor Discharge



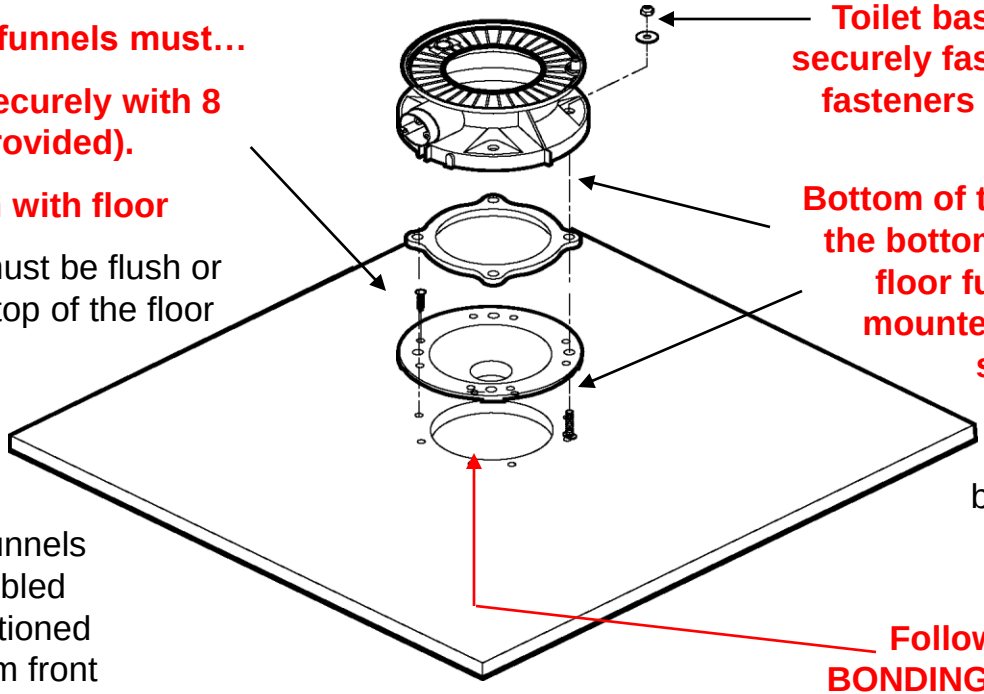
-08 Model Detail

This joint requires SOLVENT BONDING per procedure on page 11!

Toilet Base & Through-floor Funnel Installation Guidelines

Through-floor funnels must…

- **be mounted securely with 8 screws (not provided).**
- **Mounted flush with floor**
- Screw heads must be flush or lower than the top of the floor flange funnel.



Toilet base must be securely fastened with 4 fasteners (provided).

Bottom of the toilet base and the bottom of the through-floor funnel must be mounted on the same surface.

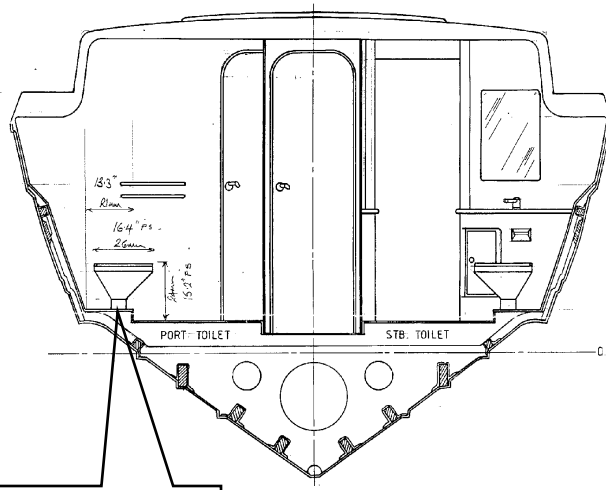
No gaps allowed between funnel and floor.

Through-floor funnels are pre-assembled and can be positioned at 90 points from front of toilet.

Use FULL scale template for cutting holes (available in the SuperTech Manual).

Follow SOLVENT BONDING per procedure per page 11 for connecting fitting to bottom of the funnel!

When there is NO room…. Use this Quick Turn Funnel

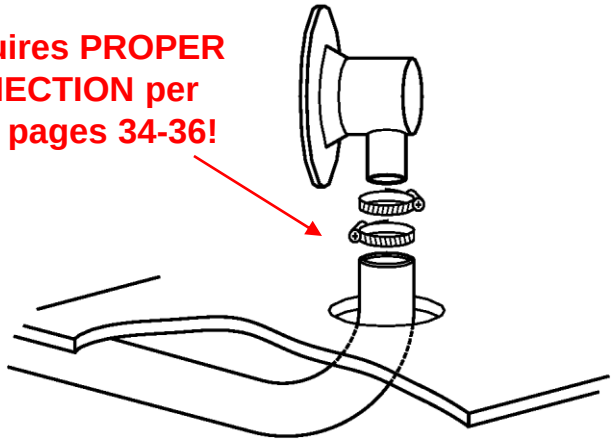


Limited space under the deck, despite the size of the boat.

Special Quick Turn Funnel - must be special ordered - P/N 385310550

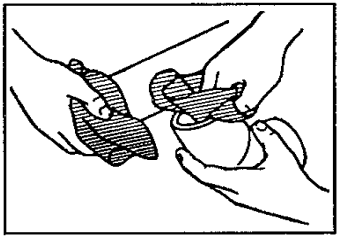
(Can only be installed with models that use a separate floor flange funnel, like the models ending in -06.)

This joint requires PROPER HOSE CONNECTION per procedure on pages 34-36!



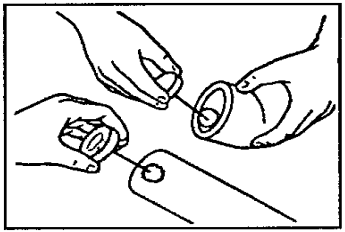
Solvent Bonding For Rigid Pipe & Fittings

1



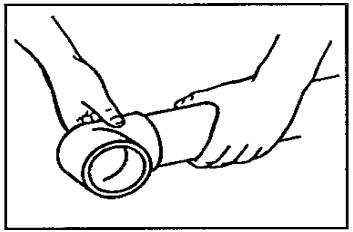
Cleaner

2



Cement

3



Twist

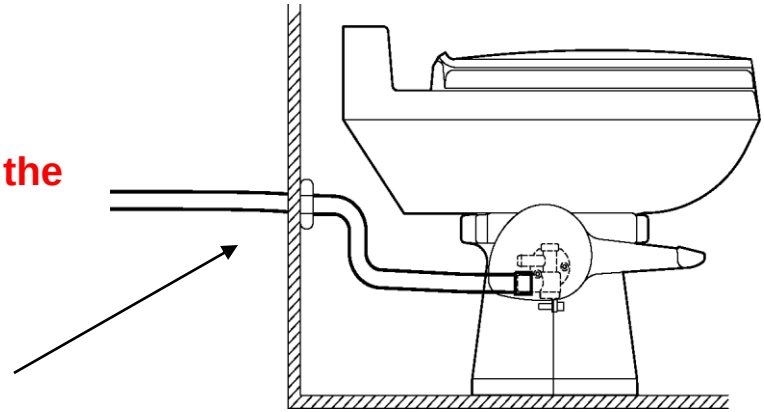
The most important steps:

1. **Use a PVC cleaner on both bonding surfaces.**
2. **Use a PVC cement (must contain Tetraheyrofuran) on both bonding surfaces.**
3. **Connect parts using a twist and hold motion until the glue is set.**
4. **Let joint cure for at least four hours or per instructions on the container. (Cold temperatures require longer cure times.)**

Incoming Water Supply

The incoming water line MUST…

- Be **cold water ONLY**
- Be ½” (13mm) **MINIMUM ID**
- **Provide a MINIMUM flow of 2 gallons/min (7.6 liters/min) at the toilet.** This requires a 2.8 GPM (10.6 l/m) demand pump, or greater depending on line restrictions.
- Include a **SHUT-OFF valve** for maintenance purposes



Fresh water is highly recommended. If the choice is made to use salt or brackish flush water, SeaLand requires the use of a primary and secondary filter. The secondary filter must be 100 mesh or less.

Keep Debris Out of the Toilet

- To prevent leaks, **THE BALL SEAL MUST BE PROTECTED FROM DEBRIS.** Keep the toilet bowl covered.
- Lag bolts and/or T-bolts **MUST be securely fastened in FOUR locations,** or toilet wobble will result.
- Should debris collect under the ball seal, use the brush and cleaner samples to remove (provided with toilet).

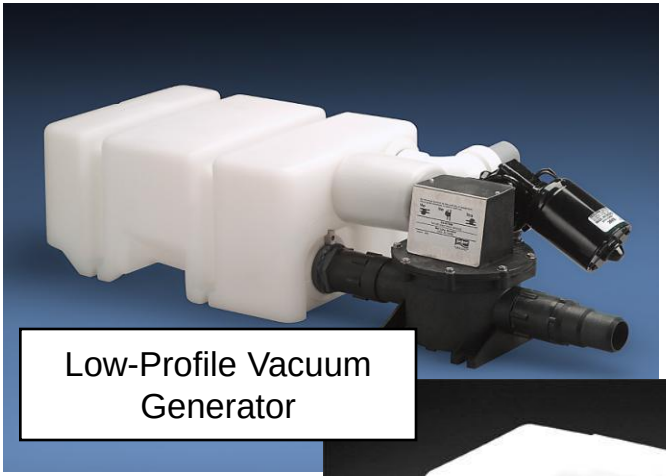
Ball seal debris is THE MOST COMMON installation problem!!

Leave this protective cover in place until final delivery.

Critical Guidelines – Toilet Installations

1. **Allow proper clearances from rear and side objects (bulkheads, partitions, etc).**
2. **When installing a funnel, secure the funnel flat against the floor using 8 fasteners.**
3. **Fasten toilet securely to floor using 4 fasteners.**
4. **When installing a funnel, the bottom of the toilet base and the bottom of the funnel flange must be mounted on the same surface.**
5. **Follow proper solvent bonding procedure for rigid PVC on page 11 when required.**
6. **Assure minimum incoming water supply of 2 gallons per minute (7.6 liters/min) at the toilet.**
7. **Keep debris out of the toilet bowl/funnel DURING INSTALLATION to avoid vacuum or water leakage through the ball seal.**

Section II: Vacuum Sources

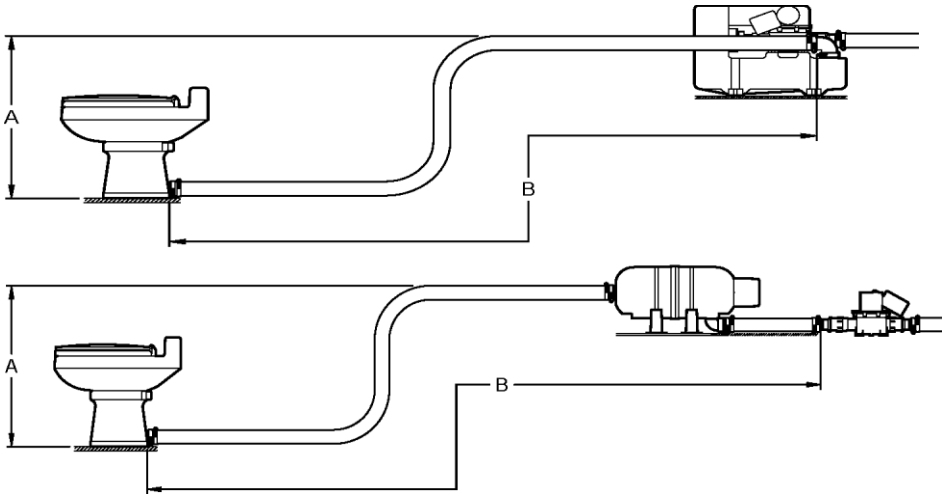


Low-Profile Vacuum Generator

Vacuum Tank and Pump

Vacuum Generator

Locating the Vacuum Source



Each toilet must have a separate vacuum source (vacuum generator or tank/pump).

A. Maximum height of vacuum piping from toilet outlet to vacuum source inlet is 6 feet (1.8 meters).

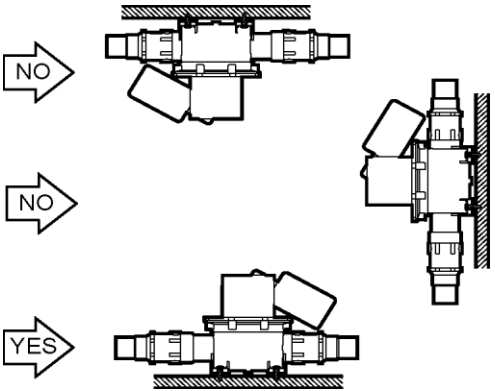
B. Maximum length of vacuum piping from toilet outlet to vacuum source inlet is 30 feet (9.1 meters).

Supporting the Vacuum Hose

The inlet hose of the vacuum generator must not have a side load (see picture below). Support the hose, as necessary.

Do not let the hose go unsupported (up or down). It will pull the fitting out of the seal, creating a leak.

S-Series Vacuum Pump



- **Mount pump horizontally**
- Mount pump at same level or lower than vacuum tank outlet. Do not mount the pump higher than the vacuum tank outlet.

Optional straight or 90º swivel quick-disconnect fittings are available for suction & discharge sides of vacuum pump.

To pump

307341513 – hose connector

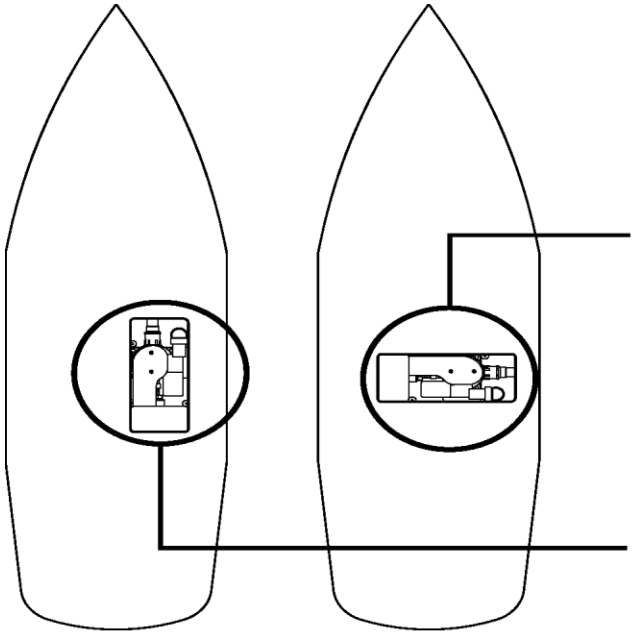
307341425 – threaded fitting

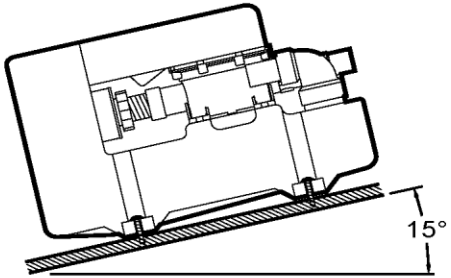
385310728 – swivel fitting assembly

307341161 – elbow

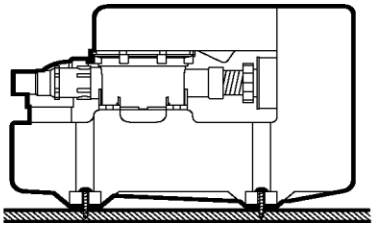
To pump

Sailboat Pump Mounting





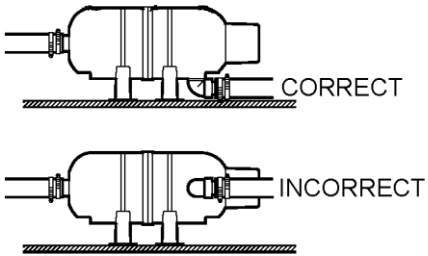
Mounted athwartship (at right angle to keel), need 15 incline to be acceptable.



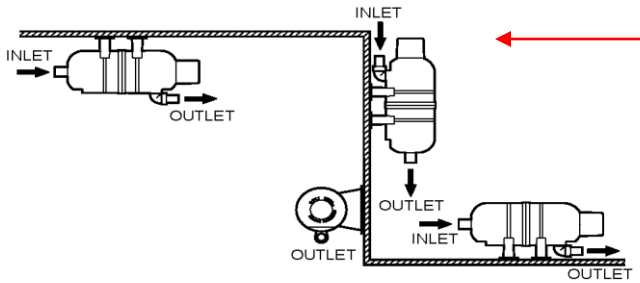
Mounted parallel with keel, no incline is needed.

When mounting S-Pump or Vacuum Generator athwartships (at right angle to keel) on sailing vessels, compensate with a 15º incline on the discharge side.

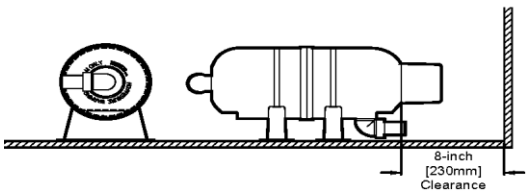
Vacuum Tanks Do's & Don'ts



- **The outlet of the vacuum tank must be at the lowest level.**



- **The vacuum switch must be on the top when mounted vertically.**



- Proper clearance must be allowed for access to the vacuum switch.

Never tamper with the vacuum switch! Vacuum levels can ONLY be adjusted at factory!

Accessibility is Critical!

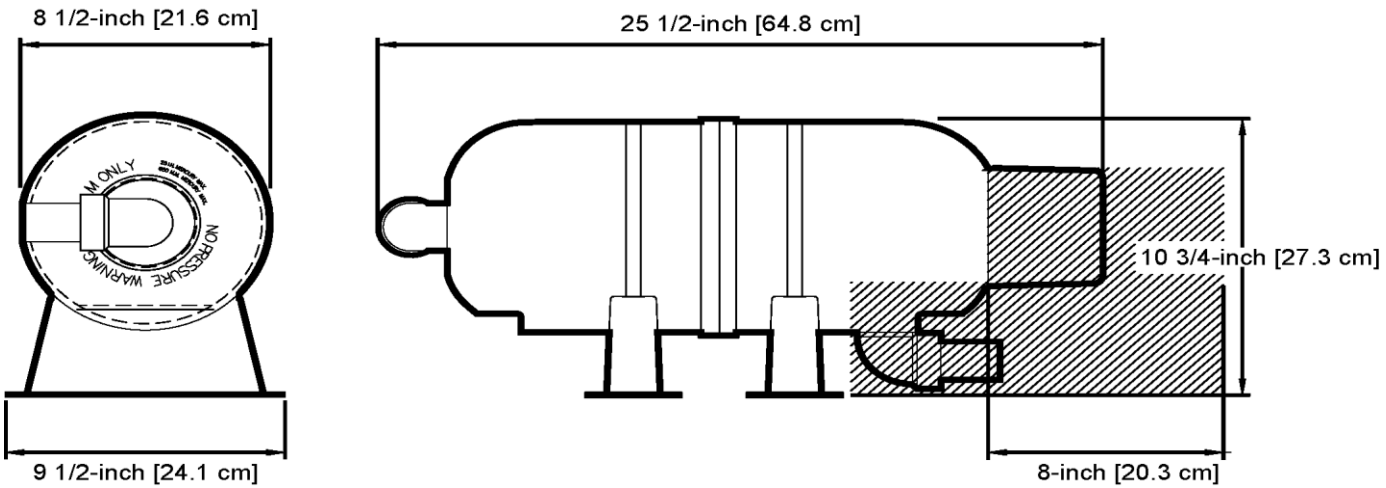
- **EASY access is needed to service**
  - **Pumps**
  - **Vacuum Switches**
  - **Tank inlet and outlet fittings**
  - **Vent Filters**

- All pumps and tanks must have access to replace if necessary.

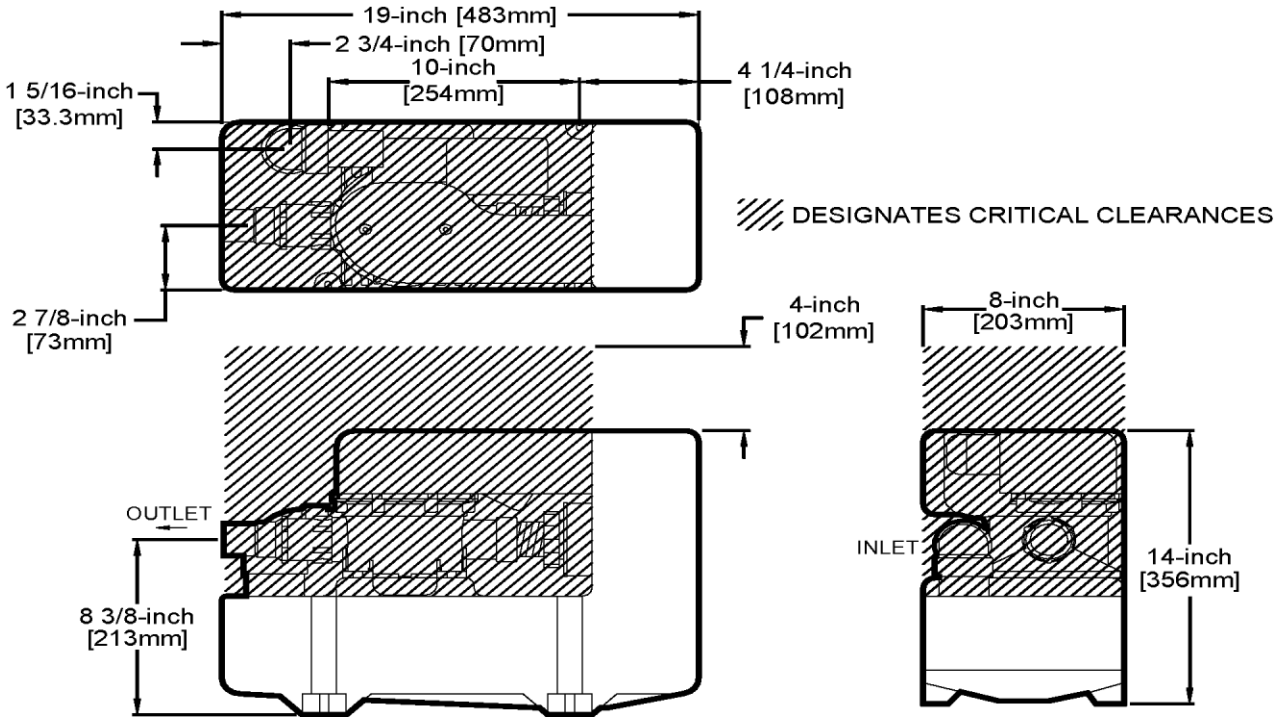
Do NOT do this!! Insufficient access.

Vacuum Generator is located behind an appliance, difficult to access and entire unit can not be replaced.

Vacuum Tank Critical Access Areas

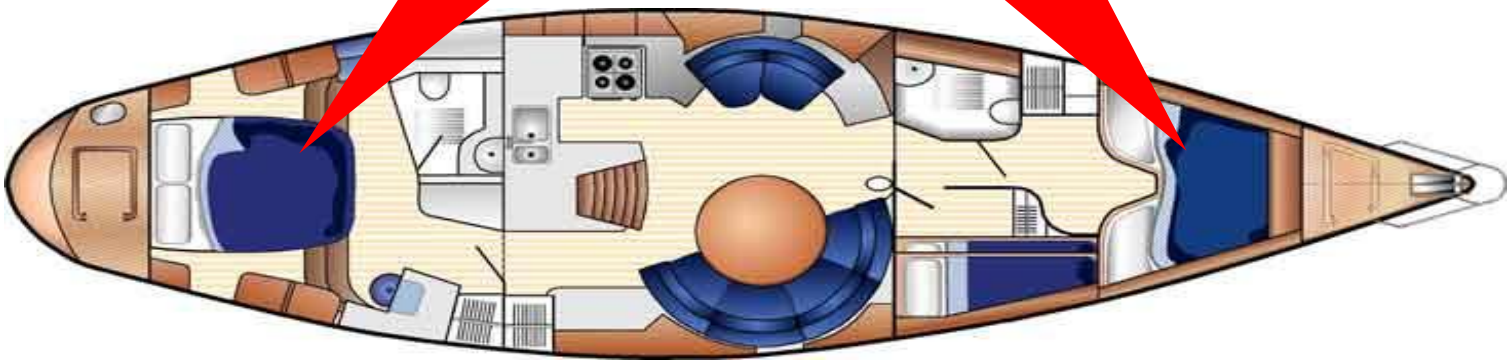


VG Critical Access Areas



Avoid locating pumps under sleeping areas

Avoid placing vacuum pumps under sleeping areas



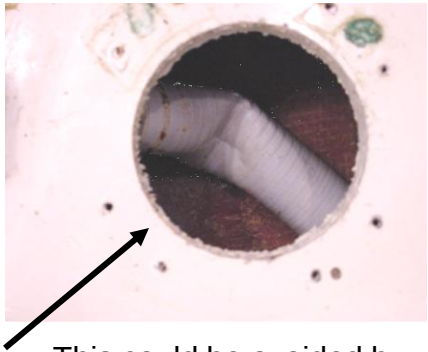
Critical Guidelines – Vacuum Sources

1. Do not exceed the maximum length between toilet outlet and vacuum source of 30 feet (9.1 meters) or the maximum height of 6 feet (1.8 meters).
2. There must be a separate vacuum source (vacuum generator) for each toilet.
3. Support the hose coming from the vacuum generator.
4. Mount pumps horizontally.
5. Vacuum tanks
   - Locate the outlet of the vacuum tank at the lowest level.
   - When mounted vertically, the vacuum switch must be at the top.
   - Never tamper with the vacuum switch settings.
6. All fittings and connections, pumps, vacuum switches, tank inlet and outlet fittings and vent filters must be readily accessible.
7. Avoid locating vacuum pumps under berths.

III. Hose and Piping Layout

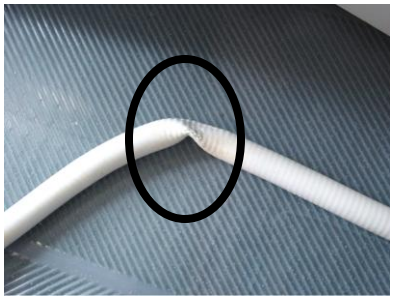
Problems to be Avoided

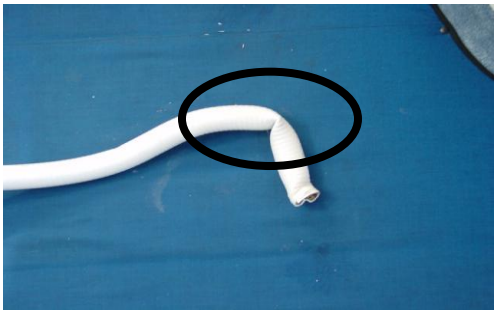
Crushed, pinched, kinked hoses found on new boats.



This could be avoided by using a quick turn funnel.

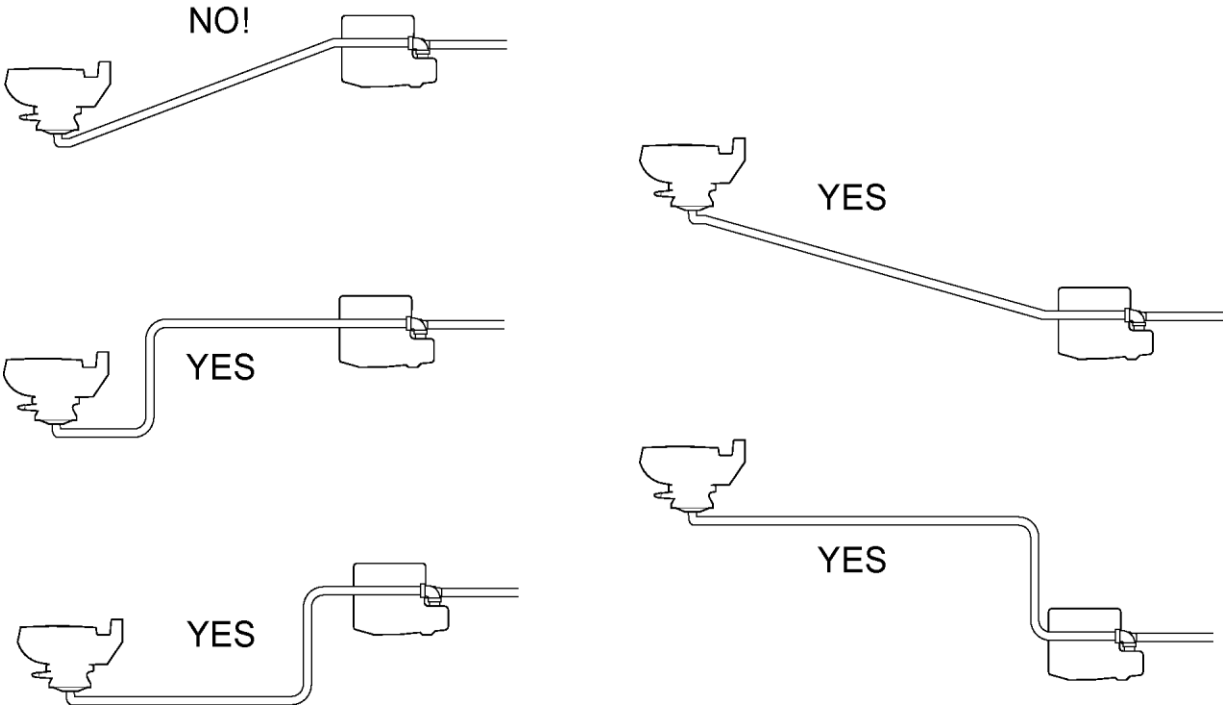
Hose is routed improperly.



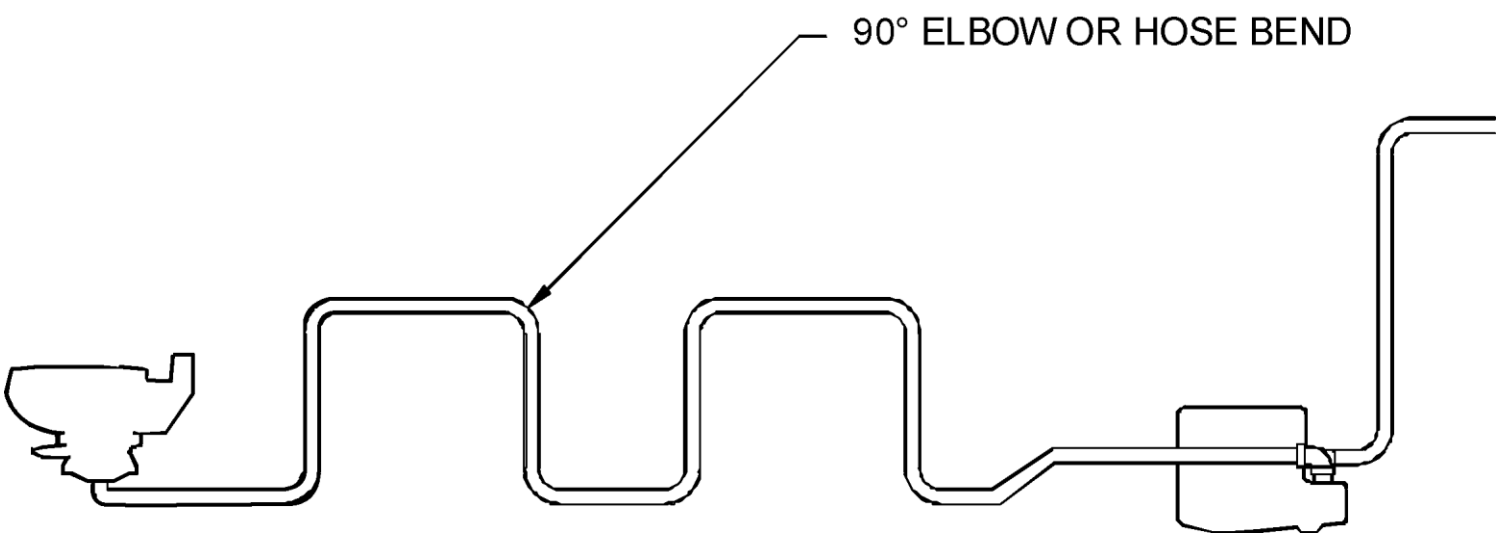


Hose forced beyond bend radius, routed too tightly.

Piping Runs to the Vacuum Source

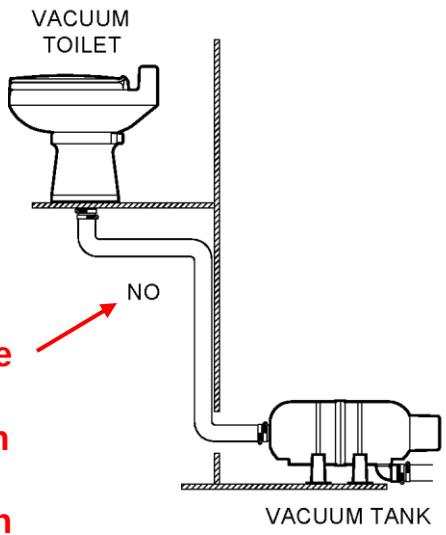


Limit of TEN 45 and 90 bends

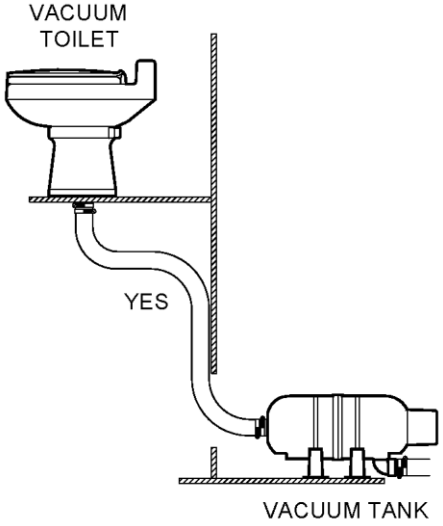


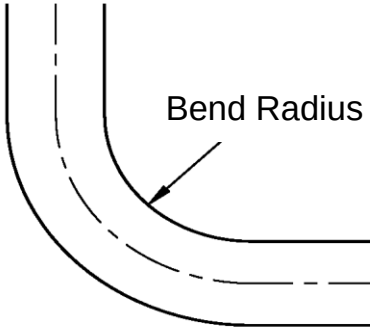
Use Generous Bend Radii

Piping Material	Minimum Inside Bend Radius
1.5” (38mm) SeaLand OdorSafe	8.5” (220 mm)
1.5” (38mm) Pipe Fittings	2.5” (64mm)

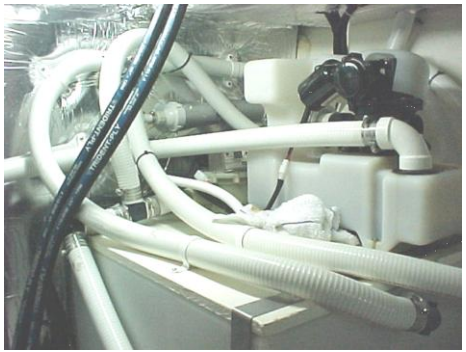


Use pipe fitting elbow in this situation





Hose Run Simplification



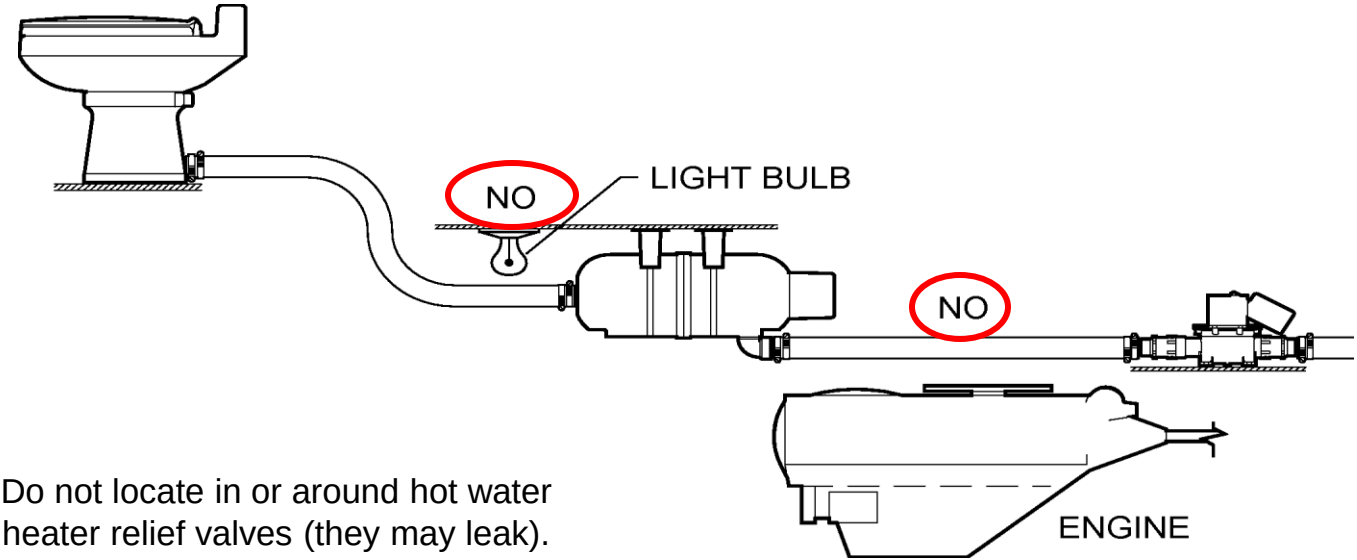
BEFORE

- One-head system with 40 gallon holding tank
- Excessive hose runs
- Difficult to reach wye valve
- Discharge hose from holding tank always filled with sewage

AFTER

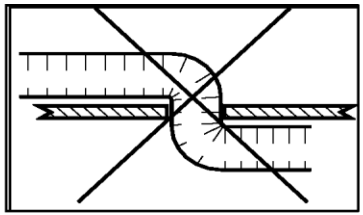
- Now a two-head system with 40-gallon holding tank on same footprint. Created by matching a SeaLand holding tank with rigid pipe fittings.

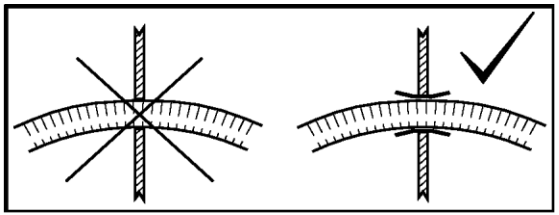
Avoid Heat Sources

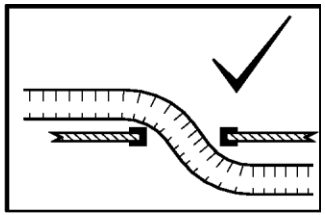


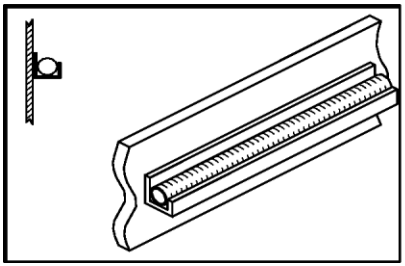
Do not locate in or around hot water heater relief valves (they may leak).

Avoid Binding Corners & Sharp Bends







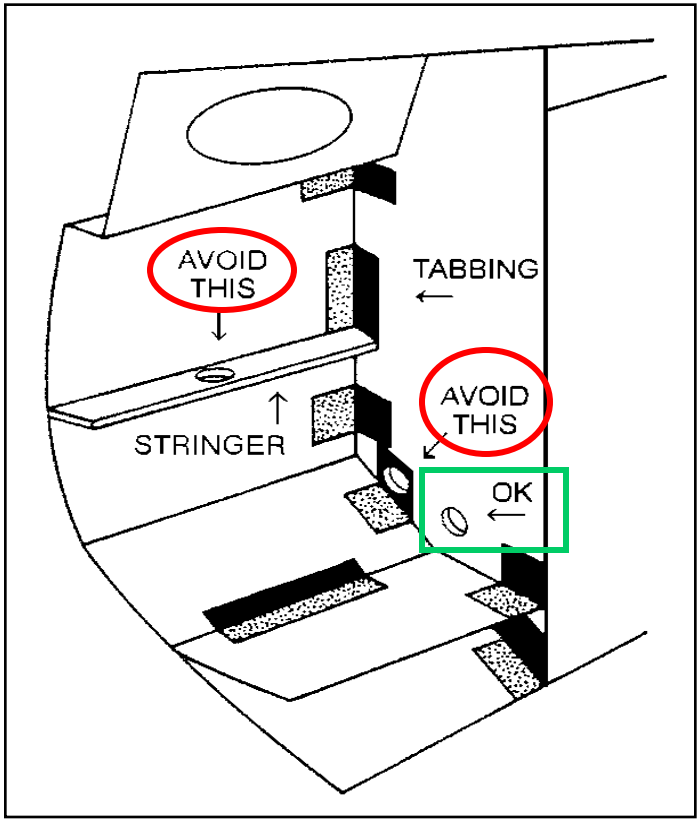


EXCELLENT

Do not restrict the ability to pull the hose or pipe.
Do not use wire ties to secure the hose or pipe.

Support flexible hose every 1 foot (0.3 m) and rigid pipe every 5 feet (1.5 m).

Do Not Risk Affecting Structural Integrity



Making Hose Connections

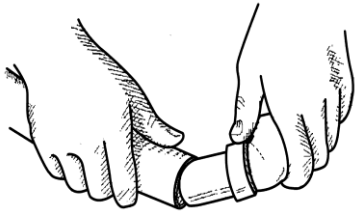
Never use an open flame or overheat hose end!

How To Use The SeaLand Hose Heater

1. Insert hose into pre-heated hose heater for 1.5 - 2.0 minutes. Do not leave the hose in the hose heater for longer than 10 minutes, hose degradation will occur.
2. Remove hose from heater. Using liquid dishwashing soap, quickly lubricate fitting and inside hose end, then push hose onto fitting. For second end, twist hose counterclockwise before placing onto fitting. This will ease installation due to natural twist (helix) of the hose.
3. **Allow hose to cool to room temperature, then clamp hose to fitting with two clamps. Make sure clamp mechanisms are 180º from each other when tightened.**

Making Hose Connections (cont'd)

WHEN DOING THIS…



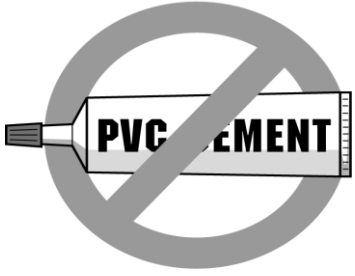
USE ONLY THIS…

AND REMEMBER THIS…

LITHIUM-BASED GREASE has led to small cracks in adapters due to chemical reaction with certain PVC formulations.

SILICONE-BASED LUBRICANT has resulted in hoses slipping off of adapters.

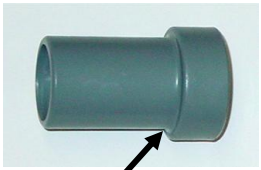
RTV (ROOM-TEMPERATURE VULCANIZING) SEALANT inhibits ability to service system easily at a later time if needed.



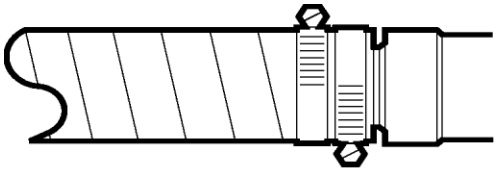
PVC CEMENT prevents ability to service system easily at a later time if needed.

Making Hose Connections - TIPS

- **All hose connections should be double clamped with screw mechanisms 180º apart and reversed.**
- **Use ONLY liquid soap and SeaLand hose heaters as aids for installing sanitation hoses.**
- Connect hose only to **barbless fittings** sized at a diameter of 1.53 .015” (39 .4mm).

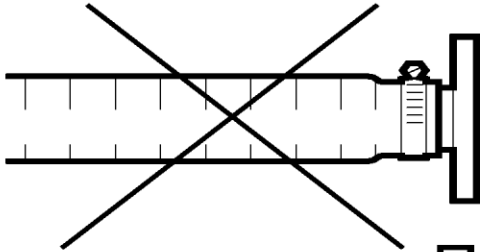


- Fully insert hose to the positive stop. If there is no stop, minimum hose insertion is 1 1/8” (29mm)

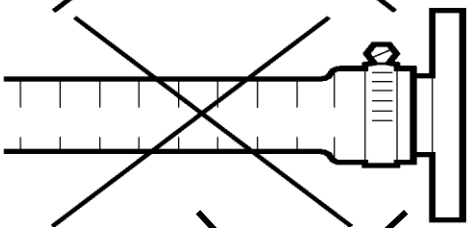


Clamps 180 apart

- Do not use undersized fittings

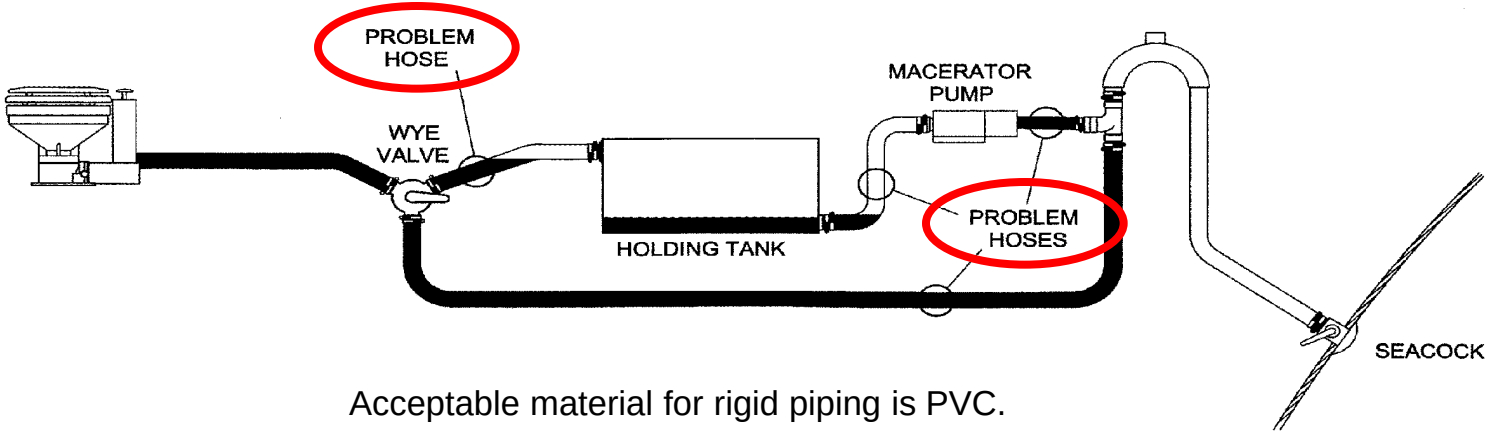


- Do not use oversized fittings



- T-bolt clamps will cause leaks at the hose connection

Avoid Common Hose/Piping Problems in Conventional Layouts



Acceptable material for rigid piping is PVC.

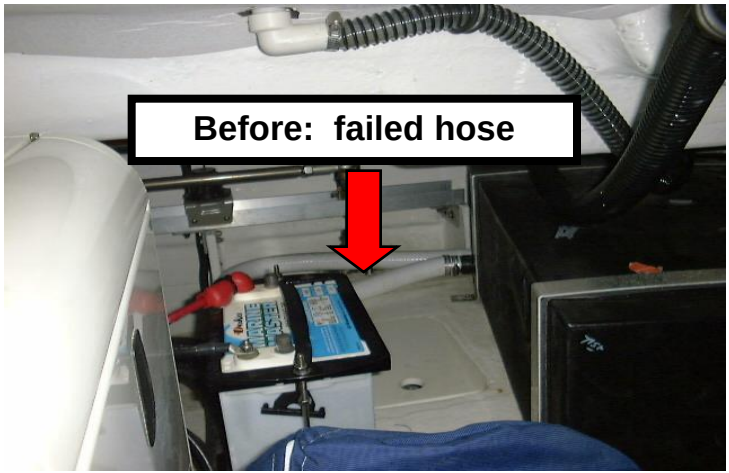
Wye valves create odor permeation problems by trapping waste in unused hose runs.

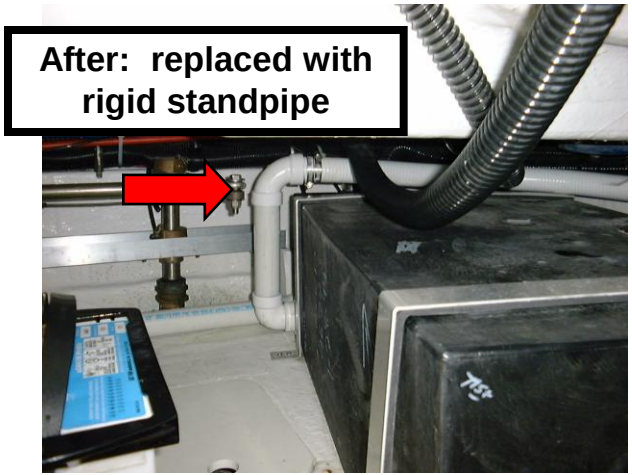
To avoid odor permeation problems, eliminate unnecessary runs that can trap liquids.

Use RIGID pipe for any locations of standing sewage.

Hose….Avoiding Malodors

Use rigid piping for standing sewage!



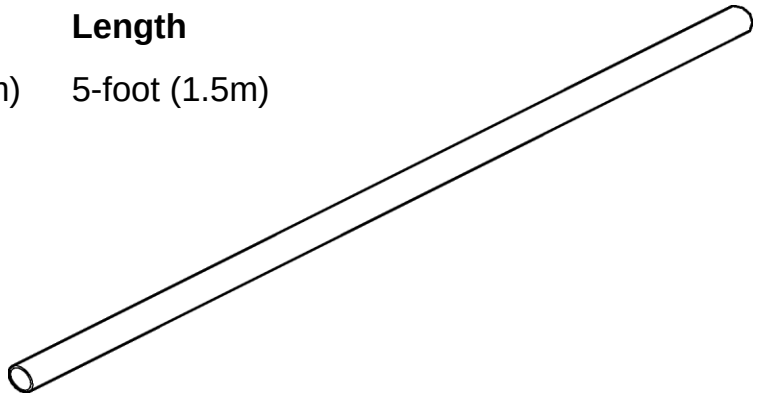


SeaLand Fitting Information

PVC Rigid Pipe

1½-inch (38mm) PVC pipe cut in 5-foot (1.5m) length for easy handling. For use with all fittings shown on next two pages.

Product No.	Description	Length
307001540	1½-inch (38mm)	5-foot (1.5m)



SeaLand RIGID Pipe Fittings

Product No. Description

307341085 Pipe Coupling

Connects 1½-inch (38mm) PVC pipe sections.

307341143 90º Bend

90º Ell for connecting 1½-inch (38mm) PVC pipe sections.

307341425 Threaded Male Adapter

Adapts 1½-inch (38mm) PVC pipe to 1½-inch (38mm) NPT thread.

307347286 45º Wye

Makes three way connection to 1½-inch (38mm) PVC pipe.

307341812 Double Bend

Makes three way connection of 1½-inch (38mm) PVC pipe.

307341158 Sanitary Tee

Makes three way connection of 1½-inch (38mm) PVC pipe.

307342971 Special Adapter for Toilet Outlet

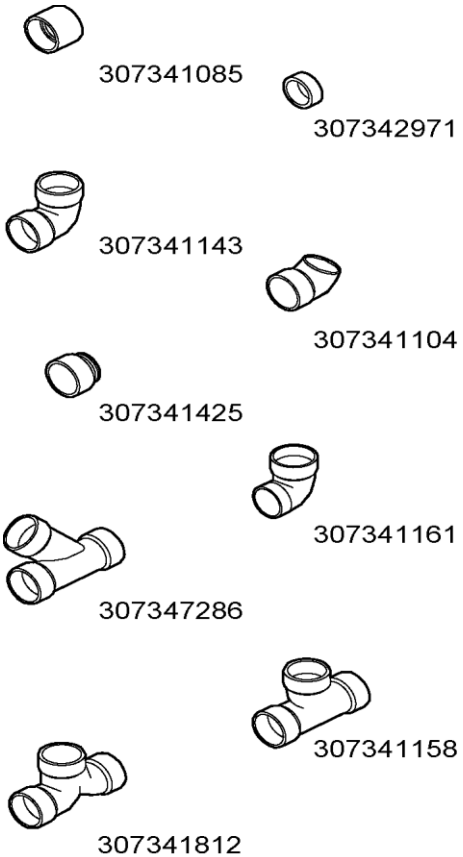
Adapts VacuFlush toilet outlet to other PVC pipe connections.

307341104 PVC 45° Street Ell

Handy for custom fitting design. Adapts to all 1½-inch (38mm) PVC fittings shown here.

307341161 PVC 90° Street Ell

For tight bends. Can be used with other PVC fittings shown. 1½-inch (38mm) Hub.



SeaLand FLEXIBLE Hose Fittings

Product No. Description

307230310 Hose Mender Kit:
Connects 1½-inch (38mm) for maintenance purposes.

307230311 90º Bend Kit:
Provides smooth sweep bend. Eliminates hose kinking in sharp bends.

307230312 Hose Adapter Kit
Connects 1½-inch (38mm) hose to 1½-inch (38mm) NPT thread.

307230313 Double Bend Kit
Connects intersecting 1 ½”-inch (38mm) hose segments per indicated flow as shown.

307238798 WYE Kit
Connects intersecting 1 ½-inch (38mm) hose segments per indicated flow as shown.

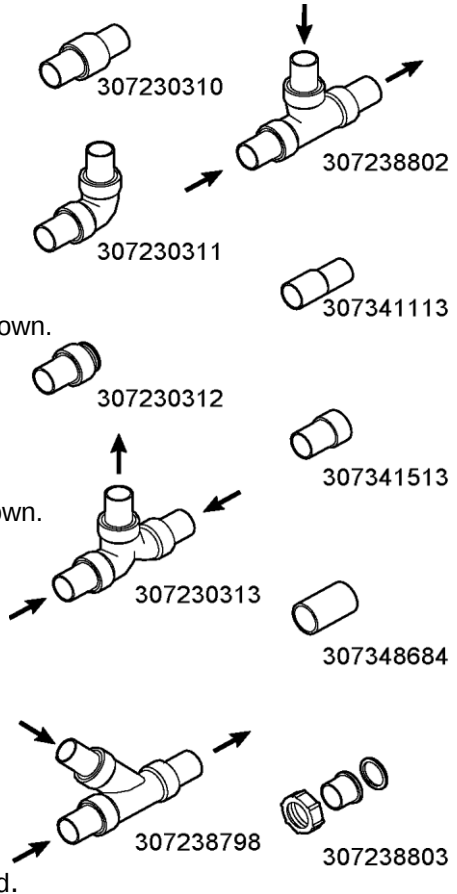
307238802 Tee Kit
Connects intersecting 1 ½-inch (38mm) hose segments per indicated flow as shown.

307341113 Reducing Adapter
Connects 1 ½”-inch (38mm) hose to 1-inch (25mm) hose.

307341513 Custom Hose Adapter
Can be used with all 1 ½-inch (38mm) PVC fittings with socket connection. Lubricated hose or cuff slides on easily.

307348684 Flexible Vinyl Couplings
Handy 3-inch (76mm) length of soft vinyl to couple 1 ½-inch (38mm) hose adapter fittings.

307238803 Hose Tail Piece
Connects hose to 1 ½-inch (38mm) MPT with swivel nut and sealing ring included.



Critical Guidelines - Hose Runs

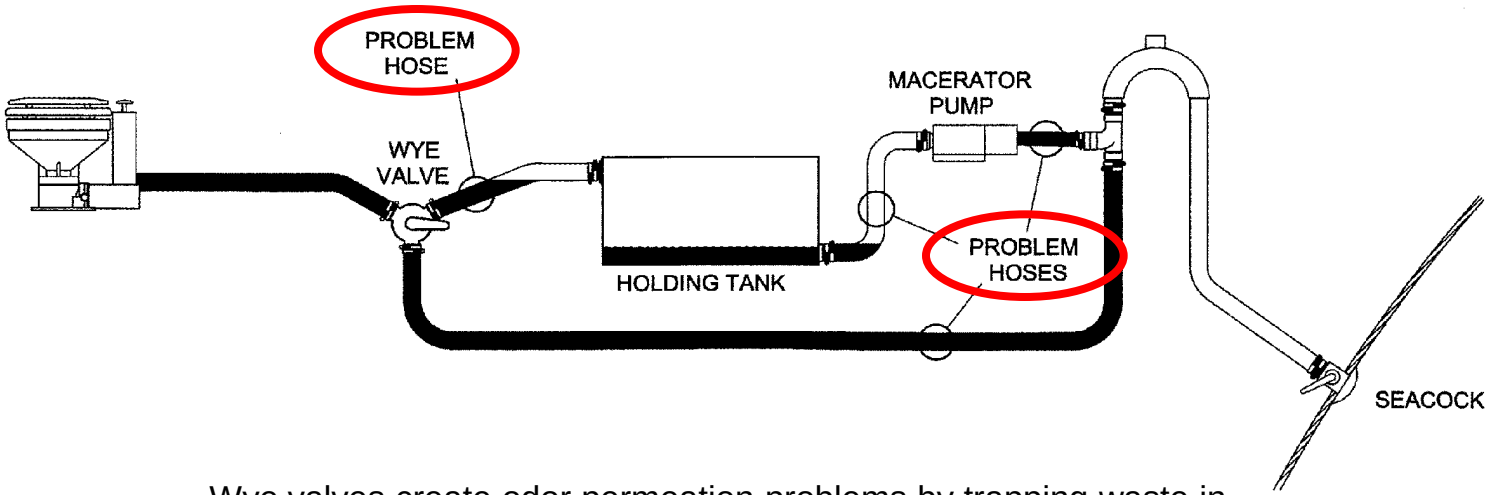
1. Simplify the layout – eliminate unnecessary valves and hose runs.
2. Use plumbing fittings or hose with generous bend radii to avoid hose kinking.
3. Do not run hose or piping close to heat sources.
4. Avoid sharp edges where hose or pipe pass through bulkheads or panels.
5. Pre-heat hose using SeaLand Hose Heaters.
6. Follow the hose connection procedure on pages 34-36.
7. Double clamp all hose connections, rotating clamps 180 .
8. Use only RIGID PIPING for any runs containing standing sewage.
9. Follow solvent bonding procedure per page 11.

Section IV: Holding Tanks

SeaLand holding tanks available in MANY configurations

Rotationally molded, polyethylene holding tanks, which have thick walls and are resistant to corrosion, are recommended.

Conventional Layout

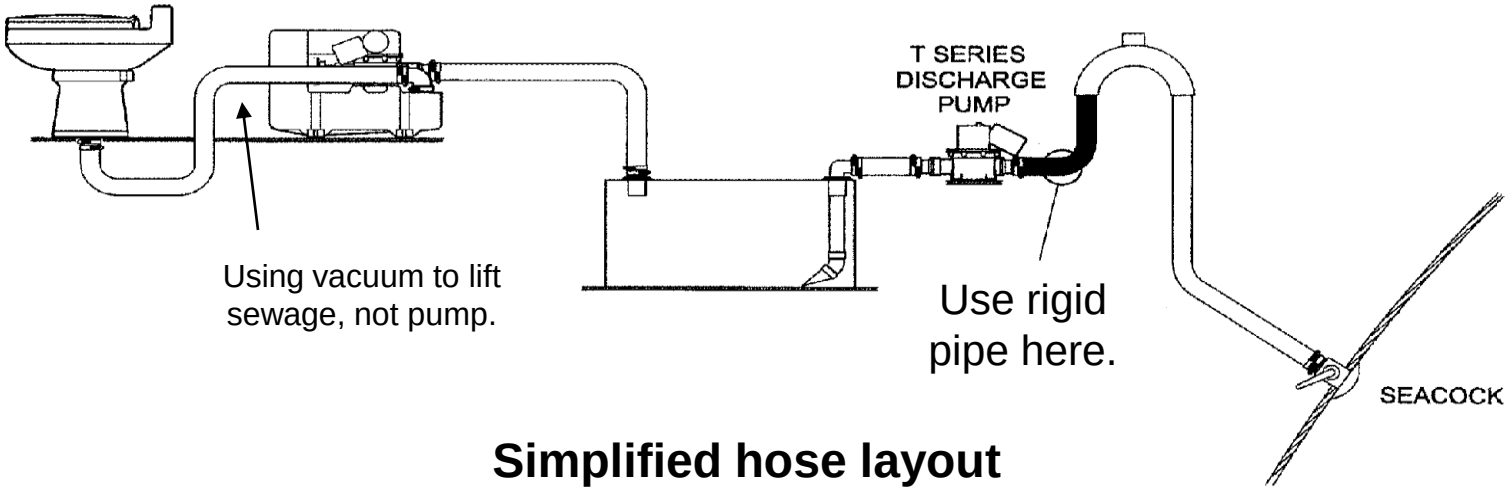


Wye valves create odor permeation problems by trapping waste in unused hose runs.

To avoid odor permeation problems, eliminate unnecessary runs that can trap liquids.

Use RIGID PVC pipe for any locations of standing sewage.

SeaLand Simplified Holding Tank Layout

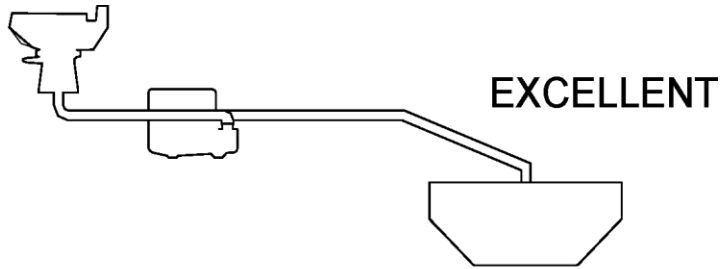


Simplified hose layout

- Vacuum flushing action keeps sewage from accumulating between toilet and vacuum generator.
- Sewage collects in the holding tank only.
- Note: vented loop is only needed if top of the toilet is below the waterline.

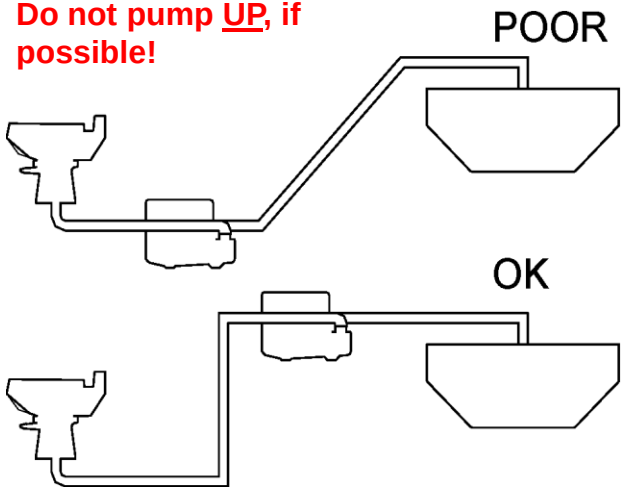
Holding Tank Locations

1. The BEST location for a holding tank is at an elevation lower than the vacuum pump.



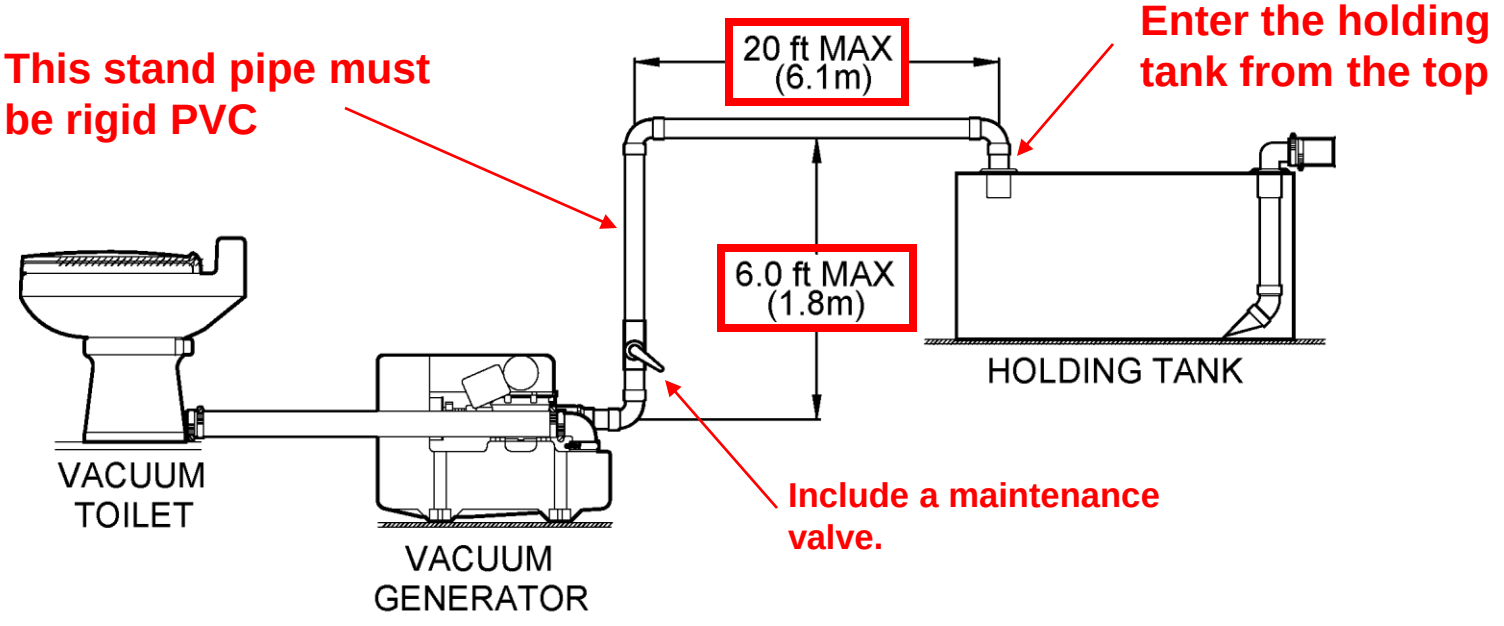
- ✓ Allow room above the tank for attaching inlet and outlet fittings, vent fittings and level indicator cap.
- ✓ **All flexible hose runs should be installed to drain into the holding tank or to the seacock. If runs of standing sewage cannot be avoided, use RIGID pipe.**

2. **Do not pump <u>UP</u>, if possible!**



3. Better to use vacuum source to lift sewage, not to push sewage with pump.

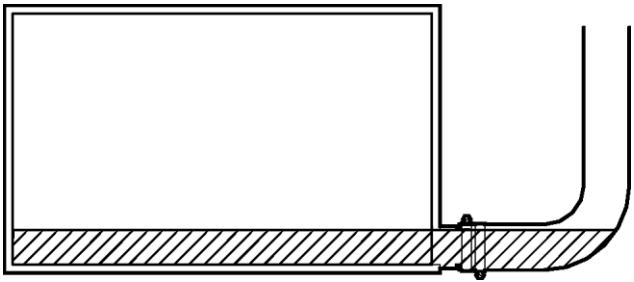
If the holding tank MUST be located above the vacuum source…



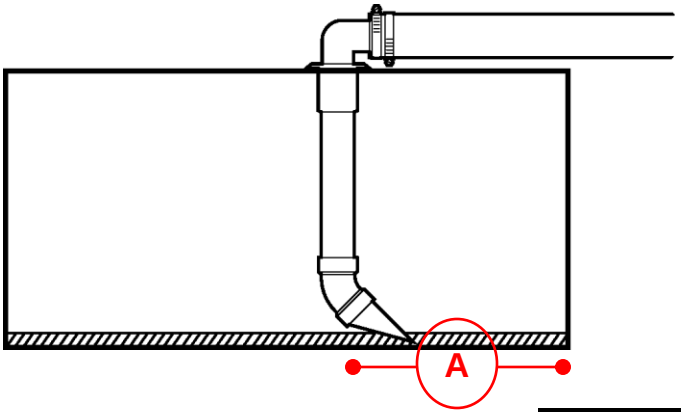
SeaLand does not recommend locating the holding tank above the vacuum generator, **but in layouts with no alternatives**, **follow the above guidelines.**

Use Diptubes

Conventional Discharge

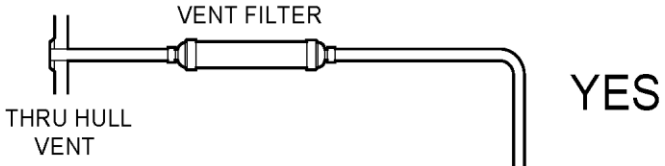


Recommended Discharge

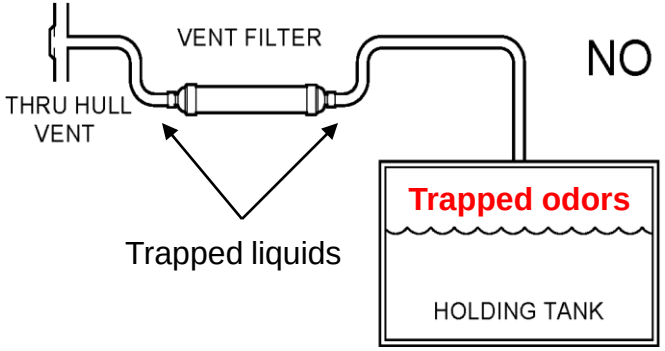


- Diptubes can be added to existing SeaLand or any holding tank.
- The engineered angle on diptubes will reduce the possibility of plugging.
- Angled suction fitting also lowers the tank contents to provide **maximum** liquid pumpout.
- **Diptubes eliminate standing liquid in the discharge hose, eliminating the possibility of odor permeation.**
- Diptube connection on top of tank allows for increased tank length **(A)**.

Use Vent Filters



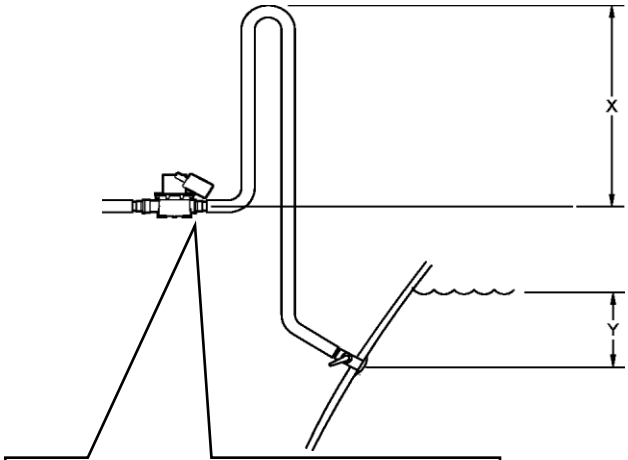
1. Always use **reinforced vent hose** to prevent kinking.
2. Do not allow a **low spot in the hose**, this will allow condensation to build up and block the hose – trapping odors.



3. **Easy access must be allowed to replace the vent filters!**

Vent filter is located below top of holding tank.

Discharge Pumps



Johnson Viking 32

Reliable, 8 gallon per minute diaphragm pump

The maximum vertical distance recommended on the discharge side is feet 13.

To calculate the pump discharge head, take the following two measurements and add them together:

X. The vertical height from the discharge outlet of the pump to the highest point in the discharge line

Y. The distance below the waterline of the discharge thru-hull if connected directly to a seacock.

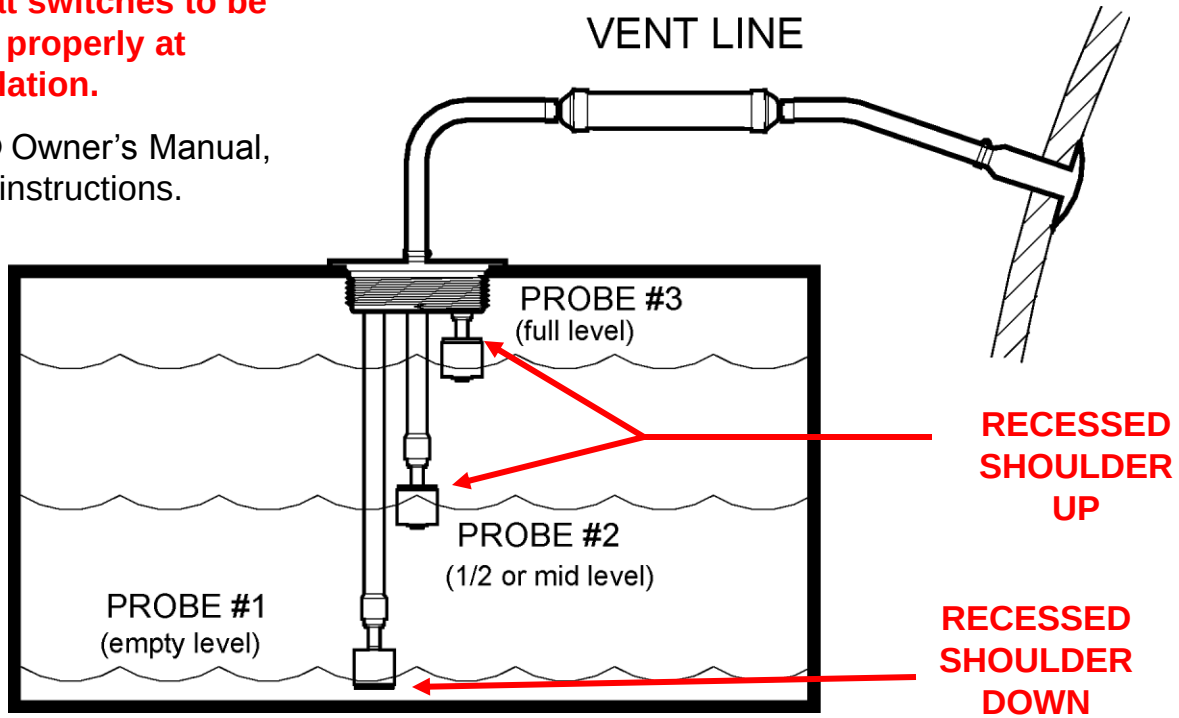
X + Y = feet
Maximum Total Head 13 feet

Vented loops are mandatory when the toilet is or may be below the water line (due to heeling or loading).

Level Indicators for Holding Tanks

It is important for the probe lengths and float switches to be positioned properly at installation.

See TankWatch® Owner's Manual, for specific instructions.



Critical Guidelines – Holding Tanks

1. Do not pump to the holding tank if possible, use vacuum to lift sewage.
2. Rigid pipe must be used for runs where standing sewage may collect.
3. Hose runs into and out of the holding tank should be made through the top of the tank.
4. If layout must pump up, 6 feet (1.83 m) is maximum allowable head and a rigid stand pipe must be used.
5. Use diptubes to eliminate discharge lines that contain standing sewage.
6. Be sure that vent filter lines do not have low spots that trap liquid.
7. Allow easy access to replace vent filters.
8. Any probe lengths and float switches must be positioned properly at installation.

Section V:

Critical Guidelines – Electrical System

1. **Each pump (or vacuum generator) must have its own circuit breaker or fuse.**

12v pump draws 6 amps, recommend 10 amp fuse and 12-14 gage wire (2.1-3.3mm)
24v pump draws 3 amps, recommend 5 amp fuse and 14-16 gage wire (1.3-2.1mm)

2. **Always use stranded copper wire (preferably tinned).**
3. **Always use crimp type connectors. Do not use wire nuts (they corrode).**
4. **Follow part specific wiring diagrams as outlined in Owner's Manual.**
5. **Wire size must be appropriate for the installation per ABYC/ISO wiring practices.**

Section VI: System Checkout

Before energizing the system, check the following:

- ✓ Key system components (vacuum generators, wye valves, seacocks, etc.) are labeled appropriately (port, starboard, forward, aft, guest, etc.).
- ✓ Toilet(s) mounted securely.
- ✓ Vacuum tank(s) mounted securely.
- ✓ Pump(s) mounted securely.
- ✓ Holding tank is vented correctly.
- ✓ All connections have double hose clamps installed tight and rotated 180 .
- ✓ No kinks or sharp bends in hose.
- ✓ No crushed or partially collapsed hose.
- ✓ Holding tank mounted securely.
- ✓ System must be winterized per page 56 instructions for areas with temperatures below freezing.

Power On Check

- ✓ Pressurize water system.
- ✓ Energize vacuum system.
- ✓ Hold flush valve open on each toilet for 30 seconds to charge vacuum pump with water. **Assure that sufficient water has circulated through the system to wet pump valves before proceeding with the following test procedure. Do not test system dry.**
- ✓ After closing toilet flush valve, note time it takes for pump to shut off. Vacuum pump should shut off within one minute.
- ✓ Inspect inlet water connections on toilet(s) for leaks.
- ✓ Turn off power to the pump and let the system sit for three hours. Re-establish power to the vacuum pump. If the pump turns on, there is a vacuum leak. Use the Digital Vacuum Gauge Instructions per pages 57-58 to troubleshoot the leak.
- ✓ Winterize the system to prevent freeze problems by flushing the system with antifreeze or draining all water from the water valve assembly (see following page).

Winterizing the System

Flushing with antifreeze

1. Thoroughly flush the system with fresh water.
2. Empty the holding tank.
3. Shut off the water supply to the toilet and remove the inlet waterline.
4. Push the flush lever until all water is drained from the toilet and water valve.
5. Drain potable water tank.
6. Add antifreeze to potable water tank. The antifreeze should be pink and contain no alcohol. DO NOT DILUTE the antifreeze with water.
7. Reconnect the water inlet to the toilet. Flush the antifreeze through the system into the holding tank.
8. Empty the holding tank.

Draining water from the water valve

1. Remove the brass cap from the bottom of the water valve.
2. Depress the flush pedal to allow water to drain out of the toilet.
3. Allow all water to drain out of water valve and water inlet line.
4. Reattach the brass cap to the bottom of the water valve. (Be careful not to strip the plastic threads on water valve body.)

Determine the System Leak Rate

Use SeaLand's Digital Vacuum Gauge (P/N 318530003) to confirm the system leak rate and find the leak.

1. Be sure that water has circulated through the system and the **duckbill valves are wet.** Turn off water to toilet.
2. Follow the instructions included with the vacuum gauge to determine the leak rate.

Digital gauge measures vacuum in 1/100 Hg in.

Reads 8-hour leak rate in 15 minutes!

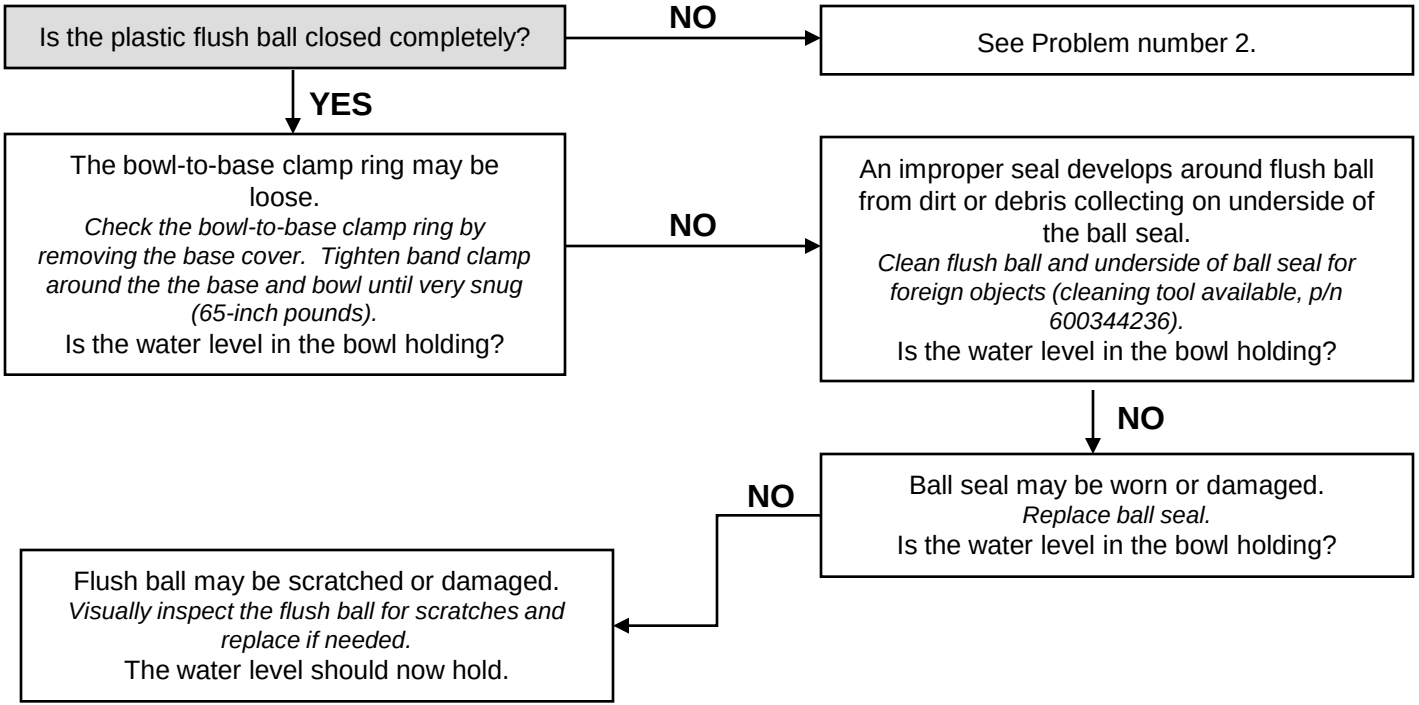
Drop in Vacuum (15 min)	Extrapolated time between pump cycles
> .2" Hg (not acceptable)	2.5 hours
.15" Hg (acceptable)	3.3 hours
.10" Hg (good)	5.0 hours
.05" Hg (very good)	10.0 hours

* Maximum acceptable leak rate*

Refer to SuperTech manual for instructions on using the gauge with a vacuum tank and pump.

Section VII: System Troubleshooting

1. Water will not stay in the bowl.



2. Plastic flush ball will not close completely.

Frictional drag may exist between flush ball and ball seal.
Lubricate the flush ball with silicone spray (must not contain petroleum distillates) or furniture polish.
Is the flush ball closing completely?

NO →

The flush ball may be catching on the edge of ball seal.
Be sure that the ball seals are centered over the flush ball and in the center of the base. Reposition if necessary.
Is the flush ball closing completely?

NO ↓

The water valve screws may be over-tightened.
Loosen the screws slightly.
Is the flush ball closing completely?

NO ↓

The spring cartridge is defective.
Check spring tension by releasing the flush lever suddenly. If lever does not snap back, replace spring cartridge.
The flush ball should now close completely.

3. Plastic flush ball will not open.

Is the shaft is broken?

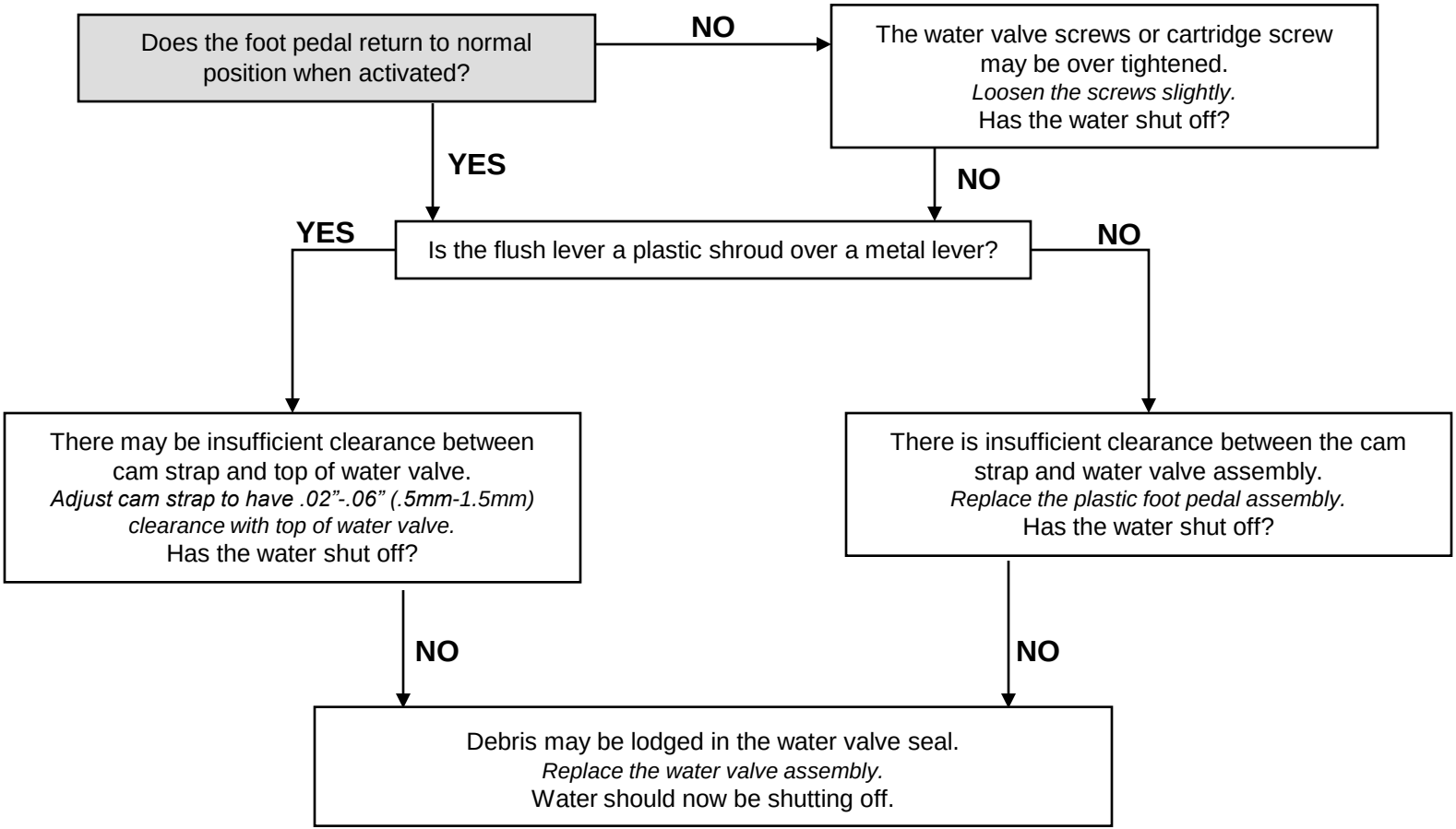
NO ↓

The shaft may not be fully engaged in the spring cartridge.
Replace the spring cartridge assembly and be sure that the shaft and spring cartridge are fully engaged upon reassembly.
The flush ball should now open.

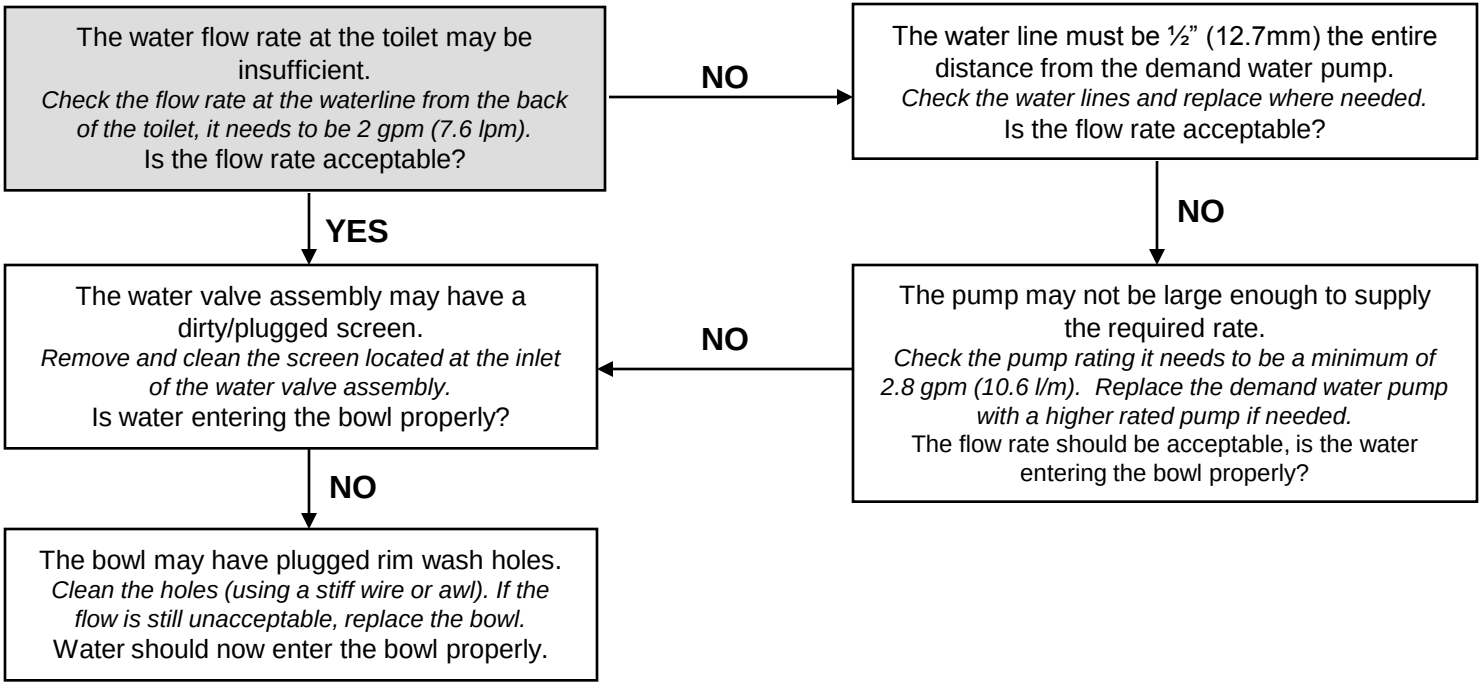
YES ↓

Replace the shaft.
The flush ball should now open.

4. Water does not shut off in toilet (toilet overflows).



5. Water does not enter toilet bowl properly.



6. Cannot lift flush lever to add water to the bowl.

Is the flush lever a plastic shroud over a metal lever?

YES →

There is excessive clearance between the cam strap and water valve assembly.
Adjust the cam strap clearance so it is .02”-.06” (0.5 - 1.5mm).
The flush lever should now add water.

NO ↓

There is excessive clearance between the cam strap area of the plastic foot pedal and water valve assembly.
Replace the plastic foot pedal assembly.
The flush lever should now add water.

7. Water is leaking from the water valve assembly.

The water line connection may be loose and/or not seated properly.
Insure that the fittings are not cross threaded and tighten.
Is the assembly still leaking?

YES →

The valve body may be cracked from freeze damage or the unit may have a defective water valve or the threads may be stripped.
Replace the water valve assembly.
Water should no longer be leaking.

8. Water is leaking from the rear of the toilet bowl.

The vacuum breaker assembly may not fully insert into the uniseal.
Secure the vacuum breaker connection.
Is water still leaking from the rear of the toilet?

YES →

The vacuum breaker may be leaking.
Remove the white cap from the vacuum breaker and flush the toilet. If water leaks while flushing, this is the problem. Replace the vacuum breaker assembly.
Was this the problem?

NO ↓

The toilet bowl may be cracked or defective.
Replace the toilet bowl.
Water should no longer leak from the rear of the toilet bowl.

9. Water is leaking from the toilet bowl/base connection.

The bowl-to-base clamp ring may be loose.
Check the bowl-to-base clamp ring by removing the base cover. Tighten band clamp around the the base and bowl until very snug (65 inch-pounds).
Is the water still leaking?

YES →

The ball seals may be misaligned.
Be sure the ball seals are centered over the flush ball and in the center of the base. Reposition if necessary.
Is the water still leaking?

YES ↓

The internal ball seals may be worn or defective.
Replace the ball seals.
Water should no longer be leaking.

10. Pump is running too often between flushes (more than once every 3 hours).

Determine the system leak rate before starting per Digital Gauge Instructions.

The flush ball may be leaking.
Leave a small amount of water in the toilet.
Is water being sucked from the bowl?

YES → See problems 1 & 2.
Was this the problem?

NO → Check for a leak at the vacuum generator.
Remove the inlet hose to the vacuum generator and insert the vacuum gauge in the inlet fitting.
Does the vacuum leak stop?

YES → The leak is between the toilet and the vacuum generator.
Insert vacuum gauge in 1" opening at toilet outlet.
Does the vacuum leak stop?

YES → The leak is "above" 1" orifice.
Check for a crack in the base or funnel and replace the appropriate item.
Leak should be resolved.

NO → The leak is probably between the toilet and the vacuum generator.
Check the hose and all connections (including clamps and threaded spin nuts between the toilet and the vacuum generator. Apply solvent to plastic joints with a cotton swab. On Ecovac units, also check the screws in the discharge cup under the base.
Leak should be resolved.

NO → The leak is in the vacuum generator unit.
Check that the fitting is not side loaded at the inlet uniseal. Tighten band clamps at the vacuum switch and diptube assembly. Check the spin nut and fitting between the pump and vacuum tank. Apply solvent to plastic joints with a cotton swab.
Has the leak stopped?

NO → Check for a vacuum leak at the pump.
Insert vacuum tester into pump inlet.
Does the leak stop?

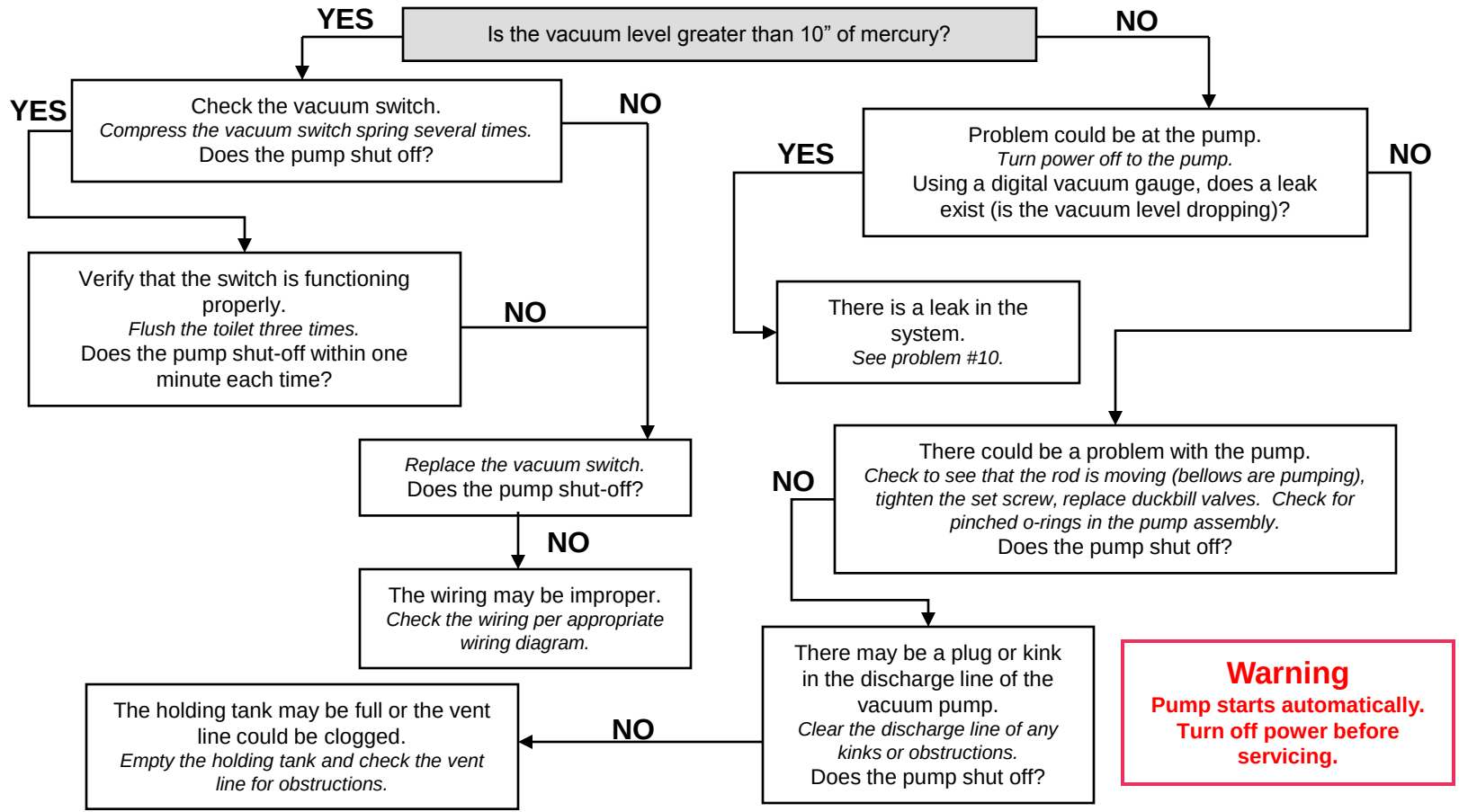
YES → The leak is most likely at the inlet elbow and uniseal, diptube, or vacuum switch.
Replace components or VG.

NO → *Replace all four duckbill valves and check the pump body for cracks.*
The leak should stop.

Warning
Pump starts automatically. Turn off power before servicing.

11. Pump will not shut off.

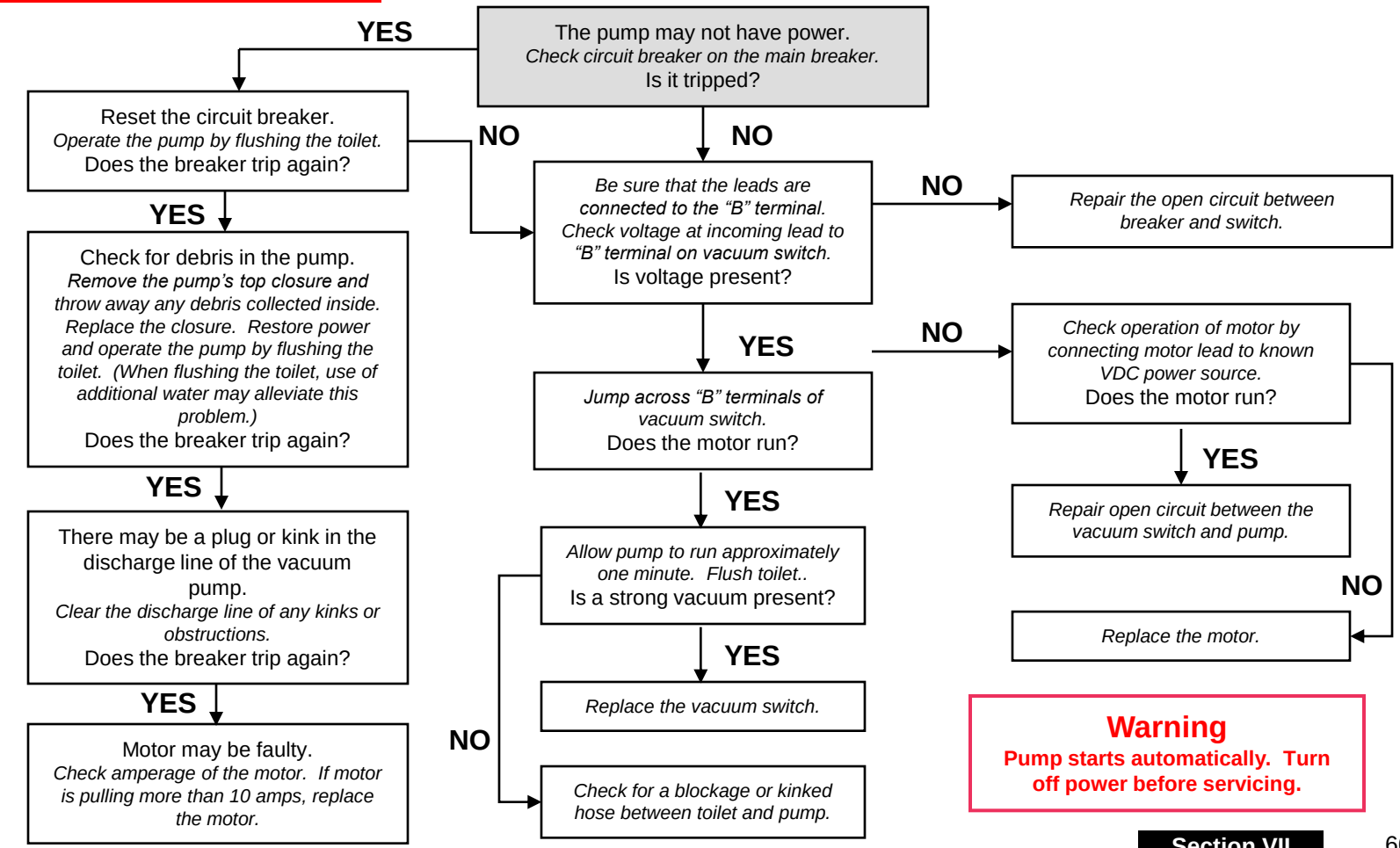
Determine the system leak rate before starting per Digital Gauge Instructions.



Warning

Pump starts automatically. Turn off power before servicing.

12. Pump will not run.



Warning

Pump starts automatically. Turn off power before servicing.

13. Vacuum pump runs too slowly, very hot, or blows fuses frequently.

The pump motor may be worn or defective.
Isolate the motor from the pump and check it with a known VDC power source. If the motor is running slow replace. Reassemble.
Is the pump working properly now?

NO

The voltage to the pump may be incorrect.
Check the input power for proper voltage.
Is the pump working properly now?

NO

The improper wire size may have been used.
The wire size is too small – check electrical diagram for proper wire size for the voltage of pump used.
Is the pump working properly now?

NO

There may be a plugged vent in the holding tank or discharge line.
Disassemble and clean. Check to be certain the seacock and in-line valves are in proper position. Disassemble and clean discharge line.
Is the pump working properly now?

NO

Check for debris in the pump.
Remove the pump's top closure and throw away any debris collected inside. Replace the closure. Restore power and operate the pump by flushing the toilet. (When flushing the toilet, use of additional water may alleviate this problem.)
The pump should now be working properly.

Warning
Pump starts automatically. Turn off power before servicing.

14. Toilet will not flush. (No vacuum)

Also see problem #3.

There is a blockage in the system.
Check the 1" opening at the bottom of the toilet base for a blockage and dislodge. Never use chemicals.
If the plug is not in the bottom of the base, blockages are most likely in the following locations:
Outlet of the vacuum tank
Inlet of the vacuum generator
Diptube of the vacuum generator
Inlet of the vacuum pump
From collapsed vacuum line
At a kink or sharp bend in a vacuum line.
Is the toilet flushing now?

NO →

There may be a problem with the pump.
See problem #12.
Is the toilet flushing now?

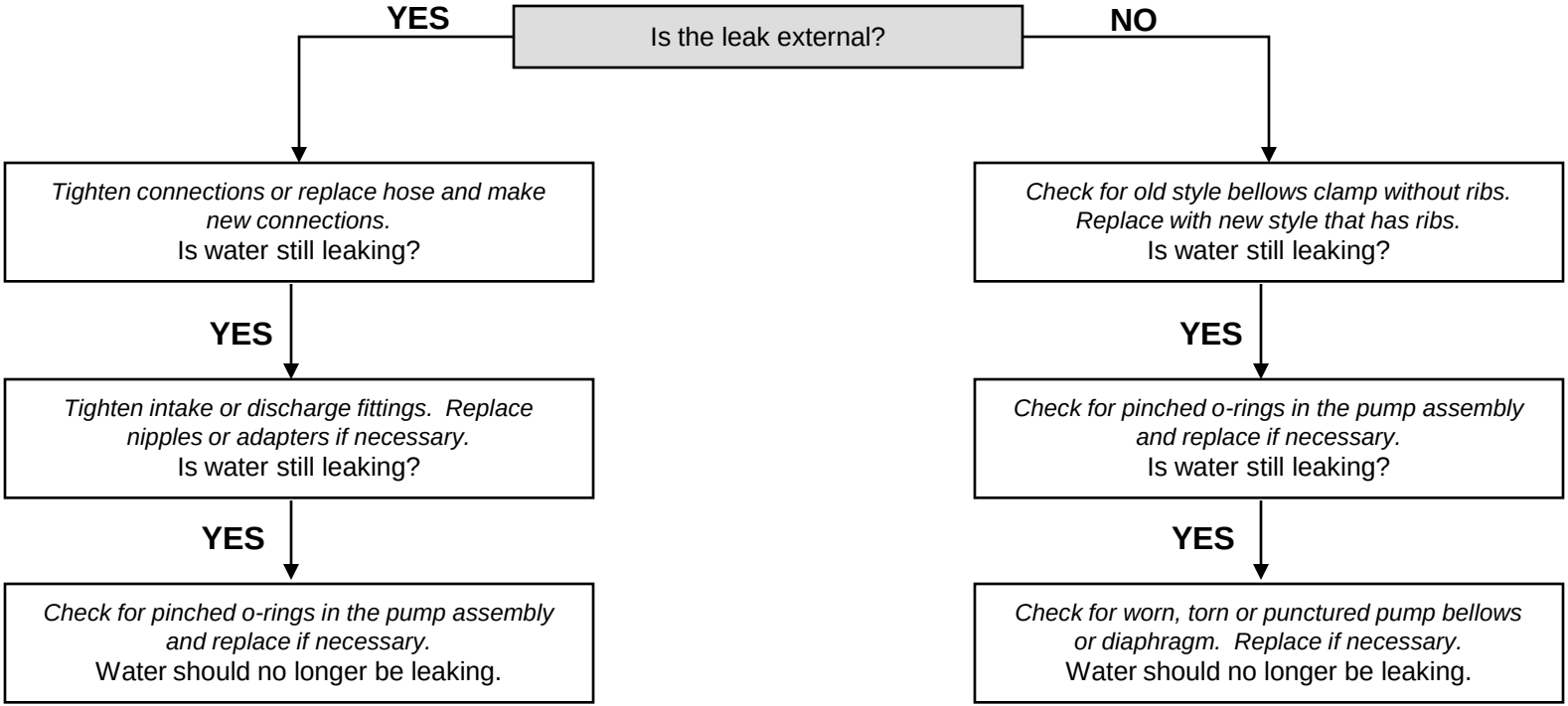
NO ↓

The duckbill valves in the pump may have inverted due to a clogged discharge line or closed seacock.
Replace the duckbill valves.
The toilet should now be flushing properly.

Blockages may also be caused by the following

1. Improper operation of the toilet. *Mare sure toilet is being operated correctly and each person using the toilet knows the correct operating procedure.*
2. Flushing foreign objects down the toilet. *DO NOT flush any non-dissolving items (I.e. sanitary napkins, facial tissue, paper towels, etc.) or excessive toilet tissue down toilet. Rapid-dissolving SeaLand® brand toilet tissue is best.*

15. Pump leaks water internally or externally (may emit an odor).



Warning

Pump starts automatically. Turn off power before servicing.

Notes: