

Share



SBF 185cc Outlaw Street Heads
277 / 191 cfm Flow "Out of the Box"





Ultimate Ford Performance Community

Tech Archives

Project Cars

Reader's Cars

Search



Have you ever wondered how professional cylinder head porters and designers come up with their high-flowing ports and runner shapes? Naturally it takes considerable experience behind a die grinder and flowbench. But it also the right tools and techniques. One of those techniques is making a mold of the port. Port molds offer up a variety of analytical opportunities by enabling the porter to see the entire runner as a physical shape rather than as an empty cavity. The mold of course also allows visualization of parts of the runner that cannot be seen by looking into the port, such as the short-side radius or transition around the valve guide. The mold can be analyzed for shape, cut in various areas to measure port dimensions, and even compared to molds taken earlier or later in the process or versus other ports on the head. It's a seemingly sophisticated technique that in reality is very easy to do and only costs about \$25 in materials. If you port your own heads we highly recommend you take a mold. If you port heads for customers a mold can be a great way to periodically check your work on subsequent heads.

In This Article:

Professional cylinder head porters and designers spend behind the [die grinder](#) put a lot of time into port and runner shaping by taking a mold of the port. This article shows how to make your own.



These elaborately shaped exhaust ports are on a Ford Brodix head ported by Blackstone of [Watson Engineering](#). Shaping a port takes lots of trial and error and verification. Preserving the shape requires a mold or a more expensive 3D CAD scan.



1 We've all used Silicone RTV as a [gasket](#) maker and have marveled at how it takes a firm shape. That's



2 The 1lb kit is good for making one intake and one exhaust port. The two parts are mixed right before you are



Here's a mold we took of a runner on a factory 460 head. Note the very smooth radius transition from the valve. Also visible are the ridges and various other features that help the air to flow.

basically what we're using to make the mold. Silicone RTV (Room Temperature Vulcanizing) mold kits are available from hobby shops like [TAP Plastics](#). This kit is rated as "25 Shore A" mold rubber - meaning it yields a low shrinkage, dimensionally stable and elongation-resistant mold.



3 The two parts must be mixed thoroughly until the material is a light blue consistency throughout. White streaks mean the base is not mixed well, this will result in a mold with nooks and crannies.

ready to pour the mold. The mix consists of a 9:1 ratio by volume of base component (side A) and catalyst (side B). The catalyst is added directly to white base container.



4 You only have about 30 minutes of working time before the silicone starts to cure. A "green" catalyst is also available which allows one hour of working time.



5 The recommended pour procedure is to transfer the silicone mix into a paper cup and then poke a small hole in the bottom. Position the head so the port faces upward. Note that the valve should be placed in the head (without spring.) This will keep the silicone from running out.



6 The cup and hole method allows for the air bubbles introduced by the mixing process to dissipate. The cup also gives better control in ensuring the entire cavity is filled.



7 Once the port is filled allow the silicone to cure for 6-8 hours. We prefer to let it sit overnight. Trying to remove the mold prematurely can lead to tearing.



8 After the mold has cured we remove the valve and prepare to extract the mold.



This is a mold of the e from a Edelbrock Performer cylinder head. You can see the [Edelbrock](#) designers improvements over the original shape.



Making a mold of an intake runner allows you to view areas otherwise inaccessible with calipers.



9 Using a screwdriver we carefully separate the mold from the port walls. Don't be too concerned about gouging the mold, be more cautious that the [screwdriver](#) doesn't nick up the valve seats or guides.



10 We like to spray silicone lubricant into the port to help release the mold. There are also release agents available made just for this purpose however we find the silicone spray works well.



11 You can also spray through the guide plate boss to get silicone lubricant thoroughly into the port.



12 If your valve guides protrude into the port you will most likely need to use a blade and place a cut on the valve head side of the mold. You only need to cut vertically along half of the mold as shown, this will allow the mold to move past the valve guide.



13 Use a screwdriver to carefully pry the silicone mold out of the port through the [combustion chamber](#).



14 The removal process takes a little patience and muscle. You'll need to follow a sequence of prying, pulling, and pushing from the port side. Spray silicone periodically to lubricate the mold.



15 Once you get enough of the mold out you can grab hold and yank it out of the runner.



16 The end result is precise 3D view of the inside of your runner. As you can see it becomes very clear where the restrictions are, and what areas need work. On both these molds it is clear the pushrod passage pinches the port.

FORDMUSCLE

· **Ads by Google** · [Molds](#) [Ford](#) [Ford on Ford](#) [2 Shot Molds](#) [Jell O Molds](#)

All content © FordMuscle, LLC. | Ford® is a registered trademark of the Ford affiliated with the Ford Motor Company