

How to CC a Head

by Tom Carnegie

A bit of history:

When my brother and I first got involved with the Montana 500, low heads were allowed. The rule was changed in the fall of 1974 to only allow high heads. I believe the thought was that low heads were getting too hard to find, so why not only allow high heads, of which there is a good supply. There also might have been some concern that someone might come up with one of the very early heads made for flat-top pistons that had a far smaller combustion chamber. As time went along, folks did some tricky things under the heading of "no limit to the amount of milling of the head." I have been told that one guy poured a layer of babbitt into the combustion chamber to increase compression. When he was sure that his car was declared "legal" at the teardown, he proudly proclaimed "look what I done!" As you mill a high head, the section in the center is usually the first part to get weak. To overcome this weakness some folks took to internally (inside the water jacket) bracing their heads with a piece of angle iron held in place by an extra bolt. This bolt was then hidden by a temperature sender, or some such thing. The brace was however discovered during teardown on one car that was so equipped, and the motor (or rather the driver) was disqualified. As time went along people got trickier. The deck of the head and the combustion chamber were sometimes manipulated to allow more milling or to make the combustion chamber smaller. The club devised a contour gauge to try to stop the chamber manipulation.

No rule, nor any way to police the deck manipulation was found or used. There was a lot of argument, or maybe "discussion" is a better word, as to whether this manipulation was illegal or not, with many drivers insisting that it was legal. Some folks also found out that certain heads, either from Canada, or those made in US around 1917 had thicker decks than the later ones. I (and probably others) found that often heads would have a "core shift" when they were cast, so the combustion chamber was noticeably shallower on some heads than others. Also the deck, even on early heads are often thicker on some heads than others, presumably for the same reason. So, if you had a large supply of heads, as I have, you would go through them all and find the one with the thickest deck and shallowest combustion chamber, and mill the heck out of it. Even at that though, the heads would only last so long before they would fold up and die. The group in Spokane got to talking about this and decided that the Montana 500 shouldn't be a contest about who can mill their head the most, which is essentially what it had become.

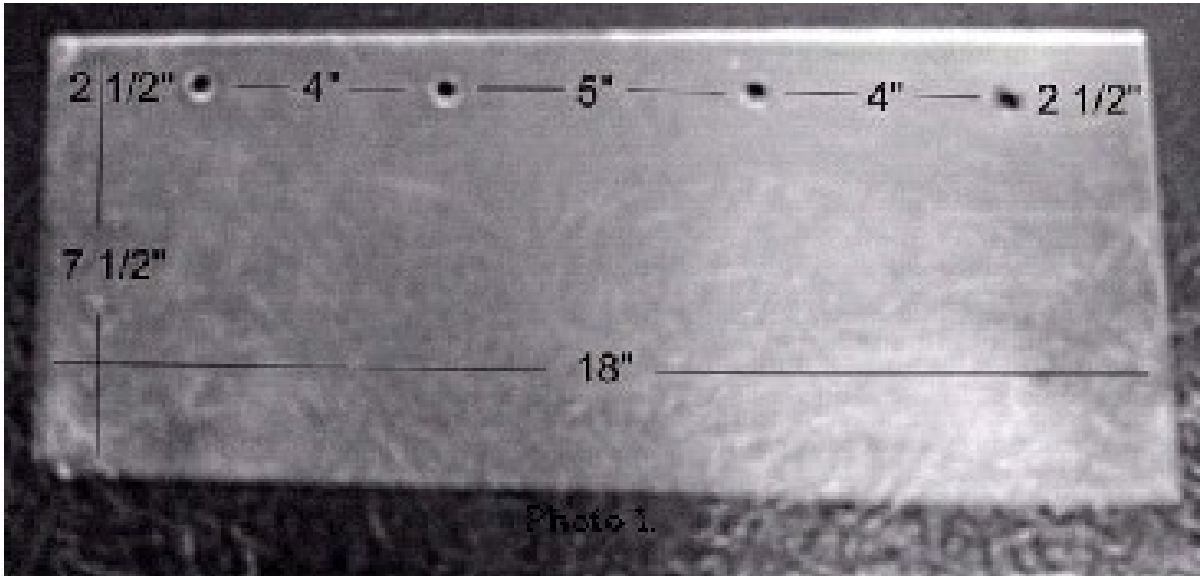
After a bit of thought it was decided to restrict the milling of the head to about .080". A high head starts out at about 300 CC's. Milling it .080" to .100" puts the CC's at about 275. Then someone said, "why not allow low heads?" A low head typically starts out life at around 280 CC's, so just cleaning it up would put it at around 275. At teardown time as the inspectors were CC'ing a head, there was quite a bit of discussion about the proper method to be used. Should you use the sparkplug or fill the sparkplug hole with a pipe plug, or perhaps clay? Do you include carbon that has accumulated in the combustion chamber or make an allowance for it? Does the combustion chamber include the head gasket or not? The rules were clarified.

Clay would be used to fill the sparkplug hole. Carbon, we didn't address. The headgasket is not part of the chamber. Rather than force people to get new heads to meet with the clarified procedure, an additional 5 CC allowance was subtracted from the original 275 CC

limit. The new limit became 270 CC's.

How to do it:

The method we use is to get a big syringe at the farm store. The biggest we could find was 60 CC's. Get a piece of Plexiglas approximately 18" X 7". Drill four 3/8" holes. (See photo 1.) Put a thin layer of grease around each combustion chamber.



Use some modeling clay to fill the sparkplug hole flush. Invert the head and stabilize it so that the valve side is slightly lower. Place the Plexiglas onto the deck, sealing it with the grease. Proceed to fill the chambers with water from the syringe, being careful to keep track of how much water you use.