

## Verifying Pushrod Length And Rocker Arm Geometry

A large number of variables are involved in determining the correct length pushrod for your application. Pushrod length is affected by any one or all of the following:

- Block deck height
- Head deck height
- Head stud boss height
- Rocker arm brand/design
- Cam base circle size
- Lifter design/brand/pushrod seat height
- Valve stem length

Don't assume anything in determining the right pushrod for your new engine. A pushrod that fits one engine may not necessarily work in another. Any number of items can be different on your engine, requiring you to use a different pushrod length. Following the steps below will streamline the pushrod selection process, ensuring that you get the right parts the first time.

### 1. Buy a checking pushrod

Do not buy pushrods when you buy the cam, lifters, and the rest of the valve train components. As much as we would like to sell you pushrods at this time, nobody can predict ahead of time what length a given engine needs, unless it is bone stock. Instead, invest in one of our checking pushrods at this time. They are on page 249 of the catalog.

They come in two different designs, the more expensive of the two being easier to measure once you have it adjusted to the proper length for your valve train. Neither is particularly expensive if you consider time lost and freight costs when returning pushrods. Other companies offer their own versions of pushrod length checking devices, funny little plastic things and such with a sheet of complicated instructions to calculate the length. The main disadvantage with these is that you have to order the pushrods and receive them before you know if your calculations are correct.

With a checking pushrod, you can actually rotate the motor over and check the rocker arm/valve tip relationship as you adjust the pushrod length. When you get the correct geometry, it is a simple matter then to measure the length and place an order. COMP Cams® carries a large number of various length and diameter pushrods in stock. So you can have them overnight if you want and get the correct length the first time.

### 2. Determine correct valve train geometry

What is the correct length pushrod for your application? The one that produces correct valve train geometry. What is correct valve train geometry? When the rocker arm roller tip rolls from the intake side of the valve tip, across the center of the tip (at approximately mid-lift), to the exhaust side of the valve tip (at full lift) and back. See Diagram A.

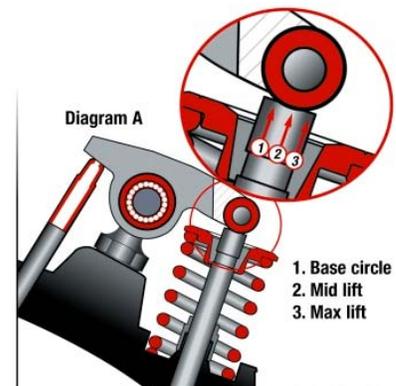
### 3. Measure the resulting pushrod

Measuring the length of a pushrod is really rather simple. The most important thing to remember is that different manufacturers measure pushrods differently. So not all pushrods of a stated length will measure exactly the same. The three most common pushrod measurements are shown in Diagram B on the following page.

**Gauge Length:** Although the most difficult to measure (it requires a special length checking gauge), this measurement is the most reliable. This is because the oil holes and their chamfers are eliminated from the measurement. The only problem is that not all companies use the same gauge diameter. COMP Cams® uses a .140" gauge diameter. All of the Magnum and Hi-Tech™ Pushrods listed in this catalog are measured using this technique. See Diagram B on the following page.

### 4. Simple measurement techniques

The above was not meant to confuse you needlessly. We know that most people don't have access to the special gauge required for these measurements or even to a dial caliper large enough for most pushrods. We've developed two techniques to help you determine exactly how long the pushrod is that you so diligently played with until the perfect valve train geometry was achieved in your engine.



## Verifying Pushrod Length And Rocker Arm Geometry (continued)

**Theoretical Length:** This assumes that the pushrod has no oil hole in the end of it. Therefore, the radius at either end is complete, which lengthens the pushrod approximately .017" in the case of a 5/16" pushrod with .100" diameter oil holes, minimally chamfered.

**Actual Length:** This is what you would measure if you had a set of calipers large enough to measure over the oil holes at each end of the pushrod. This is the measurement that most people can relate to.

Unfortunately, this measurement is affected not only by the diameter of the oil holes but also by the entrance chamfer for each oil hole.

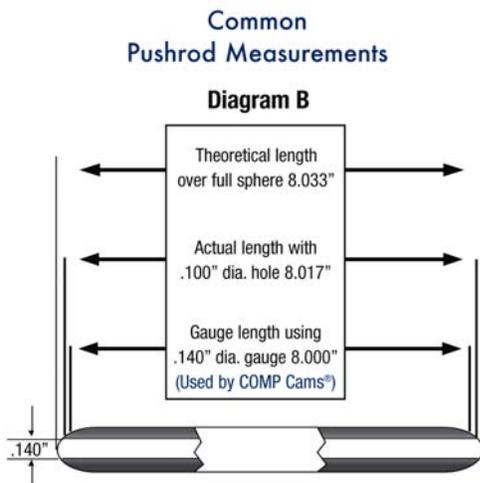
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### Pushrod Measurement Techniques

**Technique #1:** This technique assumes that you have purchased one of our Hi-Tech™ Pushrod Length Checkers. These are marked with a standard length stamped in them. This number represents the gauge length of the part (.140" gauge diameter) with the two halves screwed completely together.

Extending the pushrod one rotation lengthens the gauge length .050". For example, a pushrod stamped 7.800" screwed apart one rotation would be  $7.800" + .050" = 7.850"$  gauge length.

Therefore you would order the part number from the catalog that matches this gauge length, since gauge length is how they are listed.

**Technique #2:** This technique assumes you have purchased one of our Magnum Pushrod Length Checkers. Once fixed, you don't need to have an expensive gauge or a pair of calipers to measure it.

You just need a pushrod of a known length to compare it to (a standard). Then use a pair of common 6" calipers to measure the difference between the standard and yours.

A few final hints about pushrods in general. It is always a good idea to buy a few spares when purchasing a set of custom length pushrods, and stick them in your toolbox. If one ever fails at the track and you need a replacement, it would be nearly impossible to borrow one from a fellow racer.

Another hint involves cup end pushrods. Measuring them for length is especially difficult, no matter which technique above you choose to use. The size and shape of the cup end varies greatly from manufacturer to manufacturer, so measuring from the ball end to the cup end over the cup surface is a dangerous practice. The best strategy is to drop a 5/16" diameter steel ball into the cup end, and do all your measuring over this ball, subtracting the 5/16" diameter (.3125") to figure the length.