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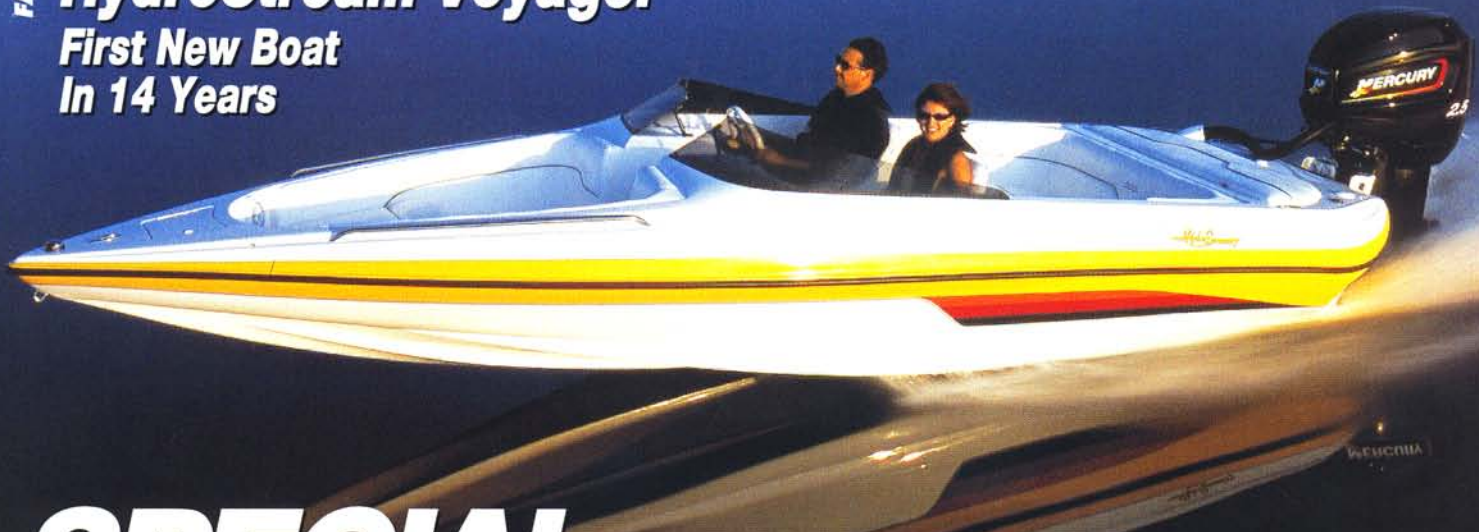
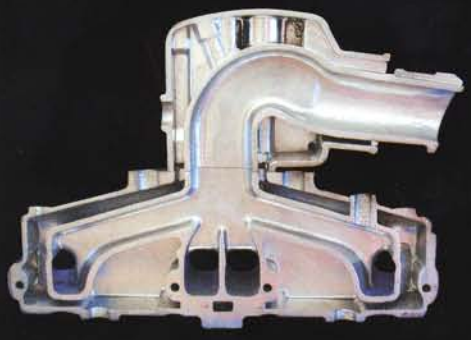


SPECIAL SECTION

EXHAUST TUNING

- CP Header Install
- Exhaust Buyers Guide
- Performance Exhaust Tech
- GLM Manifold Test



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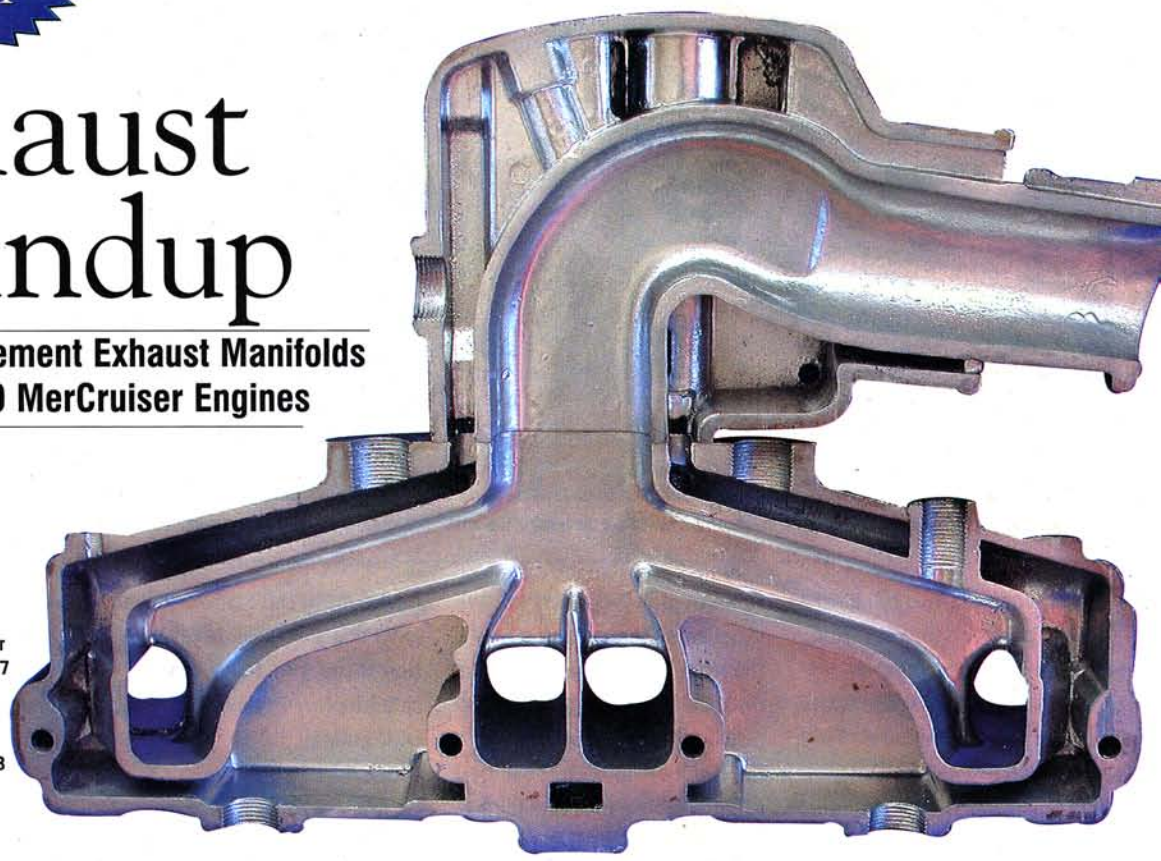
Special Section: EXHAUST

WORDS & PHOTOGRAPHY BY DENNIS MOORE

Exhaust Roundup

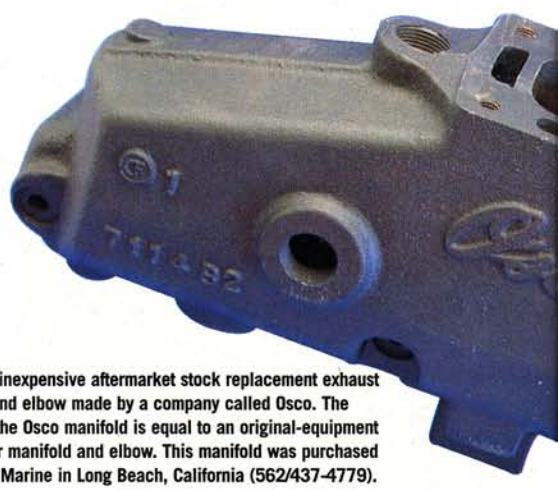
Special Replacement Exhaust Manifolds for 305 and 350 MerCruiser Engines



This is the inside of the GLM exhaust manifold. Because cylinder Nos. 5 and 7 fire consecutively, the exhaust gases from the No. 7 cylinder will contaminate the No. 5 cylinder as the No. 5 exhaust valve just starts to close. The GLM manifold utilizes a divider to separate the No. 5 and No. 7 exhaust ports. When used on the starboard side of the engine, the dividers will separate cylinder Nos. 4 and 8 (two cylinders that also fire consecutively) to help prevent exhaust gas contamination of the No. 8 cylinder.

Performance boaters are always looking to improve their boats' performance, and family boaters are always looking to save a buck. When repairing or improving our boat engines and drives, we have the option of buying original-equipment parts (such as those manufactured by MerCruiser) or aftermarket replacement parts. Many times an aftermarket parts manufacturer will produce a part that is advertised to have certain improvements over the original-equipment part, or is touted to be an exact copy of the original part but at a much lower price. We have heard parts salespeople telling customers, "Just bolt them on—they are an exact replacement for the original," when in fact some are not. One of the biggest headaches that boaters have is buying an aftermarket part and finding out that the quality of the part is less than expected or that they may not fit as well as the factory original-equipment parts.

Most aftermarket parts are good-quality parts and will work as advertised, either improving the performance/reliability of your boat or saving you some money. The key to buying aftermarket parts is to pay close attention to what you are about to purchase. It is helpful to remove the original-equipment part and bring it with you to the parts store to compare it with the new aftermarket part.



This is an inexpensive aftermarket stock replacement exhaust manifold and elbow made by a company called Osco. The quality of the Osco manifold is equal to an original-equipment MerCruiser manifold and elbow. This manifold was purchased from Egge Marine in Long Beach, California (562/437-4779).

This is a high-quality aftermarket exhaust manifold and elbow made by Glenwood Marine. They are exact replacements for the MerCruiser cast-iron manifold and elbow but are made from aluminum. The weight savings is impressive. It can be purchased either hard-anodized for corrosion protection (shown) or polished.

One of the most popular aftermarket parts available to boaters is the marine exhaust manifold. The factory original-equipment exhaust manifold is expensive to replace and can be improved upon as far as performance and reliability are concerned. This has opened a window of opportunity for many aftermarket parts manufacturers to supply the boating industry with replacement exhaust manifolds. These replacement manifolds are less expensive and (sometimes) better performing than the original-equipment manifolds.

If your goal is to purchase an aftermarket manifold that is an exact replacement of the original-equipment manifold, remove the original manifold (drag it with you to the parts store) and compare it to the new aftermarket manifold. Sometimes the difference in quality is quite apparent.

Although there are many aluminum high-performance manifolds on the market, they are not a direct replacement for the stock original-equipment manifolds. Most aluminum high-performance manifolds require a certain amount of fabrication and customizing to the engine before you can install them. We at FAMILY & PERFORMANCE BOATING (being performance boaters and do-it-yourselfers) would like to supply you with information about a couple of interesting aftermarket exhaust manifolds that you may want to consider purchasing instead of stock replacement manifolds. These are manifolds that have certain advantages over the stock manifolds and are a direct replacement for 305 and 350 Chevy/MerCruiser original-equipment manifolds manufactured between 1982 and 2002.

The first manifold is manufactured by Glenwood Marine in Gardena, California (323/757-3141). This is an exact copy of the stock MerCruiser cast-iron exhaust manifold but is made from aluminum. The savings in weight is astonishing when you compare them to cast-iron manifolds. If you have a lightweight boat (especially with twin engines), these manifolds will be an excellent direct replacement for the stock manifolds, shaving several hundred pounds off the back of your boat. The castings are excellent—very smooth with little core shift—and are available either polished (for a custom look) or hard-anodized-coated (to protect them from corrosion). When the anodized manifolds are painted Phantom Black (MerCruiser black), they look much better than the rather rough-looking stock MerCruiser manifolds.

The second manifold is manufactured by GLM Products in Monrovia, California (626/357-0077). Externally, these manifolds look identical to the 1982-2002 MerCruiser 305 and 350 exhaust manifolds, but there are many improvements that have been made to the GLM manifold that the stock manifold doesn't have. The manifolds are made from cast iron (like the MerCruiser manifold) but are manufactured using the modern "lost-foam casting process." This process is the most advanced casting process for manufacturing with cast iron. One of the most common problems with cast-iron manifolds is that when they are manufactured in the traditional sand-casting method (such as a MerCruiser manifold), some core shift will result. Core shift will sometimes leave thin or porous sections (slight defects) in the casting. Water-cooled marine exhaust manifolds will have intricate water-cooling passages that will eventually corrode through (the No. 1 reason for replacing exhaust manifolds). Thin or porous sections will be the first place that the manifold will fail. The "lost-foam casting process" will have very little casting core shift, (almost) never leaving thin or porous sections in the castings. When visually comparing a sand-cast manifold to a GLM lost-foam-casting manifold, the difference in casting quality is apparent.

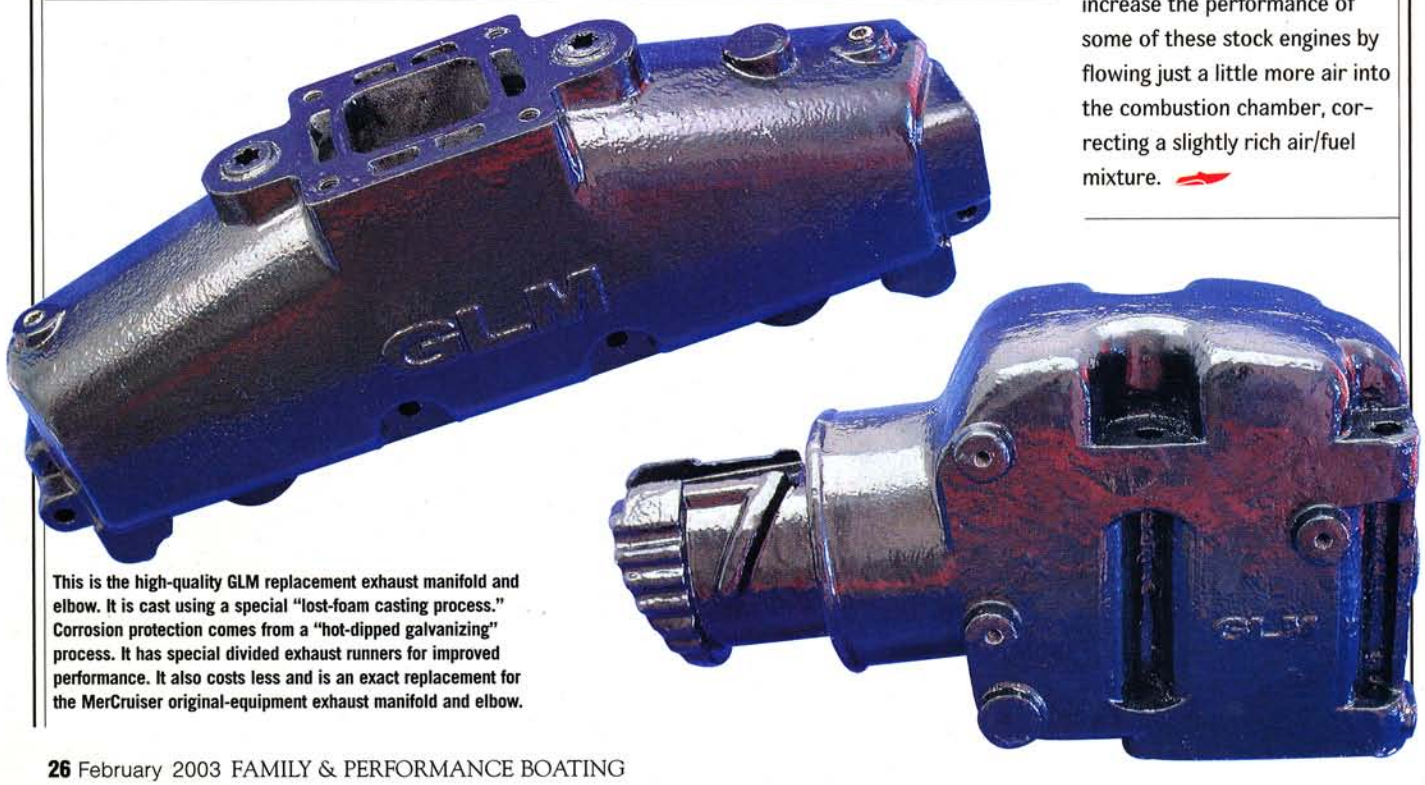
After the GLM exhaust manifold is cast and machined, it is sent through a "hot-dipped galvanizing process." This means

that the manifold is submerged in hot galvanizing (for corrosion protection) and then painted black. The GLM manifold is arguably the best manifold available for protection and durability in a corrosive environment (salt water).

The exhaust passages inside the GLM manifold are where the advantages of the precise lost-foam casting process become apparent from a performance standpoint. Special runners have been cast inside the GLM manifold to direct the exhaust gases out of the manifold; this is much better than standard exhaust manifolds that simply collect the engine's exhaust in an open chamber, allowing the exhaust gases to re-enter adjacent exhaust ports. When the manifold is used on the port side of the engine, there is a distinct separation between the No. 5 and the No. 7 cylinders, and when used on the starboard side of the engine, the No. 4 and No. 8 cylinders are divided. A performance increase can be found when installing the GLM exhaust manifolds.

The final advantage to the GLM exhaust manifold is the price. It is less expensive than buying an original-equipment manifold from MerCruiser and is competitively priced with other aftermarket replacement manifolds. It is much less expensive than aftermarket aluminum high-performance manifolds.

Installing a high-performance exhaust system on a marine engine is an excellent way to increase the performance of an engine. The most important thing to keep in mind is that when you install a more efficient exhaust system, you are doing a better job of removing the exhaust gases from the combustion chamber. The exhaust gases that might have remained in the combustion chamber from the less efficient exhaust system are now being extracted and traveling down the exhaust pipe. The increase in engine performance comes from having more space in the combustion chamber to pack in a larger amount of the air/fuel mixture. Increasing the air/fuel mixture in the combustion chamber will increase horsepower when compressed and ignited. The engine will naturally pull in more air to fill the cylinder with a better exhaust. With a carbureted engine, the extra air being pulled through the carburetor will also pick up a proportional increase in the amount of fuel by pulling a little harder on the carburetor main jets. Recalibrating the carburetor's main jets may or may not be necessary for a maximum performance increase with a high-performance exhaust. Installing a more efficient exhaust on an EFI (electronic fuel injected) engine is not quite as simple as a carbureted engine and may not result in an automatic increase in performance. While the engine will naturally pull in more air to fill the cylinder with a better exhaust, there is not a proportional increase in the amount of fuel with the EFI system. No matter how hard the extra air pulls in the injector, it will not flow more fuel like a carburetor's main jet. This means the amount of air entering the combustion chamber will increase, but the amount of fuel remains the same, resulting in a lean air/fuel mixture. It is not uncommon to see no performance increase when installing a high-performance exhaust on an EFI engine. To increase the performance, more fuel needs to be added by one of two ways. The first is to reprogram the computer, instructing the injectors to flow more fuel by staying open longer. The second and most common way is to increase the amount of fuel by increasing the fuel pressure behind the injectors. By installing an adjustable fuel pressure regulator, the fuel pressure can be increased and the injectors will flow more fuel (without having to remain open longer). Some EFI engines have the computer programmed a little rich in the stock configuration (a little soot on the transom of some boats with stock engines is not uncommon). A little better exhaust system may increase the performance of some of these stock engines by flowing just a little more air into the combustion chamber, correcting a slightly rich air/fuel mixture.



This is the high-quality GLM replacement exhaust manifold and elbow. It is cast using a special "lost-foam casting process." Corrosion protection comes from a "hot-dipped galvanizing" process. It has special divided exhaust runners for improved performance. It also costs less and is an exact replacement for the MerCruiser original-equipment exhaust manifold and elbow.

Special Section: EXHAUST

WORDS & PHOTOGRAPHY BY DENNIS MOORE

Small-Block Exhaust Manifold Test

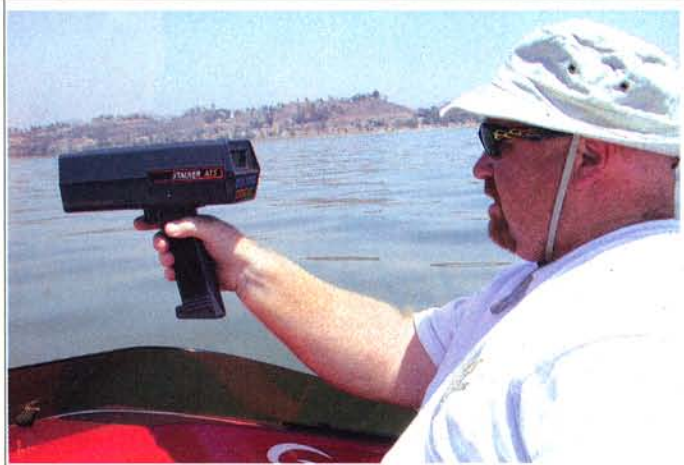
Increase Performance With a Simple Replacement Exhaust Manifold

The real fun in owning a boat is ripping across the lake at top speed. Even if you aren't the fastest boat on the lake, the wind in your face makes it feel as if you're really free! We at FAMILY & PERFORMANCE BOATING know that not everyone owns a fast boat, but most of us would like to go a little faster than the stock boat we purchased. We used a typical boat to write this exhaust-test article to see if a simple improvement could make much of a difference in the average boater's setup.

The boat we used belongs to a local car drag racer in Southern California, Kevin Houmard. He gets his kicks from tearing up the quarter-mile in a 9-second supercharged big-block Camaro. When he goes out boating with the family, he likes to take it easy and just cruise. Houmard owns a 21-foot Eliminator open-bow boat with a 350 Magnum/Alpha stern drive.

We took the little Eliminator out to a Southern California lake, Lake Elsinore. If some of you have heard of Lake Elsinore, we wouldn't be surprised; it has a section marked off in the middle for high-speed boat tests. Most of the hottest factory prototype boats in California have been tested here (sometimes on the same days!).

On the morning we arrived, it was typical Southern California weather: clear blue skies and around 80 degrees. The lake was very smooth. We were really enjoying ourselves on the lake that morning testing the speed of the little Eliminator with a radar gun. We made many passes across the lake, recording a speed of 49 mph and occasionally seeing the radar gun flash a 50-mph reading. There was no doubt in our



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1 Bob Carpenter held the radar gun during the testing. We had a perfect day, with smooth water. Here he is checking out the speed of some of the other fast boats that were on Lake Elsinore that day. Radar guns are fun! 2 We pulled the boat back onto the trailer and headed for the picnic grounds for some shade. We changed the exhaust manifolds within the hour.

minds that the boat had a top speed of 49 to 49-1/2 mph.

We came equipped to change the manifolds at the lake. We pulled the boat onto the trailer and headed for the launch ramp's picnic grounds. Because it was a weekday, we had the place to ourselves except for a few retirees. We found a cool, shady spot and removed the stock MerCruiser exhaust manifolds and elbows. We waited long enough for the exhaust to cool and that included a soft drink from the friendly attendant at the lakeside convenience store. We installed some replacement GLM exhaust manifolds and elbows. The installation was an absolute bolt-on affair. There were no installation problems. These manifolds have the same external dimensions as the original manifolds. The difference between these manifolds is all internal (as you will read elsewhere in this issue). The inside exhaust passages are tuned to separate exhaust pulses within the manifold.

After the work was done we cooled ourselves off with a few more soft drinks, and then put the boat back in the water for a retest. Under almost the exact same conditions (perhaps the outside temperature at the lake rose a few degrees), we tested the boat as thoroughly as we had with the stock manifolds. This time we consistently hit 51 mph, with the radar gun occasionally hitting 52. There was no doubt in our minds that the Eliminator was now going 51 to 51-1/2 mph.

Many of you may be saying to yourselves that an increase of 2 mph is not much. But in a small boat like our little Eliminator, 2 mph is a real treat. Let's put this into perspective: The GLM exhaust manifold is a replacement exhaust manifold/elbow combination. This means that it is less expensive than the stock MerCruiser (manufactured) manifolds. If you are replacing your manifolds/elbows on your engine due to simple wear and tear, you can purchase these high-quality manifolds for less money and find an increase in performance! And if you look at the percentage increase instead of the specific number (this is hardly a high-performance boat, after all) the results are certainly worth thinking about.

3 Every day is a bad-hair day when testing boats. Life is hard for a boating magazine writer (check out the beer gut on this hard worker!).

After talking to the people at GLM, we found out they had run similar tests and found as much as 4 mph difference in top speed and an increase in timed acceleration tests performing the manifold switch on a similar family-style boat. Different style boats could end up with better, or worse, results

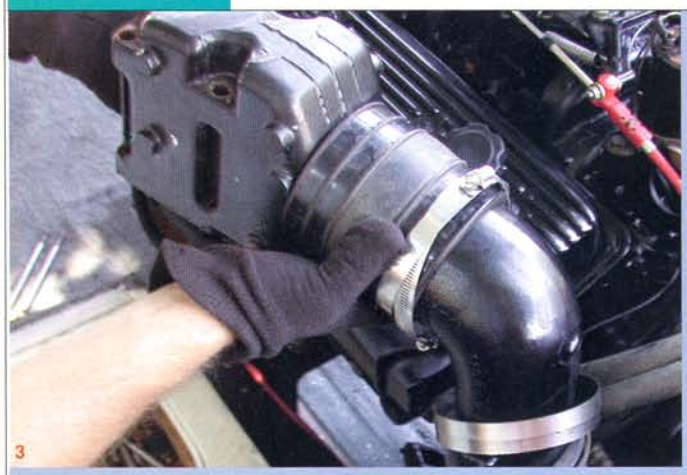
If it is time for replacement manifolds, or if you just want to improve the performance of your engine, the high-quality tuned GLM exhaust manifold is an excellent product.

Product Profile **GLM Products**
Dept. FPB, 705 Los Angeles Ave., Monrovia, CA 91016, 626/357-0077, www.glm-marine.com

Installation

It's not all that hard to replace a set of exhaust manifolds on a Chevy-based marine engine. We did it at the lake under the shade of a few big trees at a relaxed pace and didn't even bust a knuckle. Here are the basic steps.

1 Remove the hose clamps that connect the manifolds to the exhaust. 2 In this case, we had to remove the oil filter on the port side.



3 Remove the bolts that hold the manifold on. 4 You might have to use a screwdriver or something similar to pry the manifold loose. 5 Use a long stud on the two outside bolt holes and you can slide the gasket and manifold on with no fumbling. 6 The new manifolds are noticeably lighter than the stock versions, just another benefit as it takes weight off the back of your boat. 7 The elbow is tightened. 8 Reconnect the water hose. 9 Tighten the hose clamps and the job is ready to test.