# TRAC ECOLOGICAL

A Drew Marine BUSINESS

# Freshwater Engine Cooling Systems

Small to medium engines
(5-500 horsepower)

## Small to medium engine raw water cooling system cleaning instructions.

**What product do I use?**

- For ALL freshwater applications, Zebra Mussel Buster is the only choice for safe, fast, and consistent results.
- Also available in a concentrated form, one gallon of Zebra Mussel Concentrate makes five gallons of Zebra Mussel Buster.

**How much Zebra Mussel Buster do I need?**

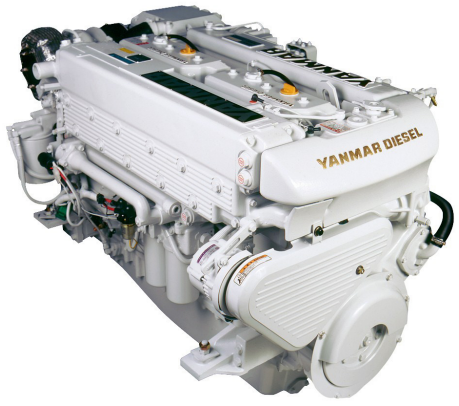
- First, measure the lengths and diameters of all hoses and piping associated with the raw water cooling system.
- Next, cross reference them with the pipe gallonage chart (see separate sheet).
- Finally, add up all your findings. Remember to add enough for your flushing equipment.

**As a guide, the adjacent chart reflects the most common requirements as related to horsepower.**

**Cleaning Options:** There are two methods to choose from when cleaning your freshwater system.

- OPEN-LOOP RECIRCULATION: This is the quickest and most preferred method. It requires recirculation of the product and the aid of a flushing system.
- IMMERSION: This is the simplest method of cleaning but also the longest. It involves filling the entire system and allowing it to work overnight.

TRAC recommends open-loop flushing for systems with large amounts of growth.





| Horse-power | 0-15 | 15-30 | 30-105 | 105-450 | 450-600 |
|---|---|---|---|---|---|
| Gallons of Zebra Mussel Buster | 1 | 2 | 2.5 | 3 | 5 |

**When to use Zebra Mussel Buster?**

- As a general rule of thumb, flushing your engine once a year is a good preventative maintenance measure. This is especially important on engines with flexible rubber impellers. Freshwater growth is the most common cause of impeller failure!
- Monitoring your engines temperature is crucial. A consistent temperature increase of 5-10 degrees could mean a problem is starting to form within your cooling system. Flushing before the problem gets worse could save you a world of headaches!
- On most engines, freshwater discharged from the engine is used to cool the exhaust gases exiting the engine. If this water flow is reduced, steam (or white smoke) will begin to exit from the exhaust. One reason for this may be a clogged heat exchanger or after cooler. Flushing the engine may prove to be an inexpensive troubleshooting technique for a boat owner.
- If all else fails and your engine does overheat, keeping Zebra Mussel Buster onboard could save both your pride and money by avoiding a tow back to the marina.

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**Open Loop Recirculation Method:**

- Make certain to secure the air conditioning system by turning off the supply power breaker and CLOSING ALL FRESHWATER VALVES.
- First, find the best locations to inject and recover the Zebra Mussel Buster. One of the biggest advantages of using any of TRAC's products is the ability to not only include the engine and heat exchanger, but all the adjoining pipe and hose work as well. With this in mind, try to choose an injection point as close to the freshwater valve as possible.

**Inlet: REMEMBER TO CLOSE THE FRESHWATER VALVE**

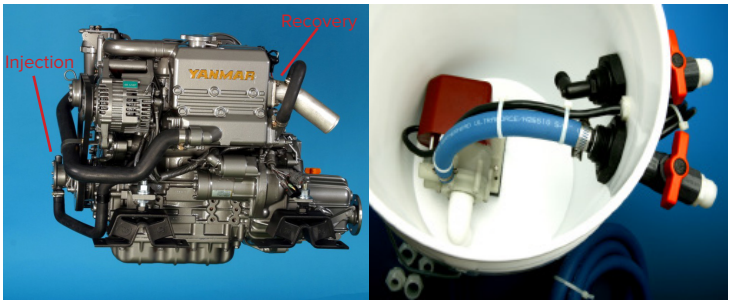
- On most engines there is a provision for either a zinc anode or a vent/priming fitting cast right into the housing of the raw water pump. Other engines may use a flexible hose between the freshwater valve and the pump inlet. Either one of these locations is perfect for injecting Zebra Mussel Buster into the system. Usually on engines of this size, the raw water pump will have a flexible impeller. If this is the case you will need to remove it before proceeding. These types of pumps do not allow fluids to pass through them and will inhibit flushing. If you do not want to remove the impeller you might be able to find an injection point after the pump.

**Recovery or Outlet:**

- The outlet is usually a bit easier to find. Look for a hose or fitting just after the heat exchanger. Most often, this hose will lead to the exhaust/water mixing elbow or spray ring. Remove the end attached to the exhaust elbow and use it as a product recovery point.

**TRAC Tip:**
Reversing the flow midway through your flushing will dramatically reduce your flushing time! Do this by switching your supply and return lines on the Port-O-Flush Jr.™

Save time by linking multiple engines together in series, allowing you to flush both engines at the same time!!





- Now, with both your injection and recover points ready, hook up your flushing gear. Connect the discharge from the Port-O-Flush Jr.™ (or your own flushing unit) to the inlet point. Then connect the recovery point to the return hose.
- Before starting, make certain there are no other systems connected to your raw water cooling system. In some cases, the shaft seal is cooled by this loop, if so, it will need to be isolated. Since other systems like the gear or fuel coolers are most likely plumbed in series to your engine, no action needs to be taken to isolate them.
- Now you are ready to recirculate and clean your engine! TRAC recommends that first you do a test-flush with water to make certain you have no leaks. If everything looks good, replace the water with your predetermined amount of Zebra Mussel Buster. Recirculate for at least 2 to 3 hours. If there is an excessive amount of buildup recirculate for 3 to 6 hours.
- When flushing is complete, rinse the system with freshwater to remove any loose debris or leftover Zebra Mussel Buster. Reassemble the system and run the engine to ensure there are no leaks.

NOTE: Magnesium/Zinc anodes will need to be removed before you start flushing or replaced after flushing is complete.

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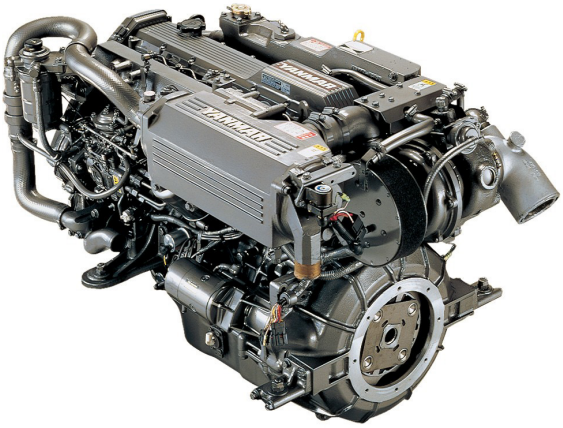
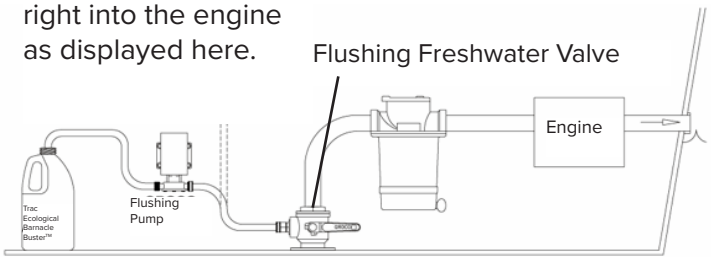
**Immersion Cleaning Instructions:**

- First, run your engine and bring it up to temperature.
- Disable engine by turning off the battery switch and closing the freshwater valve.
- Making certain the freshwater valve is closed, remove the suction hose attached to the valve and place it in a bucket filled with Zebra Mussel Buster.
- Next, start the engine and wait until you see Zebra Mussel Buster coming out of the overboard discharge.
- Now, secure the engine and allow the product to work in your system for 12-18 hours.
- Finally, reconnect the suction hose, open the freshwater valve, and run the engine for 5-10 minutes, making certain you have removed all of the Zebra Mussel Buster solution.



**TRAC Tip:**
For best results on severely clogged engines, add more Zebra Mussel Buster every 4 hours.
Do this by repeating step 3.


You can also pump Zebra Mussel Buster right into the engine as displayed here.




**TRAC Tip:**
There are many aids available to help make flushing your equipment a snap! Contact our technical support team to find out where to get them. Pictured right are just a few examples.

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