

Keep Your Head

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A key component of the comfortable, efficient boat is a head that doesn't stink. Heads (toilet, or marine sanitation device —MSD) are the simplest of machines, but they are machines, with multiple moving parts, and they operate in a damp environment, transferring corrosive materials containing potentially clogging lumps and wads. That they don't break down more often is likely because normally they are run only a few minutes per day. But a typical marine head probably experiences more failures per operating hour than any other machine on a boat.

Getting the best performance from your head is the result of four factors: correct installation, proper operation, regular maintenance, and special efforts to track down and eliminate the sources of odors.

Installation and Operation

A great many different types of marine toilet and hold tank designs are on the market, and each has particular installation and maintenance requirements. There are manu-

als and electrics, macerators, diaphragm discharge pumps, vacuum pumps, electric treatment devices and composting toilets, attached holding tanks, and remote ones. It's not possible to address the peculiarities of each in this brief article. A rundown of MSD types and requirements is provided in "Marine Heads" published in *Pacific Fishing* in March of 1999 and available from Alaska Sea Grant at <http://www.uaf.edu/seagrant/boatkeeper/>. Let's review, instead, the basic principles.

Vessels operating in state waters (inside three miles) may not discharge untreated sewage into the water, so heads (toilets) must be connected to either a treatment device or a holding tank. In most cases that treatment device or holding tank is installed in a different location from the toilet, so the waste must be pumped from the toilet to the tank, and subsequently discharged overboard or pumped out, where pump-out facilities exist. The toilet device needs water to operate, so it is fed either by pressurized freshwater from the boat's tanks, or by

seawater, and usually the latter. So, in most cases there is a through-hull seawater inlet and hose, a water pump, a bowl, a set of valves and interconnecting hoses, another pump (usually combined with the intake pump, and sometimes including a macerator blade), a discharge hose to the holding tank, the tank itself with vent hose and above-water through hull fitting, a discharge pump, and a deck pump-out fitting and/or overboard discharge port. In many cases there's a Y-valve that allows the user to send the toilet discharge either to the holding tank or directly overboard. Pumps may be either electric or manual. Obviously included are any number of hose clamps, connecting collars, and mounting attachments.

MSD manufacturers provide detailed installation instructions which, if followed closely, provide for relatively trouble-free operation.

Here are some installation and operation tips:

- Install the toilet where access for servicing and cleaning is as easy as possible. It's tempting to shoehorn it into a corner out of the way, but it's important to be able to clean and sanitize the entire unit and surrounding bulkhead and sole areas. Be sure you can get it out again when (not if) you need to repair it.
- Keep hose runs as short and direct as possible, particularly toilet-to-holding tank. Use wide-radius bends and don't allow sags or low spots in the hose runs. Use top quality sewage hose with smooth inner surface and no ribbing. Better yet is rigid PVC pipe for long runs if fittings are available.
- Use at least $\frac{5}{8}$ inch holding tank vent hose and an unobstructed breather point.
- Be sure all prospective users are instructed on proper head operation, and particularly what may and may



Images courtesy of Go2Marine.com

not be put in the toilet. Many adhere to the “only what you’ve first eaten” policy (plus some suitable toilet paper), and “gentlemen please be seated” is an effective way of minimizing head compartment odors.

- Encourage users to operate the pump long enough to ensure that waste is flushed all the way out the hose to the holding tank. Waste standing in the hose is a source of unpleasant odors.
- Ensure that no one puts bleaches, caustic cleaners, pine oil, alcohol, or any petroleum products into the toilet. They will destroy seals, gaskets, hose linings, and valves.
- Use only single-ply fast dissolving toilet paper. The cheap generic brand household stuff is just as good as the expensive “marine” TP. If you’re not sure about a particular brand, drop a square of it in a cup of water and swirl it a moment. If the paper starts coming apart it’s good for a marine head.

Regular Maintenance

Buy a repair kit and keep it on board, along with the owner’s manual. Anticipate potential problems and prevent them rather than repairing the head after it breaks down. Inspect the unit regularly, looking for signs of leaks, rust, cracking of hoses or porcelain, any loose attachments or parts, snugness of hose clamps, and signs of corrosion on electrical contacts.

Each type of toilet and MSD has its own needs, but some general principles apply to most of them:

- Seawater and urine both cause calcium “scale” to form on the inside of passageways and hoses. Like plaque in arteries, it can build to the point of eventually choking off the flow. A weekly treatment of white vinegar in the bowl will dissolve the scale. If you find evidence of scale in the intake line, close the valve at the through-hull and treat that line with vinegar too. A 10% solution of muriatic acid is a more powerful scale remover.
- Vinegar can also be used to get the calcium scale ring off the inside of the bowl.

- Most types of marine toilets have a set of flapper valves and a “joker” or duck-bill valve (which blocks odors from coming back into the toilet from the discharge line). These should be changed regularly, like once every two to three years.
- Some marine writers advocate pouring a little vegetable oil or mineral oil down the toilet to keep those valves supple, and to “lubricate the leathers” of the manual pump plunger if the unit has one. However, the nation’s foremost expert on marine heads, a woman by the name of Peggy Hall who runs a consulting firm specializing in all matters pertaining to boat toilets, directly contradicts this advice.
- If you have a manual head, dismantle the pump occasionally, check the plunger and its O-rings (or “leathers”) and grease with a non-petroleum grease. Lubricate all moving parts with appropriate spray or grease.
- Spray electrical contacts regularly to prevent corrosion. If electric pump works slowly or irregularly, suspect faulty electrical connections.
- Check seacocks and Y-valves regularly to ensure they are free of corrosion and operate easily.
- Winterize your system by cleaning it and then getting all the water out, by whatever means necessary. Some people advocate use of ethylene glycol (“RV antifreeze”) but the stuff is expensive, quite a bit would be required, and it may also cause damage to system components. If there’s no water in the system (a small amount in the holding tank is OK) there’s nothing to freeze.

Preventing Odors

Marine heads don’t have to stink. There are a few common causes of odors and most can be eliminated with minimal effort.

First be sure the toilet exterior and surrounding head compartment area are kept clean. A regular scrub-down with detergent and a mild bleach solution or Lysol helps. Again, persuading the males on the crew to sit during all uses makes the job easier.

If the toilet is supplied with seawater, odor results from minute marine organisms (plant and animal) that die and decompose in the system. That’s why some of the more expensive MSDs use freshwater. The fix for a seawater system is just to flush it frequently and thoroughly. A strainer on the intake line will diminish the amount of these sea creatures that get in, but then you have one more thing that needs cleaning and can become clogged. You can add little in-line treatment units that dissolve some kind of sweet-smelling blue chemical into the incoming water, but that’s not really necessary if the system is flushed frequently.

Many head compartment odor problems originate in the hoses or in the holding tank rather than in the toilet. Here are some tips for addressing those problems:

- Even top quality hose eventually becomes permeable to odors. Wrap a damp towel around the discharge hose, leave it a few minutes, then remove and sniff. If it stinks, the hose is a source of odors and needs to be replaced.
- Check hose clamps and all joints or connectors for indications of fluid or odor leak. Use a sealing compound when re-connecting joints.
- Because waste left standing in the discharge hose is a common source of odor, at least at the end of the day thoroughly flush the line. If holding tank capacity is an issue, close the seacock, pump the bowl dry, then run a few quarts of freshwater through the line.
- Odors are caused by anaerobic (in the absence of oxygen) bacteria. Ensure adequate ventilation of the holding tank. That means make sure that the vent hose is large enough and is unobstructed (an obstructed vent can also cause holding tank implosion during pump-out and explosion if waste is forced in by a powerful pump). Vent hoses can become plugged if the tank is overfilled or if the boat lists heavily to that side. Some users install dual vent hoses, terminating on opposite sides of the boat, to get air circulation in the holding tank. Some even install aeration systems or ozone generators to staunch holding tank odors.

- Various chemicals are sold as head and holding tank treatments. For the most part they either cover up the smell or kill the odor-causing bacteria, neither of which is a suitable solution. A little minty-smelling deodorant is OK to spruce the head up, but use it only after addressing the real causes of the odor.
- Odors may enter the head compartment from the bilge or other sources, so check for holes or passages that could allow them in.

A Couple More Tips

Keep several pairs of latex gloves handy for use when doing any head repairs. Elbow-length rubber gloves are helpful if you really have to get into it. In some cases it's a good idea to don raingear to keep from contaminating clothing.

Lay out your tools, the contents of the repair kit, and the expanded diagram of the toilet before starting work, so you don't have to paw through lockers, boxes, and pages with stinky fingers.

It's often easier to work on a toilet by completely removing it to a more convenient location, such as a back deck. Be sure to shut seacocks if the boat is in the water. Keep careful track of all the parts; some may be particular to the unit and not available at the local hardware or gear store.

When re-attaching toilet units, tighten mounting bolts evenly but not too tight. Both porcelain and plastic mounting feet can be cracked by over-tightening. ◆