INTAKE FLANGE INJECTION

Modifying a smog-era Pontiac cylinder head to accept any original intake manifold

BY ROCKY ROTELLA
PHOTOGRAPHY BY THE AUTHOR

THERE'S no mistaking that Pontiac's cast-iron four-barrel is a solid performer. When it comes to cast-iron Pontiac cylinder heads, the Round-Ports are the fancy of every performance enthusiast, but the smog-era D-port (4X, 5C, and 6X) castings have proven a performance bargain.

1 **The sight of this gaping hole on the intake flange continues to draw major concerns from unknowing hobbyists, but it's actually an intentional design. If using an intake manifold from '72 forward, there's no issue. An exhaust leak will result, however, if your manifold is from '71 or earlier.**

2 **Beginning in '72, Pontiac added this hole above the exhaust crossover. Said to keep oil flowing under the valve cover isolated from exhaust heat, it's completely separate from the crossover and does not connect to any other port or passage.**

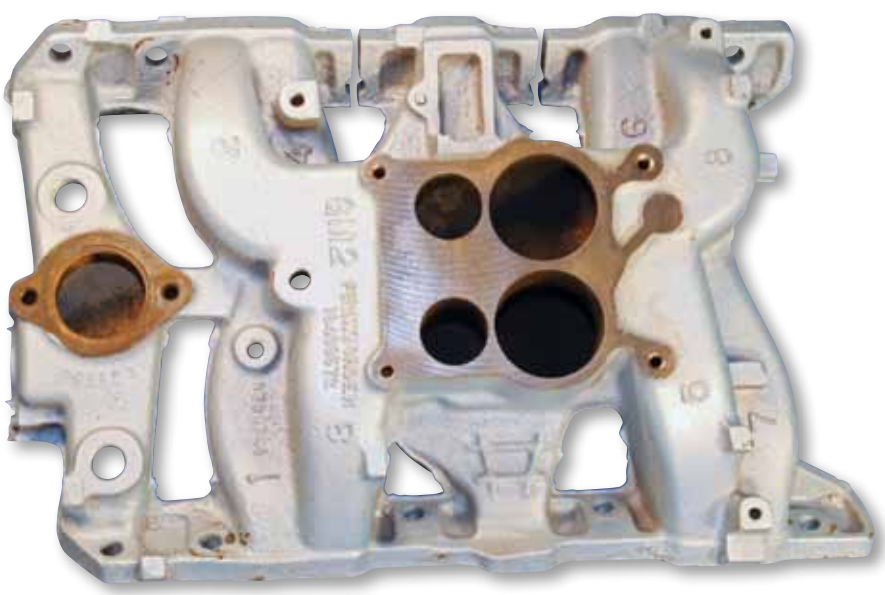
3 **The exhaust crossover of the corresponding '72-later intake manifold gasket is accordingly sized to accommodate the blind hole (top). Earlier gaskets use a larger exhaust crossover opening; that can result in a significant exhaust leak at the flange when using any Pontiac intake manifold (bottom).**

Produced using a specialized casting process for maximum uniformity, such units generally contain large valves and threaded rocker arm studs, and plenty of performance potential for engines producing 500 hp, and even more.

Beginning in '72, Pontiac incorporated a new feature into its cylinder heads. A deep depression located directly above the exhaust crossover was intended to cool the crossover area, while preventing oil flowing beneath the rocker cover from being exposed to excessively high exhaust heat. The latter can improve oil life and help prevent it from baking (or carbonizing) onto the cylinder head in that area.

The blind hole, as it's commonly referred to, presented another issue for those hobbyists seeking to combine their smog-era cylinder heads with a factory intake manifold of earlier vintage. It's located in an area that's not totally covered by some intake manifold gaskets, which creates a significant exhaust leak when the intake manifold is installed. That limits manifold choices to just a few when using such cylinder heads.

4 **Pontiac's cast-iron Quadrajet intake manifold produced is an excellent performer that can be purchased quite reasonably. The '68-'72 castings are most sought after for performance use, but the exhaust crossover in certain years can limit interchangeability. This '68 manifold was purchased locally for $75 and can be installed quickly and easily in one day. Those who want to install a factory '65 or '66 Tri-Power induction system on the later heads will also find this article useful.**



5 Through '71, the intake manifold's right-hand exhaust crossover passage is nearly double the size of the lefthand port. It was likely intended to reduce the amount of material located directly under the choke stove, providing optimal warm-up time. Exhaust leaks are common when combining a manifold of this vintage with later cylinder heads.

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Savvy hobbyists have found that simply filling the blind hole in the cylinder heads with a temperature-resistant material, such as epoxy or molten aluminum, is a permanent solution that allows the use of virtually any '65-'78 Pontiac intake manifold. While either is ideal if performed during an engine rebuild or when the cylinder heads are off the engine, neither is practical if the engine remains in the car and you're seeking to swap intake manifolds during a weekend.

Furnace cement is another solution that doesn't require removing the cylinder heads. Available at any local home repair or hardware store, its thicker consistency allows it to be packed into the blind hole without running or falling out. Once cured, it's as effective and permanent as either aforementioned option. And best of all, it can be performed in less than an hour, allowing you to complete your weekend swap. Here's how!

6 Since the engine is in the car, high-temp furnace cement was used to fill the blind hole in the cylinder heads. It can be sourced from a local home-repair store for a few dollars. A quality product that's premixed to limit the amount of shrinkage after drying is highly recommended. Be sure to follow the manufacturer's recommendations for drying and/or curing for best results.

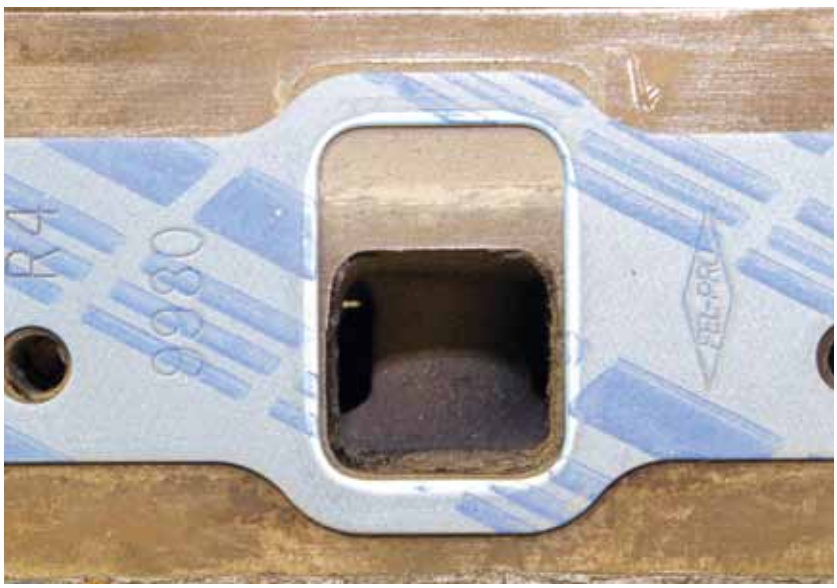
7 After removing the intake manifold and existing gasket, the intake flange was wiped clean of grease and oil using a lint-free cloth and brake cleaner. Then quality duct tape was used to seal off any opening on the flange that might allow the cement or dust/debris to enter the intake ports.

8 Masking tape and newspaper was used to shield the remaining portions of the engine. Small quantities of cement were carefully packed into the opening. As the hole filled up, it became more difficult to force in the cement, but it must be completely filled. Any air pockets can collapse, compromising the cement's integrity.

9 A putty knife was used to carefully scrape away the excess cement, and lightly wetted 400-grit sandpaper smoothed the surface. It's important that the cement is flush with the intake flange, as any recess can prevent the gasket from properly sealing. The identical procedure was performed on the opposite cylinder head and both were allowed to dry overnight.

10 Once the cement was cement fully cured, it was checked for flatness using a straight edge—it was perfectly flat. Any high spots can be knocked down with sandpaper or a file if needed. A wet/dry vacuum was then employed to suck up all traces of dirt and debris before removing the tape and newspaper. Several passes were made to ensure that absolutely nothing would enter the engine. Even the slightest amount of grit can create significant internal damage.

11 Removing the masks and tape revealed that the cement-filled opening was in fact completely flush with the intake flange. If a depression exists, the only real recourse is to chip the cement away with a hammer and screwdriver and start over again. (In either instance, be sure to carefully mask accordingly to keep contaminants out of the engine.)



12 With a '71-and-earlier Fel-Pro intake manifold gasket in place, it's easy to see how the cement fills in the area that's otherwise missing. For the cost of a few dollars, this particular cylinder head is now compatible with any Pontiac intake manifold from '65 forward, as long as the correct intake gasket for the manifold is used. HPP