



## CHECKING PISTON TO VALVE CLEARANCE

### *Technical Advice*

When you install a high performance cam, it is possible that there may not be sufficient clearance between valves and pistons when near TDC on overlap. Even if they don't touch when you rotate the crankshaft slowly by hand, they may hit and damage the engine at high revs due to slight "Floating" of the valves, stretch in the rods, deflection in the valve train, and other causes.

We recommend at least .080" clearance between intake valves and pistons at all times, and at least .100" for exhaust valves, which expand more with heat. Add .030" to these figures if you have aluminum rods in the engine to allow for their expansion and stretch.

If you are using aftermarket heads, many of them have modified valve positions and/or valve angles. This may cause valve to piston valve relief alignment problems. If your engine is equipped with an aftermarket head of this type, we recommend checking piston to valve over a broader range. The easiest way of checking piston to valve clearance in an engine, with the cylinder heads installed, is to install a pair of light checking springs in place of the valve springs. These light checking springs will allow you to depress the valve easily at any time during the entire rotation of the engine, enabling you to measure the piston to valve clearance.

If you are going to use rocker arms with a higher than stock rocker ratio now or in the future, you will need to check piston to valve clearance with the higher ratio rocker at this time. (Higher ratio rockers increase gross valve lift). After the light checking springs are installed in place of the standard valve springs, install the rocker arms and then adjust valve lash to zero, zero lash will work best to give you flexibility if at any time you want to tighten or loosen lash to change performance characteristics, and you'll know that you have sufficient clearance.

Be absolutely certain that you use the correct type of lifter for the camshaft that is being checked. This means a flat tappet for a mechanical or hydraulic cam (do not use a hydraulic lifter, as the plunger can move), or a mechanical roller tappet for a roller camshaft. Remember; always use a flat tappet lifter on a

flat tappet cam and a roller lifter on a roller cam. As a general rule, the closest point of piston to valve clearance during the rotation of an engine is between 15 degrees and 5 degrees before top dead center overlap for the exhaust valve and between 5 degrees and 15 degrees after top dead center overlap for the intake valve. This sequence takes place during the overlap cycle when both valves are open, 360 degrees from the top dead center compression stroke.

1. With your degree wheel still mounted to the engine in correct TDC position, and the valves adjusted to zero lash, turn the engine in its normal direction of rotation until you come to 15 degrees before top dead center overlap on your degree wheel, then set the tip of the dial indicator on the exhaust valve spring retainer, in line with the movement of the valve. (Figure 8) Preload the dial indicator to about the mid-point of travel, and set to zero. Depress the valve with your finger by pressing on the valve end of the rocker arm until the exhaust valve contacts the piston, make a note of the reading on the dial indicator, and record the clearance. Now, continue turning the engine in its normal direction two degrees at a time, checking and recording the clearance every two degrees until you reach top dead center, on your 7 4/00 803 Figure 8. Degree wheel. Remember, since the valve will be moving, the dial indicator will not return to zero. You can either subtract the difference or reset the dial indicator back to zero each time before you make your clearance check.
2. Move the dial indicator to the intake retainer and start checking the intake piston to valve clearance the same way you checked the exhaust, except begin at top dead center and continue to 15 degrees after top dead center, turning the engine in its normal direction of rotation. The actual position of closest piston to valve clearance will depend on how far advanced or retarded your cam is. Remember, as you advance your cam you will lose intake piston to valve clearance and as you retard your cam you will lose exhaust piston to valve clearance.