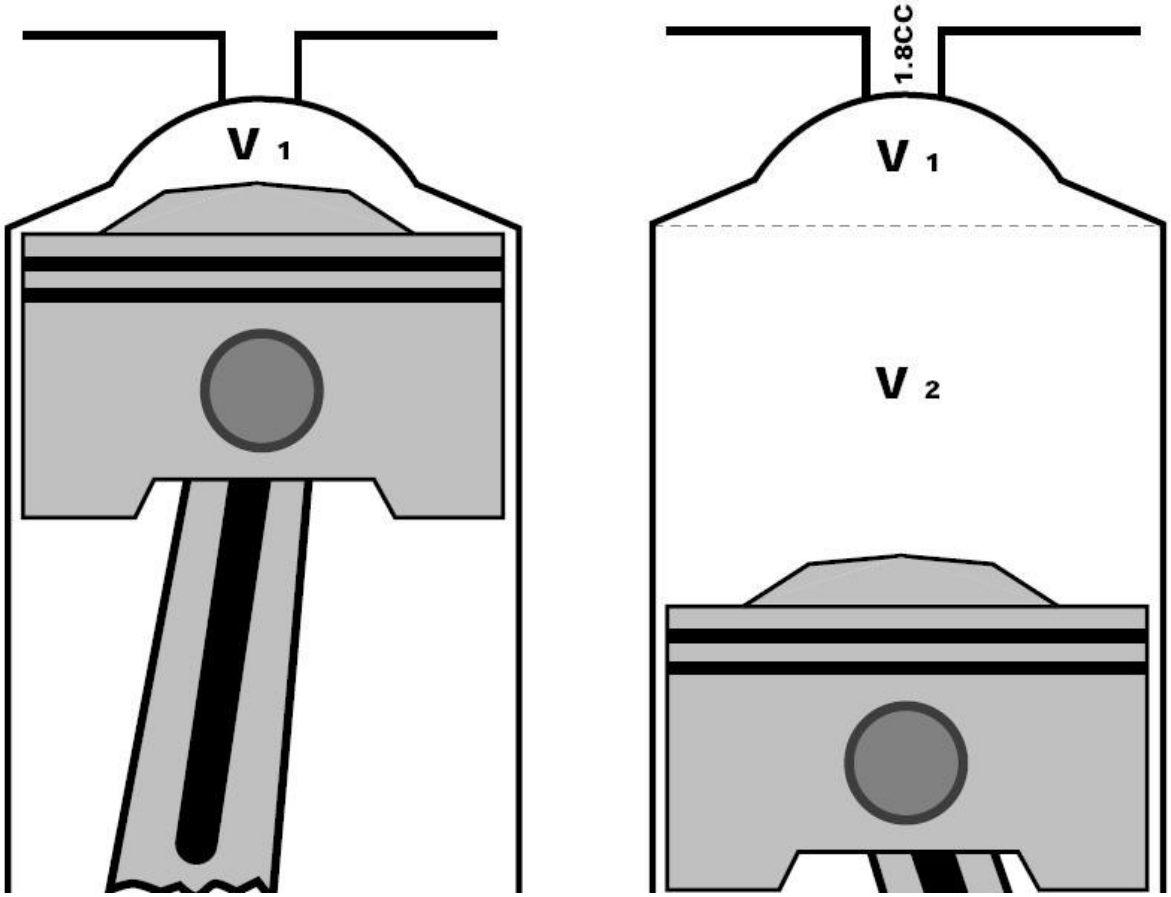
Simple Compression Ratio Calculation



V2 = CYLINDER VOLUME + HEAD VOLUME (V1) - 1.8CC*

$$\text{COMPRESSION RATIO} = \frac{V_2}{V_1} = \frac{\text{CYLINDER VOLUME + HEAD VOLUME - 1.8CC*}}{\text{HEAD VOLUME - 1.8CC}}$$

*** NORMAL SPARKPLUG THREAD VOLUME = 1.8CC**

Compression Ratio Calculation

An engine's compression ratio is a key factor in how the engine will perform. Generally, engines with high compression ratio (10:1 and higher) have less resistance to detonation and require high-octane gas. Engines with high compression ratios are generally not used in forced induction since the margin for error is greatly reduced. Compression ratio is a fiercely debated subject. This article is not about what compression ratio is "the best"...it is about how to calculate it and how to achieve a desired compression ratio.

On the surface, calculating your compression ratio seems like a very simple task. You can find it using this formula:

$$\text{Compression Ratio} = \frac{\text{Volume at BDC}}{\text{Volume at TDC}}$$

To **accurately** calculate compression ratio, you must know several things:
1) The bore of the cylinder
2) The stroke of the cylinder
3) The volume of the combustion chamber
4) The **compression height** of the piston (Ask for this from the piston manufacturer)
5) The dome/dish volume of the piston (Ask for this from the piston manufacturer)
6) The piston-to-deck clearance (See specifications on piston-to-deck clearance.)
7) The thickness of the head gasket
8) The bore of the head gasket

it sounds like a lot, but if you're going to do this right, do not skip out on the details!! Know **everything** about the parts going into your engine. The actual formula for calculating compression ratio based on the above variables is extremely long, complex, and leaves a lot of room for errors. Instead of trying to calculate by hand, I prefer to use a compression calculator.

