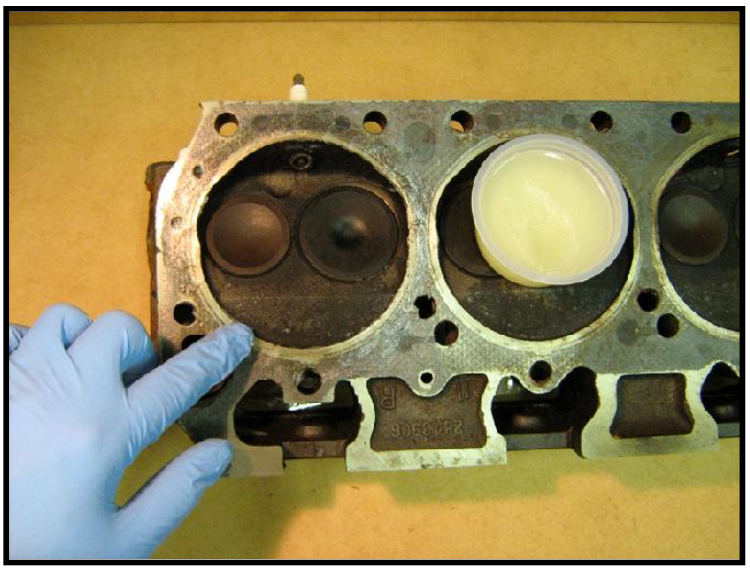
Steiger Performance Universal Cylinder Head CC Kit

Thanks very much for purchasing this Steiger Performance Cylinder Head CC Kit! If you encounter problems or have any questions or comments, please feel free to contact me via e-mail at jon@steigerperformance.com.

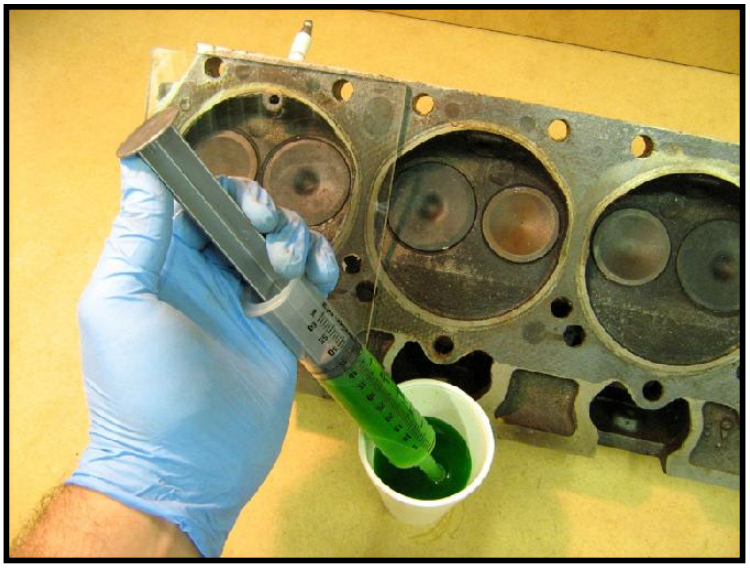
These instructions are available in Adobe PDF format on the Steiger Performance web site at http://www.steigerperformance.com

Note: A big block Mopar cylinder head is pictured in this document; however the procedure is basically the same for any head. Also, the injector included in this kit will be graduated in CCs (cubic centimeters) or mLs (milliliters). For all practical purposes, they are the same; 1cc = 1mL. (Technically, 1cc = 1.000028mL, but this insignificant difference will not influence your results.)



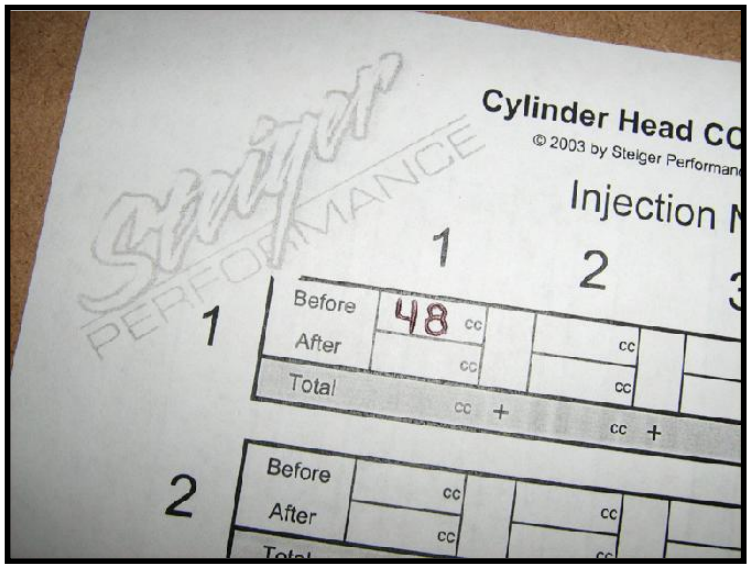
Before you can CC a head, the valves, valvesprings and spark plugs must be in place. The head surface and combustion chambers should be clean and dry. Begin by spreading a thin coat of petroleum jelly around the cylinder bore. The purpose of the jelly is to act as a seal and prevent the fluid from escaping between the surface of the head and the deck plate.

Next, position the acrylic deck plate on the head over the chamber you are attempting to measure. Press down and wiggle it slightly to make sure there is a good seal. Position the head at an angle such that the hole in the deck plate will be at the top. The hole should be as close to the edge of the chamber as possible.

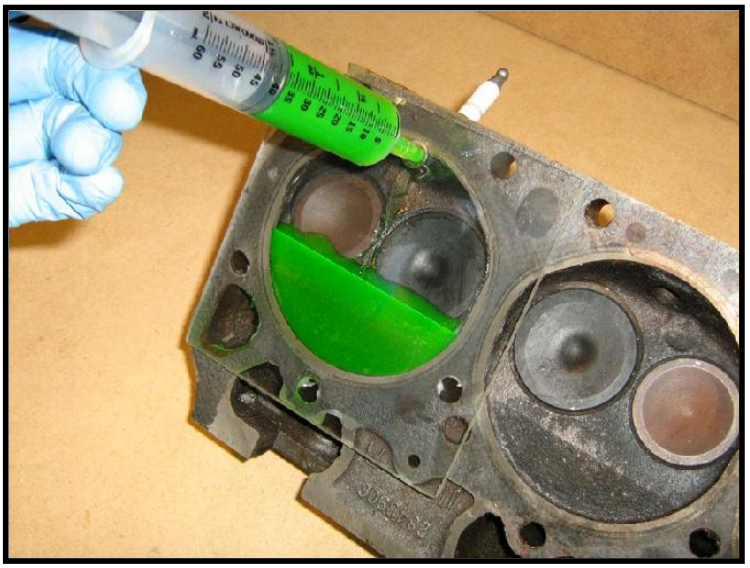


Draw some fluid into the injector. You can use just about any liquid you like; from tap water to a light oil. In this case, I am using antifreeze because its bright green color makes it easy to see and if I happen to miss some of it when cleaning the head afterwards, it will not promote rust like water might.

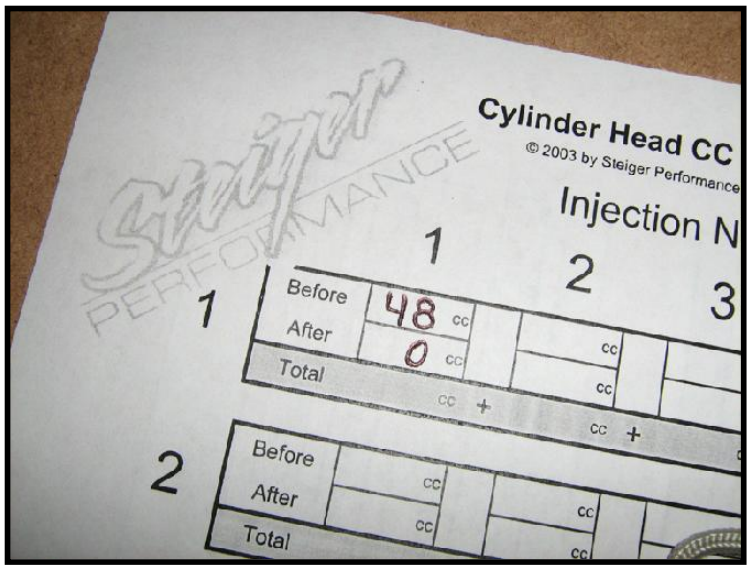
You may find that adding some alcohol to the fluid will help to break the surface tension, reducing the likelihood of air pockets under the deck plate. With the fluid in the injector, turn it upside down and remove any air bubbles. Tip: Keep pushing the plunger and stop on one of the hash marks to make your “before” reading easy.



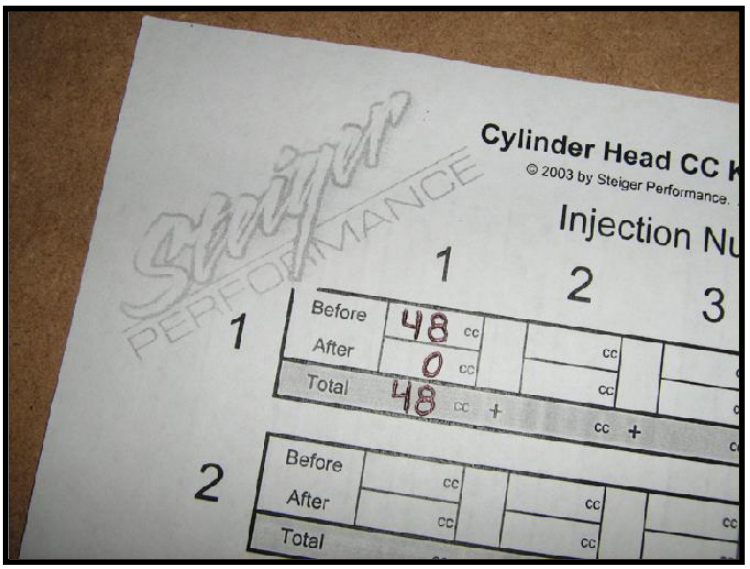
Write down the "before" reading in the "Injection Number 1" column for the cylinder you are checking. In my case, the "before" reading was 48cc.



Inject the fluid into the head through the fill hole. Keep an eye on the edge of the bore to make sure that none of the liquid is leaking out past the deck plate. If there is a leak, you should clean out the chamber and start over.



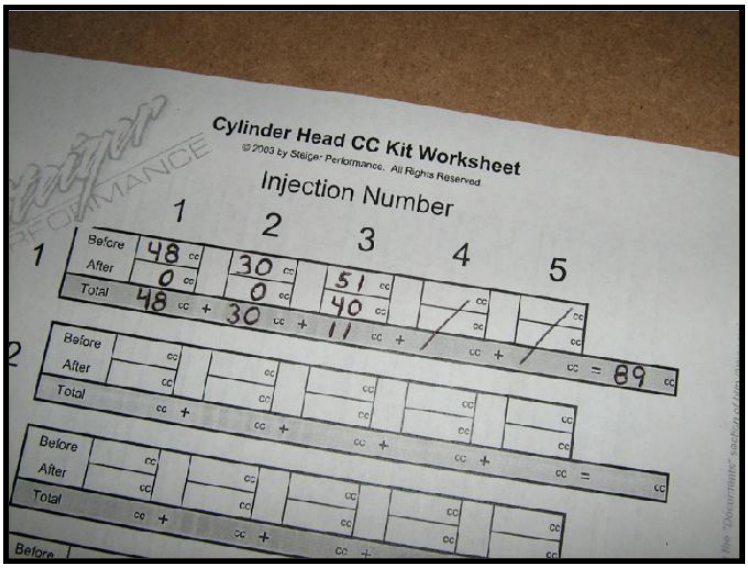
Write down the "after" reading for injection number 1 for the cylinder you are checking. In my case, I bottomed out the plunger and emptied the injector, so this was 0cc.



Subtract the "after" reading from the "before" reading and record the difference in the grey box at the bottom. This is the number of CCs used during this injection. For me, this was 48cc. (48cc – 0cc = 48cc)

Now, repeat the process again and record the results in the column for "Injection Number 2", then number 3, and so on for as many injections as it takes to completely fill the combustion chamber. Once the fluid level reaches the bottom of the fill hole, you are ready to start tilting the head horizontally.

Your goal is to work the head into a horizontal position while filling with the injector and preventing air bubbles in the combustion chamber. You can use some shims to hold the head horizontal or just steady it by hand. The supplied mini-level can be used to ensure that the head is perfectly horizontal; just set it on the deck plate as shown at left. Fill the chamber until the fluid level comes up to the bottom of the fill hole while the head is completely horizontal.



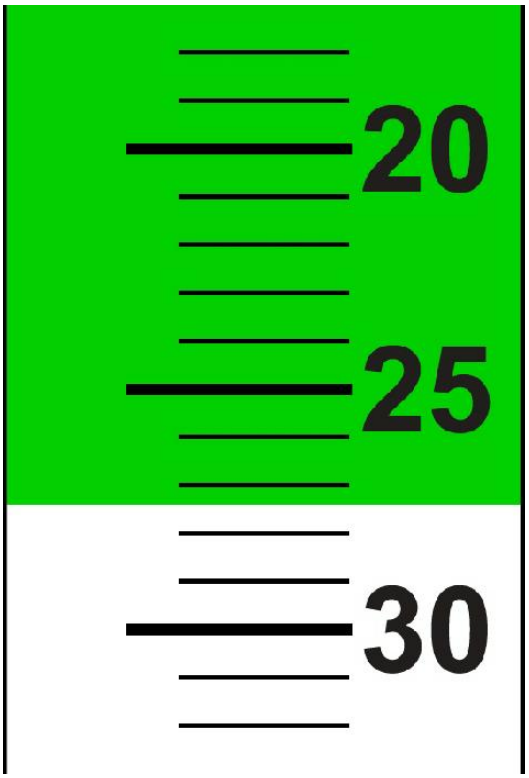
Once you have recorded your readings for the last injection, add up the numbers in the grey "Total" row to compute the size of the combustion chamber in CCs. There is a spot to record this number at the right hand side of the row. In the example to the left, it took three injections; the first was 48cc, the second was 30cc and the third was 11cc for a total of 89cc. Thus, the volume of this combustion chamber is 89cc.

Use a cloth to clean the acrylic deck plate. Wood based products such as paper towels can be used but be aware that they might scratch the surface. An old terrycloth towel works great; no water or cleaning solution is necessary – just wipe off the jelly with a clean, dry cloth or towel. Should the plate require a more thorough cleaning, some window cleaner (i.e. Windex® or similar) should do the trick.

A NOTE ABOUT READING THE INJECTOR:

Except for very small cylinder heads, it will probably take a few injections to completely fill the combustion chamber. The initial injections are pretty easy because you can start with the liquid level right on a hash mark, and you can completely bottom out the plunger to zero, which means that particular injection works out to be whatever the starting fluid level was. However, on the final fill, you will not be able to bottom out the plunger or control where it stops – you will stop when the combustion chamber is full. This means that the fluid level is not likely to fall exactly on a hash mark.

Looking at the example picture to the right, what would be the reading? Each hash mark is 1 CC, so it is at least 27cc. However, its not quite 27.5cc, which would be exactly halfway between the 27cc and 28cc hash marks. 27.3cc perhaps? Or is it 27.4cc?



Due to the fact that there are approximately 20 drops[1] of fluid per CC, there is a way to get more accuracy than is possible via the "eyeball method". Position the injector above a surface where you will be able to hear the drops as they hit, maybe something along the lines of a piece of tin foil or an empty pie plate. (You must count the drops and listening for them is probably easier than trying to watch the drops and the fluid level at the same time.) If you prefer, you can do it by feel; dripping them onto the back of your hand perhaps. You could also have an assistant count the drops or videotape yourself. However you decide to do it, what you will need to do is to keep a close eye on the fluid level while pressing the plunger *slowly* to squeeze out the fluid one drop at a time while counting the drops. Stop once the fluid level reaches a hash mark. Divide the number of drops that fell by 20 and add that number of CCs to the current injector reading. Continuing with our example at the right, lets say that you moved the fluid level back to the 27cc mark and it took 8 drops to do so. 8 divided by 20 is 0.4. 27cc plus 0.4cc is 27.4cc. If you go past the nearest hash mark, don't worry – just keep counting, and continue to the next mark. For example, if you had gone by the 27cc mark and stopped at the 26cc mark, you would have used 28 drops. 28 divided by 20 is 1.4. 26cc plus 1.4cc is 27.4cc. Using the above method, it is possible to take very accurate readings.

1 - A "drop" is not a standard unit of measure - droplet size will vary due to various factors including temperature, pressure, fluid viscosity, surface tension, nozzle size and shape, etc. As such, if you plan to use the above method and want to get every last little bit of accuracy possible, you should experiment with the fluid you will be using to see how many drops per CC you get, then use that number in your calculations. My personal experience has shown that when using antifreeze I get 20 drops per CC whereas tap water yields approximately 13-14 drops per CC.