

So, You Think You Want To Port Your Intake Huh? 🇺🇸

By: tmooss

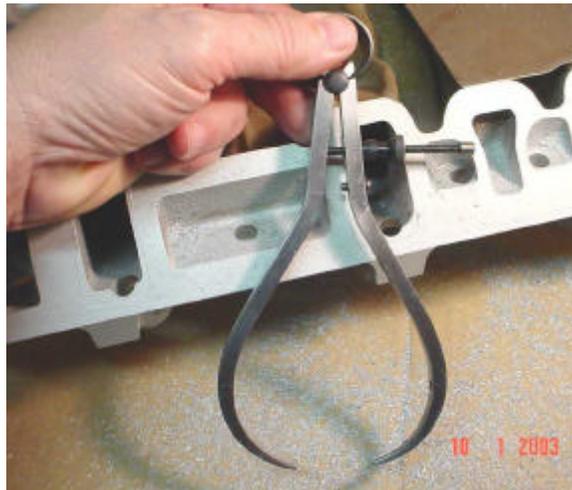
OK, well I guess I can try to convey some of the techniques I use in porting the stock 5.0 lower intakes. The same procedures can be used for porting other intakes also, such as the GT40/Cobra/Explorer family of lower intakes.

Tools

The first things you need are the right tools to do the work. The most critical tools are the Burrs to remove material, a power tool to drive the burrs and a gasket set to use for porting. I use a pneumatic tool to power my burrs and regulate power with air pressure. You can use an electric tool also, the choice is yours. I recommend the air tool because it is smaller, easier to handle for the inexperienced porter and power can be varied with air pressure. It's much easier to remove a little more material and very hard to put it back on. Below is a picture of the tools I use for cutting.



Another important tool to use is one to keep check of how thin the walls of some areas are getting to avoid cutting through them. I use a modified outside caliper. Here is a picture of my caliper.



You can see that I modified it by drilling and taping a screw through one arm. When that screw touches the other arm, there is 1/16" gap at the caliper tips. This allows you to insert one side in the runner and the other on outside the runner to get a thickness reading. It's quick and simple. Areas that you need to keep track of are at the backs of the "knees" where runners make turns to meet the head, especially the #1 and #5 runners. These two runners have severe bends where they turn to meet the head and the runners are very restricted in this area. You can port these two runners without welding them, but I prefer to have them puddle welded with a TIG welder to make the task simpler and the port shape consistent without worrying about cutting through the runner. Below is a picture of how I use the calipers for measurement.



Method

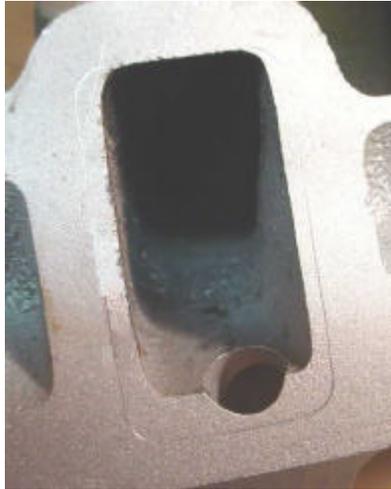
There are two methods used for porting, port matching and gasket matching. If you have a head and intake that need matching and their size does not correspond closely to an available gasket, you can match them by using a gasket that is larger and taping a heavy piece of heavy paper over the gasket runner hole. Place it over the runner you wish to port to, align the bolt holes for proper alignment and use a razor knife to cut through the paper using the port inside opening to guide your cut. Then take the gasket and place it on the port you wish to port, align the boltholes and use a scribe to make your port guide. Gasket matching involves using the gasket as the size guide for porting the runner and the head. For maximum benefit, you want to match the intake and the head ports.

For the stock lower 5.0 intake I gasket match and I use the Felpro master gasket kit MS93334 which contains all the gaskets needed to make an intake swap (if you don't take the TB/EGR apart). It is available at most parts stores for about \$15. This gasket has the same dimensions as the Felpro1250 gasket 1.2"x2" – this is the specification though and I have used a micrometer and measured actual dimensions at 1.12" to 1.15" x 1.95". This picture shows the two gaskets from the kit that you will use for scribing the new port sizes on the intake openings.



The top of the intake typically needs to be opened up about 1/16" inch on some portion of each runner's side to ensure there is no ledge exposed to the airflow inside the runner coming from the upper half. I will not be photo-documenting this portion of the procedure, as it is very easy and straightforward.

Here is what a scribed port looks like. Some people use dye to color the face of the intake, but I don't.



Set Up

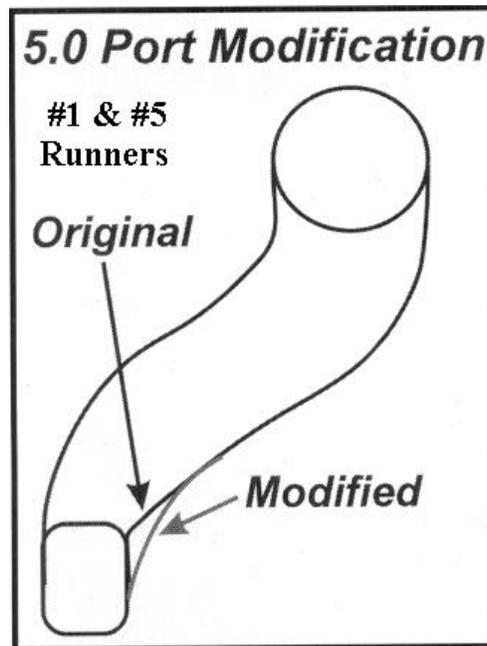
When doing the porting, you will have slivers of aluminum coming off the burr and you need good light to see what your doing. I like to set up a box to place the intake in to catch the slivers and it works well for hanging a shop light on to illuminate your work. Here is a picture of one of my setups. The box works well for hanging the light over for front illumination too. My air tool is a front air discharge unit, so it blows the slivers back up the runner and out into the back of the box. This keeps the slivers from getting on you or in your eye. ALWAYS wear safety goggles to do this type of work. Ear protection is a good idea also.



Notice I use blocks of wood for holding the intake in a good position for porting the runner I'm working on. Also notice the silicone lubricant that I spray lightly on the burr every couple of minutes to keep the burr from loading up with slivers. I use carbide bits, which are normally used for steel, I like to use them because they don't remove material as fast, they really allow me to shape the cut, and they leave a very smooth cut on the wall.

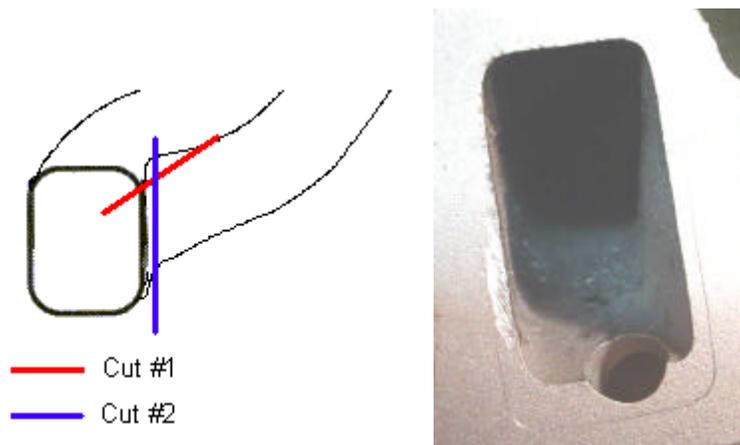
Porting

Now I will explain the approach I use to port and reshape the runners. The real key to getting this right is to work on the short-side wall of the runner to open it up and reshape it where it makes the last turn to the head interface. As mentioned above, the front runners (#1 & #5) are the most restricted and the back of the "knee" in that bend must be ported to the point of breakthrough to really equalize the port. I highly recommend you have those runners puddle welded. Here is an illustration of what we will be doing to straighten these two runners.



You will find that the rest of the runners also have a short side bend that will be the primary focus of my porting. The #8 runner is almost a straight shot but it has to be ported on both sides where the port necks down slightly about 1-1.5" into the port. You can feel the wall where it narrows at that point.

Start by making the first cut inside the port at the back of the short side knee. I take two initial cuts. The first, illustrated below in red, Cuts into the ridge just inside the runner and I cut it at an angle that will closely align its angle with the runner wall just beyond the sharp bend. The reason I do this one first is that you may hit the sides of the intake flange with the collet, leaving some small gouges in the material – see the second picture below. Doing the inside cut first allows you to remove any collet gouges in the second cut that opens the runner side.



Cut #2 will open the side of the port to the scribe line, creating new ridge where the two cuts meet. This ridge is then blended to create a nice smooth transition to the opening. These same two cuts can be done again until the port approaches the same shape and size as the opening of the runner. You should do these cuts with the intake in it's normal position and once again with it upside down. That is the only way you will get a good angle for cutting from all approaches.

Below is a before and after of runner #1 – the worst runner in the stock intake. Notice how the short-side wall has been pulled open and moved back. You'll also notice you can see through the runner despite the fact that the angle of this shot favors seeing through the stock port. The short side wall that leaned in at the top of the runner has been straightened and is now more vertical and close to the same size and shape as the rest of the rectangular port. Also

inserted is a picture of an Extrude Honed #1 intake runner so that you can judge for yourself which intake has the better port shape and best flow potential.



Use this same procedure to straighten and shape each runner. There is an art aspect to porting and that has to do with how you shape and blend the runners. Since you're doing it yourself, take your time and keep looking at and feeling your work in the runner. Your fingers can tell you things you can't see.

Below are before and after pictures of ports so that you can see the difference it makes.



Port #4



Port #8



After pictures only



#2 After



#3 After

These instructions are a guide for you to try your hand at porting. You'll find the basic burrs will cost \$15-\$30 each. You'll need at least two short burrs, one cone and one round and at least one 6" cone burr. I prefer to use the cone burrs with straight sides as they are very versatile and most cuts can be made from them. The round burr is needed to reach up around a turn and smoothing the far side of a bend into the transition cut you make. Air tools such as mine can be found for a little as \$20-30 and the outside caliper is about \$15 from Sears. Add a compressor if you don't have one and this can get expensive, so you really should have the air tools and some good technical skills to attempt porting an intake or a head.