

# Restoration "How To"

## Rebuilding the Exhaust Manifold Choke Stove

written by Bill Upham

One of the most common overlooked areas of an engine rebuild is the choke stove in the exhaust manifold. Think about it, if you had a machine shop perform the rebuild, did they include this in the rebuild? Did the rebuilder even mention it? probably not. Regardless of how much you spend on restoring your carburetor, or how much you clean or fancy finish-coat your exhaust manifolds, leaving the 30+ year-old choke stove untouched can be the root cause to many carburetor drivability problems.

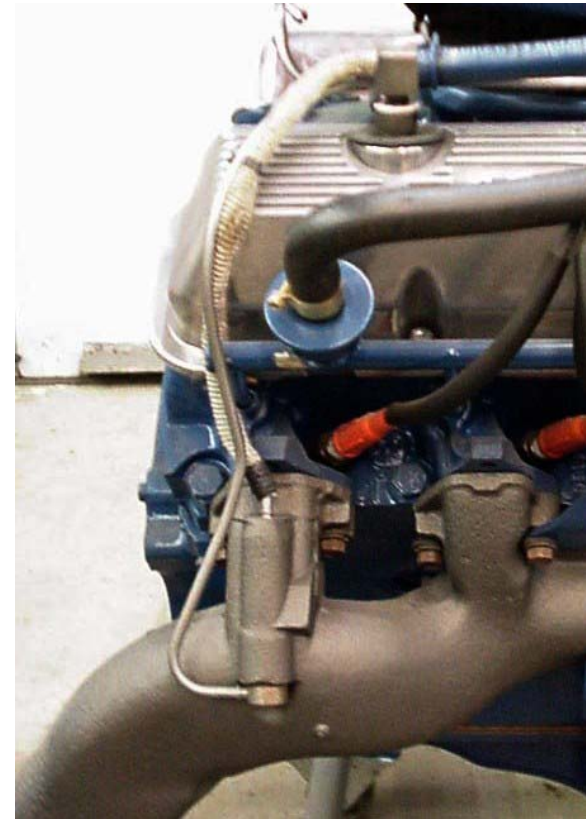
This article will clearly show you that within a couple of hours using common hand tools you can restore the choke stove to its original condition.

The procedures shown in this article cover the following years and engines:

1964 / 1973 - ALL 260, 289, 302, 351W, 351C, 352, 390, 390GT, 428 PI

1968 / 1969 428CJ/SCJ.\*

Note\* The 1970 428CJ and SCJ DID NOT have a choke stove.



The Exhaust manifold chosen for this "Do it yourself " pictorial is from a 69 428CJ.  
The procedures that will be shown are exactly the same for all of the other Ford/Mercury exhaust manifolds that have the choke stove chamber cast into the manifold.



The following procedures can be performed at home using basic hand tools listed below.

1. Ball peen hammer
2. Electric drill with  $\frac{1}{4}$ " drill bit
3. Flat cold chisel
4.  $\frac{1}{4}$ " round drift punch
5. Round wire brush
6.  $\frac{9}{16}$ " impact socket
7.  $\frac{3}{8}$ " deep socket



This picture is representative of what a typical 30 year old choke stove fitting will look like.

Looking closely you will see that this particular fitting has actually rotted clear through with a hole in the center.

After removing the manifold from the engine, place the manifold on a clean flat surface that will allow you to have full access to the manifold. It is not recommended to clamp the manifold into a vise when working on it because either the tight clamping of the vise and/or the necessary hammering could cause damage to the manifold.



### Step #1 Mark lower fitting

Using the cold chisel and hammer lightly tap a mark in the manifold directly in line with the hole in the side of the fitting that is used for the fresh air tube.

It is important to mark where this hole is to ensure that the new fitting is aligned correctly when installed during later procedures.



The lower fitting is held into the manifold via a pressed fit. To remove the fitting you will need the cold chisel and hammer.



### Step #2 Remove the lower fitting

The fitting can be "walked out" by alternately placing and tapping the chisel at a downward angle once and then go to the other side and again tap down once. Repeat alternating back and forth until the fitting starts to move out of the manifold.



Repeat alternating back and forth until the fitting starts to move out of the manifold. Continue until the fitting is out of the manifold.





These two pictures clearly show the three problems that this procedure will correct.

1. Corroded fresh air fitting
2. 30+ years of rust and scale
3. Removing broken hot air tube remnants



Step #3 Remove the broken hot air tube from the manifold.

The length of the broken piece to be removed is usually around  $\frac{1}{2}$ " in length. Using the electric drill and  $\frac{1}{4}$ " drill bit, align the drill squarely to drill down through the broken tube and open up the tube to the original  $\frac{1}{4}$ " hole.



Step #4 Remove the choke stove heat element.

Using the  $\frac{1}{4}$ " drift punch, Insert the punch into the previously drilled- out  $\frac{1}{4}$ " hole and press down, driving the old heat element out through the bottom fitting opening.



This picture clearly shows the amount of rust, scale and corrosion that came out of the choke stove chamber.

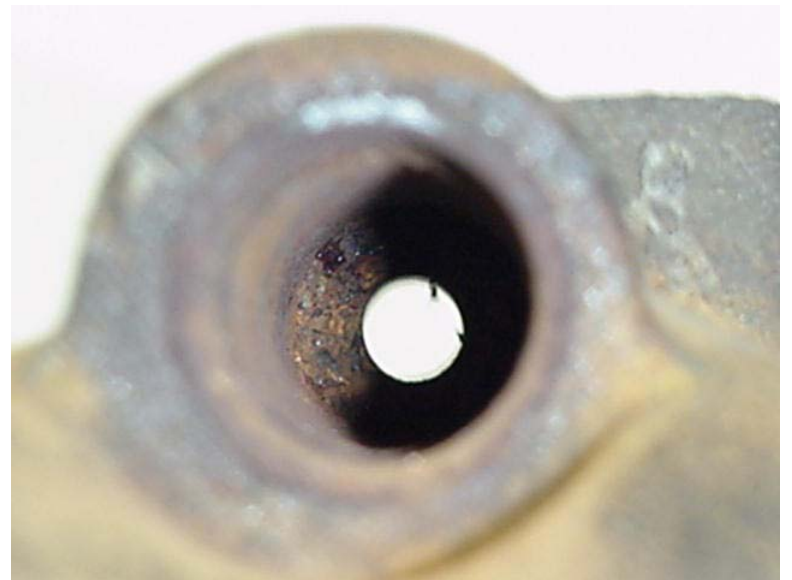
Regardless of the level of restoration done to the carburetor, leaving this cancer in the manifold can render that work useless.

Even if a very small amount of these particles is sucked up into the carburetor, they will cause serious clogging to the carburetors idle, acceleration, cruise and choke circuits.



This picture shows the choke stove chamber with the bottom fitting and heat element removed.

Notice that the chamber is symmetrical and runs from top to bottom of the manifold





Step #5 Cleaning the Heat Stove chamber.

Use the round wire brush to thoroughly remove any remaining rust and scale from inside the choke stove Chamber.



When inserting the round wire brush continually rotate the brush until it bottoms out.

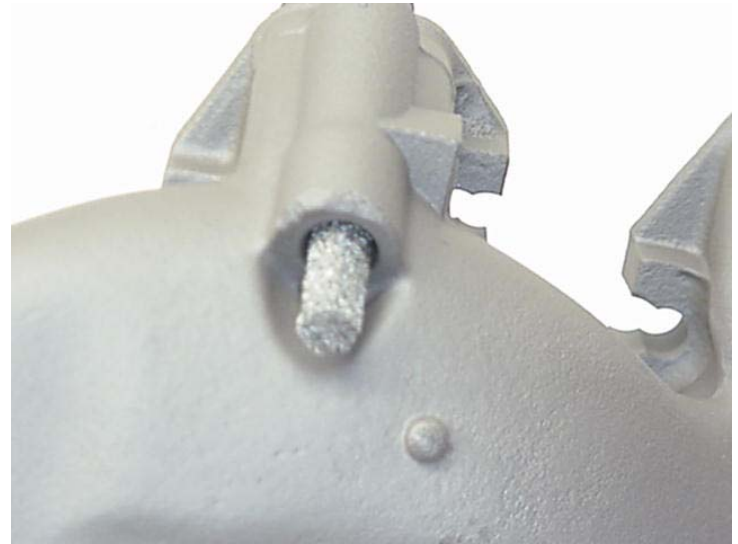
After brushing back and forth approximately 10 times removed the brush and blow out the chamber.

Upon inspection if any rust or scale remain, repeat the wire brushing procedure until clean.



## Step #6 Install the new choke stove element

Remove the new choke stove element from the rebuild kit. Insert the element into the chamber till it is completely inside. The element is purposely wound tight to allow for easy insertion into the chamber.



## Step #7 seating the heat element:

In order to ensure that all of the air passing through the chamber goes through the woven element it is important to eliminate open space on the sides of the chamber. Using a deep socket that is small enough to fit in the chamber opening, push in on the heat element approximately  $\frac{1}{4}$ ". This will cause the heat element to spread out and fill the chamber



### Step #8 Seating the woven mesh element.

The object of this step is to spread the mesh element out to fill the stove chamber. You just want to spread the element enough that when the manifold is held vertically, the element will not slip out. Forcibly jamming the element in to much will cause a restriction in the air flow to the choke assembly.

1st: Use your finger to push in the mesh in till it bottoms out.

2nd: Using a 3/8" deep socket push the woven mesh element in from 1/4" to 1/2" this will spread the mesh out making contact with chamber walls.



### Step #9 Installing the new fresh air fitting.

Remove the new fresh air fitting from the kit. Locate the mark made back in step # 1. Carefully align the hole in the fitting with the earlier made mark. Holding the fitting straight, use a hammer to lightly tap the fitting to get it started.



Before completing the fitting installation, make a final check to ensure the hole is lined up with the mark and the fitting is straight.



Here's a couple of shots showing the completed rebuild.



Before installing the manifolds on the engine, now is the best time to eliminate another possible problem area. I like to remove all four studs, run a tap down through the threads, and replace with new correct length & course threaded studs and four correct washer head nuts. Finally, install a set of the unique dual sized exhaust pipe donuts. on these 428 Cobra Jet manifolds.



After the exhaust manifolds have been installed on the engine you can now install the plumbing. I like to use a kit as shown that includes all of the attaching hardware, woven fiberglass insulator, s-clip and pre bent hot and cold lines, made out of original equipment material. .





Not only does this look like the day it left the factory, you can rest assured that you have eliminated one of the most overlooked areas to an engine rebuild. If anybody ever asks why you rebuilt the choke stove, just show them the picture of the rust particles that will not be sucked into YOUR engine.

Parts used in this article are MCA approved and manufactured by Mansfield Mustang Restoration & Detailing Parts.

These parts are available from most Ford Restoration Suppliers, including Mansfield Mustang. Call Mansfield Mustang at +1 (508) 339-5409.

Here are the parts you will need:

- o Choke Stove rebuild kit, p/n CK-10
- o 390GT/428CJ Exhaust Stud Kit, p/n EX-3
- o 428CJ Engine Pipe to Manifold Donut, p/n C8LY-9450-AR

