

**CHEAP L92 HEADS: 44HP GAIN!**



**LS6  
KILLERS!**



# High-Tech PERFORMANCE

Electronically reprinted from February 2007

## INSIDE GM

**C5R/LS7/L92 HEAD COMPARO**

**LSX BLOCK: 511 INCHES  
ON A BUDGET**

**LS7 CAMARO  
DRAG TEST**



- **LS2 HEADS/CAM SWAP HOW-TO**
- **16 HOT NEW GMs REVIEWED**

**PRIMEDIA**  
The Authoritative Source



# WONDER *HEAD*

***GM's newly released L92 cylinder heads  
outperform many other Gen III/IV units on  
the market—and they're an absolute steal!***

# WONDER HEAD



*Basic specs on the L92 combustion chamber are as follows: the chamber volume is 68.4cc, and it uses a honkin' 2.165-inch intake and a 1.590-inch exhaust valve. As such, don't even think about bolting one of these suckers to an LS1 or LS6: it'll need at least a 4-inch bore to work. (And though we've been assured that stock piston valve reliefs will work just fine with these heads, we can't promise the large valves of the L92 will work with every possible aftermarket piston: if that's your route, proceed with some caution.)*

**BY CHRIS WERNER**

PHOTOGRAPHY BY RICK JENSEN AND COURTESY OF GENERAL MOTORS

Looking for a badass head, but don't have a lot of bread? Bargain build aficionados, your prayers have been answered: GM Performance Parts now offers the cylinder head straight off its 6.2L (RPO L92) engine used in the new Cadillac Escalade and GMC Denali-series trucks. This brand new mill—with its 4.065-inch bore, variable valve timing, and fuel-saving displacement on demand—is the showpiece of current GM small-block engine technology. But more importantly for all Gen III/IV enthusiasts, the L92's head flows so well, it'll offer bolt-on performance as good or better than many aftermarket CNC-ported heads on the market for a fraction of the price.

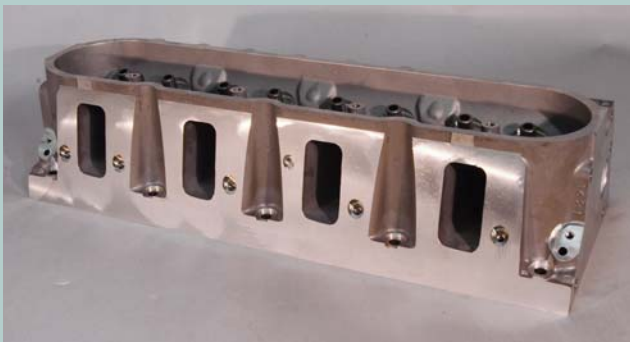
How is this possible, you ask? A head that costs comparatively so little may induce fears of the automotive equivalent of an Intel Celeron processor: are these defective, poorly performing castings that didn't come off the assembly line quite right? Or, perhaps they're a cheaped-out, skip-some-important-machining-steps version of a head GM already makes? Fortunately, none of these suspicions come anywhere close to the truth: in fact, the L92 is a top-quality, race-inspired unit that is so inexpensive simply because it's a high-volume production piece.

The photos you see here compare these new L92 castings to other

Gen III/IV units GM has already brought to market; we'll note some of the similarities and differences between them in the captions. But what's most exciting is that the L92 is, by and large, an early version of the head that ended up crowning the Z06's 427ci LS7 engine. So in other words, this ain't your ordinary truck head!

## HOW THE L92 CAME TO BE

To get the skinny on exactly how these amazing heads materialized, we talked to some of the folks who know at GM. The story begins a few years back with what would be the LS7 engine program—a project that drew significantly from GM Racing's experience with CSR technology. For the Sixth Gen Vette's killer model to truly dominate the competition, higher-ups decided a minimum of 500 hp would be needed from the engine powering the next Z06. Unsure of what displacement it would take to achieve these numbers in a naturally aspirated application, GM engineers began the task of meeting this mark by designing prototype heads for somewhat smaller bore diameters than would eventually make it to production. Dennis Gerdeman, Cylinder Head Design Release Engineer for the L92,



*With its rectangular intake ports, the L92 appears more like a race head than those you'd find on most other Gen III/IV engines. But its price speaks otherwise: bare heads can be had for about \$175 each (PN 12582714), and assembled heads for just shy of \$400 each (PN 12582713). Note that included with the assembled heads will be LS1-type valvesprings, retainers, and locks—so if you'll be using anything but a stock-type cam, stiffer springs will be in order.*



*The L92 and its not-too-distant cousin, the LS7. While the two heads have an outwardly similar appearance, a close look reveals that the LS7 (top) has intake ports that are shorter and fatter than those of the L92. Yet both port styles are substantially wider than traditional Gen III and IV heads, and much of this has to do with the offset intake pushrod setup utilized by both.*



Set side by side, the combustion chambers of the LS7 (left) and L92 show shared features in shape. Valves in the LS7 head, at 2.20 and 1.61 inches respectively, are somewhat larger than in the L92 and won't work on its smaller 4.065 bore (not to mention a 4-inch bore).



The exhaust ports of the LS7 and L92 are also quite similar, both using a D-shaped opening. In comparison to other Gen III and IV castings, says GM's Dennis Gerdeman, the L92 port opening is larger and the roof sits higher—so you'll need to watch whether your exhaust manifolds line up. Can you tell which head is which? Here's a hint: the LS7 isn't the one on the right.

explains. "When the LS7 was first being developed, its cylinder bore was not 4.125 inches. We kind of grew into that diameter as we pushed the envelope further and further and learned more and more from the C5R guys. We finally decided that more cubes would be needed to meet the 500hp goal, and it's at that point that we divorced ourselves from the smaller bores and went down the path of what would eventually become the LS7 cylinder head—maximizing its airflow with larger valves, CNC porting, and other features." But fortunately the LS7 team's early efforts at a smaller-bore head would not go to waste: when orders came along for a small-block truck engine with a minimum 400hp, engineers realized that this early LS7 design could be tweaked to work quite well for truck and SUV applications.

Chris Meagher, Assistant Chief Engineer for Small-Block Truck Engines, picks up the story. "We came to realize that with the high-flow heads that had been in development for the LS7, we had the prototype for a head that could be put on the truck small-block and pick up the airflow we needed to get to our 400hp design goal." With this preliminary head design in hand, the team was on its way toward what would eventually be the L92. Although the engineers ended up meeting their stated power goals in conjunction with increasing the L92's bore, bringing final displacement to 6.2L, happily, they made sure that the cylinder head configuration would also fit on the original 4-inch bore—and therefore be applicable to the existing 6.0L truck engine as well. "So the high-flow head on the L92 actually will work on both the 6.0 and 6.2L engine variants," continues Meagher. "The direct LS7 head continued to evolve and has a somewhat different configuration: the valve angles were changed, and you have a bigger intake valve in there—these features will not play with the truck engine. So the two head designs are not identical by any means, but the L92 is in essence what we were starting to develop along the way for the LS7. It has bigger intake and exhaust valves and a much higher flow capacity than the 'low flow' head currently on the 4.8/5.3L engines in production today."

## RACE BRED

As alluded to earlier, the LS7 program took significant cues from lessons learned in GM Racing programs, most notably the C5R. Says GM's Chris Meagher, "We had the C5R guys in to talk about what they did to get the flow they got out of a Gen III/IV head, because that was our obstacle to get to the 500hp LS7 design target. They showed us how they did it and gave our guys some ideas; we just had to match all that up with something we could do in high volume production." Fortunately for the L92, it also significantly benefited from some of these advances: features like a raised port floor and increased port width can be closely linked to racing influences.

But because the L92 was destined for production truck engines, says

Dennis Gerdeman, the L92 program really only took the racing knowledge early on, after which big-volume production concerns had to kick in. For example, the L92 maintains the 15 degree valve angle typical of most Gen III and IV engines, while the LS7 eventually took more of a page from the C5R book and ended up with a more upright 12 degree spec. "We worked with the racing guys hand in hand and learned as much as we could from them, and we still learned some further things on the LS7 later in its development," says Gerdeman. "But the L92 is a little different animal because of the high-volume manufacturing impact: it had to go down our existing production lines. We took everything we could feasibly apply to the program, but then that's where a lot of the lines got drawn in the sand: we had to maintain certain push rod lengths, valve angles, and so on. There were a lot of features that if we would have tried to incorporate them, it would have had a huge impact on manufacturing and would have driven up the cost of the L92 cylinder head tremendously."

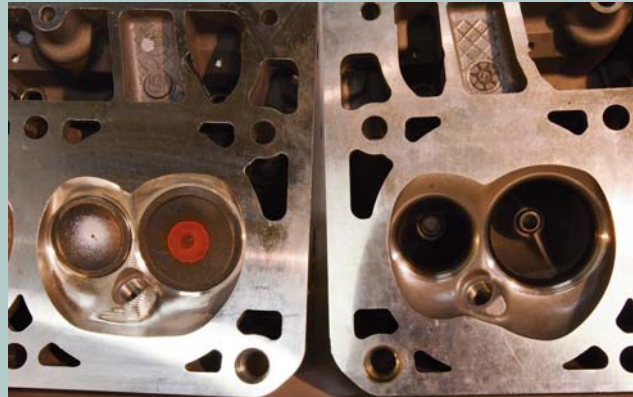
But even with those production-related constraints in place, substantial modifications were made as compared to previous production Gen III and IV cylinder heads—race-inspired changes obvious from even a quick glance at an L92 head. The raised intake port design is said to have been a very big enabler in meeting the stated power goals. "We pushed the roof up just about as far as we could without wiping out the valvetrain, and then we brought the floor up to accommodate the raised roof," says Dennis Gerdeman. "And the other big constraint for us has always been the width of the port: if you compare its width to a Gen III, the L92's is significantly wider, and right near the pushrod has always been our constraint. So we incorporated an offset inlet valve rocker arm, and that allowed us to pull that pushrod off to the side; now it's at more of an angle to the lifter, and when we did that we were able to widen the port substantially."

## WHAT IT MEANS TO YOU

Despite its race lineage, the L92 retains one feature that's somewhat unfamiliar to performance enthusiasts: it's as-cast, meaning it is not CNC ported in any way. Going this route had the primary purpose of keeping production costs down—and with how inexpensive this head is, you should be able to appreciate that. But don't let the fact that the L92 head never sees a CNC machine fool you: it's possibly one of the finest head castings ever, and man does this sucker flow (see flow bench numbers in the L92 test elsewhere in this issue). In fact, although GM Performance Parts will begin offering a CNC'd version of the L92 sometime in 2007, it won't deliver the kind of huge improvements the process often garners. According to one man on the project, GM Racing's Jeff Kettman, "The production L92 head is already so good, there's not much room to gain without altering the production casting. And for the CNC'd L92 head, we want to retain that casting so we can



Unlike the LS7, the LS2 head (left, actually a CNC-ported unit) shows some visually striking differences with the L92. Tall and narrow ports have been a part of the new generation small-block engine family since the original LS1—and while the LS2 continues that tradition, the L92 does not. Notice the raised floor of the L92 port, a main reason why standard intake manifolds won't bolt up. Intake port flow is claimed to be improved by a staggering 17 percent over the LS2 (which shares common ports with the LQ4 and LQ9 truck heads).

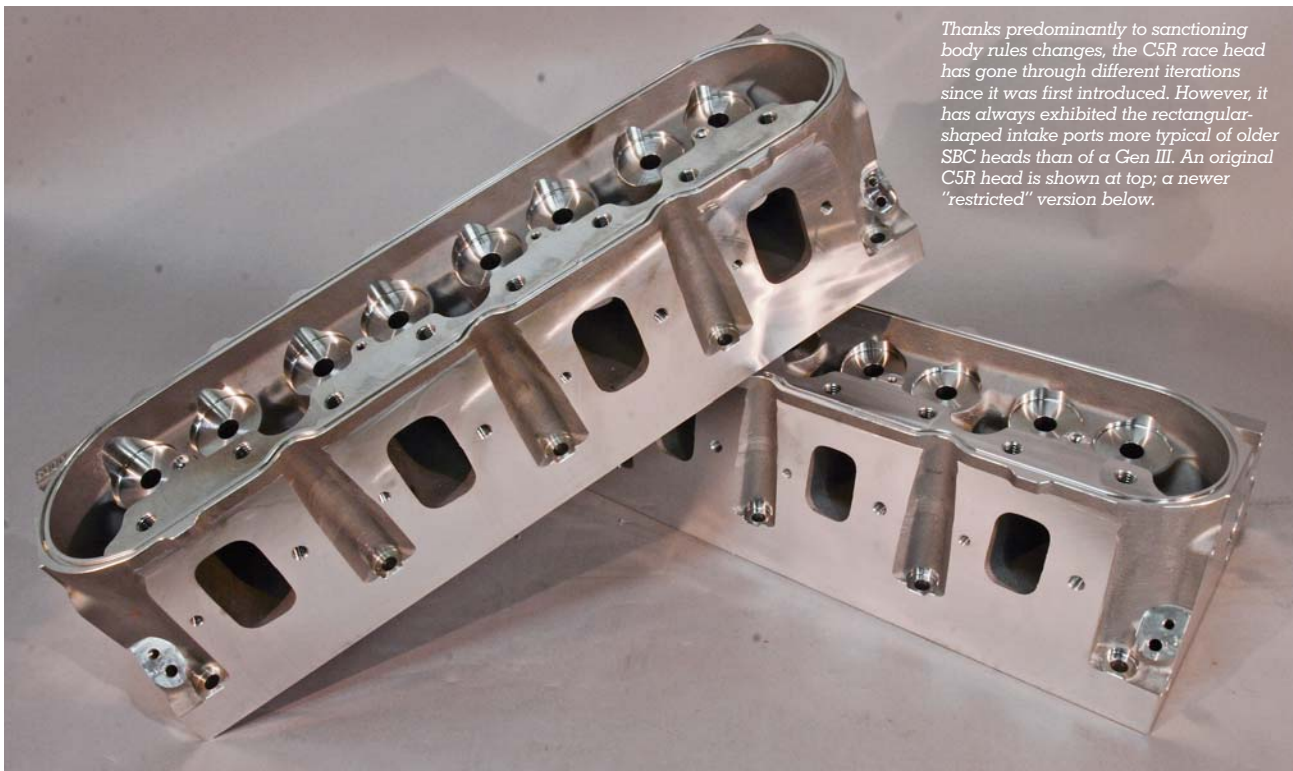


The LS2 and L92 combustion chamber designs are also conspicuously divergent. The LS2 (valves installed, here also a CNC-ported unit) has more of a traditional "heart-shaped" design, whereas the L92's looks more like a butterfly. The combustion chamber of the LS2 is somewhat smaller, at under 65 cc, and it has smaller valves: 2.00 intake / 1.55 exhaust.

keep all the benefits of GM production quality control as well as price point." (As a side note, we've also been assured that there will be more development in the coming years of L92-style heads; in fact, there will reportedly be a full family of rectangle-port GM heads in the future, both CNC'd and not! Stay tuned...). In other words, despite their cost-effective design and manufacture, big gains are in order just by popping L92s right on your ride!

But before you pull out the checkbook, know this: it's not a completely direct swap, and in order to bolt a set of these heads to your engine, a few different constraints must be met. First, (and we're repeating ourselves a bit here), although the production L92 engine features a 4.065-inch cylinder diameter, these heads were designed to

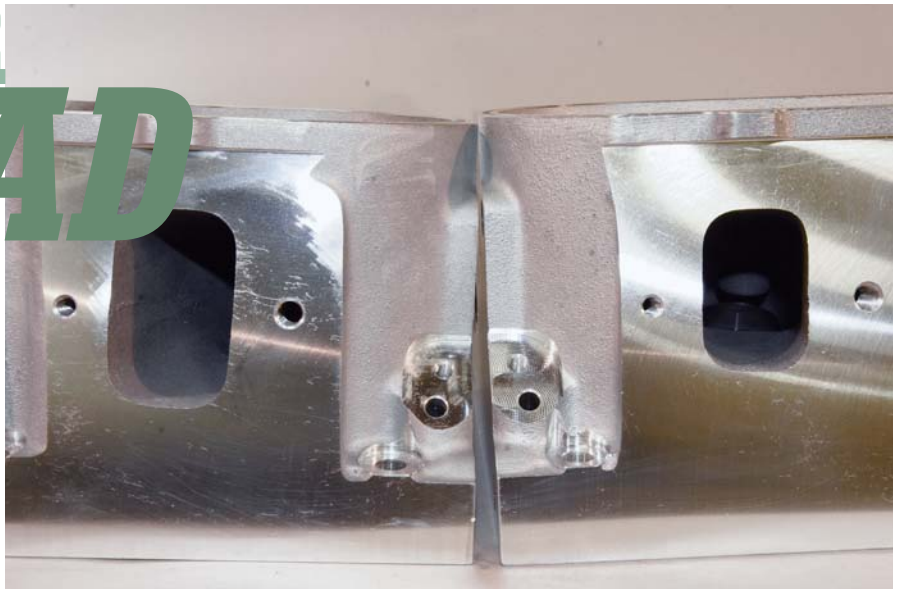
fit on bores as small as 4.00 inches so as to be compatible with the typical truck blocks already in production. So while these heads will go onto an LS2 or similar bore engine just fine, they will not bolt to an LS1 or LS6. In addition, before clamping these heads down, you will need to get a hold of head gaskets sized for a 4.065-inch bore. This is thanks to the L92's combustion chamber slightly overhanging the cylinder liner when installed on a 4-inch bore, and you don't want your head gasket lying out in the open and getting cooked. Probably most significantly, use of the L92 head requires a dedicated L76 intake manifold, as the high port floors mean a major mismatch with a conventional Gen III or IV intake. Also, depending on the size and style of your exhaust manifolds or headers, you'll need to keep an eye on exhaust port



Thanks predominantly to sanctioning body rules changes, the C5R race head has gone through different iterations since it was first introduced. However, it has always exhibited the rectangular-shaped intake ports more typical of older SBC heads than of a Gen III. An original C5R head is shown at top; a newer "restricted" version below.

# WONDER HEAD

*Up close and personal with the original and newer C5R intake ports, we note that the later design has a markedly smaller cross-sectional area (right). This is not a design improvement by any means; rather, it was mandated in a vain attempt to lessen the beating on other manufacturers in the American Le Mans racing series. According to GM engineers, the L92 and LS7 both took their cues from the original C5R head before such restrictions were put in place; nevertheless, it's clear the rectangular-port design remains all in the family.*



matchup, thanks to the L92's somewhat taller port. Finally, though your existing pushrods can be reused, you'll need to grab a set of offset inlet rockers (GM PN 12569167, less than \$10 a piece); although happily, your stock exhaust rockers can be reused. With the above facts in mind, you should be able to bolt a set of L92 heads atop your stock short-block and reap the benefits of huge flow.

## CONCLUSION

Just so you don't think we're operating in a "We Love L92" vacuum here, some comparisons to other head options are in order so as to give some perspective on what all the fuss is about. At around \$800 total for a pair of assembled L92s, you're talking less than a third of the price of assembled LS7 heads—and only a few dollars more than what GM gets for a single assembled LS6

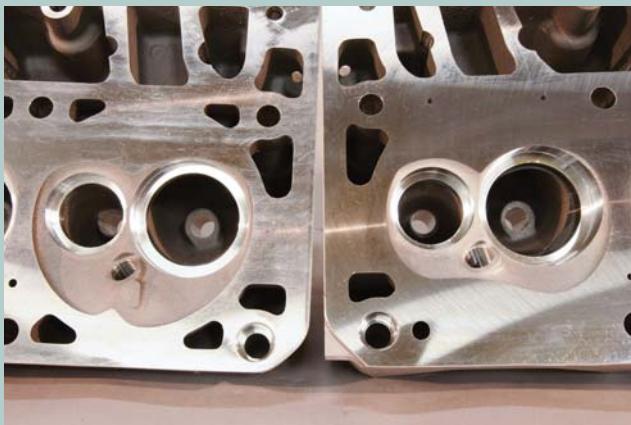
head. As far as aftermarket ported castings go, even the lowest of the low end of the Gen III/IV head spectrum will sell for around \$1,000 a pair, and the vast majority of these won't even come close to the flow of the L92. High-end aftermarket units—especially those based off of aftermarket castings—can be triple the price of the L92 or more.

Even when factoring in that you'll need to spend a few hundred dollars on an L92-compatible intake (see the L92/L76 story elsewhere in this issue) as well as a few bucks more on any other necessary goodies like offset rocker arms and stronger springs, you still should be way ahead of the game on price point. Terrific flow for low dough—what a deal! Look for plenty more coverage and engine builds with these heads in the coming issues of *GMHTP*. ■

## SOURCE

### GM PERFORMANCE PARTS

6200 Grand Pointe Dr.  
Dept. GMHTP  
Mail Code 484-393-118  
Grand Blanc, MI 48439  
[www.gmperformanceparts.com](http://www.gmperformanceparts.com)



*Probably the most obvious difference between the older and newer C5R designs lies in the combustion chamber, with the newer style (right) lacking much of the open contours and features of the original, which presumably interferes with cylinder mixing and flame travel.*



*Lying side by side with the newer-style C5R head (left), it's clear that the L92 chamber got its racing heritage before the rules-mandated redesign took place. Look for the L92 to appear under the hoods of many a street and race car in the years to come!*