

Well, it's March. I was hoping to be writing about my massive bicep resting on the door, top down, wind ripping through my flowing blonde hair, sun glinting off the chrome, and the sound of Bruce Springsteen being drown out by 6 or 7 hundred horsepower. Unfortunately I'm not AI and my bicep would be best



described as a 12 year old girl's, I don't own a convertible, my hair is more sparse than flowing, there is no sun, chrome, Boss or 700 horsepower and it is damn cold. The best I can offer you is this nice picture. So without further adieu, lets talk some tech.

I don't really think many people actually read this stuff, but for those that do, I'd like to remind you about the 13th century. I bring that up again because it is with great displeasure that I report to you all that the trans in the 98 has crapped the bed. In the 3.4 hours we had of decent weather, I decided to go out and beat the brass out of the car and see what happened. Well, it broke. I called the trans shop and in my best Goerge Thouroughgood said, "hey man". He asked who I was checked the records and depressingly sighed. That response is most common when I talk to speed shops or my wife. It turns out the shop's builder had some sort of melt down, left his wife, stole all the tools and slapped together some absolute raging junk on his way out. Guess who got the junk? I now get to remove and replace this transmission yet again. Yup, again.

This month I'm going to ramble a bit about heads. I'm in the process of buying a set and it's on my mind and well this is my damn article and nobody has asked for a topic so heads it is. Our engines are in reality just big air pumps. Pull air in, blow it up, push it out. Suck, Bang, Blow. I seem to recall being on my Harley and in a bar called Suck Bang Blow and I got a t-shirt. Now that I think of it, ever since I got married that t-shirt has been missing. That and a bunch of pictures of ex-girlfriends. Hmmm. Anyway, the way to make more power is to move more air. This is of course extremely simplified but for now let's just stick with this theory. There are a metric ton of ways to move more air but we are going to focus on heads and the basic properties. Please also keep in mind that more is not always better. But again for now let us pretend it is.

To look at a head, let's explore the basic way it works and helps an engine breathe. Air moves in through the intake where it is combined with fuel and into the head. An intake valve opens, that air/fuel mixture enters the combustion chamber which is directly on top of the piston. The piston comes up, squeezing this mixture; the spark plug fires and blows it all up sending the piston down. This makes go-go power. I like go-go power almost as much as go-go boots. The piston comes back up again compressing the blowed up mixture and when it gets back to the combustion chamber another valve opens allowing the spent fuel to escape through the exhaust and make terrific noise that if done correctly will immediately remove the clothing of beautiful women or whatever you're into. Now if you think back to what I said before an engine is just a big air pump and to make more power you just need to move more air. The bright bunch that you are should have identified at least a dozen ways in this paragraph to do just that. Increase intake, increase head runner, increase valve, hold valve open longer, increase efficiency of combustion chamber, and increase efficiency of exhaust, on and on and on. You are now a



hotrodder. Roll up your pant legs, buy a leather coat, grease up your hair, grab the nearest girl you can find with a poodle on her skirt and run off in your chopped up 32 Ford.

Obviously it's not all that easy but you get the point. Many of those things are related to the head so it's natural that people have been looking at heads to gain power, well, since transportation had heads and not a bucket of feed on one end and a bucket of crap on the other. So into the head.

Car manufacturers are no dummies (except in France, have you ever seen a French car?) and they of course realize all the same stuff dingbats like I do. But, they make cars kind of on the cheap and in some cases there is room to improve. I will say this though before we go any further, newer cars have pretty darn good heads. Horsepower wars combined with those fancy thinking boxes called computers have allowed them to design and make pretty good cheap heads. The engines overall are very efficient and I would say that if you have a 5th Gen Camaro, you are probably better off spending money on something other than heads. But, we will get into that someday and you will all argue with me. Until then, let's stay on point and explore ways to make a head work better.



You can enlarge and polish the intake runners to get more air and to get that air to move smoother as it enters the head. On most aftermarket heads the runners are larger and usually much smoother than stock iron heads or even the stock aluminum heads we have on the newer Camaros. The less turbulence and the less resistance, well for the sake of argument, let's just say it is better. There is a whole discussion we could have on velocity but we will keep this basic. In fact, I like a smaller quicker head over a large head but that whole thing is a dance and everybody has a better 2 step.

Anyway... when people talk about "port and polishing" heads they are referring to cleaning up the runners and matching them to the intake (gasket matching) and cleaning up the combustion chambers to try and get a more efficient burn. You can see in that pic where somebody cleaned up a bunch of the flash and generally smoothed out the area around the valve stem. That head, even in stock form is a sight better than any of the old school iron heads of lore. Remember my comment about computers and design tools and machining process? A stock LS3 head flows way better than a fuelie or camel hump or insert your drunken bar braggart cool iconic thing to say here. I laugh to myself every time I hear someone say ¾ race cam and camel hump heads. What you do with your camels should be kept at home. The point is technology has come a long way. Don't get me wrong, I love old school. I just sold my 2012, 600 horsepower SS because I drive my 67 all the time and it just sat. But there is no denying that a LS3 will knock the crap out of a 1967 350 and do so with many fewer puddles beneath it. The problem with the new Camaro is weight but don't get me started on that.

From the intake runners in the head we move to the valve. Common sense will tell you that a bigger hole or valve will allow more air in. Again, like my early disclaimer big is not always better but for the sake of discussion we will pretend it is. The thing with valves is there is only so much physical space in

the chamber, so you only have so much room to play with. It is tough to get any real appreciable gain by going to a larger valve alone because there isn't a whole lot of room to grow.

Next the air enters the combustion chamber. I will be honest and I don't really claim to understand the voodoo that head porters do in there. I just trust they know what they are doing, keep my mouth shut and let them have at it. It's a technique that works well for me with complex things... like my wife. But the bottom line is much like the runners, the chambers can be worked to try and gain a more efficient burn and increase the bang. The other real important thing about combustion chambers is they help determine the static compression ratio of the engine. The smaller the chamber, the higher the compression all other things being equal. Higher compression will increase the bang and make more power, but if you go too high you run the risk of pre-detonation which is bad. When you hear people talk about the cc of their heads, they are referring to either the intake runner, 170-300ish cc, or the combustion chambers, 68-118ish cc. Again if you want an arsenal of neat things to spout on about in the bar learn all these numbers about your engine. You buy a head that is appropriate for your engine set up. For example I have a 489 big block that has a dome piston. A 112 cc chamber will get me close to 11:1 compression, a 118cc head around 10.2:1. To get where I want to be I choose a 116cc head.

Changing nothing else, (piston dome, head gasket thickness, deck height) you can determine the



compression ratio by changing head chamber size. If you were keeping your head and changing nothing else in the engine, you can mill the head or take material off the mating surface thereby reducing the overall size of the combustion chamber to increase compression. You see in this picture an aftermarket head with a smaller chamber compared to a stock head. You can also run a thinner or thicker head gasket to slightly alter compression. If you think about it, the thicker gasket moves the chamber farther from the piston top, increasing the size of the

chamber and lowering compression. Not a whole lot of room to play with there and it effects quench but don't worry about that for now.

The exhaust valve and runner follow basically the same principal as the intake so I think you can imagine how that works.

Well, that's it. A basic explanation of a head and what we change to try and increase air and make "powa". Next time we will probably talk about what controls all this movement, the cam and valve train, but for now I hope this explanation has at least peaked your interest and perhaps disturbed you enough to go find some source way smarter than me to continue your understanding. If you really want to hurt yourself, here is a link to flow numbers for common GM heads.

<http://purplesagetradingpost.com/sumner/techinfo/heads1.html>

See if you can make heads, (lol pun intended) or tails of it.

Pray for spring!

RJ

