CHECKING ROCKER GEOMETRY

Rocker arm geometry in relation to the installation is critical. Having the proper valve train geometry is critical to the system being durable and providing the proper valve lift., The tip of the rocker should operate around the centreline of the valve stem when the rocker opens the valve. Locating the rocker properly is achieved by moving mounting points combining different length pushrods and valve stems or changing rockers.

The theoretical ratio is the distance from the point where the rocker tip touches the valve to the fulcrum centreline, divided by the distance from the centre of the pushrod cup or adjusting screw to the fulcrum centreline. Since valve trains have many components, deflection or production tolerances will usually affect the actual valve lift, therefore the theoretical ratio will usually be slightly higher than the rated ratio of the rocker. For this reason it is always a good idea to check the lift of each valve for your application to determine if the valve opening is the same on all the cylinders.

The roller tip should ideally contact the valve stem centre when the valve is at half lift. If it contacts the stem towards the outside of the head, the pushrod is too long or if the contact is toward the fulcrum, the pushrod is too short.

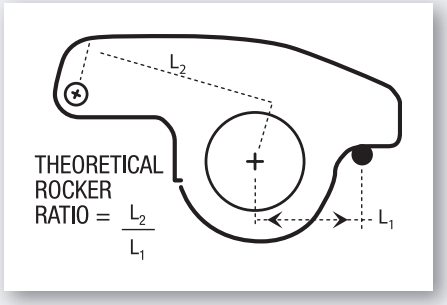
Most importantly the contact patch on the valve tip should be between 1.5mm and 2.0mm (.060"-.080") wide. Valve guide side loading is a result of excessive roller tip lateral movement and not simply the position of valve tip contact

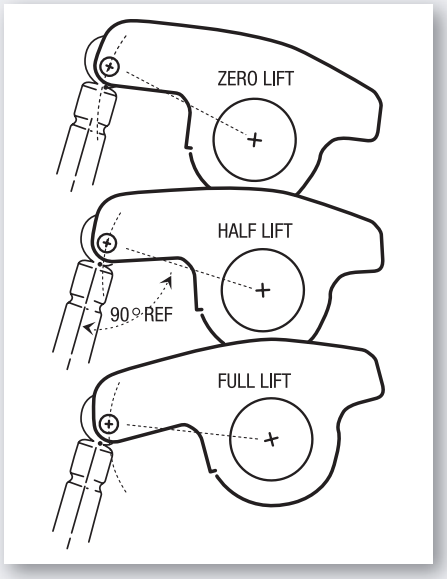
As shown in the diagrams below, a narrow contact patch slightly off valve centre is preferred to a wide contact in the centre of the valve.

The easiest way to check roller/valve tip relationship is to apply a very light smear of "bearing blue" (Available from auto parts suppliers) to the tip of the valve, then carefully assemble the rocker/rockers to the cylinder head.

Once the valve has opened and closed, you can clearly see the "contact patch" of the roller. This contact patch should be as close as possible to the centre of the valve and as thin as possible to minimise the amount of side loading on the valve experienced under extreme operating conditions.

Lash caps can sometimes be used instead of changing pushrods to alter rocker geometry. It is important to note when using rigid mount shaft type or pedestal type rockers, the mounting pedestal or spacer height may need to be altered to make geometry changes.





VALVE LIFT AND SPRING COIL BIND

A common cause of interference and consequent cam and valve train damage is valve spring coil bind. Coil bind is when the coils of the spring stack solid at or before full lift. The spring becomes solid and will not allow the valve to move any further. The shock and load on the valve train when coil bind occurs will demolish the cam.

Another common area for interference is between the valve spring retainer and the valve guide, or where fitted Teflon guide seals - the type that clip onto the valve guide.

Since the average valve seal is nearly 4.5mm thick, the valve guide height must be reduced by this much in most cases to provide clearance between the retainer and the seal at full lift. This is easily checked by installing the retainer that is to be used on the valve, without the springs.

Depress the valve and retainer, without the valve spring, by hand to the valve lift figure given on the timing tag. At this point, there should be at least. 150" clearance between the bottom of the retainer and the top of the seal. If there is not enough clearance, the seals will have to be removed and the guides machined for more clearance.

LASH OR VALVE CLEARANCE ADJUSTMENT

On engines having an adjustable valve train, improper adjustment is a primary cause of initial engine run-in problems. It is better to set initial lash slightly on the loose side, than risk setting valves so tight that the engine won't fire (which in turn could cause cam lobe failure).

Adjust the intake and exhaust valve lash for a particular cylinder when that cylinder's piston is at TDC between the compression and power stroke. With mechanical cams, follow the manufacturers cold lash spec. Set hydraulic lifters about a half-turn down past zero lash; this point is best determined by holding the pushrod between two fingers while you adjust the lash. When you can no longer turn the pushrod easily, you are at zero lash, now adjust the rocker a further 1/4 to 1/2 turn.