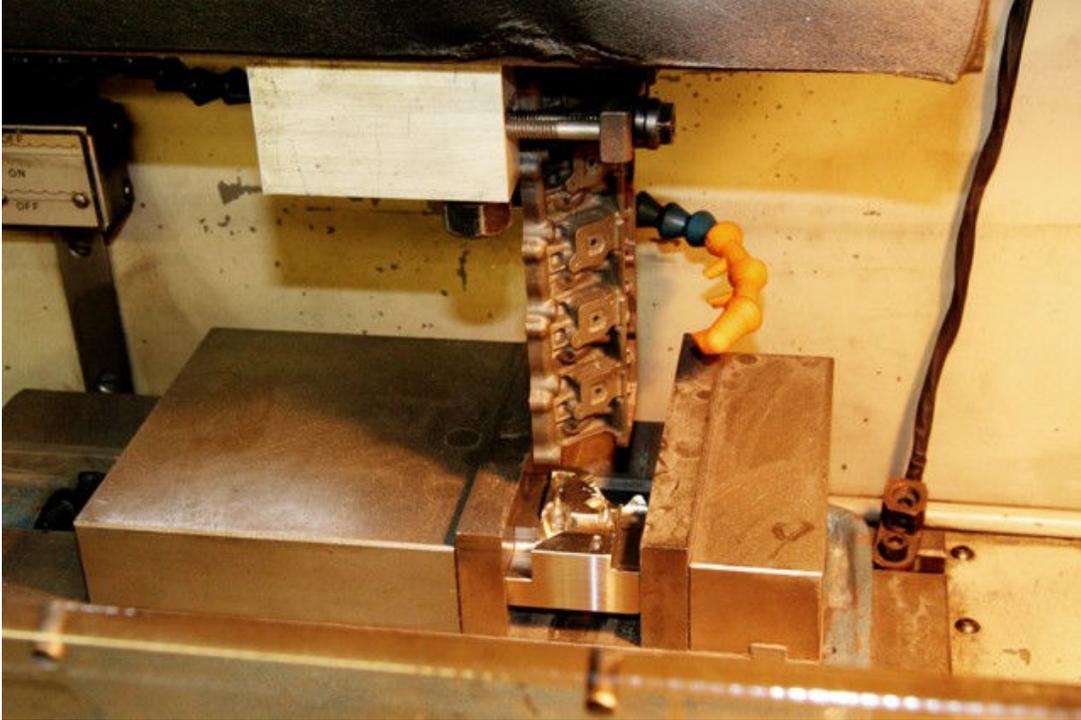


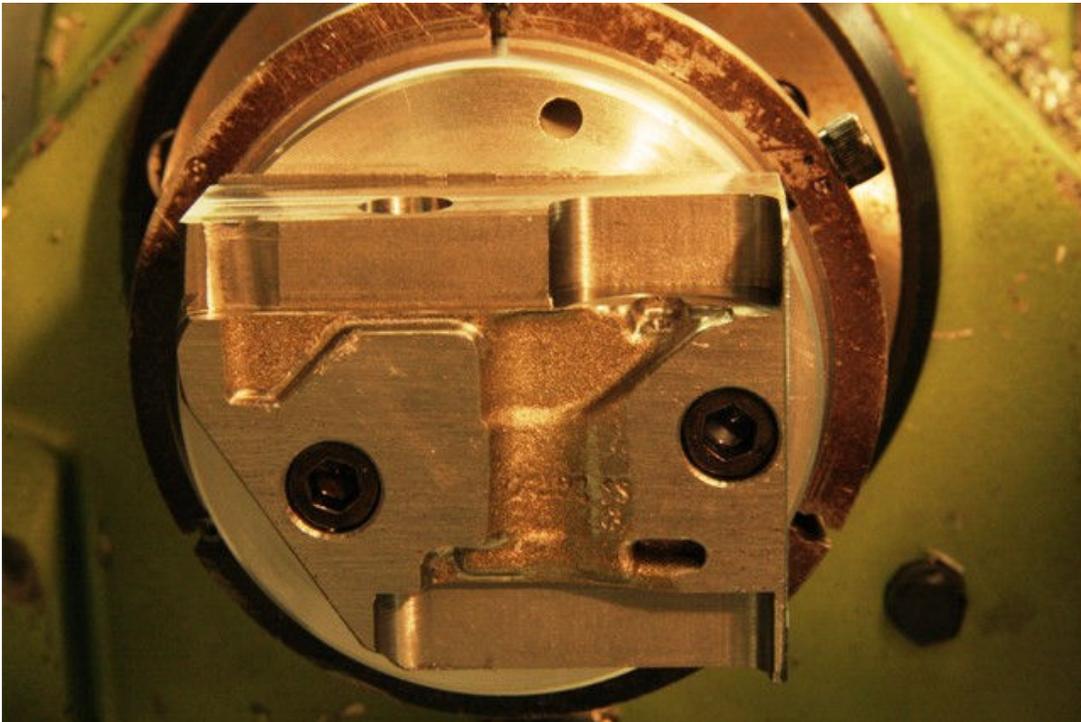
It is 7:14am Sunday morning and before I start the continued work on the heads it seemed like a good time to explain in more depth about the machining process on the heads. Several emails were received that ask “how was I able to hold each head in the exact position every time”. If you remember, from a long time ago I explained that the original master parts were not destroyed in the fire. As fate would have it, the head which is made of Tellurium Copper (not Carbon) was still in my possession. The head was mounted vertically and using my EDM (Pic #1) and about three hours later an exact negative of the end of the head was burnt into a block of steel. The head was then removed and rotated 180 degrees so the opposite end could be used, and the process was repeated. When all was finished and a little “touch-up” with a Dremel tool, the cast heads fit perfectly into the cavity that was just created – Pic #2, #3, and #4. My machining center only has a 10 position tool changer and the heads must be removed at the end of the program, then another head is put in place and the entire process begins again. Picture #5 & #6 shows the head being machined.

I think that the first complete machining operation takes about 28 minutes and 30 seconds, which allows me enough time to deburr the just machined heads and make additional parts on the CNC lathe. The second operation will do the valve seats (7 minutes 28 seconds) and the final procedure is the spark plug holes. Although a lot of time was spent on the initial programs, set-up, and jigs, the end result is that I only need to handle each piece three times instead of eleven. If you multiply this by over 100 heads it is easy to see how much time will be saved in the future, with the added benefit of increased accuracy. Keep in mind once the head is in position the entire machining process is automatic, including the tapping process that includes twenty-nine 2-56 holes. To put this into perspective, a 2-56 tap is just about the size of pencil lead. Notice the attention to the detail on the castings of the head in Pic #7 & #8. This same awareness is evident thru ought all the castings which sets my engine apart from all others. It is all the little things that go together to form a complete “work of art”. This is a direct quote from one of my customers. Another customer wrote “It is the busiest engine that he has ever seen and it looks like it is going a 100 mph when just sitting”. Pictures #9, #10, #11 shows the completion of the first machining process. The last group of pictures shows the progression to the second operation and the finished combustion chambers. Once completed the only machining operation that remains is the spark plug holes. When the final machining is finished, the valve guides will be pressed into place as will the intake and exhaust valve seats. Each combustion chamber will then be glass beaded, which removes any final burrs that may remain and leaves a nice satin finish. This is very important because when lapping the valves it is a visual remainder that the entire valve seat area is concentric. It is then just a matter of installing the valves, valve springs, keepers, “high hat” which holds the valve seals, and the heads will be ready for installation. Simple huh? Not really, but it is one more piece of this very complicated puzzle that needs no more work. If all goes well I should be able to show you a finished head within about a week. It is now 9:30am – time to go to work.

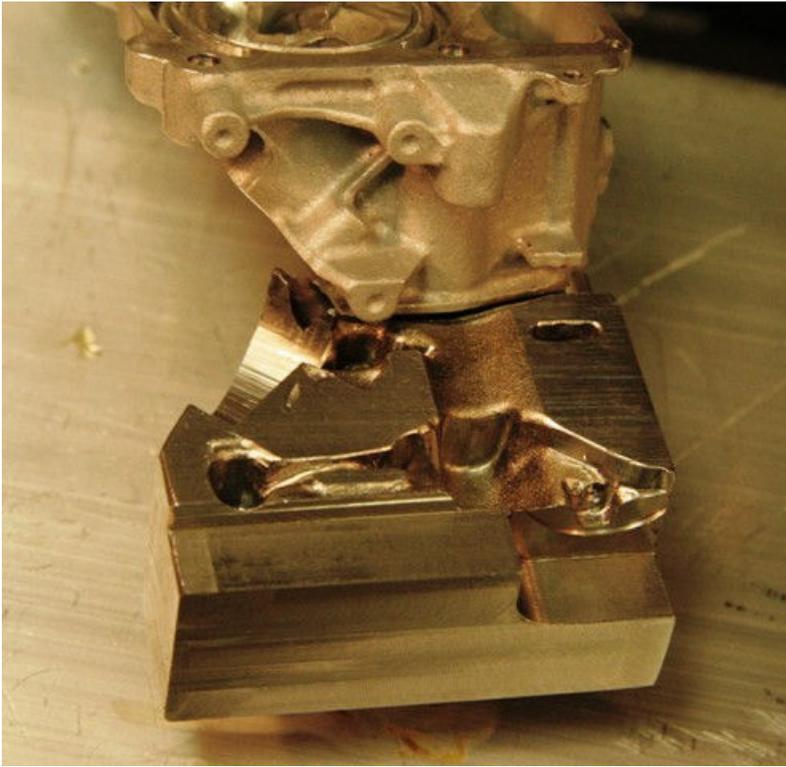
Pic #1



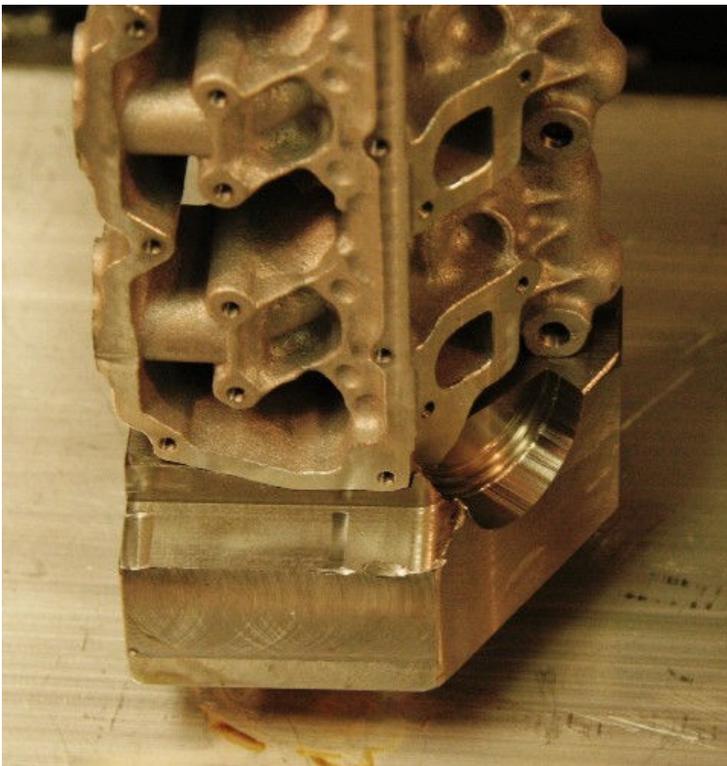
Pic #2



Pic #3



Pic #4



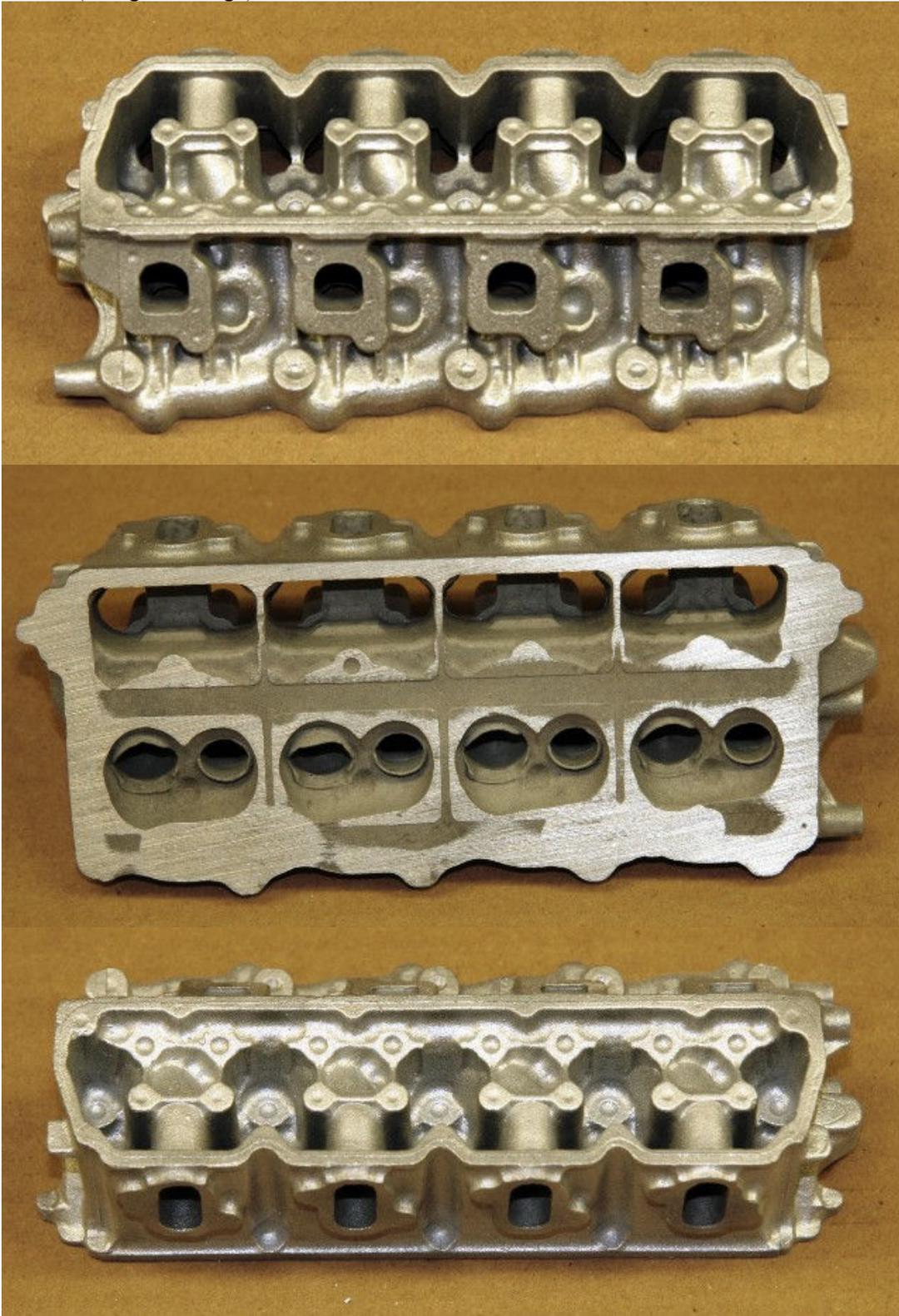
Pic #5



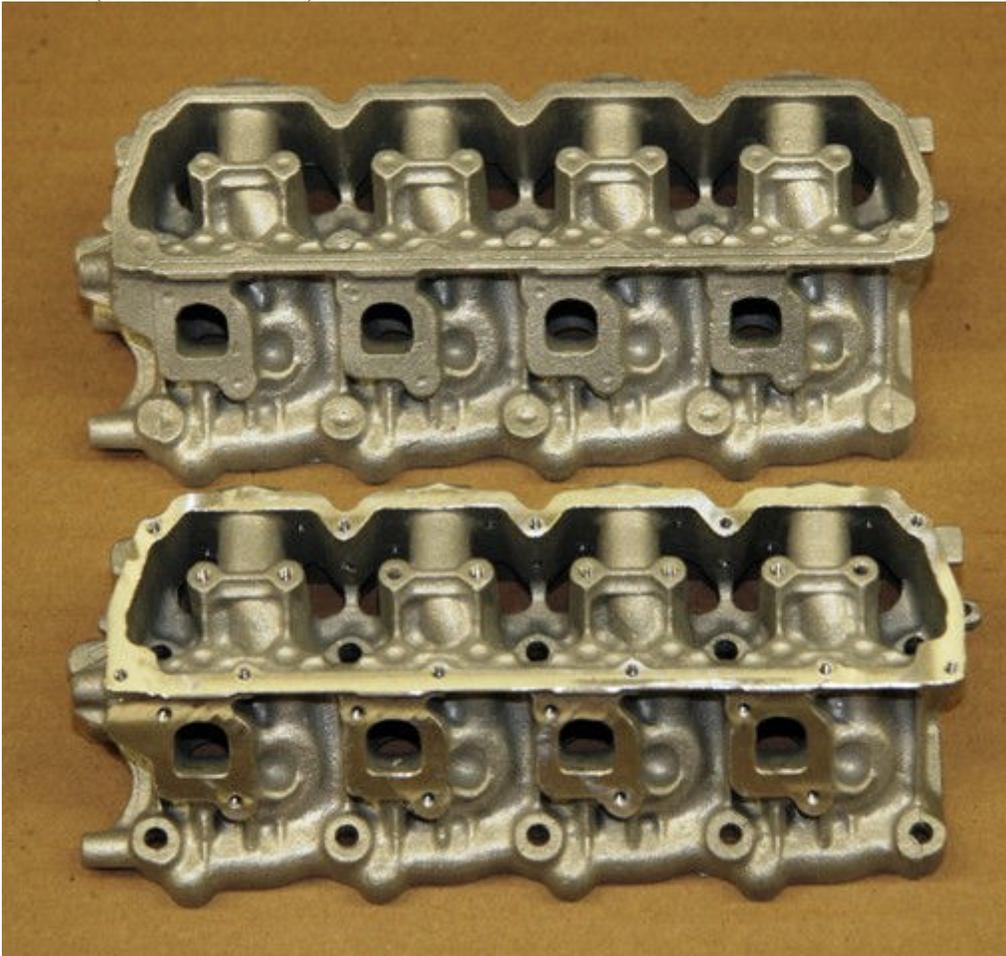
Pic #6



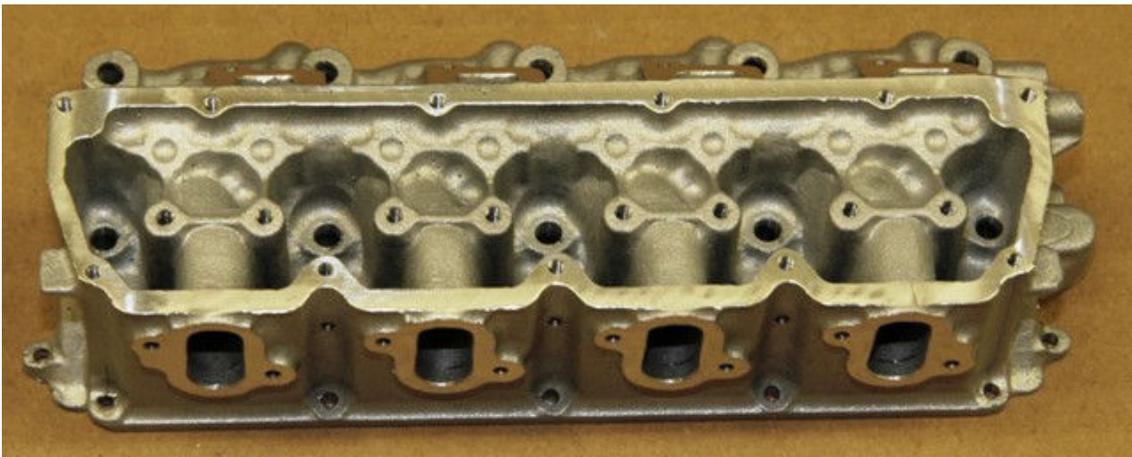
Pic #7 (Rough castings)



Pic #8 (Before and after)



Pic #9



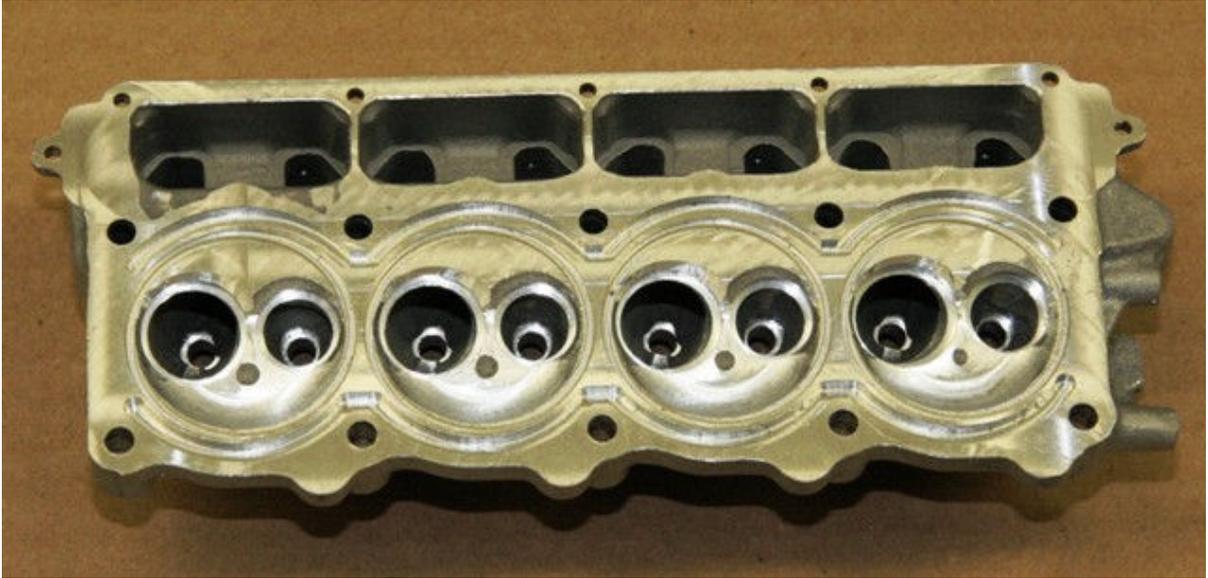
Pic #10



Pic #11



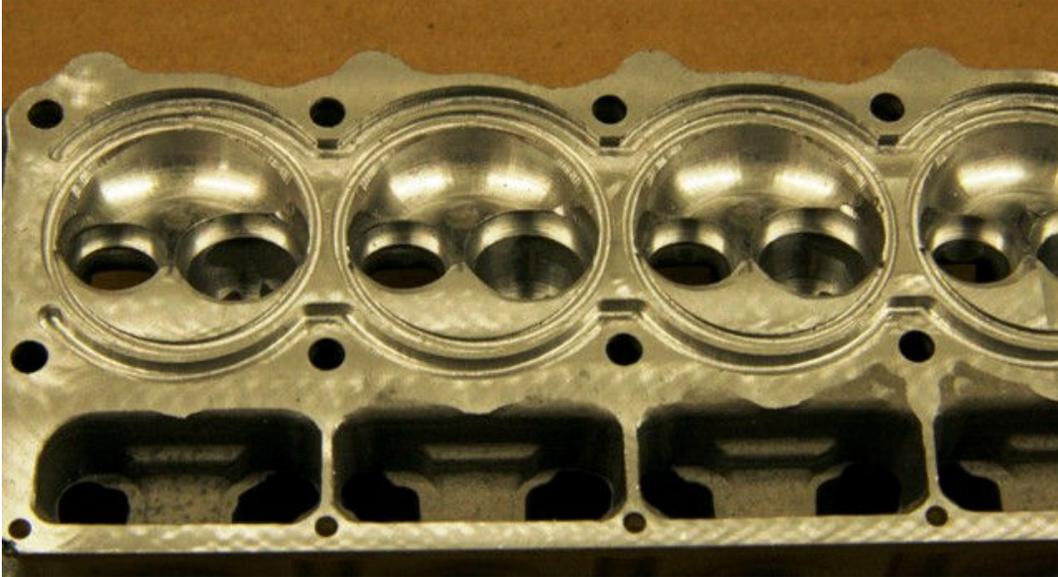
Pic #12



Pic #13



Pic #14



Pic #15

