How To Make A Perfect Match (Gasket That Is)

Have you ever poured water over an ice cube with a sharp edge? Try it some time. Notice that the water tends to splash off the edge until the cube melts down a bit and the sharp edges become rounded. Then the water tends to hug the contours of the ice and flow smoothly down and around it.

The same principle applies to the air/fuel mixture that passes through your intake. One of the keys to making good horsepower is doing all the little things to optimize that flow.

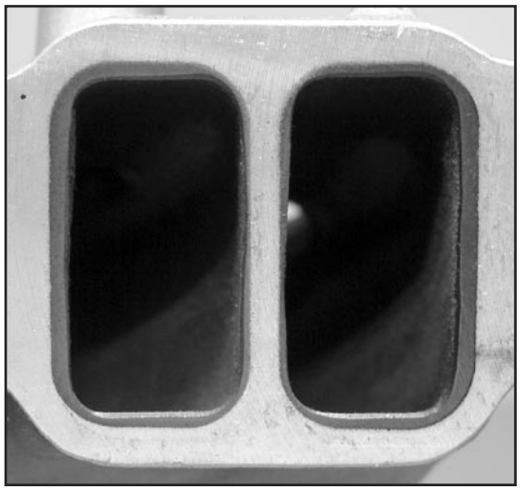
Most engine builders will tell you that a proper gasket match can ad as much as 20 horsepower to an otherwise stock rebuild. All it takes to unleash that hidden power is a few tools and the patience to use them.

Port alignment after the gasket match is even more critical. Misaligned ports will block the smooth flow of the intake charge causing disturbances and eddies. This is very bad for induction. We will address port alignment in another article.

Our heads have already been port matched to the intake gaskets we will be using. The following will offer steps on how we set up our guides and grind the intake manifold ports to match.

Follow along as we open up the ports of our aluminum manifold to gasket match our Felpro 1233 gasket set.

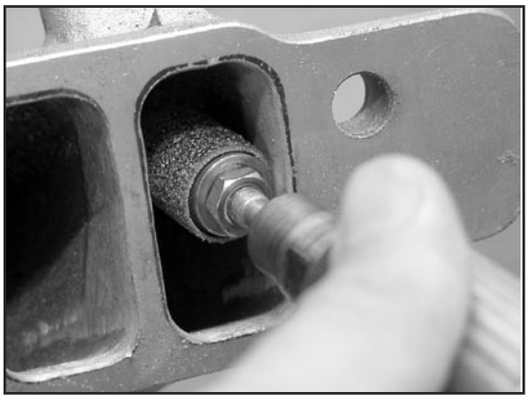
1. We begin the process by mounting the gasket to the intake using the plastic retainers that come with the gasket. This will center the gasket to match our ports. Once the gasket is in place grab a can of spray paint and shoot paint around the ports. Be careful where you spray or you'll be spending some quality time getting overspray off your shiny new intake manifold.



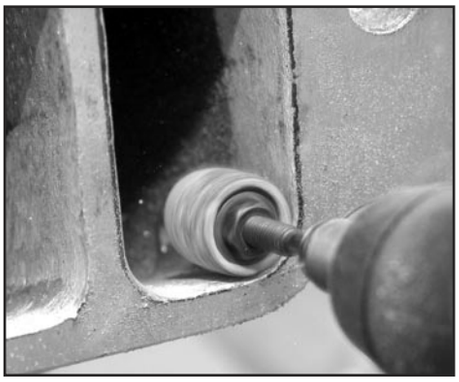
2. Remove the gasket and you'll have an outline of the material that need to be removed from the mouth of the port.

3. The first cut, which will remove the bulk of the material, is made with a carbide tip. When working with aluminum, be very careful since it's very easy to remove a great deal of metal in a very short time. It's also a good idea to have a can silicone lubricant spray handy to shoot on the tip and the surface you're milling. This will keep the bit from plugging up with the softer aluminum shavings.

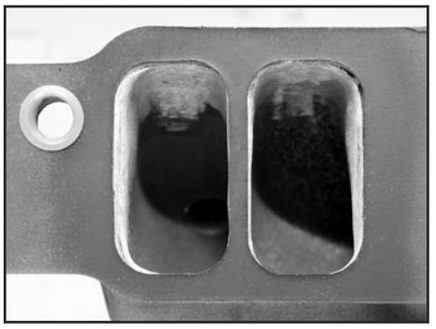
4. Next up is our grinding stone in the die grinder. The tapered grinding stone allows shaping of the tight corner areas. Be sure that all cuts are blended back at least 1.5 inches back into the throat of the runner. This will smooth the transition to the wider part of the port. Do not cut to your final dimension as you'll still be sanding to smooth things out.



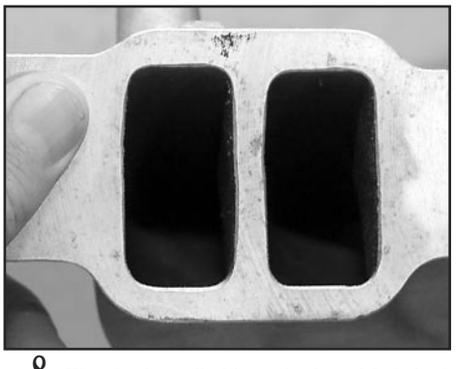
5. After the primary cutting and shaping is done it's time to use the sanding scrolls to work down any bumps and smooth out the cuts. A coarse grade (80 grit) scroll is fine. If the sides of the port are polished to a mirror finish it could create problems with the fuel separating from the air and cause puddling. It's better to have a rough finish to maintain suspension of the charge.

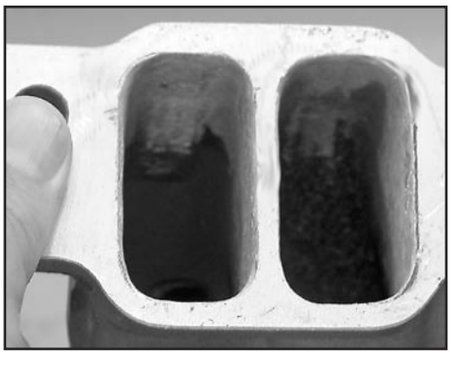


6. The same principle applies with our small sanding scrolls in the rotary tool. A rough grit is used but the smaller diameter (1/2 inch as opposed to the 3/4 inch used in our die grinder) allows us to make the finishing cuts in those tight corners. Depending on the intake, a conical sanding scroll might be needed. These are available from companies such as Eastwood Inc.



7. Here's our finished product. Keep in mind, the objective here was not to grind out the ports to a new size. Rather, we needed to blend the runners to match the opening size of the gasket. The intake ports on our heads have received the same treatment. Now, with proper port alignment, we should have matched mating surfaces that will allow a full, undisturbed flow of air/fuel to the combustions chamber.





8. The before (left) and after (right) show just how dramatic a difference there is between the unmatched and finished port openings.

STORY AND PHOTOS BY CHRIS RITTER