

# Miscellaneous Engine Q&As

## Readers write...

**Q.** I am an airframe and powerplant (A&P) mechanic building a 1/2 VW. I am building a set of cylinder heads for the 1/2 VW.

My question is about combustion chamber shape. I've built heads and engines for circle-track cars. The in thing then was leaving a lot of squish area to promote turbulence in the combustion event.

However, in *Hot VWs* and other publications, the combustion chamber appears to be hogged out, sort of semi Hemi. I have also seen a term called "plunge cutting" the head. Generally, preserving the squish/quench area delays the onset of pre-ignition and allows more compression and less ignition advance with less trouble. You have stated that you get more torque out of a lower compression ratio. In your experience, do you believe it is because the duration of the combustion event is longer?

Are we shooting for a slower burn rate, because the cylinder pressure rise is too fast in a traditional race-type engine? And, can we still utilize the squish area, if we run a lower compression ratio?

John Wenz  
Via e-mail

**A.** When turning a propeller, we want an agricultural engine, not a race engine. If we had an old 8N Ford tractor, we could pull a single-blade plow. A friend of mine milled the head and ported it to get more power. It sounded great like a race engine, but it would not produce the ability to

run "smothered" on the bad side of the torque curve.

*A propeller is always a compromise. We prefer climb over speed, and the bigger the diameter, the better the climb rate. On a direct-drive application, the larger diameter propeller must have a lower top rpm because it needs to stay below 0.85 Mach.*

*The optimum propeller diameter for a VW engine is 54 inches with a 24-inch pitch. This needs to turn 3000 rpm, minimum, to deliver tolerable climb. Elevating compression, bigger valves, and high lift cams subtract from the rpm, and temperatures go up around 400°F or above.*

*I shim the cylinders to bring the deck clearance to 0.090-inch below the top of the cylinder (low limit for VW engines), use small valve heads, and use a stock camshaft. This drops the cylinder head temperature to around 230°F and raises the static full-throttle rpm to 3200. The hopped up VWs give 1.08 gph, whereas my little one reaches 1.17 gph.*

*The propeller could be made smaller to allow the engine to get into the hot rod range on rpm, but the mileage and climb would go the wrong way. In my opinion, the problem is that we tend to think of optimizing things, like we would on a race engine. What we should be thinking about is a compromise between the propeller and the engine to get a tolerably safe climb angle.*

Bill Bronson

**Q.** My engine, a Kawasaki 440, was running good; now it doesn't have as much power and spits a lot of gas out


of the carburetor. I recently took the air filter off, so maybe I just didn't notice the exiting fuel before. Any thoughts?

Jaeger Wing Center  
Via e-mail

**A.** Generally speaking, two-strokes will spit some fuel out of the carburetor, but usually only during high power settings, and only a slight mist. This spitting is based on the action of negative and immediate positive pressures inside the crankcase. However, if this back spitting is abnormal, particularly at low power setting, and you are experiencing power loss, there is a problem.

Here are some causes to consider: stuck or worn piston rings, excessive piston clearance (worn cylinder and/or piston), or a slight engine seizure that may cause the rings not to seat against the cylinder. If the engine is more than 3 years old, or is a high-time engine, the crankshaft center seal may be failing. Using the wrong oil can affect the seals, too.

A compression test will reveal stuck rings or excess wear. Spin the engine two or three turns, and the crankcase pressure should rise immediately. About 125 pounds plus is average. Pressure should build up quickly; if it rises slowly, the problem lies in the upper end. A pressure test will reveal if the center seals are leaking.

Pressure testing is inconclusive if the upper end is low on compression. You didn't mention how much running time the engine has, but if it is in the 300-hour range, you could have a combination of all those items mentioned. 

Torello Tacchi