

THE EXTRA MILE

Engine Building and Power Techniques

BY SCOTT SEHR



Absolutely, The Most Motor For Your Money! *Guaranteed*

Up In Flames

It is well known that higher compression makes more horsepower but there is a limit depending on the fuel that is being used in your hot rod. Not all fuels are created equal, there are different properties and additives that are included in the fuel that make it perform better with the weather and altitude in which it will be used. Under the certain conditions the fuel-air mixture can spontaneously combust. Chemical additives are used to control how readily the fuel will burn and these chemical additives result in the octane rating of each particular fuel. A higher octane rating results in a slower flame travel and a more controlled burn rate. For an engine to run best, the fuel octane rating only needs to match the needs the compression ratio requires. Using a higher octane fuel in a low compression engine will actually hurt the engine's performance.

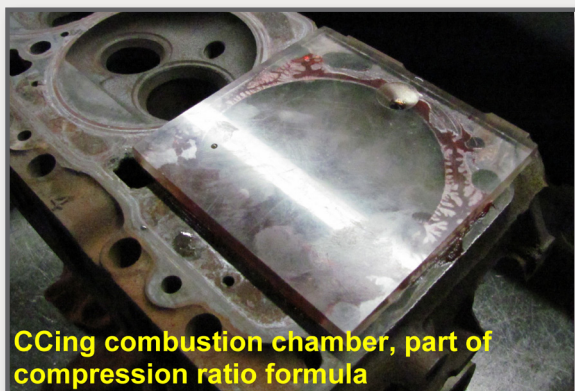
There are several factors that contribute to the formula on how much fuel octane a particular engine will need. One is the static compression ratio but that does not tell the whole story. Dynamic compression ratio and compression pressure also weigh heavily in determining the fuel octane requirements. Dynamic compression ratio takes in to account the compression pressure that is bled off due to the overlap of the camshaft and when the intake valve closes in crankshaft degrees. Other factors to that take into account

on fuel octane required for the best performance and prevent detonation are cylinder head material, combustion chamber shape, smoothness, quench, flame travel distance, engine operating temperature, incoming air temperature, spark plug heat range and ignition advance curve to name a few. Any oil getting past the rings and valve stem seals also influence octane requirements and the list goes on. Cranking compression pressure is the measurement of the dynamic pressure built by the engine and is a good baseline in determining needed octane requirements.

When pushing the envelope of higher compression with available fuel octane to get more power out of your hot rod there are consequences that need to be considered. Detonation will occur more readily under high loads at lower engine RPM so the correct rear gear ratio, tires size and torque converter must be used to prevent damage to your engine if you are equipped with an automatic transmission. At higher engine RPM events are happening more quickly so detonation will be less likely.

At Sehr Performance, we take all these things into consideration and go the Extra Mile to make sure that your engine will perform to the intended limit.

Let us help you get the **"EXTRA MILE"** out of your next build.



CC'ing combustion chamber, part of compression ratio formula



Measuring deck clearance, part of compression ratio formula