

THE EXTRA MILE

Engine Building and Power Techniques

BY SCOTT SEHR



Absolutely. The Most Motor For Your Money! Guaranteed



Checking valve to piston clearance



Checking ring end gap clearance

Putting it all together.

Now that all of our machine work and assembly washing is done it's time to get the cam degreed in and some clearances checked out. Without checking crucial clearances the engine will not perform up to its potential or have the reliability that's expected. If anything is overlooked, it has the potential to cause engine failure. Most engine failures that occur in the first 30 minutes of run time are due to an improperly set or overlooked clearance.

The first clearance to set up is the piston ring end gap. The end gap must always be checked to the bore it will be riding in. Too tight of a gap will result in extreme cylinder wall wear and possibly piston failure. An end gap that is too loose and the engine will have compression loss, crankcase pressure increases, and engine oil use. The gap that is right for engine use and components is an exact measurement and depends on the piston material, ring material, compression and fuel being used. The use of the engine, if forced induction or nitrous oxide is to be used, and expected engine temperatures are also key to this measurement. To find and adjust this gap we measure the ring gap with the rings placed square in the engine bore and then the ring gets carefully filed until the correct gap is achieved. When all the top and second rings are set, it is essential that all the rings get de-burred and the side clearance is also checked. The bearing clearances must also get checked. At Sehr Performance we check the bearing clearances using our precision bore gauges. Accurate bearing clearances are important for proper engine reliability and power output.

Now we are ready to install the camshaft making sure to use plenty of quality camshaft lube. The crankshaft is installed next using proper assembly lube and the proper torque sequence and specifications. Next the timing chain or gear drive gets installed. After all the rings are carefully installed on the correct pistons, number one piston and rod assembly gets installed. Using the TDC (top dead center) method, the intake centerline of the camshaft is checked and set to the correct degree setting. After the cam is in at the correct degree, the valve train geometry and valve to piston clearance must be determined. We put a little clay on the piston valve pockets and temporarily install the cylinder head with the head gasket and lightly tighten the head to the block. The number one cylinder valve train is installed using the correct valve setting for the camshaft used. If a hydraulic cam is being used, a solid type lifter will give a more accurate valve to piston clearance. The engine gets turned over by hand and the actual rocker geometry, spring coil compression, pushrod clearances, and all other related valve train components are checked. The head is removed and the valve radial and depth clearances are determined, if the clearances are too tight then the piston valve pockets must be machined out until the desired clearance is achieved. If it is too large and more compression is desired, a thinner head gasket is used or the head gets milled.

Every clearance in an engine must be accurately checked and set for the engine to perform to its full potential. At Sehr Performance we always go the extra mile so our customer's get a powerful and reliable engine.



Degreing in the camshaft

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