

BILGE PUMP CHECKLIST

Definition of a Boat = constructed to provide buoyancy by excluding water!

How many of you have tested the “Actual” capacity of your bilge pump systems?

Step #1 - Test Existing Pump Capacity

- a) Pour a **known quantity of water into your bilge** (at least 20-30 gallons). A 1” hole two feet below water allows 28 gpm into your vessel.
- b) Turn on your **Electric Bilge Pump** and use a stopwatch to time how long it takes to empty your bilge. Record the time in your vessel records.
- c) Pour another **20-30 gallons and empty your bilge using your Manual Bilge Pump**. Time the test and count the strokes of the pump needed to empty your bilge. **You will need to calculate the volume per stroke of your manual bilge pump.** (This is the most important number when determining manual pumping capacity).
- d) Fill a **2 ½ or 5 gallon bucket** with water (not to the top but close to full) and stand in the cabin. Pick up the bucket and empty it out into the cockpit. This will help you understand the **sheer weight** of the bucket and the **awkwardness** of lifting it up to or above your shoulders. While doing this test imagine doing it many times in a seaway. Also, take note of your **Nav Station** location, (typically next to your companionway) with all its electronics and communication equipment. Imagine that getting doused with a bucket of water. NOTE: consider the **water level required in your vessel that allows for the use of a bucket** (it is often not until the water has risen above the floor boards).
- e) **Record your capacities in electric, manual, and scared man buckets** after performing the above tests. Calculate your combined current pump capacity. **Calculate total pumping capacity.**
- f) **The above suggestions are intended to establish your current baseline bilge pumping capacity.** You need to put yourself into the worst case situation to make a reasonable assessment of (1) your electrical pump capacity (2) your manual pump capacity, and (3) estimate how many buckets of water you can throw out of the companionway. NOTE: **your physical capabilities need your honest assessment**

Step #2 - Understanding How and What to Add for Pump Capacity

- a) When looking at the **capacity of Electric Bilge Pumps** it is important to know the approximate distance from the bottom of the bilge to the **underside of the deck where the “loop vent” is located for the discharge** hose. This height is

known as the discharge head. Based on the discharge head and the rated capacity of the pump, you will now be able to calculate the actual capacity of the electric pump.

NOTE: A typical **2000/gallons per hour pump with 6' of discharge head will actually pump approximately 1,300 gallons per hour, or 22 gallons per minute**. The capacity gets reduced further by right angle turns, ribbed hoses, etc. You are almost keeping up with a 1" hole two feet below the waterline (28 gpm).

- b) **Boat manufacturers are required to install an Electric Bilge Pump and a cockpit mounted Manual Pump. However, there is no capacity requirement for either.**

#3 Water in the Boat – the sooner you know this the better

What is the first step if you find your bilge full of water, or your bilge alarm goes off?

FIND THE LEAK! And stop it by any and all means possible. If you cannot stop it – what can you do to slow it down to a point your pump capacity can handle?

- a) **The more water that comes into the boat, the harder it is to locate the ingress point.**
- b) The more water that comes in lowers the waterline – which simply increases the amount of water, as well as the pressure it is exerting, making it harder to patch or fix.

These are the reasons why **Bilge Alarms are important** as well as **regular scheduled inspections** of the **bilge**.

#4 Important factors to consider

1. **How far** offshore do you plan to **venture?**
2. Will you be **boating in a remote area** or one populated with other boats who could help in an emergency?
3. How comfortable/confident are you with your **current pumping capacity?**
4. **Survey** available **space** for additional manual and/or electric pump installations, and the **hose runs required.**
5. If you are considering **adding a Manual pump**, think about the **ergonomic activity of pumping**. Can you **brace yourself** in a seaway? Can you put **your body behind each stroke?** These are important considerations, as

“sustainability” is the main ingredient in maintaining manual pump output volume. Remember **volume per stroke** when shopping for a manual pump!

6. Is your **bilge** compartmentalized?
If so, how do you best address that? Most would suggest **each compartment** have its own **bilge pump** with its own **discharge hose** and **thru hull**.
7. **Know your physical limitations**, and that of your crew.
8. Know how fast water can come in to a boat.
See chart below.

CHART SHOWING FLOW OF WATER IN “GALLONS PER MINUTE”

		Feet Below Waterline		
		2'	4'	6'
Hole Diameter In Inches	1"	28	40	49
	2"	111	157	192
	3"	250	354	433

*Multiply by 60 for “gallons per hour”

Step #5 Planning & Prevention

- a. Install a **Bilge Alarm**
- b. **Check all hoses** above and **below the waterline**.
- c. Check engine **exhaust risers and hoses**.
- d. Check **seacocks** and all **thru-hull fittings** for cracks and/or corrosion.
Are **plugs** tied to them?
- e. **Make a plan for rudderpost failure**
- e. Check **prop shaft**, **rudderpost stuffing boxes** and lip seals.
- f. **Clean the bilge and paint it white**. This will help you **see**

debris that could clog a pump, hopefully in advance.

- g. **Keep a waterproof LED flashlight handy.** If your bilge is deep, tape the flashlight to a dowel long enough to reach the bottom of the bilge. **This will help you see debris** and any issues happening below the water level.
- h. Draw a **map of the thru hull hole locations** in your boat. **Check your map when your boat is on the hard** and make sure **every thru-hull is** duly noted on the map. **Laminate three (3) or more copies**, one for each cabin, and **keep them in logical places**. Place one on the **back of the head door** so family and friends have something important to read. It is also good to note the **location of fire extinguishers** on the same sheet of paper and any **other safety tips** that you think would be helpful in case of emergencies (which could include incapacitation/injury to the captain and/or master of the vessel).
- i. Each **pump should have its own thru-hull**
- j. Put a sign on your engine intake seacock that says "**Leave open if engine is running**". **You never know who is closing seacocks.**

Regulations vs. Responsibility

In summary, we have seen 45' LOA vessels launched, tied to a marina, and used as a summer home. We have also seen 25' boats designed for "coastal cruising" circumnavigating the globe. These guidelines are designed to help boat owners make informed decisions as to the pumping capacity needed for the intended use of their vessels

Make a list of all the things on your boat that you never want to have to use in duress. Those are the items to spend extra money on. Do you want the "best buy" VHF, or the "best quality"? Do you want to step into a life raft that you saved \$1500 on? There are items you can save money on but they are not included on this list.

Manual Pump Manufacturers:

- 1) Whale
- 2) Bosworth
- 3) Patay
- 4) Plastimo
- 5) Edson