

## ***Degreeing In Your Camshaft***

Degreeing In Your Camshaft means synchronizing the camshaft's position with the crankshaft. A few degrees of misalignment can affect the engine's operation dramatically. If there were no manufacturing tolerances, you would only need to line up the marks on the timing chain sprockets and the cam would be degreeed, but with a group of components (the camshaft, crankshaft, timing chain, and sprockets) all with their own standards and tolerances that when installed, can stack up against you. You can never be sure that the cam is in it's correct position. Whenever possible, always degree in your cam.

The basic tools required are a degree wheel, a stable pointer that can be mounted to the engine, a dial indicator with at least a half inch of travel in .001" increments with a stand that mounts it to the engine, and a positive stop device to locate T.D.C.

**DISCONNECT THE BATTERY!** Do not use the starter to perform any of these steps. To find Top Dead Center use a piston stop to stop the piston in, the same position on either side of T.D.C. and take readings from the degree wheel. You will then split the difference in these readings and move the pointer this amount, making it the true T.D.C. point. First mount the degree wheel on the end of the crankshaft, and rotate the engine to approximate T.D.C. Mount the pointer and line it up at zero on the degree wheel. Now rotate the engine to move the piston down into the cylinder. Install your positive stop device into the spark plug hole and extend the bolt. Now hand turn the engine rotating until the piston comes up and stops against the bolt. Look at the degree wheel and write down the number of degrees shown by the pointer. Hand turn the engine in the opposite direction until the piston comes up, and stops on the bolt again. Go back to the degree wheel and write down the degrees it now reads. Add these two readings together and divide the answer, by two. Now either move your pointer by this many degrees, or carefully loosen the degree wheel (without disturbing the position of the crankshaft) and move the wheel this required amount. Retighten the bolts, and rotate the engine again making sure that the readings on each side of T.D.C. are equal degrees away from zero. If they are, the zero on the degree wheel will now be the true T.D.C. point. Remove the positive stop device from the spark plug hole.

After you're done finding TDC proceed with the following:

Remove *ALL* lash.

With your dial indicator on the retainer or follower, rotate the engine in the direction it would normally turn, and come up to .050 inches of lift. Write down that figure. This is your opening figure. This is when the intake opens **BEFORE** Top Dead Center. Example would be 10 degrees on the degree wheel BTDC.

Now go over the top on the lobe until your indicator is .050 inches off the Base Circle. Now you should be where the intake closes **AFTER** Bottom Dead Center. Keep in mind to continue turning the engine in the same direction it runs and **DO NOT BACK UP**. Example would be 39 degrees on the degree wheel ABDC.

Now you can calculate your duration. The valve opens at 10 degrees, plus it closes 39 degrees, plus 180 degrees. (the crank turns 2 times as fast as the camshaft) Your duration at .050 inches of lift would be 229 degrees. (10 + 39 + 180 = 229) Now you can calculate your lobe center . Divide your total duration by 2 and subtract your intake opening figure, (This would normally be the smaller number of the two)  $(229 / 2) - 10 = 104.5$ . This is your lobe center.

You may move the cam to the desired lobe center and check again. If you move the lobe centers closer together, it would normally give you more low to mid range. If you move the lobe centers apart, it would normally give you more mid to top range. Not all engines can handle tight lobe centers. Certain applications require wider lobe centers, such as stock fuel injected engines or blown applications. For our best recommendation, please call WEB-CAM direct. Always check all clearances (and check for coil bind) when degreasing in cams. Check the exhaust in the same way.

Please note:

If you have a low overlap cam, the intake opening may be AFTER TDC, if so, you will have to SUBTRACT that figure from the closing number and add 180. This will be the duration at .050 inches of lift.  $(39 - 10 + 180 = 209)$  Divide the number by two, and add back in the opening number.  $(209 / 2) + 10 = 114.5$  This will equal lobe center. The same thing may happen on the exhaust side with your closing number, it could close Before TDC. If you need help, please call us direct. Thank you.

MINIMUM	3500	
RPM		
MAXIMUM	7000	
RPM		
VALVE FLOAT	7500	
X LIFT	ATDC	DURATION
05		238 <sup>a</sup>
15	BTDC	246 <sup>a</sup>