

# ENGINE BUILDER

Babcox

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cooling, but the peak load for the bearing will be higher.

## Cam Bearings

Cam bearings, like the mains, are manufactured using various materials. New manufacturing technologies and metallurgical advancements mean these components are able to match the strength and durability of other high performance valvetrain components. High performance micro babbitt and burnished cam bearings are available to provide twice the fatigue strength while using high spring force. Additionally, high performance coated bearing are available to assist with dry starts and provide added lubrication.

Manufacturers put considerable effort into designing components for engines that are built to exceed the performance they were originally designed for in an OE application. As with other engine bearings, advancements in technology and manufacturing processes have produced a higher quality product available today.

As is frequently evident, the OE engine manufacturer doesn't always try to make your job easier. Cam bearings are bored in place on most OE blocks due to block tolerances. In some cases, engine repairs have necessitated block replacement. However, engineering expertise has resulted in aftermarket alternatives for many popular performance engines including the Chevy LT1 (6.2L OHV V8, MY 2014-2011) and Dodge Hemi (5.7L OHV V8, MY 2009-2014; 6.4L OHV V8, MY 2011-2014).

In many cases, bearing manufacturers work with successful CERs and PERs to develop products to solve specific engine issues. Some of the more critical issues have included Ford applications, where slots in the bearings were replaced by holes to keep the bearings from buckling on installation and control oil flow; with Jeeps (bearings in positions 2 and 3 tend to need grooves to control oil flow not found in the OE application) and the popular GM LS engines (MY 2005-2015) which require a coated bearing in positions 1 and 5 to keep the engines running.

One of the biggest culprits in cam bearing complaints has to do with misalignment. This can occur from improper installation or as the result of block distortion. Use of a centering cone while driving in the bearings will help



*New cam bearing manufacturing technologies and metallurgical advancements mean these components are able to match the strength and durability of other high performance valvetrain components. Photo courtesy of Dura-Bond Bearing Co.*

achieve the correct alignment in the cam bore and prevent damaging the steel backing. Precautions should also be taken to prevent any nicks or gouges in the bearing material during installation and especially when test fitting the cam for proper rotation.

Block distortion happens gradually over time and the camshaft wears the bearings to match the amount of distortion through continual engine operation. Upon disassembly of the engine, the camshaft would rotate freely in the worn bearings but produce tight spots or make installation of the new cam impossible after the bearings have been replaced with a new set due to the distortion of the housing bores. Due to block tolerances and distortion, a forgiving bearing material is necessary for reliable operation.

Larger OD bearings are available for many mainstream engines, which allows the cam tunnel to be re-bored in order to eliminate the distortion of the block. The general consensus of bearing manufacturers suggests an optimum operating clearance of .002" with an upper range of .004" in order to provide the best oil layer.

When installing cam bearings, the positioning of the oil hole can be placed in a preferential location in order to aid the oil in

achieving a more efficient hydrodynamic layer upon start up and operation if the housing bores in the block are fully grooved or the bearing itself has an oil groove machined into it. The best position for the oil hole when viewed from the front of the block is at the 2 o'clock (60 degrees) location when using a standard rotation camshaft. This location enables the oil layer to begin to form more quickly at the lower part of the bearing plus the rotational forces of the cam can assist in pulling oil through the feedhole. Not all blocks have this option and there may not be a grooved cam bearing available, at which point the feedhole should be centered with the oiling hole in the housing bore to insure a full flow path for lubrication.

We've really just scratched the surface on the subject of bearings as there are several other areas to discuss, including roller cam bearings and coatings that we'll have to save for later. However, a quick note regarding coatings is to simply say that if a coated bearing is available for your particular application and within your budget it will always be beneficial to utilize it.

Matching your bearing material to the application in conjunction with setting clearances and oil selection will go a long way in the effort to keeping your engine performing smoothly. ■

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- More Than Double the Fatigue Strength of Standard Bearings - Withstands Racing Spring Loads
- Micro-Babbitt/Grain-Controlled Babbitt/ Roller Burnished



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