

ALL Gen III heads are inter-changeable. However, they need to be matched up with the proper engine combo to see any gains.

Here is a list of a known production casting #'s:

**933** 97 aluminum perimeter bolt 5.7

**806** 97-98 aluminum perimeter bolt 5.7

**853** 99-00 aluminum center bolt 5.7

**241** 01-03 aluminum center bolt 5.7 (some late MY00 cars got 241 castings)

**243** 04 up LS6 aluminum center bolt 5.7 \*\*\*These castings were also used around 05 in truck applications\*\*\*

**862** 99 and up 4.8-5.3 Truck heads

**706** 99 and up 4.8-5.3 Truck heads

**799** 05 and up 4.8-5.3 Truck heads \*\*\*reportedly came on a few corvette's too\*\*\* These are basically 243 Heads

**873** 99-00 LQ4 6.0 Iron center bolt heads

**317** 01 and up LQ4 and LQ9 6.0 aluminum center bolt heads

**035** 01 - 04 LQ9 6.0 aluminum center bolt heads

### **Even more detailed info:**

#### **Casting Numbers 241, 806, 853**

Head: 1997+ LS1 5.7 Liter Passenger Car

Material: Aluminum

Part Number:

12559806 (1997-98) Chambers = 69cc

12559853 (1999-00)

12564241 (2000-03)

Combustion Chamber Volume: 66.67cc

Compression Ratio: 10.1:1

Intake Port Volume: 200cc

Exhaust Port Volume: 70cc

Intake Valve Diameter: 2.00 inches

Exhaust Valve Diameter: 1.55 inches

#### **Stock Head Flow Numbers**

Chamber 66.67 cc-----0.100--0.200---0.300---0.400---0.500---0.550--0.600

Intake 200 cc-----67----122-----178-----215-----219-----223---227

Exhaust 70 cc-----52-----97-----133-----156-----170-----76----180

#### **What you need to know:**

The standard issue LS1 heads is best all-around head for the street / strip engines . A thorough porting and milling job plus a valve upgrade on these will really wake up your engine. The heads have undergone only minor revisions since their introduction in 1997 , most notably a switch from perimeter to center valve cover bolt configuration for the 1999 model year. Each style has its own dedicated valve covers and coil packs mounting apparatus.

#### **Casting Number 243**

Head: 2001 LS6 5.7 Liter Passenger Car

Material: Aluminium

Part Number: 12564243

Combustion Chamber Volume: 64.45cc  
Compression Ratio: 10.5:1  
Intake Port Volume: 210cc  
Exhaust Port Volume: 75cc  
Intake Valve Diameter: 2.00 inches  
Exhaust Valve Diameter: 1.55 inches

### **Stock Head Flow Numbers**

Chamber 64.45 cc-----0.100---0.200--0.300--0.400---0.500---0.550---0.600  
Intake 210 cc-----62-----126---184---224----251----256----257  
Exhaust 75 cc-----57-----108---143---163-----176----180----183

### **What you need to know:**

The LS6 cylinder heads is essentially a tuned-up version of the LS1 head. At 65cc, the combustion chamber is slightly smaller and more efficient than the LS1. The more efficient design shortens burn times and ultimately means less ignition timing advance is required to produce the same power. And because less timing allows more efficient combustion, the LS6 heads allow the engine to produce more torque. The exhaust port is a unique D-shape that improves flow. LS6 heads are the best choice only when all-out power is needed. Be prepared for a big price tag at the dealer or steep core charge from your head porter.

### **Casting Number 706 and 862**

Head: 1999+ 4.8L / 5.3 Liter Truck  
Material: Aluminium  
Part Number:  
12559862  
12561706  
Combustion Chamber Volume: 61.15cc  
Compression Ratio: 9.5:1  
Intake Port Volume: 200cc  
Exhaust Port Volume: 70cc  
Intake Valve Diameter: 1.89 inches  
Exhaust Valve Diameter: 1.55 inches

### **Stock Head Flow Numbers**

Chamber 61.15 cc----0.100--0.200--0.300-- 0.400--0.500---0.550---0.600  
Intake 200 cc-----63 ---128----179-----210----218----221----226  
Exhaust 70 cc-----54 -- 93 ----121----145-----163----168----174

### **What you need to know:**

These small combustion chamber truck heads offer no advantage over an LS1 head except the smaller combustion chamber. This along with milling of the deck surface will allow a slightly higher compression ratio to be achieved. Because of the smaller intake valve installed in these heads a valve upgrade is practically mandatory.

### **Casting Number 873**

Head: 1999-2000 LQ4 6.0 Liter Truck  
Material: \*\*\*Cast Iron\*\*\*  
Part Number:  
12561873  
Combustion Chamber Volume: 71.06cc

Compression Ratio: 9.5:1  
Intake Port Volume: 210cc  
Exhaust Port Volume: 75cc  
Intake Valve Diameter: 2.00 inches  
Exhaust Valve Diameter: 1.55 inches

### **Casting Number 317, 035**

Head: 2001+ LQ4 and LQ9 6.0 Liter Truck  
Material: Aluminum  
Part Number:  
12562317 -LQ4  
12572317 -LQ9  
12572035 -LQ9  
Combustion Chamber Volume: 71.06cc  
Compression Ratio: 10:1 LQ9 Flat top pistons  
Compression Ratio: 9.6:1 LQ4 Dish piston  
Intake Port Volume: 210cc  
Exhaust Port Volume: 75cc  
Intake Valve Diameter: 2.00 inches  
Exhaust Valve Diameter: 1.55 inches

### **Stock Head Flow Numbers**

Chamber 71.06cc----0.100---0.200--0.300--0.400--0.500--0.550--0.600  
Intake 210cc-----66-----142-----196---228---236---238-----240  
Exhaust 75cc-----59-----104-----137---155---167---173-----177

### **What you need to know:**

The LQ4 head received aluminum heads starting in models year 2001. All other features are the same as previous years iron heads. This is the workhorse head for street / strip turbo and blower cars. They offer a large combustion chamber that lowers compression ratio making them perfect for a forced induction application. Swapping on the LQ4 head drops the compression ratio of a typical LS1 engine to 9:5.1

### **So you want to figure out how much to mill:**

It takes about .005" milling of the block deck to remove 1cc of volume. It takes .007" milling to remove 1cc from an LS1 head

### **Simple Milling Math:**

You have a stock 66cc chamber and you want to get down to 63cc

$66 - 63 = 3$ . You have to remove 3cc's

$.007 \times 3 = .021$ . So to get your 66cc chambers down to 63cc you'd have to mill  $\sim .021$ .

You can also do the reverse, say you want to mill a head .030 to figure out how many CC's that removes you take  $.030 / .007 = \sim 4.28$ . Milling a stock 5.7 head .030 puts your chamber at  $\sim 62$ .

241 cast heads were Die Cast which is a process that smooths up the ports a bit compared to the Sand Cast procedure that was done on the 806 and 853 heads. Once ported any "advantage" the 241 cast had is moot.

Same Info applies to the:

#### 4.8L/5.3L Truck 862 and 706 Head castings

While the 706 Heads are a SPM = Semi Permanent-mold And considered to be a more consistent head casting then the 862 wich are Sand cast, Once ported There Is no difference.

-----  
**799 Vs. 243** Info Copied From this thread <http://www.ls1tech.com/forums/conver...l#post10241473>

This appears to be one of the common misconceptions about heads having the 243 casting no. -- they are not necessarily LS6 head assemblies. The LS2 heads (243 or 799 casting) have the "heavy" standard LS1 valves. However, they do have the LS6 springs.

Only the true LS6 engine heads have stainless steel (not titanium) hollow stem valves (the exhaust stems are sodium filled). These valves are slightly longer than LS1 valves too.

The LS7 heads do have titanium valves.

New LS2 heads are about half the price of new LS6 heads (check [sdparts.com](http://sdparts.com)). GM is "really proud" of those hollow stem valves!

Oh, if you have the 799 castings -- the only thing "Corvette" about them is the valve springs/retainers! Still a desirable set of LS1 heads though!

Supposedly, the 243 mold was done at GM Research, the 799 mold furnished to other vendors. The same vendor may have the 243 and 799 mold.

Both heads have identical sized intake and exhaust valves

With all the interest in the General Motors Gen III V-8-based LS1 and LS6 engines, there has been a need for a story showing what the best production cylinder heads are for making power with this engine family. This excerpt from the just-released book *How to Build Performance Chevy LS1/LS6 V-8s*, by Will Handzel, contains key cylinder head information performance enthusiasts need to know when working with the Gen III V-8.

**Overview Of The Gen III V-8**The General Motors Gen III V-8 engine, what most refer to as the LS1, is an engine family that was initially released as the GM Regular Production Order (RPO) code "LS1" engine in the '97 Corvette. The exact same V-8 architecture went on to be used in other GM products like Camaros/Firebirds ('98-'02), all fullsize trucks and SUVs ('99-present), some **midsize SUVs** ('04 to present), GTOs ('04), and the special production run of CTS Vs ('04). This means a set of LS6 performance cylinder heads will bolt on to your '00 Suburban, '99 Camaro, or '04 GTO!

**Power Heads**The best heads for most performance applications are by far the LS6 cylinder heads built beginning in 2001. They were designed for higher-rpm applications that require increased airflow and higher compression ratios. These cylinder heads will fit any Gen III V-8 engine, but you'll need to mind the details when switching heads such as combustion chamber volume, valve-to-piston clearance, and valvetrain geometry.

The combustion chamber volume does vary across the Gen III V-8 engine family. We've included a chart listing combustion chamber volumes (including gasket volume) and engine compression ratios. On some engines, like the 10.08:1 compression ratio LQ9 345hp 6.0L Escalade Gen III V-8 engine, installing a set of LS6 cylinder heads without changing the head gasket thickness or swapping in dished pistons would result in

almost an 11:1 compression ratio. This would force the use of 100-octane fuel to prevent detonation and yet would not net enough power gain for the hassle-not a winning situation for a street [vehicle](#).

In fact, swapping LS6 heads on the aluminum-head-equipped LQ4 or LQ9 6.0L would only result in higher compression. This is because the LQ heads were derived directly from the LS6 heads. This means the LQ intake and exhaust ports are exact copies of the LS6 heads. The main difference is the LQ cylinder head has a 72cc chamber volume while the LS6 head has a 64cc chamber volume.

The valve-to-piston clearance in swapping LS6 heads on another Gen III engine is also an issue because GM has used multiple piston dome/dish and cylinder head combinations. Going with the small LS6 combustion chamber cylinder heads, a nearly 0.600-inch lift cam, and a flat-top piston will challenge the accepted 0.080-inch clearance between the piston and valve at max lift and piston TDC. This is best accomplished by using modeling clay (not Play-Doh or similar play clay, as it "springs" back giving a false reading) between the valve and piston during the "mock-up" stage of the engine build.

The production valvetrain on the Gen III V-8 is non-adjustable, but geometry issues can be addressed by installing different-length pushrods. In general, most Gen III V-8 builders say a stock valvetrain with the proper geometry will require the rocker holddown bolts be turned another 1 1/42 turns beyond the point where the pushrod will not spin between your fingers. This is considered the valvetrain "preload" with the components "hot."

These same engine-builders have found power by running less valvetrain preload. The general consensus is that power exists in valvetrains with a preload of about 31/44 turn of the holddown bolts. On a stock head, this would mean you'd run about a 0.040-inch shorter pushrod to achieve this-but always measure your valvetrain for this measurement. Most of the aftermarket valvetrain companies offer Gen III pushrods in multiple-length increments to allow geometry tuning. You could buy adjustable rockers, but they will just add valvetrain weight (not good for high-rpm applications) and cost that can be rectified with the proper pushrod length.

The LS6 heads were first released in '01 on the Z06 Corvette and are available today in assembled form from GM Performance Parts (PN 12564824, casting number 12564243) loaded with hollow stem valves (these were factory pieces from '02 to today) and LS6 valvesprings.

To learn more about the Gen III V-8, check out [www.carttechbooks.com](http://www.carttechbooks.com) to order How to Build Performance Chevy LS1/LS6 V-8s.

**Power Secret**Here's a secret: If you want the best heads for performance, make sure your heads have these small triangle marks below every spark plug hole. The marks are left by "chills" used during the casting process in GM's semi-permanent mold (SPM) tooling. Of the three casting facilities that make Gen III cylinder heads, two use SPM tooling, the other heads are sand-cast. The SPM tools produce heads with very smooth, consistent ports and chambers which consistently dyno at least 4 to 7 hp better than the sand-cast heads.

#### Common Gen III V-8 Engine RPO Packages and Power Output

RPO	Description	Power Output	Comp.	Chmbr.	Int/Exh.
	Displacement	HP/Torque	Ratio	Vol.	Port Vol.
	Liters (ci)			(cc)	(cc)
LS1	5.7 (346) <a href="#">car</a>				
	Corvette	345/340	10.19	67	200/70

	Camaro/Firebird	305/335 to 325/350			
	GTO	350/365			
LS6	5.7 (346) car				
	Corvette	385/385 '01	10.46	65	210/75
		405/400 '02-today			
LQ9	6.0 (364) truck/SUV				
	Escalade & Silverado SS	345/380	10.08	71	210/75
LQ4	6.0 (364) truck/SUV				
	GMC/Chevrolet Fullsize	300/360 to 330/370	9.41	71	210/75
LM4	5.3 (325) truck/SUV				
	'01 and later Fullsize, '04 SSR	290/325 to 300/335	9.49	61	200/70
	'04 Trailblazer/Envoy/Bravada				
LM7	5.3 (325) truck/SUV				
	'99 and later Fullsize	285/325 to 295/330	9.49	61	200/70
LR4	4.8 (293) truck/SUV				
	'99 and later Fullsize	270/285 to 280/290	9.47	61	200/70

#### Gen III Cylinder Head Casting, Machined and Final Part Numbers

RPO	Size	Part Numbers	
Year	Casting	Machined	Final Assembly
LS1			
'97-'98	10215339	10215339	10215337
	12558806	12558806	12558808
'99-'01	12559853	12559854	12559856
'01-'04	12564241	12559854	12559856
	12559853	12564242	
LS6			
01-04	12564243	12560800	12560802
			12569315
			12564824
LQ9			
'02-'04	12562317	12562318	12565363

## LQ4

'99-'00	12581873	12561874	12561876
'01	12562317	12562318	12562320
'02-'04	12562317	12562318	12565363
			12565364*

## LM4, LM7

## LR4, L59

'99-'01	12559862	12559863	12559865
'01-'04	12561706	12561708	12563678
	12569862	12559863	

\*(this PN also good for RPO KL5; the natural gas engine)

## Head Bolts

(do not reuse these stretch-to-torque fasteners!)

Description	PN	Type	Torque & Twist Specifications lb-ft, degrees twist
Long (16/eng)	12560744	M11x2.0-155.5	22, 76 deg, 76 deg
Short (4/eng)	12560745	M11x2.0-101	22, 76 deg, 34 deg
Short (10/eng)	12558840	M8x1.25-46	22, no twist

Important: In January, 2004, the depth of the blind, threaded head bolt holes on the Gen III V-8 engine blocks were changed to use the common head bolt, PN 17800568. There was not a new engine block part number issued for this change, so it is difficult to determine what head bolts you will need until you see the existing head bolts in your engine.

"Lost" Power For the sake of mass production, the production Gen III V-8 cylinder heads were designed to fit the smallest-bore Gen III V-8 engines-the 4.8L and 5.3L, 3.780-inch-diameter cylinder bore SUVZ and truck engines. The displacement difference between the 4.8L and 5.3L engines is created with the stroke. The 4.8L engine uses a 3.27-inch stroke crank, while the 5.3L engine has the common Gen III V-8 3.622-inch stroke crank. Since the 5.7L and 6.0L Gen III V-8 engines have 3.898- and 4.00-inch bores, respectively, this means there is room for larger valves and better valve placement in the larger bores.

Why did GM do this? For every LS1 or LQ9 engine built, there are about two 4.8Ls or 5.3Ls built. The 5.3L is GM's bread and butter, so the heads had to be common to work with all the designs.

Virtually every GM engineer who worked on the Gen III V-8 knows there is power in moving the valve spacing to install bigger intake valves and achieve improved flow into the engine. They also know this change would require a new intake port design, offset rockers, and other changes to accommodate the design, but the power potential is great enough to warrant this work.

Obviously, a cylinder head with all these changes requires considerable work to create and manufacture, but it's possible it might appear in the near future-the multiple-digit power potential is too great for hot rodders to pass up. For those not capable of creating a cylinder head, just know there is power left on the table there!