

New Model A Engine - November 2019 Update

26 November 2019

Updates

In case someone gets this Email without seeing the article on the new Model A engine, the article can be found at: <http://www.modelaengine.com>

If anyone has a question, concern, comment, or suggestion, please let me know at model.a.engine@hotmail.com and I'll do my best to resolve the issue.

New Engine

This project started in 2007 and stalled in 2015 because of sky-rocketing cost and the lack of quality control at foundries in California.

Previous updates, pictures, and videos can be found at: www.modelaengine.com

I use the term "new engine" loosely because the only new parts are the cylinder block, crankshaft, and connecting rods. All interfaces for mating parts are identical to original and have been documented from original Ford drawings.

In the 2 July 2019 update, I was happy to state that the project was resurrected and I would be working with others to have the "new engine" manufactured in China.

A lot has happened since the last update on 24 Sept 2019.

John, who is responsible for manufacturing and quality assurance, has been to China twice since the last update. Between flights on his last trip, I picked him up at SFO, and we spent several hours going over the design, physically seeing parts, and how the parts are assembled. John also took samples of the 3 studs used for new engine main bearing cap retention, and a A-6551, A-6550, and A-6561 distributor/oil pump gear and bushing assembly for the engineers in China to better understand the design and how parts fit together.

The cylinder block and main caps will be manufactured in one factory and the crankshaft and connecting rods will be manufactured in another factory. Both factories will be working together so that there are no conflicts.

Cylinder Block and Main Caps

The exterior of the cylinder block will be based on computer 3 dimensional models derived from CMM (Coordinate Measuring Machine) and Laser scanning of the original cylinder block that was sent to China.

The need for CMM and Laser scanning is because the Ford drawing of the cylinder block did not specify parting lines, draft, and many other details that were left to the discretion of the pattern makers.

For machining of the cylinder block, the engineers in China have made drawings that are based on my SolidWorks models that were derived from the Ford drawing.

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Both the engineers in China and I have asked for minor changes to be made to the original SolidWorks design. We have worked through these changes, and are in agreement, so the design is "frozen" unless something unforeseen comes up.

The drawings that were created in China are dimensioned from an origin where 3 perpendicular planes intersect, and almost all machined dimensions are from these 3 planes. This dimensioning system is much easier to understand than the stacked dimensioning system used on the Ford drawing (A-6015).

My job which I have just finished, was to verify that the drawings from China are correctly dimensioned. China works to the metric system, so all dimensions have been converted from inches to millimeters. We are on the 5th drawing revision, and I think that the drawings are good to proceed.

The first castings are scheduled to be complete by the middle of January 2020. John asked if it would be good to display the castings at the Turlock swap meet which is the last weekend of January 2020. My reply was no because the one good cylinder block casting from Lodi Iron Works was previously displayed by John LaVoy, the editor of Model A Times at Turlock for several years, and the new cylinder block from China should be identical.

Although the studs and nuts will have inch threads, they will be manufactured to metric Class 10.9 which is similar to SAE Grade 8 (150 KSI). The threads on the studs that fasten the main caps will be rolled which is stronger than cut threads.

The first two pictures attached show a SolidWorks assembly of the machined cylinder block along with main caps and crankshaft. The 3rd and 4th pictures are photos of the drawings from China that have been checked.

Crankshaft and Connecting Rods

John met with the crankshaft and connecting rod manufacturer to go over the design. John and I communicate almost daily when he is in China.

The factory in China typically rolls crankshaft journal fillets which is great because the material in the fillets is compacted by rolling which is a deterrent to fatigue cracks. They asked if we wanted rolled fillets and my reply was yes.

The factory also asked about balancing and I replied that we wanted the crankshaft dynamically balanced to 2 oz-in (1.41 Newton-cm) or less. The Ford Model A crankshafts were dynamically balanced to 3 oz-in according to Ford drawing A-6303.V-8 engines built during the muscle car era were typically balanced to 2 oz-in. New engines with higher RPM's are balanced even closer.

Another question asked was about hardening of journals and the rear main seal rubbing surface. My reply was that it would be good to have the hardness still intact if the journals were ground .030 inch undersize.

Several people have asked what bearing insert is being used. The answer is that all (main and rod) journals are 2 inch diameter and any of the following inserts can be used: Clevite CB-745 series, Federal Mogul 2020 series, King Bearing CR803 series, Sealed power 8-7065 series, and others. When I say series, several letters and numbers are used in the suffix depending on material, radii, and undersize. We will be using a Clevite CB745P which is tri-metal and standard size.

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Questions regarding what the rear seal have also been asked. The rear seal will be a radial lip seal with a steel housing. The new cylinder block and rear main cap will have a bore of 5 inch diameter, and the crankshaft will have the flywheel mounting flange (4 inch diameter) that is extended forward to provide a seal rubbing surface. The rear seal will be a SKF 39933, Timken 415035, or others with a 5 inch OD that seals on a 4 inch shaft.

SolidWorks models of the crankshaft and connecting rods have been provided and the instructions to the factory in China are to follow the SolidWorks models.

Next Update

The latest schedule (subject to change) looks like we will have castings around the middle of January 2020, and machined parts in the middle of March 2020. The machined parts will need to be evaluated and tested before production begins.

There have been no changes that will have an effect on pricing. The pricing goal is to provide these parts a price that is competitive with the cost of machine work for a rebuild.

The next update will be after castings have been made which should occur in January 2020. These first castings will need to be cut apart or sonically tested to verify wall thickness before they are machined.

Terry Burtz, Campbell, Calif.



