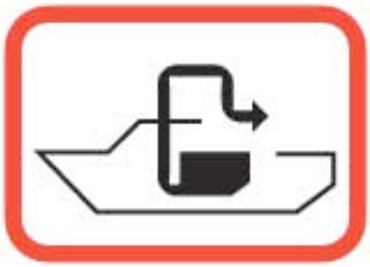
VESSEL SEWAGE AND MARINE SANITATION DEVICES

Clean Boating Tip Sheet

HOW TO PROPERLY DISPOSE SEWAGE

Maintaining a properly functioning sewage system and using best practices in sewage handling is the first step in reducing human health risks and protecting the environment. If your vessel has a toilet, it must be equipped with an operable sanitation device that is certified by the U.S. Coast Guard.

Marine sanitation devices allow for sewage to be temporarily stored in a holding tank on a vessel and then transferred onshore, eventually to a local sewage treatment facility. The waste or sewage collected in the sanitation device must be properly disposed of by using pump-out stations, found at many public and private marinas throughout the Great Lakes. Pump-out stations typically consist of a hose that connects to the holding tank on the vessel and a motor that drives the pump to remove the waste.



It's the Law

Discharging sewage is not just a health hazard – it's also against the law. According to federal and state law, it is illegal to discharge raw sewage in territorial waters of the United States. Michigan is a "No Discharge" state, making it illegal to discharge either raw or treated sewage from a watercraft within all waters of the state, including inland lakes and waterways.

The federal Clean Water Act requires that if a toilet is installed on a vessel, it must be equipped with an operable marine sanitation device (MSD) that is certified by the U.S. Coast Guard. Michigan regulations (NREPA; Act 451, Part 95) require that any vessel with a head (toilet) not be allowed to operate unless one or more of the following pollution control devices are used:

- An approved holding tank that will retain all sewage produced on the watercraft for subsequent disposal at approved dockside or onshore collection and treatment facilities.
- An incinerating device that will reduce all sewage produced on the watercraft to ash. The ash must be disposed of onshore in a manner that precludes pollution.

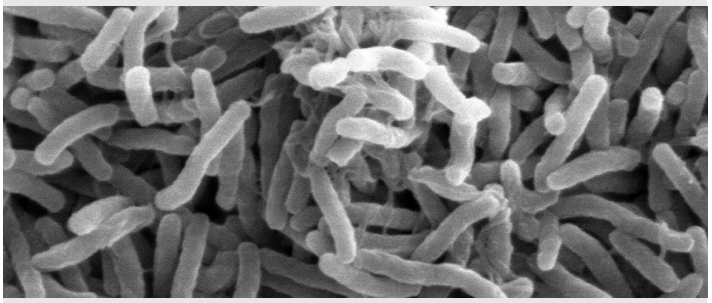
Why Sewage is a Problem

Raw or poorly treated sewage is harmful to human health and water quality. Life-threatening waterborne diseases, such as typhoid, hepatitis, cholera and gastroenteritis, may be passed directly to people who swim, consume fish or drink water contaminated with raw or poorly treated sewage.

Raw or poorly treated sewage discharged to waterways reduces the amount of oxygen available to fish and other forms of aquatic life because microorganisms within sewage consume oxygen. Nutrients in sewage discharge also promote algal growth. As the algae multiply, they prevent sunlight from reaching plants below the surface. When the algae die and are decomposed by bacteria, this further reduces oxygen levels and compounds the problem.

Another Source of Sewage

Some areas in Michigan use a combined sewer system to handle wastewater. A combined sewer carries both domestic sewage and stormwater. During heavy rainfall, a combined sewer system can overflow to a nearby stream or river, bypassing treatment and entering rivers and lakes.



Scanning electron microscope image of Vibrio cholerae bacteria, which causes cholera in humans. Photo courtesy of Dartmouth College.

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MARINE SANITATION SYSTEMS

Sanitation systems consist of an installed head (toilet), a waste-treating device, and/or a holding tank. See Figure 1.

Three Types of Sanitation Devices

The U.S. Environmental Protection Agency and U.S. Coast Guard recognize three main types of Marine Sanitation Devices (MSDs): I, II and III. Type III is the most commonly used sanitation device in Michigan. The Type III device meets state and federal laws and has the least impact on the environment, since waste is not discharged to the water body.

Type III

Requirements Specific to Vessels Equipped with a Bypass Valve (NREPA; Act 451, Section 324.9503)

Many vessels are equipped with a bypass valve, often referred to as a "Y" valve, which must be sealed to properly direct waste from the toilet to a holding tank. To prevent discharge of sewage, the "Y" valve must be secured by either:

(a) Removing a section of the pipe or tubing that would allow discharge, installing a cap, and placing a non-reusable, state-approved seal over the cap; or

(b) Closing the valve to prevent all discharge, and placing a seal over the valve handle in a manner that precludes reopening the valve without breaking the seal.

The state may inspect your MSD to determine compliance; the seal must be unbroken at the time an inspection occurs. If you are unsure of how to secure the "Y" valve, ask a marina operator to board your vessel and show you.

Note: Boaters using portable toilets can also use pump-out stations and are subject to the same regulations that prohibit the disposal of sewage into the Great Lakes.

Types I and II

These two types of MSDs need to be adapted in order to be in compliance with Michigan regulations. In no discharge zones, like Michigan waters, it is illegal to use flow-through Type I and Type II devices. Waste must be stored in a holding tank and removed from vessels by pumping.

- TYPE I: Flow-through device (maceration and disinfection). Maceration is the process of reducing human waste to a more liquid form (slurry). Type I MSDs typically discharge treated waste directly overboard.
- TYPE II: Flow-through device (maceration and disinfection). Type II devices are similar to Type I devices, but are more powerful and do a better job of treating waste. Waste is treated with special chemicals to kill bacteria before being discharged into the water.

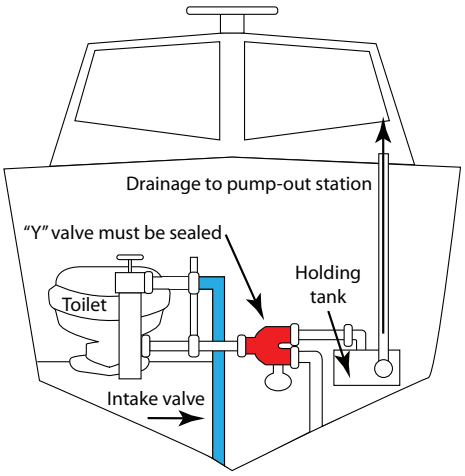

Figure 1: Plumbing connections, such as "Y" valves, can either direct waste into a holding tank, as indicated in the figure above, or overboard. In no discharge zones, the valve must be secured so that it routes waste into a holding tank, rather than into the water.

- Adapting Type I and Type II Devices for Use in Michigan: The critical adaptations of Type I and II devices are alterations to plumbing and the installation of a holding tank. Figure 1 illustrates the type of plumbing connections, including a "Y" valve, that must be installed to direct waste into a holding tank to prevent sewage discharges directly into the water. Also, see additional resources.

Controlling Odor

Proper plumbing and material selection will control holding tank odor. Fiberglass and metal tanks are highly resistant to permeation. Specially labeled flexible "sanitation hoses" and PVC piping are also highly impermeable. Hose runs should be as short and as straight as possible. Wherever practical, use rigid pipe below the level of the holding tank and in other areas where sewage will accumulate. Keep the number of connections to a minimum and ensure that seals are tight.

Holding Tank Maintenance

Use enzyme-based products in your holding tank to further control odor. Enzymatic products use biological processes rather than harsh chemicals to break down sewage. Be sure to pump and rinse your holding tank prior to initial use of an enzyme product if you have used chemical-based odor control additives in the past. Chemical residues may interfere with the effectiveness of enzyme-based products. Avoid holding tank products that contain quaternary ammonium compounds and formaldehyde. These products may disturb normal sewage treatment plant operations when the sewage is transferred to an onshore facility.

Additional Resources

For more information on sanitation devices, see the following for guidance:

- U.S. Army Corps of Engineers – Human Waste Disposal: Marine Sanitation Devices
- BoatU.S. Foundation – Sewage, MSDs and Pumpout
- Boating Basics Online – Marine Sanitation Devices, Michigan

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