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engine professional

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BY **LAVERN SCHUMANN, JR.**

New Tool to Find Correct Cam Lobe Centerline

Determining the proper centerline of a camshaft lobe to the existing centerline of the engine block lifter bore has never been easier when using a new tool developed by Schumann Sales and Service.

Cam manufacturers and engine builders all recognize the fact that the centerline of the cam lobe and the centerline of the lifter bore must coincide in order to use optimum high pressure valve springs with fast rate of lift, solid flat tappet camshafts. Have you ever tried to eyeball this alignment? The critical ideal misalignment is plus or minus .015" of coinciding centerlines. Some manufacturers and engine builders spend tremendous amounts of time determining the 16 centerlines required.

This new tool will guarantee proper alignment in 10 minutes or less. Simply install the new camshaft with a thin coating of alcohol quick dry layout blue dye or a thin layer of blue paste layout dye on each lobe. Then, secure the timing cam timing gear assembly to establish the depth of the cam to the engine block assembly used. Next, insert the cam/lifter body centerline checking tool into a lifter bore, apply light thumb pressure to the top rim of the tool while turning the camshaft over one complete revolution. Doing so will show the actual centerline scribed onto the cam lobe by the nylon adjustable centering scribe on the tool body base. Repeat this process fifteen more times and carefully remove the camshaft to evaluate match or mismatch of each lifter bore/lobe alignment.

If your misalignment is on the high side of the taper inclination of the cam lobe, a higher incidence of lifter rotation with a smaller contact footprint available and results in a higher psi present at the wear pattern.

If your misalignment is on the low side of the taper inclination of the cam lobe, a lower incidence of lifter rotation with a larger contact footprint available and results in a lower psi present at the wear pattern.

Obviously, dead center alignment creates the acceptable lifter rotation and acceptable psi load ratings.

Please note that there are five cam blank manufacturers commonly used in aftermarket camshafts, two are domestic USA, two in Asia and one in Mexico. Guess what? None of the five coincide with the centerline spacing and there are three different load widths among the five.

If you want to maximize camshaft performance, serious attention must be concentrated on this centerline issue.

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Cam Lifter Test Results

We recently completed a unique and definitive cam lifter test. A camshaft with identical lobe specs was ground with .0005", .001", .0015", .002", .0025", .003", .0035" and .004" (micrometer measured) inclination taper per lobe. One of our lifters within our normal specifications, one push rod, one rocker arm and identical specification valve springs were constant on the test. We're testing the number of crankshaft revolutions to equal one lifter revolution, the lifter; Blue Dykman paste frictional imprint was measured and the camshaft lobe imprint was also measured. The results are interesting from an engineering viewpoint and a small window of correct measureable inclination of the lobe is quite evident, in order to maximize lifter revolutions versus footprint.

Micrometer Taper	# Crank Revolutions	= One lifter Revolution	Lifter Imprint Width	Cam Pattern Width
.004"	26	1	.303	.186
.0035"	52	1	.331	.189
.003"	56	1	.352	.227
.0025"	58	1	.368	.250
.002"	60	1	.385	.254
.0015"	74	1	.388	.262
.001"	172	1	.344	.260
.005"	no turning or revolution evident			

An aftermarket Dart block was used in the test to optimize lifter bore spacing and negate the random spacing of used salvage yard blocks. With our lifter, parabolic crown .0002" accuracy at .0025" radius/diameter a .0005" optimum lobe taper of .002" to .0025" produces the best surface area footprint contact pattern and consistent acceptable crankshaft revolutions to lifter turn ratio.

Please note that other available lifters with different crown accuracies or specifications would not adhere to the above test data.