

The New Burtz-Block

Model A Cast Iron 5 Main Engine Block, Crank, Rods Kit

by **Terry Burtz**

"We ran it continuously at 3100 RPM (75 MPH) for 6 hours, and nothing broke."

This article describes the new Model A Engine Kit and certain details from the "Builders Guide". For additional information including the latest "Builders Guide", "Doubling the Flow Area of a Model A Oil Pump", "Installing an Oil Filter", and "How to Order", see www.modelaengine.com

DESCRIPTION

The Burtz Model A Engine Kit is a newly engineered and manufactured kit of parts designed to replace the frail original Ford Model A engine components that will break if driven hard.

The new Block, Crankshaft and Connecting Rods are re-engineered for strength and durability and manufactured in a modern factory that supplies OEM engine parts to many manufacturers. The kit's external appearance once installed, is identical in appearance to the original Model A Engine. All new machined interfaces for attaching parts are a match to original interfaces.

The 5 main journal crankshaft is fully balanced and utilizes standard insert bearings (Federal Mogul 2020 CP) that are available at all major automotive parts suppliers. The fillets are rolled and all wearing surfaces are hardened. The forged connecting rods also use the same standard insert bearings.

The block comes ready for assembly with no machining required. All parts needed to assemble an engine other than the Crankshaft and Connecting Rods are standard Model A engine parts, or they may be purchased from an auto parts store.

CYLINDER BLOCK

The new Block is cast and machined from modern high strength grey cast iron. All interfacing surfaces for the attached parts match the original block design so that original or new aftermarket parts can be utilized during the building process. The new block features larger streamlined intake ports and an internal closed pressurized oil lubrication system that feeds oil directly to the main journals, rear main thrust bearing, and camshaft bearing journals. The Block has replaceable cam bearings fitted for use with either a 3 or 5 bearing camshaft and hard exhaust valve seats. The rear crankshaft seal is a standard "off the shelf" radial lip seal (National 415035).

CRANKSHAFT

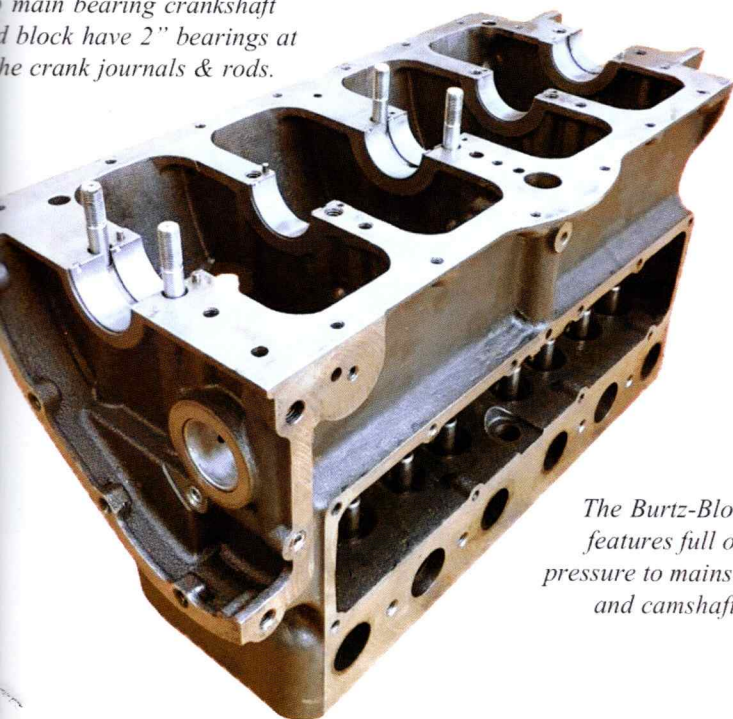
The new Crankshaft is made from nodular iron and has 8 counterweights with 5 main journals. It is cross-drilled to lubricate the 4 connecting rod journals, and dynamically balanced. The front and rear interface surfaces accept the standard timing gear, front pulley, and flywheel original to the Model A engine. The main and connecting rod journals both utilize the same standard 2" insert bearings that were used in GM engines from 1955 until 2003 (Federal Mogul 2020 CP).

CONNECTING RODS

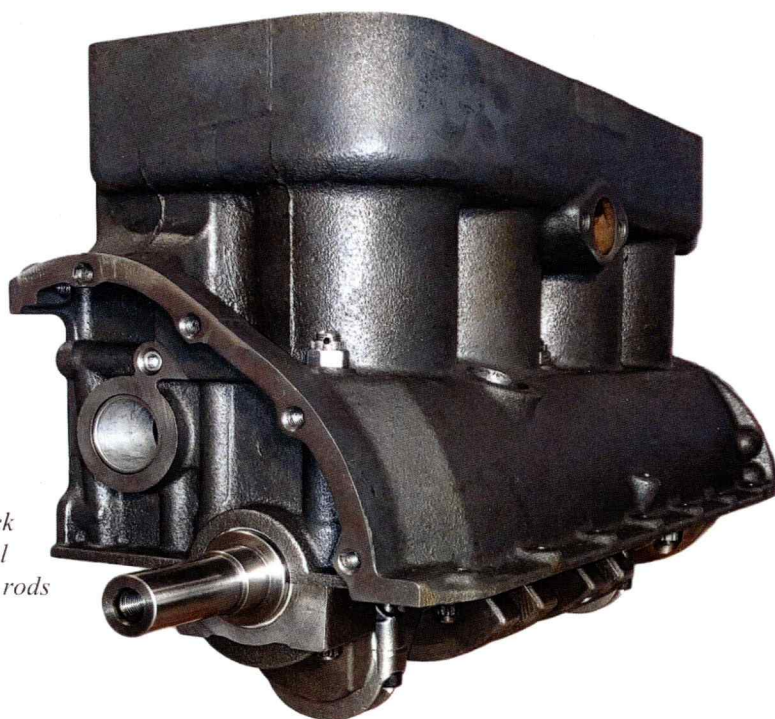
The new connecting rods are forged steel and utilize 2" insert bearings for the crankshaft journal. Wrist pin bushings

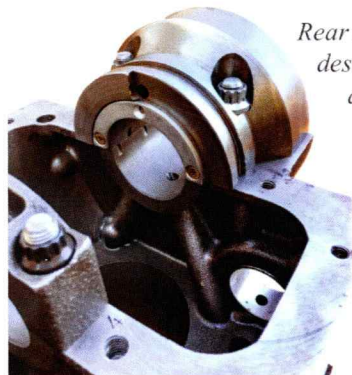


The main bearing crankshaft and block have 2" bearings at the crank journals & rods.

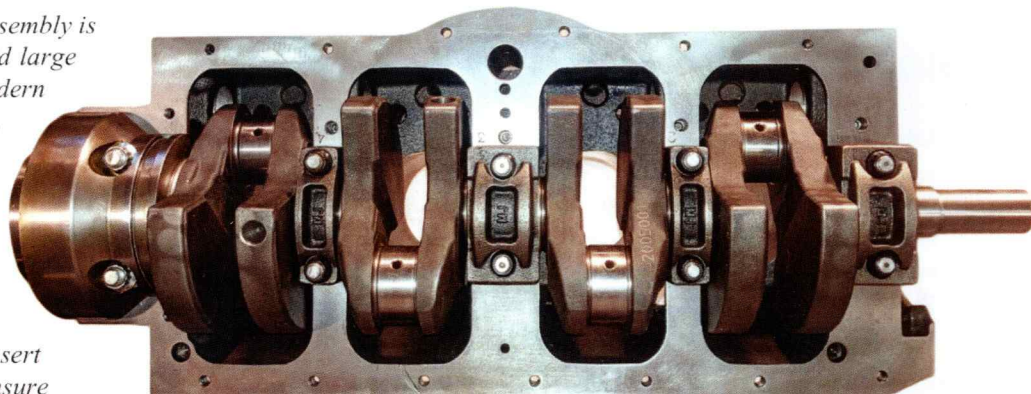


The Burtz-Block features full oil pressure to mains, rods and camshaft.





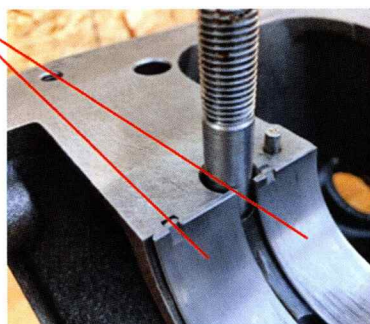
Rear main cap assembly is designed to hold large diameter modern oil seals.



Modern insert bearings insure easy serviceability and less friction.



Forged steel connecting rods swing with clearance and strength.



are installed and ready for assembly with standard Model A type pistons. The connecting rods are balanced in sets of 4 to closer than Ford tolerances. The rod caps are bolted in place with high-strength 3/8-24 UNF 12-point bolts.

PARTS INCLUDED

Cylinder Block Qty 1, cylinder block with 4 hard exhaust seats, 5 cam bearings, and 10 cylinder block/main cap dowel pins installed. Other loose parts are either assembled to the cylinder block or they are packaged separately.

Crankshaft Qty 1, dynamically balanced crankshaft with 2 rear dowel pins, 4 setscrew oil passage plugs, and 1 Woodruff key installed.

Connecting Rod Qty 4, balanced connecting rods each with wrist pin bushing, 2 dowel pins at the cap interface installed, and 2, 12-point 3/8-16 x 1 1/4 UNF bolts.

OIL SYSTEM OPTIONS

If desired, the new engine can be built to utilize a full flow oil filter. The modifications required for an oil filter can be reversed in the future and the cylinder block will again look to be original. The oil pump chosen must provide a greater volume of oil than stock.

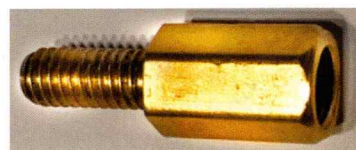
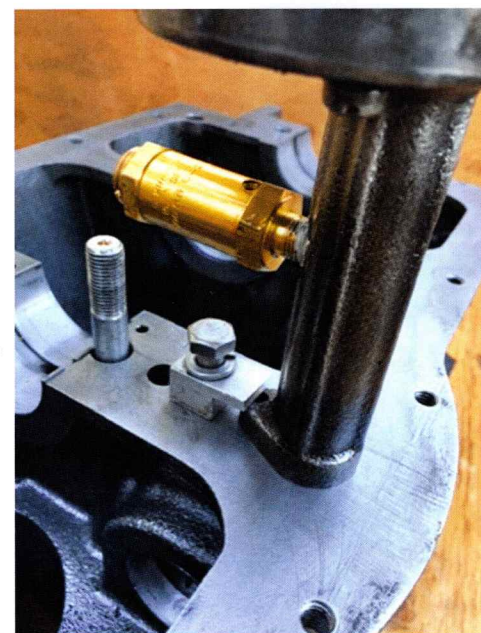
We recommend that an oil pressure relief valve set no higher than 40 PSI. Higher pressures can push oil pump/distributor drive gear up and disengage it by compressing the retaining spring (A-6570). The installed stock retaining spring (*inside valve chamber*) exerts a downward force of 32 pounds and at 40 PSI the upward force from the oil pressure is 27 pounds. A stronger spring (McMaster Carr 9657K552) will exert 60 pounds of downward force can be used.

We recommend a clamp be fabricated to hold the chosen oil pump in place. A 5/16 UNC tapped hole is provided in the new cylinder block for the clamp.

OIL PRESSURE MONITORING

If you look at the bottom of the valve chamber cavity, there are 2 oil passages from the main oil galley that connect to 2 valve cover bolts. These passages can be used for an oil pressure gauge or to provide oil for an over-head valve conversion. To utilize these oil passages, a special bolt needs to be made from 1/2 inch hexagon stock.

The kit does not come with an oil pump, but there are several applications. Terry has a good method available for you to build.



SEALANTS & LUBRICANTS

Terry outlines in great detail the type of sealants to use with the new engine. Those types and brands can be found in the latest "Builders Guide" found online at www.modelaengine.com

If you have any concern about head gasket sealing or the integrity of your head, we recommend Irontite "All Weather Seal" because it is compatible with antifreeze.

We recommend 10W-40 or 20W-50 motor oil both for break-in & thereafter.

PISTONS

Pistons sold by the Model A parts vendors are solid skirt and use original width rings.

We used EGGE (<http://egge.com>) part number E1104-4 pistons in the engineering evaluation engine. They use narrow rings (5/64 inch wide compression, 3/16 inch wide oil)

Make this special valve cover bolt to add oil gauge.

and they fit with .004 inch piston/wall clearance so no honing was needed. The EGGE pistons are solid skirt with an expansion slot that does not extend to the bottom of the piston.

ADD-ON PARTS

There are no metric threads used.

All interfaces on the new cylinder block, where parts are attached, are identical to stock. In other words, if a part fits an original Model A engine, it will fit the new cylinder block.

Add-on parts, whether new, used, NOS, or aftermarket, need to be clean, inspected for wear and flatness. Flatness is critical at the cylinder block/head interface, cylinder block/manifold interface, and cylinder block/oil pan interface.

Aftermarket high compression heads must be flat within .003 of being flat or it will need to be resurfaced.

The rear main seal is a National 415035 with "garter spring" removed.

OIL PAN

The upper surface of an original oil pan is often distorted due to over tightening with the thick cork gasket, and will need to be straightened.

TOLERANCES

Terry goes into great detail about mains and rod bearings and piston ring tolerances. We recommend that you follow the dimensional specifications from your parts suppliers.

TIMING GEAR

We used an aluminum camshaft gear with a deepened dimple for ease of ignition timing.

OIL PAN TRAY

Leave the dipper tray in place because the baffles on the bottom help to mitigate oil sloshing and starving the oil pump.

The new connecting rods have reinforcing ridges that dip into the troughs on the upper side of the tray and this creates an oil mist to lubricate the wrist pins, valve guides, tappets, and timing gears.

VALVE TRAIN

Two-piece original, one-piece with shoulder, or press-in valve guides with appropriate valves can be used. Lap the valves using Permatex 80036 Valve Grinding Compound. Over-size intake valves can be used. The thickness of the upper surface of the new cylinder block and an original cylinder block are identical at .375 inch. We used Colony CM1008 single lock tappets in the engineering evaluation engine.

Intake valve/Tappet clearance .011-.012 inch

Exhaust valve/Tappet clearance .012-.013 inch

CAMSHAFT

A new 5 or 3 bearing camshaft can be used. If ordering a new or reground camshaft, tell your supplier how you want your engine to perform. To prevent the buildup of oil pressure behind camshaft bearing #5 which may force the camshaft forward, we recommend that it be vented to the crankcase.

Model A camshafts have full length spiral oil distribution grooves that provide a sufficient vent. Model B camshafts have short grooves that need to be lengthened to edges or a vent hole added. If a 5 bearing cam is used, the oil feed holes for journals #2 and #4 will need to be opened. See the latest "Builders Guide" found online at www.modelaengine.com

HEAD STUDS

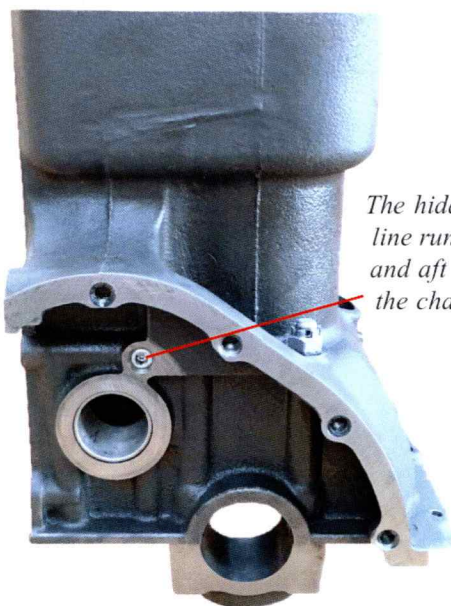
We recommend that grade 8 head studs be used and installed using anti-seize compound. They are much stronger and less likely to twist off during removal in a future rebuild.

ROD SWING CLEARANCE

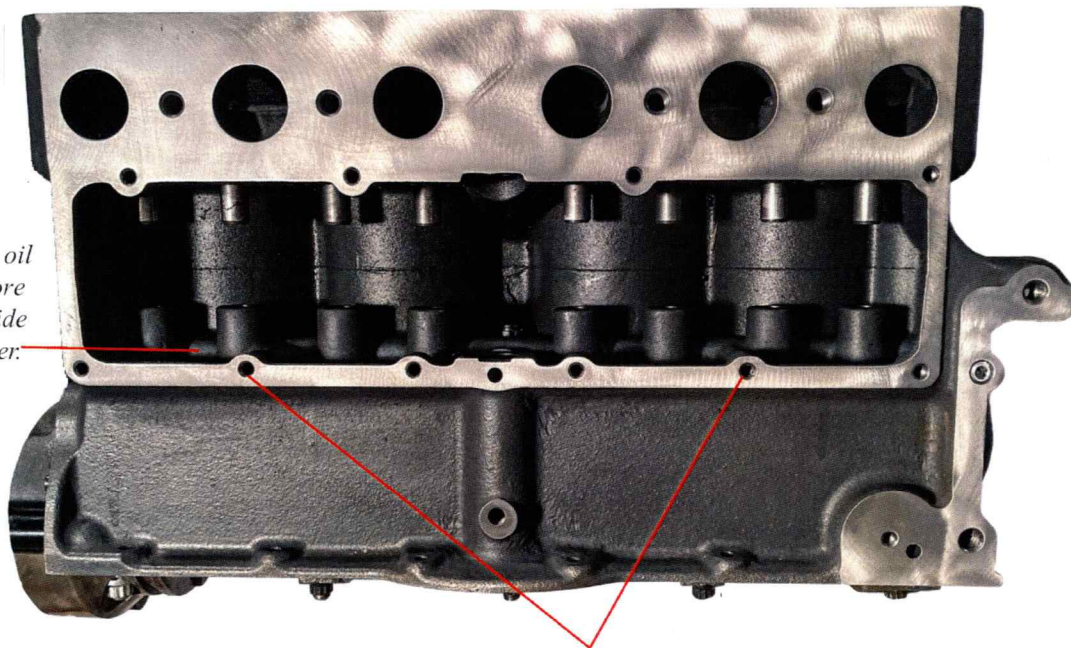
The connecting rod big end comes very close to the cylinder block walls, oil pan walls, and the camshaft. Verify



The rear main seal has a garter spring that is to be removed.



The hidden oil line runs fore and aft inside the chamber.



Two of the valve cover bolts are connected to the main oil galley. A special hollow bolt can be made to supply oil to an oil gauge and/or lubrication to an OHV.

that there is clearance by rotating the crankshaft after assembly of each connecting rod/piston assembly.

CLEANLINESS

Light oil was applied to the new engine kit parts to prevent corrosion, and it has likely collected a lot of dust particles during transportation. In addition, every oil passage and threaded hole may have machining chips and grit that needs to be removed.

Remove the 4 setscrew plugs in the crankshaft to open all passages for cleaning. For a long engine life, every part (*new or old*) needs to be surgically clean.

BREAK-IN

Common Sense . . . Please don't plan on building an engine that can continuously keep up with modern traffic. Short bursts of speed are fine like passing slower traffic or entering a freeway on ramp, but attempting to continuity keep pace with modern traffic may result in other problems and is not recommended.

We are confident that the new engine will survive short bursts of speed because we assembled the "Engineering Evaluation Engine" and then broke it in by intentionally abusing it to see if anything would break by running it continuously at 3100 RPM (75 MPH) for 6 hours, and nothing broke.

We recommend that you break your new engine in at varying speeds, but not over 2400 RPM (58 MPH) for the first 1000 miles. Before Starting Engine: It is recommend that the spark plugs be removed, and the newly assembled engine be cranked by the starter to confirm oil pressure.

FASTENER TORQUE

Terry goes to great lengths explain bolt and nut torque settings for the head nuts (55 ft lbs) and all other fasteners.

FLYWHEEL

The newly designed, lightened, and balanced 30 lb. flywheel is available as an option. The mating interfaces to the crankshaft, pilot bearing, and ring gear are identical to an original Model A flywheel. The new flywheel is drilled to accept the V-8 9-inch Long design pressure plate. (The pilot bearing and the ring gear are not included).

The price is \$350.00 plus shipping and tax

JUDGING

Detailing the New Engine for Judging can be done. Depending on date of manufacture, the exterior of the new engine block can be detailed for judging per Mr. Steve Plucker's extensive research, which can be found here (type all the letters, numbers and symbols as one with no spaces):

http://www.plucks329s.org/pdf/engineblock/cylinder%20block%20guide_1.pdf

CONTACT INFORMATION

Terry Burtz, (model.a.engine@hotmail.com) Engineering and anything technical including revisions to the "Builders Guide", "Oil Pump Modification", and "Installing an Oil Filter".

John Lampl, (jrlampl@jrlasia.com) Manufacturing, Quality Assurance, Scheduling, and USA Shipping.

Leonard Nettles, (ln.lja@sbcglobal.net) Orders & Disbursements

To learn more about the block and the history of development as well as Terry's engine building recommendations, visit www.modelaengine.com

The engine kits will be available from most Model A parts dealers, engine builders & directly.

\$3950.00 Plus shipping and taxes

To place an order call **(540) 739-7577**
or visit

www.burtzblock.com



The extra strong rear crank flange accepts your Model A flywheel or the new 30 pound Burtz flywheel shown here.

