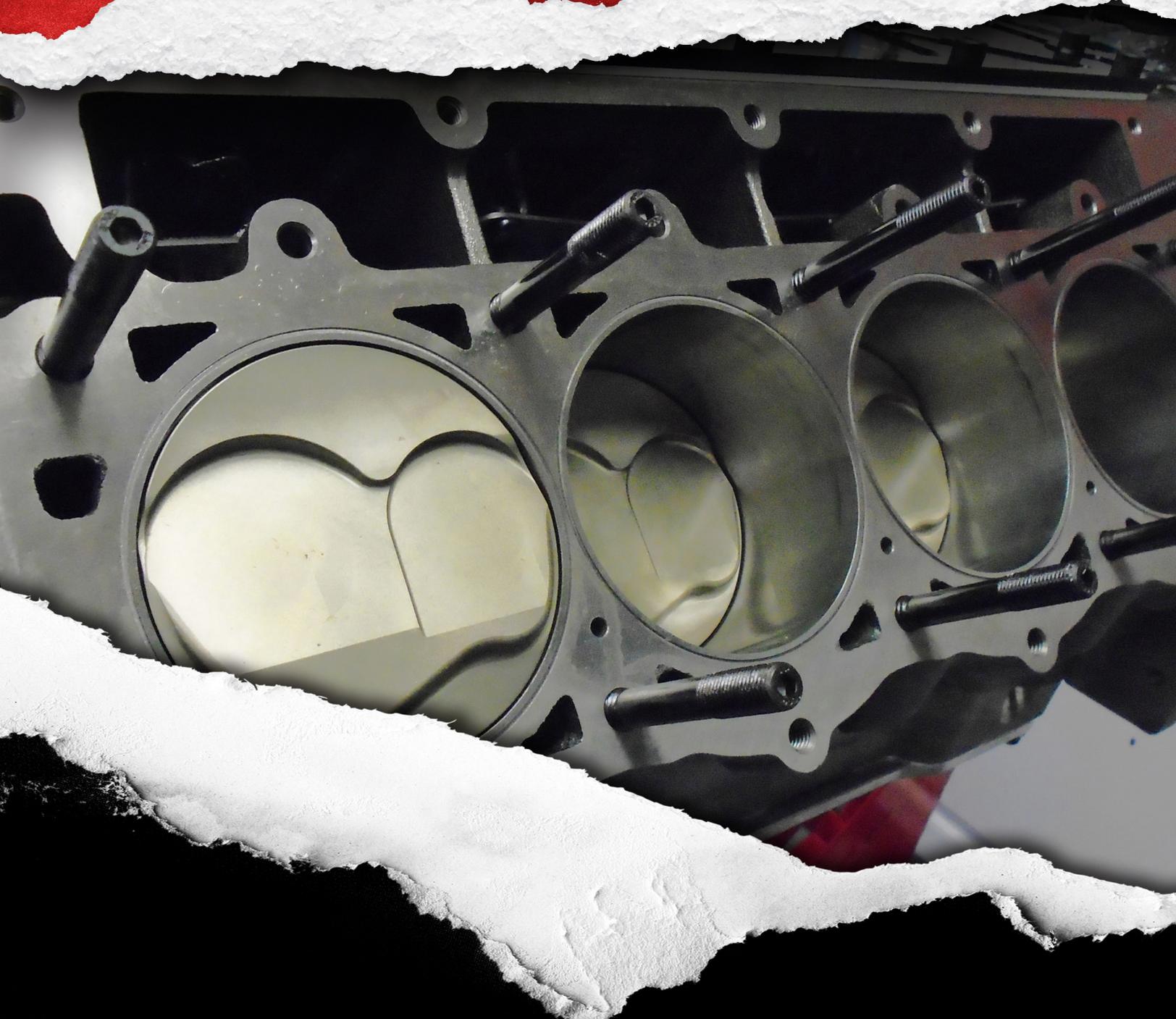


STRAUB TECHNOLOGIES

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LS AND LT PERFORMANCE CATALOG

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LS and LT OEM Port Programs

We have an extensive list covering all LS and LT OEM castings that we have developed port programs for. Customer cans send in heads for port work, valve jobs, chamber softening, milling, flame hoop installation. Below is a listing of programs

LS Cathedral Ports

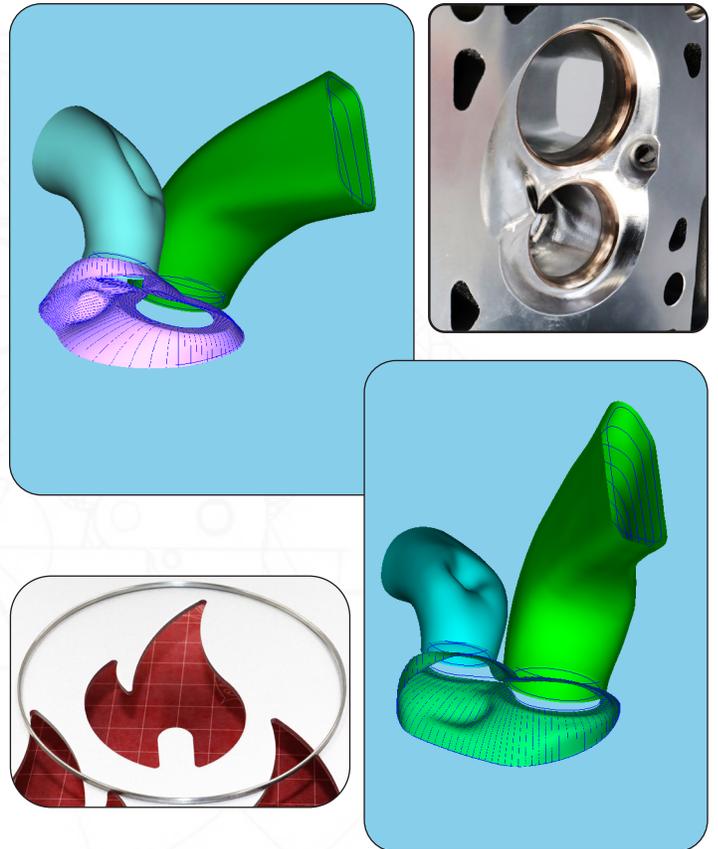
Program No	Description
LAB 5241	GM 241 Castings with full Port
LAB 5243	GM 243 Castings with full Port
LAB 5317	GM 317 Castings with full Port
LAB 5319	GM 319 Castings with full Port
LAB 5799	GM 799 Castings with full Port
LAB 5852	GM 852 Castings with full Port
LAB 5862	GM 862 Castings with full Port

LS Square Ports

LAB 5716	GM 716 Castings with full Port
LAB 5821	GM 821 Castings with full Port
LAB 5823	GM 823 Castings with full Port
LAB 5863	GM 863 Castings with full Port

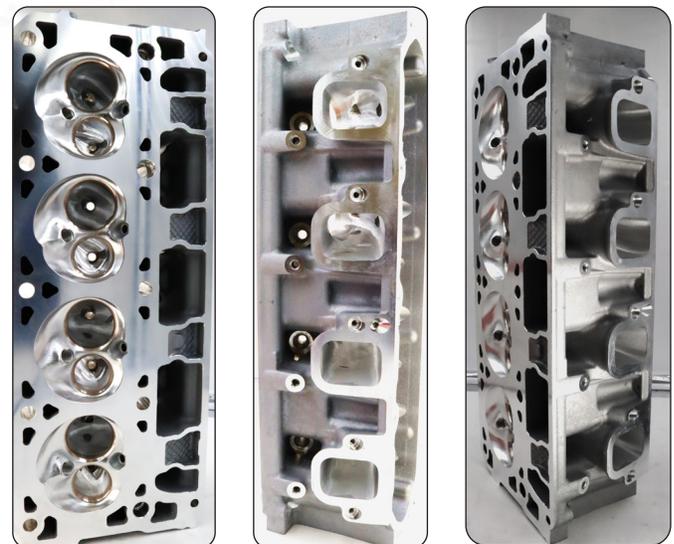
LT Heads

LAB 5083	GM L83 Castings with full Port
LAB 5084	GM L84 Castings with full Port
LAB 5086	GM L86 Castings with full Port



Options

LAB 5051	SOFTEN CHAMBERS FOR BOOST OR HEAVY NOS
LAB 1112	MACHINE HEAD FOR FLAME HOOPS AND INSTALL FLAME HOOPS
900-0501	FLAME HOOP- LS/LT LRG BORE: 4.370" x 4.290" x .080" (EA)
900-0502	FLAME HOOP- LS/AT SML BORE: 4.080" x 4.000" x .080" (EA)
LAB 1048	BLUEPRINT HEAD: 5 ANGLE VALVE JOB, FLAT MILL UP TO .030". HONE GUIDES TO VALVE, CYCLE SPRINGS, ASSEMBLE HEADS



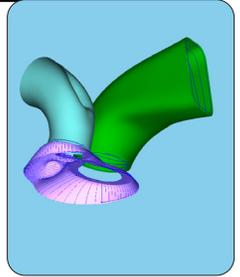
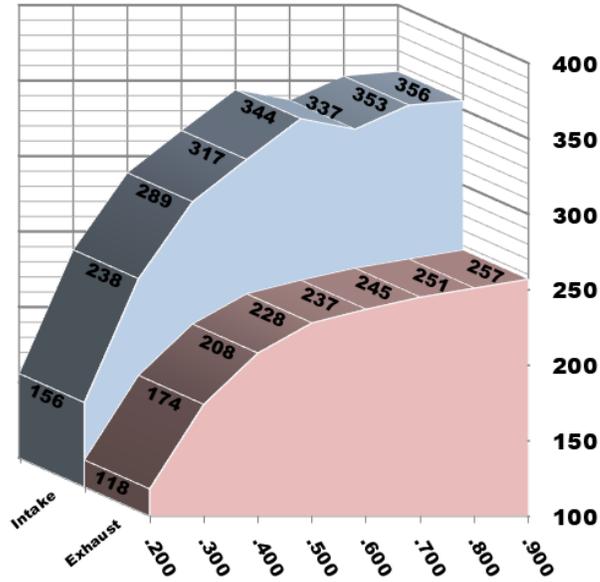
VEPR LS3 823 Stage 3

Specifications

Casting Origin	USA GM 823
Cylinder Head Make BBC/SBC/SBF etc.	GM
Valve Angle	15°
Intake Runner Vol	260cc
Intake Valve Dia & Length	2.165"
Exhaust Runner Volume	92cc
Exhaust Valve Diameter and Length	1.600"
Combustion Chamber Volume	70cc

Notes

Head Bolts	ARP 134-3610
Head Studs(Pre 2004)	ARP 234-4316
Head Studs(2004 and Later)	ARP 234-4317
Head Gasket	OEM or Aftermarket
Intake Gasket	OEM or Aftermarket
Exhaust Gasket	OEM
Spark Plug Starting Range	NGK TR55



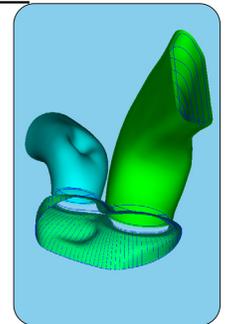
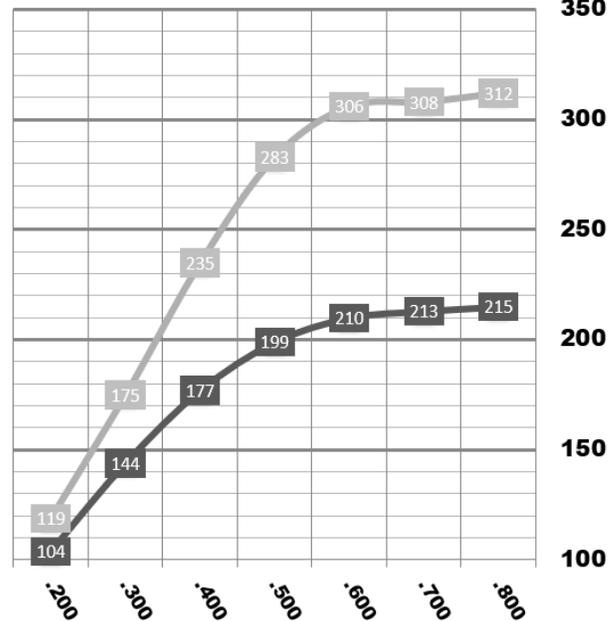
VEPR LS Cathedral

Specifications

Casting Origin	Import Cathedral
Cylinder Head Make	GM LS
Valve Angle	15°
Intake Runner Vol	228cc
Intake Valve Dia & Length	2.02
Exhaust Runner Volume	80cc
Exhaust Valve Diameter and Length	1.6
Combustion Chamber Volume	68cc
1cc per .006" shaved on head	

Notes

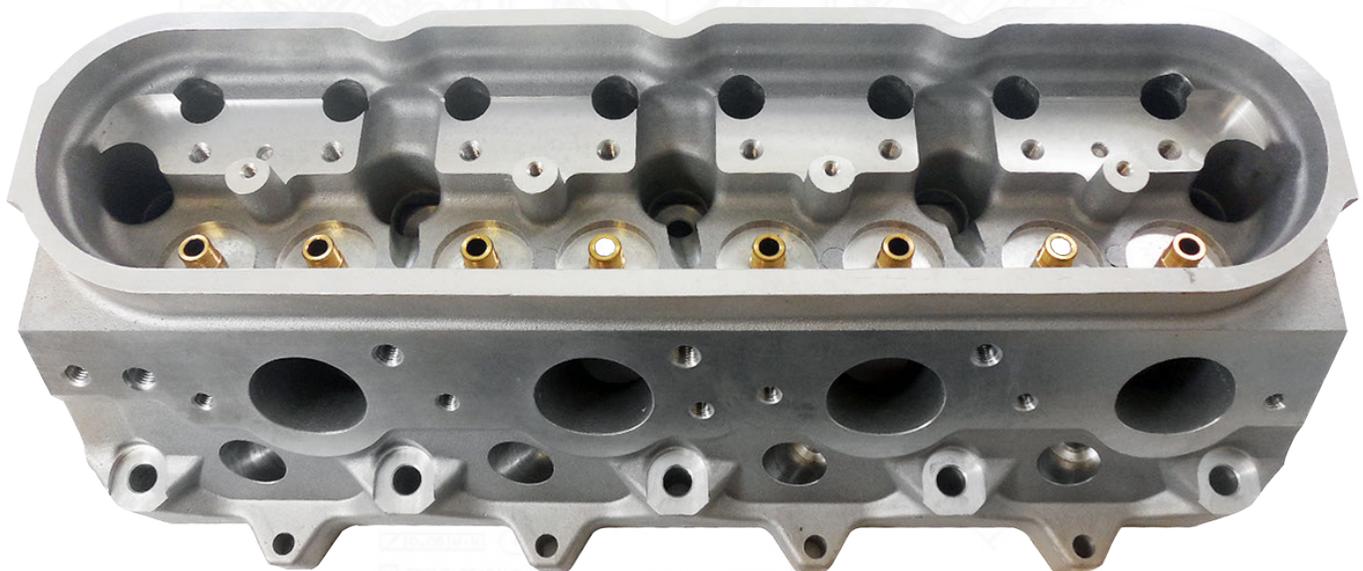
Head Bolts (97-03)	ARP 134-3609 or OEM
Head Studs (97-03)	ARP 234-4110
Head Bolts (04+)	ARP 134-3610 or OEM
Head Studs (04+)	ARP 234-4317
Head Gasket	OEM or Aftermarket
Intake Gasket	OEM or Aftermarket
Exhaust Gasket	OEM
Spark Plug Starting Range	NGK TR55



VEPR LS Cylinder heads by Straub Tech

The Straub LS VEPR head program uses NEW castings that we import from an overseas supplier that manufactures for several OEM's. Each casting is inspected and tested before machine work starts. Available in a LS Cathedral and LS3 Square port, we machine each and every casting in house on our state of the art Rottler 5 Axis machining center. Each head is CNC ported using our VEPR port design (Velocity Enhanced Port Range), that gives an engine maximum power over the broadest rpm range. Our competition valve job has been painstakingly developed by Scott Foxwell to enhance flow in the mid lift range. We offer a valve job for both NA engines and boosted engines to maximize longevity. We hone valve guides based on engine application and use of a power adder. All heads are assembled using our hand selected components that have been used in the industry for decades. Valve heights are held to a range of +.005" to ensure proper rocker arm adjustment and lifter pre-Load.

Note for Boosted applications our heads are cast with very thick decks which allows for better sealing under boosted applications.



VEPR LS3 12X

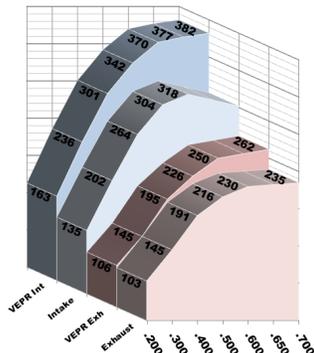
Specifications

Casting Origin	Import Aftermarket
Cylinder Head Make	Square Port LS
Valve Angle	12°
Intake Runner Vol	260cc
Intake Valve Dia & Length	2.165"
Exhaust Runner Volume	92cc
Exhaust Valve Diameter and Length	1.600"
Combustion Chamber Volume	64cc
Bore	4.125

Notes

Head Bolts	ARP 134-3610
Head Studs(Pre 2004)	ARP 234-4316
Head Studs(2004 and Later)	ARP 234-4317
Head Gasket	OEM or Aftermarket
Intake Gasket	OEM or Aftermarket
Exhaust Gasket	OEM
Spark Plug Starting Range	NGK TR55

Potential HP Increase after VEPR Program 168HP



Components

All heads come with stainless steel valves. Heads for boosted applications come with Inconel exhaust for extreme heat. All retainers are steel. All valve locks are forged. All valve seals are metal clad viton. All spring bases are alloy steel. All springs are 1.290" Dual springs are good for up .670" lift

The Straub VEPR LS heads are available in 2 packages:

Basic Performance Combination:

Complete pair of Heads, Set of new Straub LS Rockers* with Bushing Trunnions and bolts, and OEM Head Bolts

Max Power Combination:

Complete pair of Heads, Engineered Camshaft for engine combination, Delphi Lifter Set, New Straub LS Rockers* with Bushing Trunnions and bolts, and OEM Head Bolts.

**Included with each set of LS3 heads is our machined rocker stand. This must be used with these heads.*



Part No.	Description
347-1205N	LS1 210cc/64cc 2.02/1.6 Cathedral Port heads fully CNC ported and Assembled for NA Use.
347-1205P	LS1 210cc/68cc 2.02/1.6 Cathedral Port heads fully CNC ported and Assembled for Boosted Use.
<i>Includes Special High Temp Alloy Exhaust Valves for extreme heat.</i>	
347-1260N	LS3 260cc/64cc 2.165/1.6 Square Port heads fully CNC ported and Assembled for NA Use.
347-1260P	LS3 260cc/70cc 2.165/1.6 Square Port heads fully CNC ported and Assembled for Boosted Use.
<i>Includes Inconel Exhaust valve for extreme heat.</i>	

Bare Heads	
Part Number	Description
346-1205	LS 15 Degree Cathedral Port 205cc / 64cc Chamber Aluminum (Bare) Factory Rocker Stand and Rockers Bronze Guides/ Ductile Iron Seats
346-1255P	LS 11 Degree Cathedral Port Porters Casting for up to 269cc / 70cc Chamber Aluminum (Bare) Takes LS3 Rockers with aftermarket Stand Bronze Guides/ Ductile Iron Seats
346-3255	LS 3 11 Degree Square Port 255cc / 72cc Chamber Aluminum (Bare) Takes LS3 Rockers with aftermarket Stand Bronze Guides/ Ductile Iron Seats
346-3276P	LS 3 11 Degree Square Port Porters Casting for up to 286cc / 72cc Chamber Aluminum (Bare) Takes LS3 Rockers with aftermarket Stand Bronze Guides/ Ductile Iron Seats
Assembled Heads no CNC Porting	
346-2205	Vepr 346-1205 ls 15 degree cathedral port assembly with beehive spring for up to .570" Hyd roller 64cc chamber with 2.02 And 1.6 Valves bronze guides / ductile iron seats accepts factory rocker stands and rockers factory 3 angle valve job skim milled for mls gasket sealing
346-3205	Vepr 346-1205 ls 15 degree cathedral port assembly with beehive spring for up to .620" Hyd roller 64cc chamber with 2.02 And 1.6 Valves bronze guides / ductile iron seats accepts factory rocker stands and rockers factory 3 angle valve job skim milled for mls gasket sealing
346-4205	Vepr 346-1205 ls 15 degree ls cathedral port assembly with dual springs for up to .640" Hyd roller 64cc chamber with 2.02 And 1.6 Valves bronze guides / ductile iron seats accepts factory rocker stands and rockers factory 3 angle valve job skim milled for mls gasket sealing
346-5205	Vepr 346-1205 ls 15 degree ls cathedral port assembly with dual springs for up to .650" Hyd roller and machined valve locks 64cc chamber with 2.02 And 1.6 Valves bronze guides / ductile iron seats accepts factory rocker stands and rockers competition 5 angle valve job milled for mls gasket sealing up to .030". Mill heads
346-6205	Vepr 346-1205 ls 15 degree ls ls cathedral port assembly with dual springs for up to .660" Hyd roller or .640" Lift solid roller machined valve locks 64cc chamber with 2.02 And 1.6 Valves bronze guides / ductile iron seats accepts factory rocker stands and rockers competition 5 angle valve job milled for mls gasket sealing up to .030". Mill heads
346-4255	Vepr 346-3255 ls 11 degree ls 11 degree head assembly for .650" Lift hyd roller cam 6 bolt square port head with factory ls3 intake port location 255cc intake runner with 72cc chambers 2.165 X 1.590" Exhaust must use straub tech rocker stand to use factory ls3 rockers offset intake on center exhaust
COMPETITION 5 ANGLE VALVE JOB HEADS ARE SKIM MILLED FOR MLS GASKET SEALING	
346-5255	Vepr 346-3255 ls 11 degree head assembly for .660" Lift hyd roller or .640" Lift solid roller cam 6 bolt square port head with factory ls3 intake port location 255cc intake runner with 72cc chambers 2.165 X 1.590" Exhaust must use straub tech rocker stand to use factory ls3 rockers offset intake on center exhaust competition 5 angle valve job heads are milled up to .030" And finished for mls gasket sealing mill heads
For CNC Porting of any of these package add STL LAB 5004 to the order.	

Custom CNC Ported Cylinder Heads

346-1256 Custom CNC ported 11 Degree Cathedral Port Head Assembly. Built to Custom Order

346-3277 Custom CNC ported 11 Degree Square Port Head Assembly. Built to Custom Order

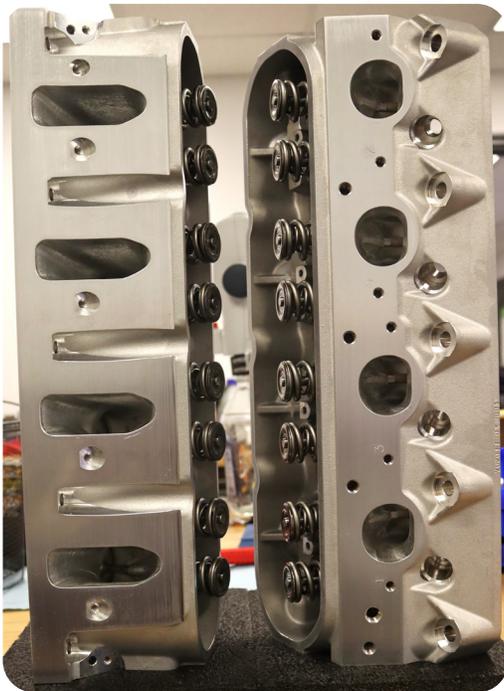
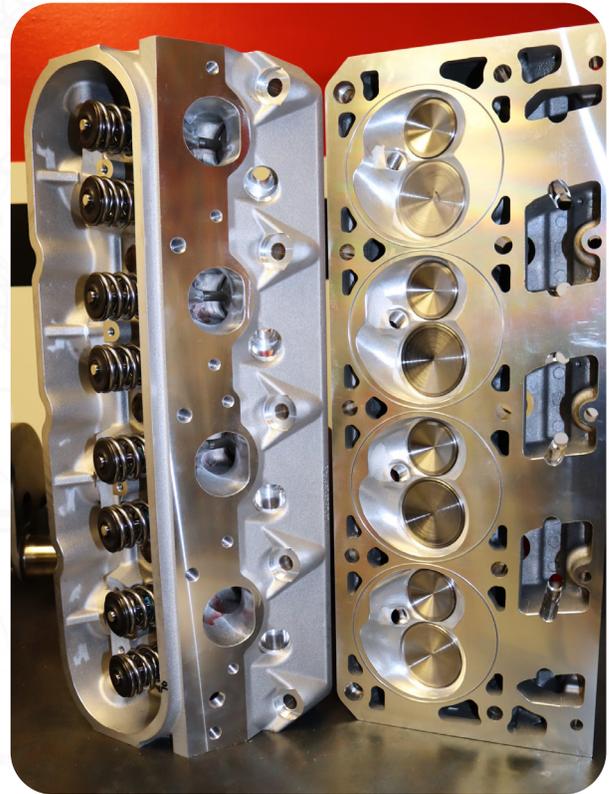
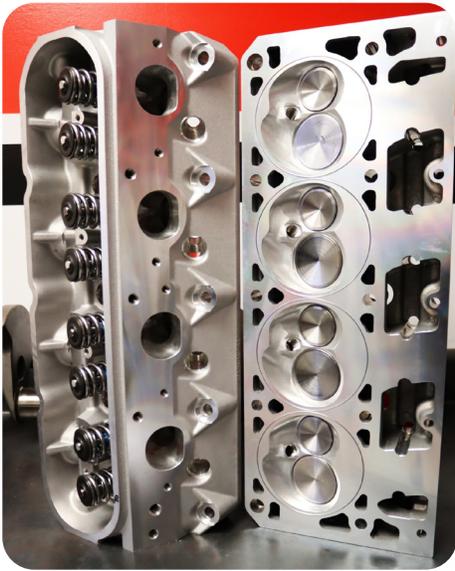
Additional Labor

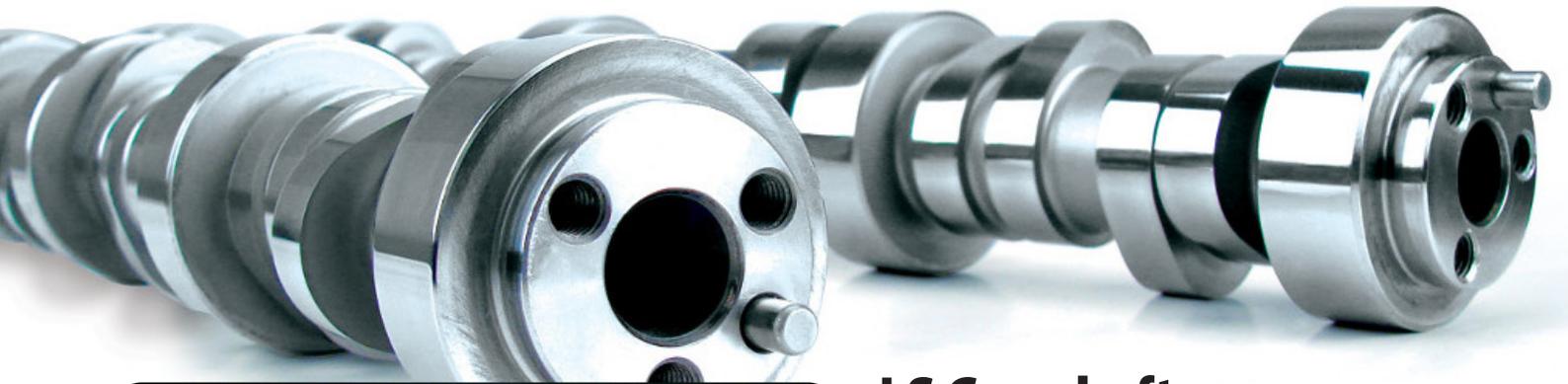
5100 LS Chamber softening for Power Adder

5300 Install Flame Hoops in Head for Power Adder

5600 Install Stepped Washer in Head for Power Adder

5800 Machine Head for BERYLIUM seat

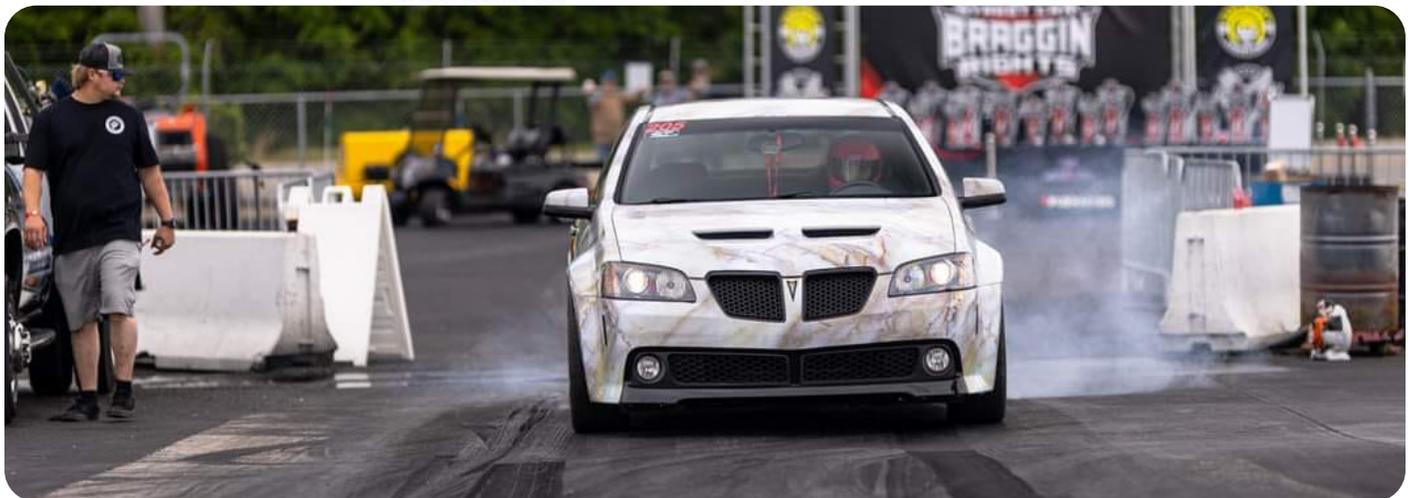




LS Camshaft

“GTA Street Cams” If you want more power out of your LS, the “GTA” Series of Street Performance Cams from Straub Tech will boost the power like no other hydraulic roller cam. These cams have been engineered to feed the demand of your LS based on CID and cylinder head. Your CID and desired rpm range sets the demand of the engine. The cylinder head based on its flow characteristics will deliver the air and fuel. Since there are multiple options in heads with different flow rates, then you need a camshaft

based on what the heads can supply. The GTA series of street performance hydraulic rollers makes this easy. Straub Camshafts are worldwide proven by HP crazy customers. These cams all but guarantee the performance the street guy is after with his performance Detroit V-8. Customers Report: Easier Starting Much greater powerband Greatly improved throttle response, faster spooling of turbos, and lower EGT's. Dyno test have consistently shown a greater power under the curve compared to the competition. Note Max HP rpm is where engine will make peak power. This can vary a few 100 rpm.



For Quotes on Product for Private Label Programs, please call 423 391 7774

Warning: all oem fasteners are torque to yield and are designed to be torqued one time. Reusing these fasteners can cause pre mature failure.

Application	Part No.	Max HP RPM	Lift x 1.7 Ratio	Adv.Duration	@ .050	ICL/ECL	LSA
LS1 Cathedral Port Heads with stroker crank (3.622")							
NA*	LS1280-282-10	6500	.578/.558	280/282	221/223	108/112	110
Turbo	LS1284-282-12	6500	.560/.560	284/282	225/223	112/112	112
Turbo	LS1292-288-12	7000	.620/.600	292/288	233/229	112/112	112
Blower	LS1284-294-12	6500	.560/.560	284/294	225/235	112/112	112
LS1 Cathedral Port Heads with stroker crank (4.00")							
NA*	LS1292-302-12	6500	.620/.600	292/302	233/243	106/116	112
Turbo	LS1302-300-12	7000	.600/.570	302/300	243/241	112/112	112
Blower	LS1302-317-12	7000	.600/.600	302/317	243/257	112/112	112
LS3 Square Port Heads and stock stroke (3.622")							
NA*	LS3282-292-11	6500	.617/.617	282/292	223/233	108/116	112
Turbo	LS3284-282-12	6500	.560/.560	284/282	225/223	112/112	112
Turbo	LS3288-286-12	7000	.600/.545	288/286	229/227	112/112	112
Blower	LS3284-302-12	7000	.560/.570	284/302	225/241	112/112	112
LS3 Square Port Heads with stroker crank (4.00")							
NA*	LS300-310-10	6500	.570/.570	300/310	243/253	105/115	110
Turbo	LS3296-294-12	7000	.620/.560	296/294	237/235	112/112	112
Blower	LS3300-320-12	7000	.570/.570	300/320	241/255	112/112	112

*NOTE All LS NA cams can be used with up to a 300 shot of nitrous. Just be sure to have a good fuel system and reduced timing when using nitrous.

Performance Modified Cam Plate

Part No.	Application
346-9016P	Cam plate with oil retention grooves. Developed by RYRE to prevent premature wear on cam plate



Cam Plate

Part No.	Application
12589016	Camshaft Thrust Plate for all LS engines. Includes o-ring gasket
12556127	Camshaft bolt for LS engine.



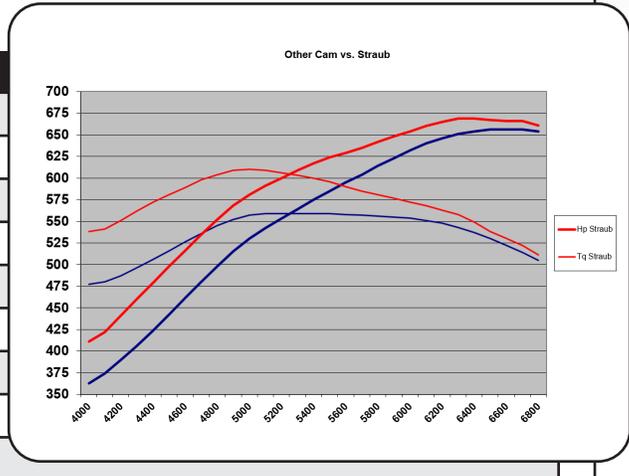
StraubTech has over 15 years of development behind the scenes in the LS community in camshaft lobe development. We have designed and sold lobe profiles to some of the top engine shops in the country and these profiles have gone on to become some of the most Googled camshaft specs in the world.

Chris Straub will work 1 on 1 with you to develop a camshaft to power your combination.

Call **423 391 7774** or email cstraub@straubtechnologies.com for a custom quote on custom camshafts.

Straub Tech Custom LS Camshafts

Application
All LS1 and 2 Single Bolt Cams Hyd or Solid Roller
All LS3 3 Bolt Cams Hyd or Solid Roller
All LS Gen V 5.3 L83 Camshafts
All LS GEN V 6.2L LT1 / L86 Camshafts
All LS GEN IV VVT Camshafts
Profile Cam on Cam Doctor
Custom Round Core Lobe Cam Core
Design and make CAD of lobe
Design and make 2 or more camshaft lobes



The difference in getting a camshaft correctly spec'd for your application can make a quite a bit of difference as seen in this comparison.



Basic Cam Swap Kit

This kit services 1 engine for the basic needs of a "junk yard" cam swap. (SEE PAGES 34-36 FOR MORE PRODUCT INFORMATION)

Part No.	Description
346-9001	Basic cam swap kit for LS and LS3

Hydraulic Roller Lifters and Centistoke

Hydraulic roller lifters function best when an oil with a centistoke rating of less than 15 at 100C is used. Centistoke is a decimal fraction of the CGS unit of kinematic viscosity stokes. The lower the number the better for lifter function and prevention of lifter noise.



Delphi Hydraulic Roller Drop in Lifter

Part No.	Application
12499225	"LS7" Lifter - Fits all LS and LT Engine Platforms
17120735	Fits all LS and LT Engine Platforms. OE Replacement lifter for LT engines. Lifter has .030" less travel than the "LS7" Lifter

GM LS Lifter Guides

GM/Delphi lifter guides are available from Straub Technologies. These units are the newer design LS2 trays used in all current LS builds except for the active cylinder management engines. This guide features increase support in the design.



Part No.	Application
12595365	GM LS Lifter guide. Fits all LS engines that are not using active cylinder management
12551163	GM lifter guide retaining bolt. Use 1 per lifter guide, 4 per engine.
346- 1608	Lifter Guide 1997 - 2015 Rear Holds 2 Regular, 2 De-active GM 12571608
346-1596	Lifter Guide 1997 - 2015 Front Holds 2 Regular, 2 De-active GM 12571596

Basic Valve Train Kit

The Straub Basic valve train kit for the LS engine replaces the lifters, the lifter guides, and the guide bolts. This kit features product just like OEM product. The kit is available with Delphi lifters or Morel lifters.



Application	Part No.	Description
All LS	346-9225	Basic kit with 16 Delphi Lifters, 4 Delphi LS2 Trays, 4 GM hold down bolts
All LS	346-7717	Basic kit with 16 Morel 7717 lifters, 4 Delphi Trays, 4 GM hold down bolt
LS	346-9820	GM LS Lifter Kit with guides For DOD vehicle. Features 2 Rear 2 Front Guides, the bolts, and 8 OEM Delphi DOD Lifters And 8 OEM Delphi Lifters
LS	346-7290	Morel LS Lifter Kit With Guides For DOD Vehicle. Features 2 Rear 2 Front Guides, the bolts, and 8 Morel DOD Lifters And 8 Morel Std 7717 Lifters

The History of Morel Lifters

Morel first entered the racing lifters market in 1992. The plant is 100,000 square feet and has in-house heat treating with a full Metallurgical lab. The oven is a hermetically sealed unit using different gases for controlling the heat treatment quality. There are over 100 pieces of specialty equipment in the plant for making lifters and gears. The plant was started by Ed Morel's uncle over 60 years ago. Ed has worked there over 30 years and bought the company 20 years ago. Ed is a graduate mechanical engineer. The plant manager is also a graduate mechanical engineer. Our designer is an engineer with 35 years of tool and die, plumbing, electrical, electronic, programming and hydraulic experience. I am also a graduate mechanical engineer. I spent 20 years with General Motors in the Pontiac Division, with the last 15 years heading up Pontiac Motorsports Engineering. I left Pontiac in 1986 and started Callies Crankshaft and sold it in 1994. I helped Joe Lunati build his company and sell it to Holley Corporation. Then, I started building performance cam cores with Camshaft Machine Company. We developed the three-pieces cam core using the Everwear Gear(tm), eliminating the cam gear to distributor wear issue. Ed and I started getting serious about the lifter business in 1994. We developed lifter programs for Street Performance lifters through Professional Racing lifters. We continue development on new or current products every day. The business has grown to the point that I left Camshaft Machine in 2009 to concentrate with Morel to continue to bring innovative products to the racers.

Street Series Hydraulic

The Street Performance hydraulic lifters are made from a cold formed body with a clipped axle and have 6500RPM capability. These lifters have .120" plunger travel and have an 80% fill rate with the test oil. The lifter wheels in this series are .700" diameter. Recommended Spring Pressures: 100-180lbs Seat, 280-380lbs Open Pressure

IMPORTANT: FOR HYDRAULIC LIFTERS TO FUNCTION CORRECTLY YOU MUST USE AN OIL WITH A **CENTISTOKE RATING BELOW 15 AT 100C**. IF NOT THE LIFTER MAY NOT FUNCTION CORRECTLY.



Make	Engine		BodyD	RollID	Pair#	Set#	
Chevrolet	LS	Drop In Use OEM Lifter Trays	0.842	0.700	7716*	7717	
		Tie Bar Fits 5 head bolt pattern	0.842	0.700	5289	5290	
		RACE ONLY Limited Travel Drop In Use OEM Lifter Trays	0.842	0.700	7789*	7790	
		<i>RECOMMEND MAX CAM LIFT .360" MIN BC 1.445"</i>					
		LS/LT Tie Bar RACE ONLY Limited Travel	0.842	0.700	7798	7799	
		LS DOD Replacement NEW Design for LS/LT	0.842	0.700	7828*	7820	
					7716*		
		<i>NOTE: Set has 8 DOD and 8 STD lifters</i>					
		LT DOD Replacement Lifters NEW Design All 16 DOD	0.842	0.700	7728*	7729	
*Sold as Single Lifter							

Pro Series Hydraulic

These Performance hydraulic lifters are made from a billet body with a clipped axle and have 7000 RPM capability. The Pro Series have the larger .750" Diameter wheel with the full .120" of hydraulic plunger travel and an 80% fill with the factory test oil. Recommended Spring Pressures: 100-220lbs Seat, 280-550lbs Open HLT – The Limited Travel Lifters, also known as our HLT Series, is a clipped axle lifter with a minimal .015" to .030" of total plunger travel. Often used in sanctioned racing bodies requiring a Hydraulic lifter, but wanting to extend RPM range and performance. Due to short plunger travel and aggressive cam lobe profiles, there is some valve train noise that can typically be associated with this series of hydraulic. Recommended Spring Pressures: 100-295lbs Seat, 295-750lbs Open Pressure. **Morel lifters should be use with any quality oil and any viscosity rating. Consult your engine builder for recommended weight.**



IMPORTANT: FOR HYDRAULIC LIFTERS TO FUNCTION CORRECTLY YOU MUST USE AN OIL WITH A **CENTISTOKE RATING BELOW 15 AT 100C.** IF NOT THE LIFTER MAY NOT FUNCTION CORRECTLY.

Make	Engine		BodyD	RollID	Pair#	Set#
Chevrolet	LS	Drop In Use OEM lifter trays	0.842	0.750	5912*	4708
		Drop In Limited Travel - Use OEM lifter trays	0.842	0.750	5913*	4793
		TIE BAR - Fits 5 & 6 head bolt pattern	0.842	0.750	5205	5206
		Limited Travel - TIE BAR - Fits 5 & 6 head bolt pattern	0.842	0.750	5849	5850
		*Sold as Single Lifter				

Hi RPM Series Hydraulic

Morel's top of the line Hydraulic Roller, easily identified via the Polished Billet Body, clipped axle and open wheel, as seen in the photo. These lifters have a 7000+ RPM capability with .120" plunger travel and an 80% fill rate with the test oil. The Hi-RPM hydraulic series utilizes a larger .750" sized roller wheel within the .842" & .875" diameter body. The .903" diameter body lifter utilizes an .810" sized roller wheel with direct pressurized oil to the needles. Recommended Spring Pressures: Up to-220lbs Seat, Up to-650lbs Open Pressure. **Morel lifters should be use with any quality oil and any viscosity rating. Consult your engine builder for recommended weight.**

IMPORTANT: FOR HYDRAULIC LIFTERS TO FUNCTION CORRECTLY YOU MUST USE AN OIL WITH A **CENTISTOKE RATING BELOW 15 AT 100C.** IF NOT THE LIFTER MAY NOT FUNCTION CORRECTLY.



Make	Engine		BodyD	RollID	Pair#	Set#
Chevrolet	LS	Tie Bar - Fits 5 & 6 head bolt pattern	0.842	0.750	5293	5294
		Limited Travel - Tie Bar - Fits 5 & 6 head bolt pattern	0.842	0.750	7259	7260
		Pressurized Oiling - Tie Bar - Fits 5 & 6 head bolt pattern	0.903	0.810	5471	5472

Installing and Adjusting Morel Hydraulic Lifters:

1. Do not wash in any solvent. Wipe the parts off with a lint free towel.
2. Use 10W30 oil and lube the O.D. of the body and wheel.
3. Make sure the lifter-to-bore clearance on cast iron blocks is: .0015" - .0017".
 - On aluminum blocks that oil the lifter (LS Series), the clearance is: .0014" - .0016".
 - Both of these measurements are at 70 Deg F.
 - The aluminum block will have a higher rate of expansion and that is why the clearance is tighter.

Adjusting the Zero-lash setting of the Lifter:

1. I always like using the firing order to set the valves. Put the engine on #1 cylinder.
2. What we want is the int. and ex. to be on the base circle of the camshaft.
3. Adjust the rocker until the push rod just starts to get tight while taking the pushrod and rolling it between your thumb and finger. Once you feel drag, this is what we call Zero-lash.
4. You are now ready to tighten down on the adjuster using the following method:
 - a. It is important to know the thread pitch, in threads per inch, of the adjuster nut, because one complete turn of the nut will move a distance of one complete thread. Therefore, verify the thread pitch of the adjuster nut, because racing rocker manufacturers use different nut sizes and thread pitches.
 - b. If your adjuster nut is 7/16 x 20 threads per inch, then divide 1 inch by 20 threads per inch. One complete turn down on a 7/16 by 20 adjuster nut will move .050".
 - c. Next, divide .050" divide by 4 to calculate the distance for a quarter-turn of the adjuster nut ($.050" / 4 = .0125"$).
 - d. For a 3/8 x 24 adjuster nut, the calculations are:
 $1" / 24 \text{ TPI} = .042" \text{ per full turn and } .042" / 4 = .0105" \text{ per quarter-turn.}$
 - e. Use the chart below to determine how many quarter-turns to tighten the adjuster nut after Zero-lash:
 - Cast Iron block and Cast Iron Head = .020" - .025"
 - Cast Iron block and Aluminum Head = .030" - .035"
 - Aluminum block and Aluminum Head = .045" - .050"
5. Repeat these adjustments for each cylinder running through the firing order.

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Adjusting Hydraulic Limited Travel (HLT) Lifters

FOR RACE USE ONLY

These parts may require instructions and information not provided in this document. If you do not understand something, find a skilled automotive technician or engine machinist to assist you. We make a large variety of hydraulic lifters, please visit our website to be sure the correct lifters have been selected for your build. Instructions for these limited travel set numbers: 4789, 4795, 5327, 5329, 5850, 6402, 7530, 7790, 7797, 7803, 7805, 7807, 7809, 7811, 7813.

1. Do not wash in any solvent. Wipe parts with a lint free cloth.
2. Use 10W30 engine oil to lube O.D. of body and wheel. You can submerge them in a container of clean new engine oil.
3. Check O.D. of lifter-to-I.D. of lifter bore clearance. There is an Excel spreadsheet available for download on the John Callies, Inc. website that you can use to make your recording easier. Clearance on cast iron blocks is .0015" - .0017". Clearance on aluminum blocks is .0014"-.0016".

Carefully note the decimal place, not thousandths, these are ten-thousandths.

This clearance is measured at 70°F.

Aluminum blocks, having a higher rate of expansion, is the reason for less clearance.

Hydraulic Limited Travel Lifters are recommended only for race engines for classes limited to "hydraulic" lifters.

The amount of plunger travel is approximately .030".

We recommend setting be made while the lifter is all the way down (on the base circle of camshaft), adjust the rocker arm until the plunger in the lifter has "bottomed out" with a "feeler" gauge between the rocker arm and the valve. These are cold (70°F) setting instructions, so if you are using aluminum block and aluminum heads this minimum feeler gauge is .004", and the maximum gauge is .008". If you have iron block and aluminum heads the minimum gauge is .006", and the maximum gauge is .010". If you have iron block and iron heads, minimum gauge is .008", and the maximum is .012".

Make sure to note, this is how far the plunger comes up from being at the lowest point of its travel, NOT clearance at the top of its travel.

This will be a challenge with non-adjustable valve trains, especially if there are any machining inconsistencies in the block or heads. With the selected pushrod length and rocker arms torqued to the correct spec and with the lifter on the base circle, make sure you attain the same *values as above*.

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Morel Solid Roller Lifters

Morel Motorsports first entered the racing lifter market in 1992, having been an OEM Supplier for now over 80 years. The 100,000 square foot plant is located in Cleveland Ohio USA. The engineering department has a full metallurgical lab onsite. A robust production facility houses over 100 pieces of specialty manufacturing equipment, including hermetically sealed heat treat ovens, which use different gases to control the heat treatment quality. Morel's solid roller lifter first debuted in the Buick V-6 Indy Engine program. Today Morel's solid roller lifters are used in NASCAR, WoO, NHRA, Drag Week, and other multiple forms of professional and sportsman racing engines. The complete Morel solid roller line up runs from tie bar pairs to the ultimate keyway style lifters. From the .750" diameter wheels, to the huge .920" diameter wheel in the Top Fuel, Morel's solid roller lifters are housed in lifter bodies from .842" diameter to 1.00" diameter.

Sportsman Series

The Standard Mechanical lifters are made from a billet body with a clipped axle and have 7500 RPM capability. These lifters (4601, 4604, 5452, 4677, 4606, 4713, 5411, 4719, 4726, 4723 & 4730) have a .750" diameter roller wheel. Recommended Spring Pressure 150-275lbs Seat Pressure 400- 700lbs Open Pressure. **All Morel Solid Roller Lifters are compatible with any high-quality oil and any viscosity rating. Consult your engine builder for recommended weight, based on bottom end clearances.**



Make	Engine		BodyD	RollD	Pair#	Set#
Chevrolet	LS	Drop In - Use OEM lifter trays *Sold as Single Lifter	0.842	0.750	5911*	4737
		Tie Bar Fits 5 head bolt pattern	0.842	0.750	5451	5452

Sportsman Pro Series

Just like the Sportsman Solid Roller lifters, the Sportsman Pro are made from a billet body, .750" wheel diameter, and clipped axle and have 7500 RPM capability. Additional features include **EDM oiling circuit to needle bearings for direct lubrication to axle assembly**, reduction in mass of lifter, machined to accept all reduced base circle cams, and modified oiling groove to feed hole for positive oil flow to rockers. These lifters give the engine builder a very budget friendly lifter for the street strip solid roller engine in GM, Ford, and Chrysler applications. Recommended Spring Pressure 150-275lbs Seat Pressure 400-700lbs Open Pressure. **All Morel Solid Roller Lifters are compatible with any high-quality oil and any viscosity rating. Consult your engine builder for recommended weight, based on bottom end clearances.**

Make	Engine	BodyD	RollD	Pair#	Set#
Chevrolet	LS	0.842	0.750	7831	7832

Sportsman Pro Oil Flow Diagram

The milled notch allows oil flow on small base circle cams.

Full time pressurized oil enters the body and exits into the bearing to enhance durability.



Ultra Pro Series

The Ultra Pro (U/P) Mechanical lifters are made from a billet body with a clipped axle and have 8000 + RPM capability. Additional features include **EDM oiling circuit to needle bearings for direct lubrication to axle assembly**, reduction in mass of lifter, machined to accept all reduced base circle cams, and modified oiling groove to feed hole for positive oil flow to rockers. The .842" & .875" diameter lifters in this series have a .750" diameter roller wheel. The .903" diameter lifters have a .810" diameter roller wheel and the .936" diameter lifters have a .850" diameter wheel. Recommended Spring Pressure 250-350lbs Seat Pressure 600-850lbs Open Pressure. **All Morel Solid Roller Lifters are compatible with any high-quality oil and any viscosity rating. Consult your engine builder for recommended weight, based on bottom end clearances.**



Make	Engine		BodyD	RollD	Pair#	Set#
Chevrolet	LS	On Center - T/B	0.842	0.750	5424	5425
		On Center - T/B	0.903	0.810	5427	5428
		.180" Left INT Offset - T/B	0.903	0.810	5432	5457
		.180" INT & EXH Offset - T/B	0.903	0.810	5430L/32R	6356

Black Mamba Series

The Black Mamba Mechanical lifters are made from a billet body with a pinned axle and have 9000 + RPM capability. The Black Mamba's have an axle diameter of .470" with full time pressurized oiling. The Black Mamba series has Diamond-Like Coating (DLC) for less friction and wear durability. This series is recommended for all aluminum block applications that do not have lifter bore bushings. The Mamba Lite's body is polished to an RA finish to give it a mirror like finish to reduce friction. This series is recommended for any block material type. These lifters have a .750" diameter roller wheel. These lifters have a special break-in lube between the axle and roller wheel and should not be washed with solvent prior to installation. These lifters also require a break-in period of 25-30 minutes varying the RPM from 1800-2200 RPM. Recommended Spring Pressure 150-400lbs Seat Pressure 550-1000lbs Open Pressure. **All Morel Solid Roller Lifters are compatible with any high-quality oil and any viscosity rating. Consult your engine builder for recommended weight, based on bottom end clearances.**



Make	Engine		BodyD	RollD	Pair#	Set#
Chevrolet	LS	On Center	0.842	0.750	6482	6483
		.150" Left INT Offset	0.842	0.750	6484	6485
		.150" INT & EXH Offset	0.842	0.750	6486	6487
		On Center	0.903	0.810	6658	6659
		.180" Left INT Offset	0.903	0.810	6660	6661
		.180" Right INT Offset	0.903	0.810	7390	7391

Black Mamba Lite

The Mamba Lites Mechanical lifters are made from a billet body with a pinned axle and have 9000 + RPM capability. The Mamba's have an axle diameter of .470" with full time pressurized oiling. They have a highly polished body for less friction and wear durability. These lifters have a .750" diameter roller wheel. These lifters have a special break-in lube between the axle and roller wheel and should not be washed with solvent prior to installation. These lifters also require a break-in period of 25-30 minutes varying the RPM from 1800-2200 RPM. Recommended Spring Pressure 150-400lbs Seat Pressure 550-1000lbs Open Pressure. **All Morel Solid Roller Lifters are compatible with any high-quality oil and any viscosity rating. Consult your engine builder for recommended weight, based on bottom end clearances.**

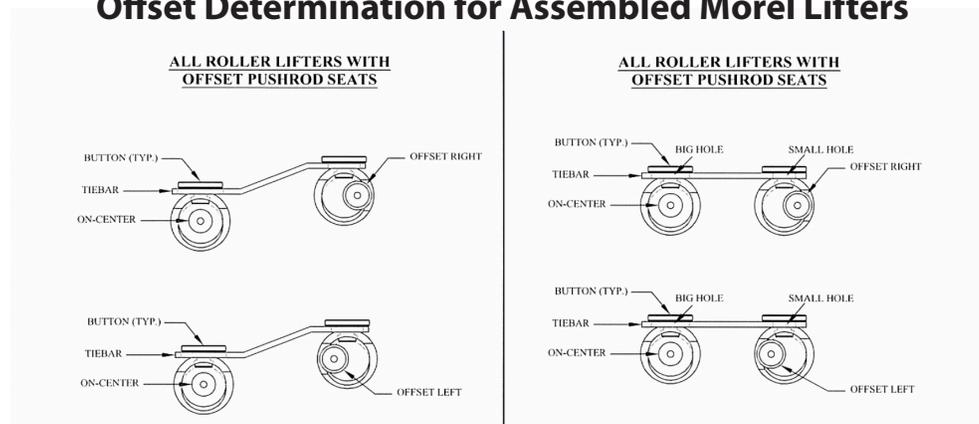


Make	Engine		BodyD	RollID	Pair#	Set#
Chevrolet	LS	On Center	0.842	0.750	6716	6717
		.150" Left INT Offset	0.842	0.750	6718	6719
		.150" INT & EXH Offset	0.842	0.750	6720	6721
		On Center	0.903	0.810	6722	6723
		.180" Left INT Offset	0.903	0.810	6724	6725

Legend and Definitions

Part No.	Application
U/P	Ultra Pro Body. Full Body Design That Is More Stable At High Rpm.
T/B	Tie Bar. Vertical Tie Bar To Retro Fit The Given Engine.
HLT	Hyd. Limited Travel. It Is A Hyd Roller Lifter That Is Treated Like A Solid Roller Lifter. Cheater Lifter.
P/O	Pressurized Oiling. Direct Pressure Fed Oiling To The Needle Bearings And Axle.
O/C	On Center. Pushrod Cup Is Centered. If Off Set It Will Be .180 And Either Left Or Right
NBA	Nascar Bearing Axle. Developed With A Top Nascar Team This Needle Bearing Assembly Is For High Endurance Applications.
UFRS	Bushing Lifter. Instead Of Needles This Lifter Has A Bushing In It.
BM	Black Mamba High Endurance High Spring Load Lifter

Offset Determination for Assembled Morel Lifters



For Quotes on Product for Private Label Programs, please call 423 391 7774

Warning: all oem fasteners are torque to yield and are designed to be torqued one time. Reusing these fasteners can cause pre mature failure.



LS/LT Rocker Arm Kits

Introducing our NEW Straub Tech Rocker kits with our LIFETIME Warranty against body breakage. Available for all LS1 heads that use stock rocker assemblies, our rockers are made from investment cast steel that has been shot-peened and micro polished to stress relieve the part. Each rocker is fully assembled with our proven bushing kit featuring our self lubricating bronze material and our proprietary oiling system to the trunnion. Each kit comes with Grade 12.9 Bolts and comes with our exclusive LIFETIME warranty against body breakage. If a body breaks, we will replace it free of charge.

Application	Part No.	Description
LS1	346-1700	Set of 16 Rockers, all straight. 1.7 Ratio with bronze bushing trunnions. Includes bolts
LS3	346-1703	Set of 16 rockers. 8 Offset and 8 Straight, with bronze bushing trunnions. Includes Bolts
LT	348-1800	LT Rocker Arm Kit. OEM 1.8 Rockers, REM finished bodies and assembled with Bushing Kit. Kit includes 16 rocker arms and bolts
LS7	346-1801	LS7 Rocker Arm Kit with Bushings. 1.8 ratio. Kit Includes: 8 offset intakes, 8 on-center exhausts, with bolts.



LS and LT Aluminum Rocker Arm Kits

Straub Tech Aluminum LS Rockers are Made in the USA for us by Harland Sharp. These pedestal mount, GM LS1/LS6 roller rockers are designed to be a replacement for the factory rocker that fits under the stock valve cover. Simply remove the factory rockers and rocker stands and replace with your new Harland Sharp roller rockers.

We offer 2 types of Rockers in this series. The adjustable rocker fits on the factory heads but will require shorter pushrods and correct adjustment of the adjuster on the rocker.

THE ADJUSTER SHOULD NEVER BE MORE THAN 1.5 TURNS OUT FROM THE ROCKER. THIS WILL CHANGE ROCKER GEOMETRY AND CAN CAUSE DAMAGE.

Part No.	Ratio	Application	Adjustable
SLS17	.7	All LS except LS7	NO
SLS17A	1.7	All LS except LS7	YES
SLS18	1.8	All LS Except LS7	NO
SLS18A	1.8	All LS Except LS7	YES
SLS78A	1.8	LS7 Only	YES
PLS78A	1.8	LT Engines 2016+	YES



LS Rocker Arms

Straub Tech's relationship with some large PER's has given us the endurance data reports on an aftermarket rocker for LS1 and LS 3 engines. This rocker features an investment cast body with a full caged needle bearing, centerless ground, fulcrum featuring a steel trunnion that is C-Clipped in the body. These are available in sets of 8 and can be bought for LS1 and LS3 engines. Re-useable socket cap grade 9 bolts are included with rockers.



Part Number	Description
346-4664	LS Straight Rocker, 1.7 Ratio. Fits LS1/2/6 both Intake and Exhaust
346-6105	LS Offset Rocker, 1.7 Ratio. Intake Rockers for all LS3 Heads



LT Rocker Arms

These are 100% OEM rockers and fit the both intake and exhaust of the Gen V LT 2014+ LT1 LT4 L83 L86 L84 L87 L8T L82

Part Number	Description	
12619829	LT V Intake and Exhaust Rocker	1.8 Ratio



Rocker Arm Trunnion Kits

These new bushing LS trunnion kits for factory LS rockers are designed to increase durability and load capacity without the failure prone needle bearings. Engineered to provide maximum lubrication to the trunnion while also providing maximum load capabilities, the NEW bushing LS trunnion UP-grade kits give the LS world peace of mind. The proprietary bushing material is fed with an oil channel at 12 O'Clock position of the trunnion. This channel constantly feeds oil to the bushing surface ensuring proper lubrication unlike needle bearing trunnions the have to rely on oil "finding" it's way to the needles. The greater surface area of the bushing will support 300X the load of what a needle will due to the fact that only 3 needle on the bottom of the race are carrying the load. Also there is NO CHANCE of needle bearings destroying the engine when using much more aggressive cam profiles and a rocker fails.

100% Manufactured and Engineered in the USA.

Kit includes the trunnion, bushings and C-Clips and can be used with the stock rocker bolt. Fits all OEM LS Rockers, LS1/2/3/6 and 7, and all LT4 and 5



Part No.	Application
346-1370	Fits all LS OEM Rockers bodies from 1997 to Present
346-1371	Fits all LS1/LS2/LS3 engines with 1.7 Rockers and uses stands on the head. Comes with 12.9 Grade Socket head bolts to be used to replace TTY OEM bolts.
346-1381	Fits all LS7 engines with 1.8 Rockers. Comes with 12.9 Grade Socket head bolts to be used to replace TTY OEM bolts.
*Replacement parts are available and sold separately. Please call for pricing.	
346-1370OS	LS Bushing Trunnion Kit. Fits all LS OEM Rockers but bushings are .001" oversized for worn rocker housings.
346-1481	LT Rocker arm bushing trunnion kit. Fits all OEM LT Rocker bodies for conversion to bushing fulcrums.
Replacement and Service Parts	
346-1370B	8MM Socket Cap Bolt for LS1/2/3 rated at 1220 MPA Tensile
346-1380B	8MM Socket Cap Bolt for LS7, All LT's rated at 1220 MPA Tensile
346-1370BU	1 x SureOil Trunnion Bushing for 346-1370 Kit. Need 2 per rocker arm
346-1370S	Snap Ring for all bushing kits. Need 2 per rocker arm.
346-1370T	Replacement Trunnion for rocker arm. 1 per rocker arm

**Replacement parts are available and sold separately. Please call for pricing.*

Straub Technologies Spring Kits

Straub Technologies spring kits are designed to simplify valvetrain assembly. Each kit is designed for LS and LT camshafts that are sold by StraubTech and others. We feature Beehive and Dual Spring kits that use valve springs from the OE Supplier. These premium coils have been cycle tested and are designed for upper rpm operation. Each kit features steel retainers, forged or machined valve locks, and premium viton seals. Kts are sold to do a pair of heads.



Beehive Spring Kits

Part No.	Description	Lock Type
346-1201	DROP IN BEEHIVE VALVE SPRING KIT 135# AT 1.800, MAX LIFT .635"	Forged
346-5034	DROP IN BEEHIVE SPRING KIT 90# SEAT A 1.800", MAX LIFT .550"	Forged
346-3266	DROP IN BEEHIVE SPRING KIT 95# SEAT AT 1.800" MAX LIFT .570"	Forged



Dual Spring Kits

346-1821	LS Gold Dual Spring Drop In Kit .640" Lift 140# Seat	Forged Locks
For use with heads with OEM Valve Guides of .500" Diameter		
346-1823	LS Platinum 1.290" Dual Spring Kit	Machined Locks
150# Seat/475# Open Springs for max of .650" lift. Designed for Heads with .500" Diameter Valve guides		
346-1824	LS Platinum 1.290" Dual Spring Kit	Machined Locks
150# Seat/475# Open Springs for max of .650" lift. Designed for Heads with .560" Diameter Valve guides		
346-1822P	LS Platinum Polished Plus 1.290" Dual Spring Kit	Machined Locks
150# Seat/475# Open Springs for max of .660" lift. Designed for Heads with .500" Diameter Valve guides		
346-1823P	LS Platinum Plus 1.290" Dual Spring Kit	Machined Locks
150# Seat/475# Open Springs for max of .660" lift. Designed for Heads with .560" Diameter Valve guides		

Valve Springs

Straub Tech valve springs have been track tested now for over 20 years. These coil combinations offer the best in performance and endurance for intended engine applications. We use only premium wire from the coil manufacturers for our select coil combinations. Racers demand endurance from parts and these springs, no matter what form of racing you are doing, will hold up under the intended application.



Part No.	OD/ID Seat	# Inch Rate	Coil bind	Max lift
Beehive				
110-1201	1.290/1.070"	135#/340#	1.150"	.650"@1.850
110-1218	1.055/1.290"	130#/325#	1.150"	.600"@1.800
110-5033	1.050/1.290"	90#/280#	1.100"	.580" at 1.800
110-3265	1.050/1.290"	95#/295#	1.100"	.580" at 1.800

Part No.	OD/ID Seat	# Inch Rate	Coil bind	Max lift
Dual Spring (No Dampers)				
110-1821(Gold)	1.290/.650"	145# 355#	1.200"	.620"@1.800"
110-1822 (Platinum)	1.290/.650"	155# 370#	1.200"	.650" @1.800"
110-1822P (Platinum Polished)	1.290/.650	155/440	1.200	.660 at 1.800
110-1858	1.290/.650	140/380	1.100	.650"@1.800

*Nitrided Spring for Endurance

Valve Springs Retainers

Straub Tech Steel Retainers are machined from Chrome Moly steel. Each retainer is precision cut for included lock angle. Retainers are available in 7 and 10 degree lock angles. All retainers are finished in black oxide. All steel retainers are finished in black oxide, me manium retainers are nignly cousnec.



Valve Spring Retainers

Part No.	Material	Height	Spring Size	Degree	Stem Size	Dimensions	Fits
100-1297	Steel	1.290	STD	7	8mm	1.270 .645"	110-1821/1822
100-1055	Steel	Beehive	STD	7	8mm	1.055	110-1218
105-1222	Titanium	1.290	STD	7	8mm	1.270/.645	110-1821/1822

Valve Locks

Straub Tech Valve Locks are manufactured from Alloy steel here in the USA. Straub Tech locks have been used for almost 2 decades by performance cylinder head companies and valvetrain companies.



Part No.	Groove	Degree	Valve Size	Install Height	Lash Cap	Type
100-7778	Radial Bead	7°	8mm	Stock	NO	Stamped
100-9008	Radial Bead	7°	8mm	Stock	NO	Machined
100-1315	Radial Bead	10°*	8mm	Stock	Yes	Machined

*This lock fits any 10 degree retainer in the industry and will convert it to use with LS 8mm valve.

Spring ID and OD Locators

Straub Tech ID locators are manufactured from 4140 material and case hardened to a minimum of .010". Close tolerances are maintained to ensure proper spring location and long life. Even under extreme spring pressure conditions.

Spring Locators

Part No.	Spring OD	OD	ID	Shoulder OD
101-0240	1.300	1.29	.505	.650"
101-0245	1.300	1.29	.565	.650"



Spring Shims

The StraubTech LS Valve Spring shims come in .015, .030, .060 and are heat treated for more aggressive spring loads. These are 100% USA made



Application	Part No.	Description	Qty
ALL LS Engines	346-1536	Spring Shim Kit, includes 16 of each .015/.030/.060"	
ALL LS Engines	346-0015	.015" Shim 1.255 x .565" X .015"	Qty 50
ALL LS Engines	346-0030	.030" Shim 1.255 x .565" x .030"	Qty 50
ALL LS Engines	346-0060	.060" Shim 1.255 x .565 x .060"	Qty 50

Lash Caps

Straub Tech Lash Caps are 100% Machined from Chrome Moly Steel here in the USA. Each cap is machined on a CNC lathe for both ID and OD sizing to ensure proper tolerance fit. We then lap the face of the cap to ensure parralle fit with the rocker tip. Each cap then is EDM hole popped to provide lubrication between the valve tip and lash cap. Each cap is then vapor hone finished. Sold in sets of 16 or available for bulk quote.



Each cap is REM Finished.

Part No.	Stem Size
100-3150	Fits all 8mm LS Valves

Bronze Valve Guides

The Straub Technologies manganese bronze stepped valve guide replaces for the OEM iron guide and allow you to run aftermarket seals so that the heads can use a dual spring assembly. These guides are machined from bronze alloy and come with proper press fit for the OEM castings. Guides are stepped for a positive stop insuring correct install height.



Sold in sets of 16 and boxes of 100.

Part No.	Application	Description
900-0086	ALL LS1/3 OEM Heads	OAL 2.260" x UHL 1.630 x OD Step .560 x Guide OD .502 x ID .314" (Set of 16)



Valve Seals

Straub Tech Performance Valve Seals are built with OEM quality with race engine function. Our metal clad seals are designed to work with race fuels and lubricants and function under the higher temperatures that race engines see over continued use. Our seals are designed to run continuously at 400 degree F engine temps.

We offer a Hat Seal for both Beehive and Dual Springs. A Hat Seal is a combination of seal and spring seat locator. Using this does was with need for a steel spring seat on a aluminum head.



LS with Beehive

Application	Part No.	Description
All LS with Beehive	131-900	.313 x .286 x .492 x .887 x .791 x 1.187" Set of 16
Bulk	131-900-100	.313 x .286 x .492 x .887 x .791 x 1.187" Box of 100

All LS OEM guides and Dual Springs

Application	Part No.	Description
All LS	131-1805	Seal OD .608" x Guide OD .502" x Stem .315 Set of 16
Bulk	131-1805-100	Seal OD .608" x Guide OD .502" x Stem .315 Box of 100

All LS with Bronze Stepped Guides

Application	Part No.	Description
All LS	131-1806	Seal OD .608 x Guide OD .500 x Stem OD .315" Set of 16
Bulk	131-1806-100	Seal OD .608 x Guide OD .500 x Stem OD .315" Box of 100

Top Hat Seals

Part No.	Description
131-900	Top Hat for Beehive Springs.313" x .286 x .492 x .887" x .791 x 1.187" Sold Each
131-900-100	Bulk pack of 100 pcs of 131-900
131-1906	Top Hat for 1.290" Dual springs .313 x .286 x .500 x .650 x 1.300" Sold Each
131-1906-100	Bulk pack of 100 pcs of 131-1906
131-1907	Top Hat for 1.290" Dual springs .313 x .286 x .565 x .650 x 1.300" Sold Each

Viton Metal Clad Seals (Will require shim or locator on aluminum heads)

Part No.	Description
131-180	Fits OEM .500 Guide Seal OD, .608, ID, .500 Stem .309 Sold Each
131-1805-100	Bulk pack of 100 pcs of 1805
131-1806	Fits Aftermarket Stepped guides, .560" OD .640 x .558 x .309" Sold Each
131-1806-100	Bulk pack of 100 pcs of 1806

Rollmaster LS Timing Sets

Rollmaster timing sets have become an industry standard ever since they were first used in the US. All timing sets are produced using billet steel K1045 material for both the crank and camshaft sprockets. All Gold sets are nitride hardened and include a one-piece Torrington bearing with an Iwis chain. Timing chain sets have 9 keyways which allows more adjustment for dialing in the cam. Crankshaft sprocket keyways are in 2-degree increments unless otherwise noted. The relationship from crank keyway to camshaft sprocket timing is 2:1 meaning that the amount of advance or retard at the camshaft is in one-degree increments, IE 1, 2, 3 or 4 degrees. Multiple keyways are a solid fixture and do not tend to move or work loose like offset dowels, thus providing a positive locking of the cam timing to whatever position is desired. Rollmaster timing sets are light weight and stronger than any other timing set available, due to the weight savings of billet steel and use of CNC machinery. Gold sets are shipped with our proprietary IWIS premium grade one-piece full roller timing chain that was developed by Rollmaster's founder with IWIS. No other timing set manufacturer is supplied this chain. All Gold Series timing sets have a one-piece Torrington thrust bearing fitted to the cam sprocket and requires no additional machining for fitment to a block. Gold set's sprockets are both nitride for longevity under high spring loads.



Features:

- Proprietary IWIS Seamless Chain Exclusive to Rollmaster
- Nitride hardened for endurance under extreme loads
- Captive Torrington bearing on cam sprocket that requires on additional machining to block.
- Multi Keyway crank sprocket for quick indexing/phasing of engine.

"I have personally sold the Rollmaster line since 1996. This includes shipping stock orders of 100 to 200 sets to warehouses as we were only 3 direct accounts in the USA. I don't know the exact number, but when I say its in thousands you can bet on it, and I have had very few issues with the sets and can't think of 1 failure. I'm proud to offer this line in my product catalog." **Chris Straub, CEO of STI**

24X vs 58X: What to look for...

STR 346-6407

- 1 pole 3 bolt cam gear.
- 1 raised portion for the cam sensor to read.
- Compatible with 24x crank reluctor.



STR 346-6481

- 4 pole 3 bolt cam gear.
- 4 raised portions for the cam sensor to read.
- Compatible with 58x crank reluctor.



This GM cam gear is used in late model motors that are being swapped from the single-bolt cam to a three-bolt camshaft.

Make	Engine		Pair#	Chain Links	Crank Keyways	Part No.
Chevrolet LS Series	Gen III	LS1 & LS6 - w/Torrington Brg	SR	60	9	CS1135
		LS1 & LS6 - w/Torrington Brg	DR	60	9	CS1136
		LS1 w/Torrington Brg & Nitrided Sprockets	DR	60	9	CS1160
	24x Crank	LS2 w/Torrington Brg - One Trigger Sensor	SR	60	9	CS1180
		LS2 w/Torrington Brg - One Trigger Sensor	DR	60	9	CS1185
		LS2 w/T/Brg – One Trigg – Suit RHS Block Cam Raised .388"	DR	62	9	CS10000
		LS2 w/T Brg – Nitrided Sprockets - One Trigger Sensor	DR	60	9	CS10005
	58x Crank	LS2 w/T Brg – Nit Sprks – 1 Trig - RHS Block – Cam Raised .388"	DR	62	9	CS10035
		LS7 w/T Brg – 3 B – Multi Trigg – Long Oil Pump Drive for Dry Sump	SR	60	9	CS10010
		LS7 w/T Brg – 3B – Multi Trigg – RHS Block - Cam Raised .388"	DR	62	9	CS10015
		LS7 W/T Brg – Nit Sprks - 3B – Multi Trigg – RHS C Raised .388"	DR	62	9	CS10040
		LS7 w/Torrington Brg – 3 Bolt Early Series - Multi Trig Sens	SR	60	9	CS1190
		LS7 w/Torrington Brg – 3 Bolt Early Series - Multi Trig Sens	DR	60	9	CS1195
		L98 w/Torrington Single Bolt - Multi Trigger Sensors	SR	60	9	CS1197
		L98 w/Torrington Single Bolt - Multi Trigger Sensors	DR	60	9	CS1198
		L98 w/T/Brg – Nitrided Sprockets – 3 Bolt Early – Multi Trigg	DR	60	9	CS10020
		LS7 Cam Gear & Chain Only w/ Torrington Bearing-3 Bolt	SR	60	9	CS10075
		LSA	LSA Single Row - Must Use 3 bolt Cam	SR	60	9

Timing Gears and Chain

Part No.	Description
346-6407	1 pole 3 bolt cam gear. Compatible with 24x crank reluctor.
346-6481	4 pole 3 bolt cam gear. Compatible with 58x crank reluctor. This GM cam gear is used in late model motors that are being swapped from the single-bolt cam to a three-bolt camshaft

OEM Timing Chains and Accessories

Straub Tech stocks the various GM OEM Replacement Timing Chain Components for the LS & LT platforms, including the VVT Phaser and Cam Bolt Control Valve, as seen below.



Part No.	Description
3SR60-2	Chain only. This fits all LS engine sprockets and can be retro-fitted to any OEM timing gear set.
346-3368	Engine Timing Cam Phaser Sprocket - GM 12623368 2007-20 5.3L, 6.2L
346-1018	Cam Bolt VVT Control Valve Gen 1 LT1, L86, L83 Engines, OE GM# 12681018
346-8670	Timing Chain Dampener Same as OEM 12588670
346-6582	LS Crankshaft Timing Gear OEM

LS Front Covers

ST features all LS front covers. The differences are shown below.



Part No.	Description	Application	GM Part No.
346-6623	LS "NO HOLE" Cover Only	Gen III 4.8L 5.3L 6.0L 1997-2004.5	GM 12556623 & 12561243
346-0325	LS "HOLE" Cover Only	Gen IV LS2/LS3 Non-VVT 2004.5-2017	GM 12600326
346-3906	LS "HOLE" Cover Assembly	Gen IV LS2/LS3 Non-VVT (or DELETE)	GM 12633906
346-3904	LS Timing Cover Gasket	Gen III/IV LS engines) 1997-2019	GM 12633904



GM LS/LT ENGINE QUICK REFERENCE GUIDE

Gen 3									
Displacement	Engine Code	DOD	VVT	Cam Bolt	Reluctor	VIN (8th Digit)	Block	Head	Gen III Years
4.8L	LR4	No	No	3	24X	V	Iron	Cathedral	1999-06
5.3L	LM4	No	No	3	24X	P	Alum.	Cathedral	2003-05
5.3L	LM7	No	No	3	24X	T	Iron	Cathedral	1999-07
5.3L	L59	No	No	3	24X	Z	Iron	Cathedral	2002-07
5.3L	L33	No	No	3	24X	B	Alum.	Cathedral	2005-07
5.7L	LS1	No	No	3	24X	G	Alum.	Cathedral	1997-04
5.7L	LS6	No	No	3	24X	S	Alum.	Cathedral	2001-05
6.0L	LQ4	No	No	3	24X	U	Iron	Cathedral	1999-07
6.0L	LQ9	No	No	3	24X	N	Iron	Cathedral	2002-07
Gen 4									
Displacement	Engine Code	DOD	VVT	Cam Bolt	Reluctor	VIN (8th Digit)	Block	Head	Gen IV Years
4.8L	L20	No	Yes	1	58X	A	Iron	Cathedral	2010-17
4.8L	LY2	No	No	1	58X	C	Iron	Cathedral	2007-09
5.3L	LY5	yes	No	1	58X	J	Iron	Cathedral	2007-09
5.3L	LC9	Yes	No/Yes	1	58X	3 or 7	Alum.	Cathedral	2007-14
5.3L	LH6	Yes	No	3/1	24X/58X	M	Alum.	Cathedral	2005-09
5.3L	LH8	No	No	1	58X	L	Alum.	Cathedral	2008-09
5.3L	LH9	No	Yes	1	58X	P	Alum.	Cathedral	2010-12
5.3L	LMF	No	Yes	1	58X	4	Iron	Cathedral	2010-14
5.3L	LMG	Yes	No/Yes	1	58X	0	Iron	Cathedral	2007-14
5.3L	LS4	Yes	No	3/1	24X/58X	C	Alum.	Cathedral	2005-09
6.0L	LS2 (Car)	No	No	3/3/1	24X/58X	U	Alum.	Cathedral	2005-2007
6.0L	LS2 (Truck)	No	No	3/1	24X/58X	H	Alum.	Cathedral	2005-06, 2007-09
6.0L	L76 (Car)	No/Yes	No	1	58X	Y	Alum.	Rectangle	2008-10
6.0L	L76 (Truck)	Yes	Yes	1	58X	Y	Alum.	Rectangle	2007-09
6.0L	L77	Yes	No	1	58X	2	Alum.	Rectangle	2011-17
6.0L	L96	No	Yes	1	58X	G	Iron	Rectangle	2010-17

Displacement	Engine Code	DOD	VVT	Cam Bolt	Reluctor	VIN (8th Digit)	Block	Head	Gen IV Years
6.0L	L98	No	No	1	58X	N/A	Alum.	Rectangle	2007-08
6.0L	LC8	No	Yes	1	58X	B	Iron	Rectangle	2011-16
6.0L	LFA	Yes	Yes	1	58X	5	Alum.	Cathedral	2008-09
6.0L	LY6	No	Yes	1	58X	K/N	Iron	Rectangle	2007-14
6.0L	LZ1	Yes	Yes	1	58X	J	Alum.	Cathedral	2010-13
6.2L	L92	No*	Yes	1	58X	8	Alum.	Rectangle	2007-08
6.2L	L94	Yes	Yes	1	58X	F	Alum.	Rectangle	2010-14
6.2L	L99	No	Yes	1	58X	J	Alum.	Rectangle	2010-15
6.2L	L9H	No	Yes	1	58X	2	Alum.	Rectangle	2009-14
6.2L	LS3	No	No	3/1	58X	W	Alum.	Rectangle	2008-17
6.2L	LSA	No	No	1	58X	P	Alum.	Rectangle	2008-15
6.2L	LS9	No	No	3	58X	T	Alum.	Rectangle	2009-13
7.0L	LS7	No	No	3	58X	E	Alum.	Square	2006-15



Fasteners and Hardware

Straub Tech offers engine builders OEM fasteners and the finest in aftermarket fasteners for LS and LT engine builders. The OEM stuff has proven its reliability in 1000 RWHP builds for over 2 decades of LS engine building. Build with confidence with our product.

LS Basic "Junk Yard" Cam Swap Kit - Early

All the necessary fasteners to complete a cam swap on 1 engine.

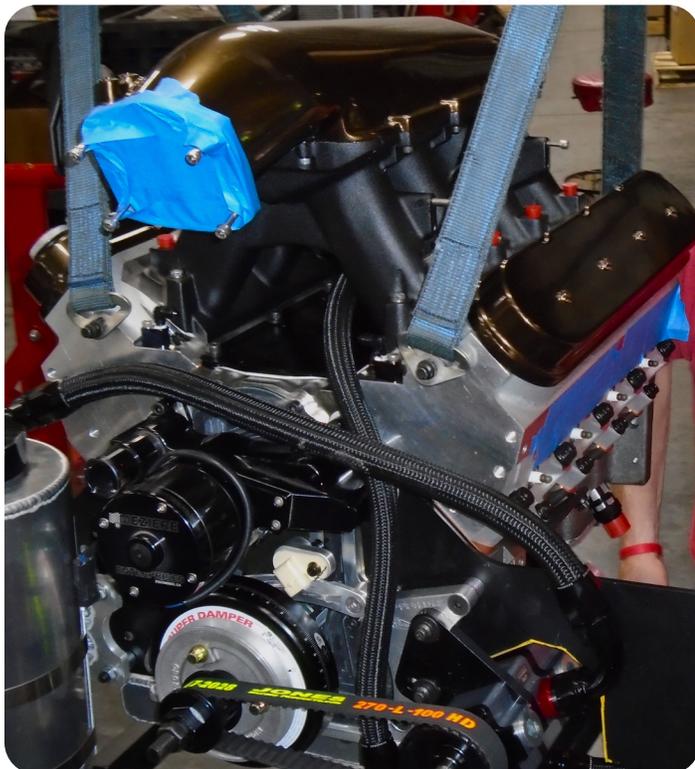
Part No.	Description
346-9997	1997 to 2004 LS Basic "Junk Yard" Cam Swap Kit for 1 Engine
19258707	- Medium Head Bolt x4
12558840	- Short Head Bolt x10
11588291	- Long Head Bolt x16
12573460	Oil Galley Plug(Dog Bone) x1
12551933	- Coolant Tube Air Bleed Seal x4
12589016	- Camshaft Thrust Plate x1
12557840	- Balancer Bolt x1
11515758	- Front Cover and Oil Pump Bolt x12
12551163	- Lifter Tray Bolt x4
12556127	- Cam Bolt x3
11561455	- Cam Retainer Bolt x4



LS Basic "Junk Yard" Cam Swap Kit - Late

All the necessary fasteners to complete a cam swap on 1 engine.

Part No.	Description
346-9002	2004.5 and Up LS Basic "Junk Yard" Cam Swap Kit for 1 Engine
19258707	- Medium Head Bolt - 20
12558840	- Short Head Bolt - 10
12573460	- Oil Galley Dogbone - 1
12551933	- Air Bleed Seal - 4
12589016	- Cam Thrust Plate - 1
12557840	- Damper Bolt - 1
11515758	- Front Cover Bolt & Oil Pump Bolt - 14
12551163	- Lifter Tray Bolt - 4
12556127	- Camshaft Bolt - 3
11561455	- Cam Thrust Plate Bolt - 4



LS Short Block Bolt Kit

Straub Short Block fastener kits contain all the hardware that needs to be replaced when doing the lower end on a LS engine. All bolts are Torque-To-Yield on any LS engine, therefore they all need to be replaced. In addition to these bolts the kits have other items like pipe plugs and dowels that are removed during the machining and cleaning process. Each kit contains the following:

Part No	Description	Qty needed per engine
346-9901	Basic Short Block kit for LS Engines (1 Complete)	
346-0272	Main Cap Bolt	x 10
346-0273	Main Cap Bolt w/ windage tray	x 10
346-5758	Oil Pan x 13 Front Cover x 8 Oil Pump	x 4
346-1663	Brass Plug	x 1
346-769	Front Galley Plug	x 1
346-3658	Engine Bellhousing	x2
346-8714	Coolant Airbeed	x 2
346-6127	Outer Main Cap Bolt x 10 Cam Bolt x 3 Rear Cover 12	x 12
346-8949	Small Pipe Plug	x 3
346-4990	Oil Pan to rear cover bolt	x 2



Master Bolt Kits for LS Engines

Straub Master Short Block fastener kits contain all the hardware that needs to be replaced when doing the lower end on a LS engine. All bolts are Torque-To-Yield on any LS engine, therefore they all need to be replaced. In addition to these bolts the kits have other items like pipe plugs and dowels that are removed during the machining and cleaning process. Each kit contains the following:

Part No.	Description
346-9003	Master Pack to do 3 complete LS Cam swaps. Includes Metal Case with tech sheet for torque and qty.
346-9003R	Master Pack Refill. Includes all the parts less the metal case.

GM Part No.	Qty
12556127	75
11561455	12
19258707	60
12558840	30
12573460	3



LS Short Block Bolt Kit

Straub Short Block fastener kits contain all the hardware that needs to be replaced when doing the lower end on a LS engine. All bolts are Torque-To-Yield on any LS engine, therefore they all need to be replaced. In addition to these bolts the kits have other items like pipe plugs and dowels that are removed during the machining and cleaning process. Each kit contains the following:

Part Number	Description
346-9903	Master Kit for LS Short Blocks. All hardware to do 3 complete LS short blocks. Comes with Steel Case
346-9903R	Refill for master kit box. All parts less the steel box.

GM Part No.	Qty
12560272	30
12560273	30
11515758	75
12561663	3
9427693	3
11453658	6
11588714	6
12556127	75
11588949	9
12554990	6
12570326	12



LS Engine Basic Plug Kit

The Straub Tech LS Plug kits contain all the plugs and dowels available in a basic kit and a Master kit

GM Part No.	Description	Basic Kit	Master Kit
12561663	Brass Plug	Yes	Yes
12573460	Dog Bone	Yes	Yes
11588949	Coolant Plug	Yes	Yes
94277693	16MM Plug	Yes	Yes
12570326	Head Dowels	No	Yes
1453658	Trans Dowels	No	Yes

Part No.	Description
346-2000	Basic Block Kit
346-3000	Master Block Kit



LS and LT Fasteners, Bolts, Studs, and Plugs

Head Bolts

These are OEM GM head bolts used on all LS engines from 1997 to present. Bolts are priced each based on quantity ordered. All GM LS head bolts are TTY. They must be replaced after installed.



Head Bolt Kits (1 Per Head)

Part No.	Description
346-8291	LS 1997 to 2004 Heads that take 3 head Bolts 11588291 / 19258707 / 12558840
346-0568	LS 2004.5 to 10015 all LS1/LS3/and LS7 Heads that take 2 bolts 19258707 / 12558840
346-6976	LT 2014 to Present. Fits all LT 5.3/6.2/6.6 Engines 11546956 / 116119776
Head Bolts Each	
346-8291	LS 1997-2004 Only Long Bolt 155MM / 6.102" (Each) Bulk 90 Per Case
346-8840	LS 1997-2015 Short Bolt 45MM/1.770" (Each) Bulk 400 Per Case
346-8707	LS 1997-2015 Medium Bolt 00MM/ 3.930" (Each) Bulk 200
346-1976	LT 2014 to Present Cap Socket Bolt (Each) (Bulk 95)
346-6959	LT 2014 to Present Hex Head Bolt (Each) (Bulk 95)

Main Bolts/Studs

These are OEM GM main bolts and studs used on all LS engines from 1997 to present. Bolts are priced each based on quantity ordered. All GM LS main bolts are TTY. They must be replaced after installed.

Main Bolts

Main Bolt Kits (1 Block)

346-0270	ALL LS1/2 1997 to 2004
346-0271	All LS1/2/3/7 2004.5 to 2015
346-8074	ALL LT 2015 to Present

Main Bolts Each

346-1389	All LS Engines 12561389 Bolt with Windage Tray Stud 3 per engine 12561389 (Bulk 90)
346-0273	All LS Engines 1997 to 2004 Bolt 10 per Engine 12560273 (Bulk 100)
346-0272	All LS Engines 2004.5 to 2015 Bolt 10 per Engine 12560272 (Bulk 100)
346-6127	All LS Engines 1997-2015 Outer Main Cap Bolt 10 per engine 12556127 (Bulk 200)
346-8075	All LT Engines 2014 to Present 10 per Engine 11548075 (Bulk 100)
346-8076	All LT Engines 2014 to Present 10 per Engine 11548076 (Bulk 100)
346-6565	All LT Engines Outer Main Cap Bolt 10 per Engine 11546565 (Bulk 200)
BULK: Call for quote based on quantity needed to purchase.	

GM LS and LT Fasteners

These SAME as GM fasteners are available 1 at a time or in bulk. The more quantity you buy the better the price.
Call for Bulk pricing

Application	Part No.	Description	OE Part No.	Per Pack
LS Coil Bracket Bolt	346-4211	Coil Bracket Bolt 1997 - 2013	12554211	8
LS Intake Bolts	346-7135	Intake/Manifold Bolt Sold Each M8X1.25X30.7	11757135 GM	12
LS Valve Cover Bolt w/Gromet	346-7215	VALVE COVER BOLT M6X1X69	12577215	8
LS Coolant Plug	346-0259	Engine Coolant Plug 12MM X1.50MM X .835	11610259	11
LS Thermostat Bolt	346-6480	Thermostat Housing Bolt	11516480	3
Harmonic Damper Bolt Kit	ARP 234-2503	LS Gen III/IV (except LS7), 8740, 12pt, M16X2.00, 4.325", 1-1/16	234-2503	12
LS Rocker Arm Bolt	346-0961	GM LS Rocker Arm Bolt M8 X 1.25 X 52.50 GM	12560961	16 per or 1 per rocker
LS Lifter Guide Bolt	346-1163	Bolt For Lifter Guide M6 x 1 x 19 GM	12551163	4
LS Coolant Plug Bolt	346-8714	Pipe and Plug Bolt	11588714	4
LS Oil Pan / Timing Cover / Oil Pump	346-5758	Oil pan x 12 Short	11515758	12
		Timing Cover x 8		8
		Oil Pump x 4		4
LS Long Oil Pan Bolt	346-4990	Long Oil pan bolt	12554990	2
LS Oil Pump Cover Bolt	346-9133	Oil Pump Cover Bolt M6X1.0X20	11519133	7
LS Dampner Bolt	346-7820	Harmonic Balancer Bolt LS 1/2/3 Fits Engines - 4.8, 5.3, 5.7, 6.0,6.2 (2007 - 2015)	12557840	1
LS/LT Cam Sensor Bolt	346-8712	Cam Sensor Bolt Gen IV & LS2/3	11588712 GM	1 per
LS/LT Cam Retainer Bolt	346-1455	Cam Retainer Bolt (Torx) 2006 - 2014, 4.8, 5.3, 6.0, 6.2	11561455	4
LS Camshaft Bolt for 3 Bolt Cams	346-6727	3 Bolt Cam Sprocket Bolt. Fits Engines - 4.8, 5.3, 6.0, 7.0 M8 x1.25x24	12556127	3
LS Camshaft Bolt for 1 Bolt Cams	346-1283	Cam Sprocket Bolt W/ O.V.V.T. GM	11561283	1
LS Timing Tensioner Bolt	346-9681	Chain Tensioner Bolt	11519681	2
LS Flywheel/Flexplate Bolt	346-9956	Flywheel/Flexplate Bolt 1569956 LS1 -		LS6 (6), LSX (8), LS9 (9)
LS Crankshaft Adapter Bolt	346-7940	LS Flywheel Adapter bolts, for adapter LS3532 OE	19257940	6
LS Connecting Rod Bolt	346-0662	Connecting Rod Bolt 2007 - 2015 Gen IV GM	11570662	2
LT Oil Pan Drain Plug	346-2588	Oil Pan Drain Plug (No Magnet) All Vehicles	11562588 (2013-2022)	1

LS and LT Gaskets

Straub Tech offers both original equipment style high quality gaskets and original equipment gaskets for original equipment replacement, high performance street, drag race and oval track. All our gaskets and seals either meet OE requirements or exceed OE requirements. This includes all gaskets, seals, and O-rings that we offer in complete engine gasket kits or individually.

Our complete gasket sets are offered in Small Bore and Large Bore with both cathedral port and square port gaskets. This way you have the intake gaskets you need.

Also, the gasket kits are available with our modified gaskets that allow water to flow behind the combustion chamber and decrease engine temperature but increase engine HORSEPOWER! These are available in both LS and LT small bore and large bore applications. Here is some technical info on what has been done to these gaskets:

Modified Head Gaskets for Cooling and Power

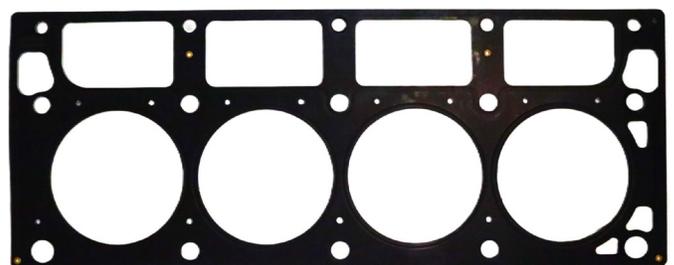
Is there HP and RPM to be gained by replacing head gaskets on and making cooling system modifications to your Gen III/IV LS engine? Yes, and it's been proven by Robert Yates Racing Engines in their continued development of the GM LS Spec engine for circle track racing.

RYRE pulled a track-tested engine out of a race car for endurance testing which had the OEM-type head gaskets and cooling system that was run in the car. Testing also included using the radiator right out of the race car. During testing, RYRE simulated the operating temperatures that the engine saw during races and it was noticed in the overflow tank that the engine was venting out of the radiator cap. Some head scratching went on with the results of the engine and cooling system testing. Donnie Lewis, part of the RYRE development team and Art Leniti from Arts Radiators, started researching the LS engine program and GM's focus for the engine platform; emissions legal for the EPA and better fuel economy. Donnie and Art's research revealed that GM achieved this through heat! Increases in the operating temperature related to the fuel operating temperature and the higher the fuel mileage and less emissions due to the heat that is needed for the catalytic converter to function efficiently. As more fuel is burned, there is more energy generated. In the confined space of a cylinder, this increases the pressure and hence the temperature, which is converted via the Otto cycle and the engine design, into mechanical energy to operate the engine. The energy realized is related to the temperature difference; the higher the combustion temperature and the lower the discharge temperature, the higher the efficiency of the engine and the more gas mileage you'll achieve. In addition, to meet EPA efficiency and emission regulations, OEM manufacturers use 200 or even 210 degree thermostats.

MODIFIED COOLING HEAD GASKET



NON MODIFIED COOLING HEAD GASKET



At the end of the day, Donnie Lewis of RYRE used simple physics to convert an EPA emissions engine into a 600HP NA race engine that runs to 7800RPM!!!!

Straub Tech's relationship with RYRE has given us the opportunity to take this tech and turn it into a product for the performance LS customer. Available in small bore and large bore, the Straub Tech MLS gasket features additional cooling holes that allow for more HP and higher RPM!!



Complete Gasket Sets:

These sets includes all gaskets, seals, and O-rings to assemble a complete engine.

Part No.	Application	Head Gasket Info
346-0175	LS1/2/3 Max Bore 3.930	.051"Thick MLS No modified cooling
346-0175P	LS1/2/3 Max Bore 3.930	.051"Thick MLS With modified cooling
346-0176	LS1/2/3 Max Bore 4.080	.051"Thick MLS No modified cooling
346-0176P	LS1/2/3 Max Bore 4.080	.051"Thick MLS With modified cooling



We all know running an engine cooler will produce more HP, but sacrifices fuel economy. RYRE needed performance and reliability for their race engine. Inspection of the head gaskets revealed that GM limited the water flowing around the combustion chamber to maintain the higher operating temperature. Additional evidence of an imbalance in cooling between the right and left head was evident because of the factory plumbing. RYRE modified the plumbing to consist of equal-length lines with a T in the middle running to an expansion tank just under the radiator cap. This allows the gases to leave the heads equally.

RYRE pulled the stock head gaskets off the test engine and punched seven missing holes in the them. Being that this engine was a spec engine, power output and RPM range of power was well documented. These engines, when reaching operating temperature, had always "laid over" on the straightaways and just quit pulling. RYRE's cooling system modifications with parts from Art's Radiators by RYRE were quite amazing. A simple few holes and some plumbing changes to add additional cooling and release off gases allowed the engine to continue pulling through the entire RPM range! All of this was from modification to the cooling system. Additional track testing showed that the engines ran cooler on the track.



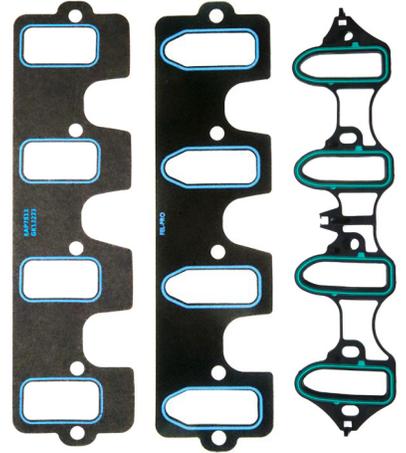
Head Gaskets

Part No.	Application	Dimensions	Modified Cooling
346-4031	LS 4.8-5.7	3.945" Bore x .051" MLS	No
346-4031P	LS 4.8-5.7	3.945" Bore x .051" MLS	Yes
346-4411	LS 6.0-6.2	4.100" Bore x .051" MLS	No
346-4411P	LS 6.0-6.2	4.100" Bore x .051" MLS	Yes
346-0046	LS3/92	4.080" Bore x .051" MLS 5 Layer	No
Same as 12610046			
346-0046P	LS3/92	4.080" Bore x .051" MLS 5 Layer	Yes
346-2033	LS9/LSA	4.100" Bore x .051" MLS 7 Layer	No
Same as 12622033			
346-2033P	LS9/LSA	4.100" Bore x .051" MLS 7 Layer	Yes
346-8420	LSA Small Bore	3.945" Bore x .051" MLS 7 Layer	No
346-1651	LS3/92 XL Bore	4.162" Bore x .051" MLS 5 Layer	No
348-2325	LT 5.3	3.838" Bore x .047" MLS 5 Layer	No
348-2325P	LT 5.3	3.838" Bore x .047" MLS 5 Layer	Yes
348-2325K*	LT 5.3 (Kit)	3.838" Bore x .047" MLS 5 Layer	Yes
348-4622	LT 6.2	4.094" Bore x .047" MLS 7 Layer	No
348-4622P	LT 6.2	4.094" Bore x .047" MLS 7 Layer	Yes
348-4622K*	LT 6.2	4.094" Bore x .047" MLS 7 Layer	Yes

*NOTE: THIS IS A COMPLETE KIT WITH 2 HEAD GASKETS, WATER RESTRICTORS, AND INSTRUCTIONS TO INSTALL THIS KIT ON A LT. REDUCES ENGINE TEMP BY AN AVERAGE OF 20 DEGREES. HIGHLY RECOMMEND FOR BOOSTED APPLICATIONS.

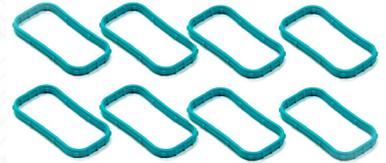
Intake Manifold Gaskets

Part No.	Application	Description
346-2223	LS3 Square Port	Composite Material with Silicone Bead
346-9589	LS3 Square Port	Rubber Green O-ring (O-rings only) Set of 8
346-6587	LS1 Cathedral Port	Plastic frame with Green O-ring
346-1312	LS1 Cathedral Port P	Composite Material with Silicone Bead



Valve Cover Gaskets

Part No.	Application	Description	
346-7683	LS1/2/3/7	Rubber O-ring Gasket (Pair)	12637683



Lifter Valley Cover Gaskets

Part No.	Application	Description	
346-0141	LS3	Rubber Embossed Steel Gasket	12610141
346-8178	LS1/2/6	Rubber Embossed Steel Gasket	12558178



Header Gasket

Part No.	Application	Description
346-7944	LS1/2/3	Composite High Temp Material (Pair)
346-XXXX	LS1/2/3	MLS Stainless Steel (Pair)



Water Pump Gasket

Part No.	Application	Description	
346-0223	LS1/2/3/7	LS Water Pump Gasket Each	GM 12630223



EGR Gasket

Part No.	Application	Description
346-0009	LS1/2/3	EGR Valve Mounting Gasket, EGR Tube Gasket



Front Cover Gasket

Rear Main Seal

Part No.	Application	Description	
346-0436	LS1/2/3	LS Rear Main Seal	89060436



Oil Drain Plug Gasket

Part No.	Application	Description	
346-0908	LS1/2/3/7	LS Oil Pan Drain Plug Gaskets	14090908



Oil Filter Bypass

Part No.	Application	Description	
346-1384	LS	Oil Filter Adapter Bypass Cover Gasket	12611384



Coolant Air Bleed Gasket

Part No.	Application	Description	
346-1933	LS1/2/3/6/7	Coolant Tube Air Bleed Seal Takes 1 per head	12551933



Oil Pan Gasket

Part No.	Application	Description	
346-2350	LS1/2/3	Oil pan gasket Rubber Embossed Steel	12612350
346-2351	LS7-LS9	Oil pan gasket Rubber Embossed Steel	



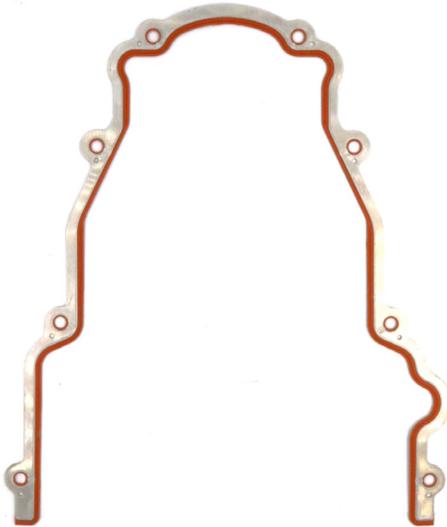
Valley Covers

Our Valley Cover is an aftermarket plate machined from 6061 plate aluminum. With performance builds not needing the OEM sensors this plate allows for the use of any head or intake to be used. Plate is in natural finish and comes with the genuine GM bolts.

Part No.	Description
346-8830	LS1/2/3 Valley Cover with bolts
346-8805	2004-Up Valley Cover with bolts

Block Front & Rear Covers

Straub Tech offers both original equipment style cast front covers and rear covers. Each includes seals either meet OE requirements or exceed OE requirements. Covers come as kits or have install kits available with hardware and gaskets.



Part No.	Description	Application	GM Part No.
346-6623	LS "NO HOLE" Cover Only	Gen III 4.8L 5.3L 6.0L 1997- 2004.5	GM 12556623 & 12561243
346-0325	LS "HOLE" Cover Only	Gen IV LS2/ LS3 Non-VVT 2004.5-2017	GM 12600326
346-3906	LS "HOLE" Cover Assembly	Gen IV LS2/LS3 Non-VVT (or DELETE)	GM 12633906
346-3904	LS Timing Cover Gasket	Gen III/IV LS engines) 1997- 2019	GM 12633904



Rear Covers

Part No.	Application	Description	
346-9250	LS Rear Cover	Rear Cover Kit, Includes OEM Bolts, Seal and Install Tool	12639250
1453658	Solid Dowel Pin Block to Transmission 2 per Engine		
Adapters			
12563532	Crank Spacer LS-engine to pre-1997 non-LS for use with Turbo350, 400, 700R4, and 200Metric Transmissions.		
Use with bolt 11569956. Takes 6 bolts. LS Flywheel/ Flexplate Bolt All LS Cranks			



LS Cam Swap Basic Gasket and Fastener Kit

The Straub Tech Basic cam change kit includes a pair of head gaskets, head bolts, timing cover seal, timing cover gasket, water pump gasket, and dampener bolt.

Application	Part No.	Description
LS 1997-2003	346-1997	Fits all early LS heads with 3 bolt holes and small bores.
LS 1997-2003	346-1997P	Fits all early LS heads with 3 bolt holes and small bores includes our Modified Cooling Head Gaskets
LS 2004 Newer	346-1998	Fits all later model LS Engines with 2 head bolts and small bores
LS 2004 Newer	346-1998P	Fits all later model LS Engines with 2 head bolts and small bores includes our Modified Cooling Head Gaskets
LS3	346-2004	Fits all later model LS engines with 2 head bolts and 4" bore or larger
LS3	346-2004P	Fits all later model LS engines with 2 head bolts and 4" bore or larger includes our Modified Cooling Head Gaskets

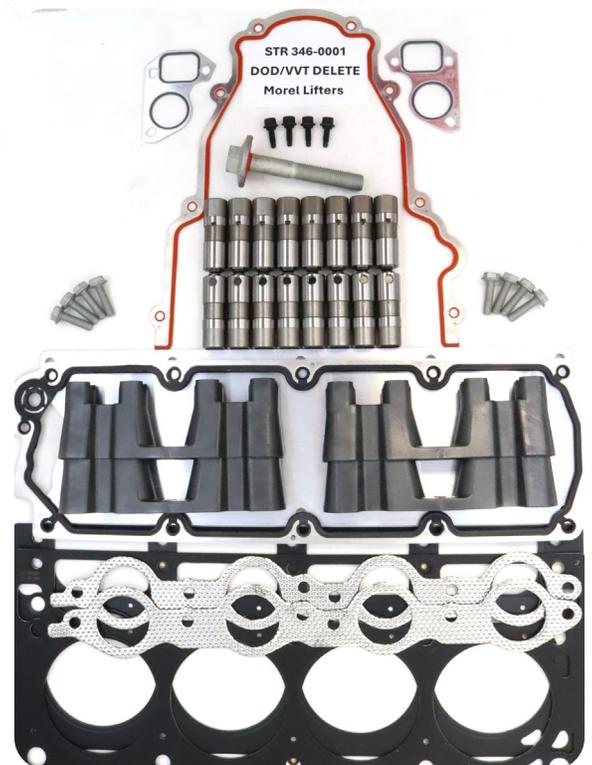
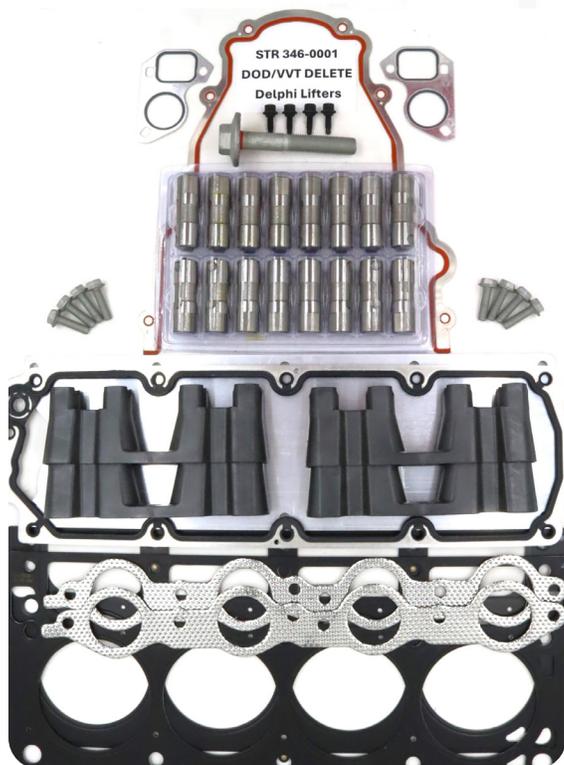


DOD AFM Delete Kit

Straub Tech DOD/AFM Kits are available as a kit for both 5.3, 6.0, and 6.2 Engines. We also give you the option to include our head gaskets with upgraded cooling for added rpm and HP increase along with one of our GTA LS 3bolt camshafts.

Part No.	Description
346-0001	5.3 LS BASIC DOD/VVT DELETE KIT W/ DELPHI LIFTERS
12499225	Lifters x 16
12595365	Lifter Guides x4
346-1163	Lifter Guide Bolts x4
346-7840	Damper Bolt
11515758	Front Cover Bolts x 8
346-3904	Front Cover Gasket x 1
346-0223	Water Pump Inlet Gaskets x 2
346-0141	LS Valley Cover Gasket x 1
346-8830	Machined Valley Plate with Bolts
346-4031	Small Bore MLS LS head Gasket x Pair
346-7944	Header Gasket Pair
346-4224	LS AFM DOD PLUG KIT 2006-2019 KIT FOR 1 ENGINE

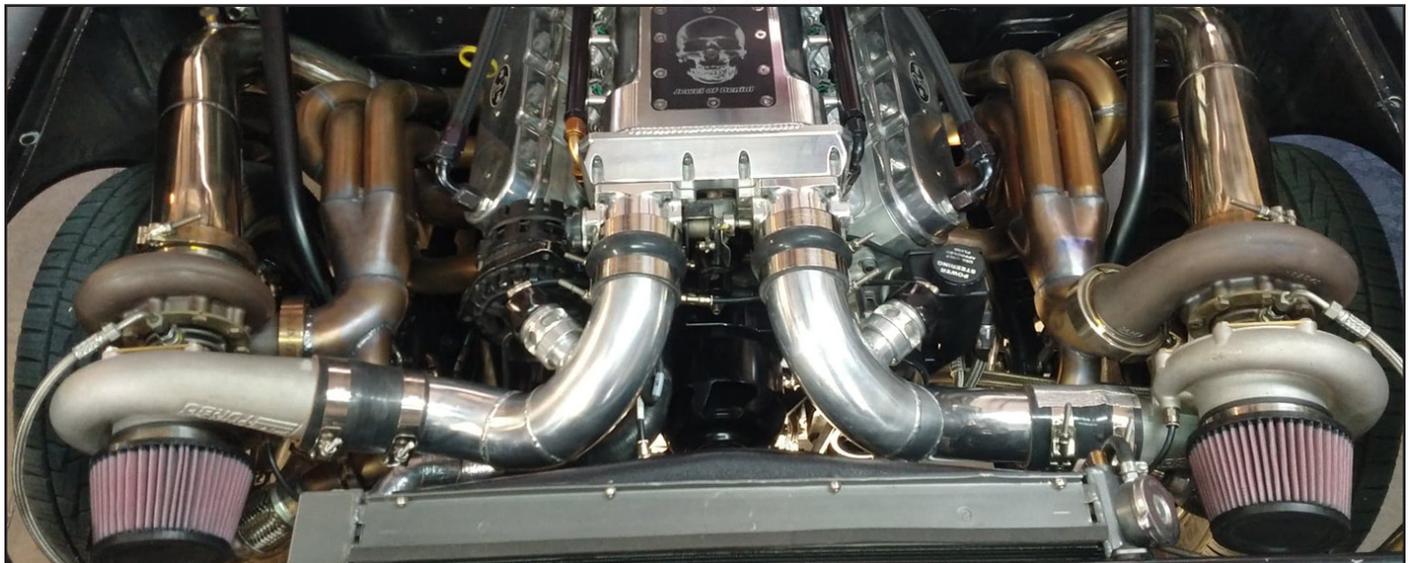
Part No.	Description
346-0002	5.3 LS BASIC DOD/VVT DELETE KIT W/ MOREL LIFTERS
7717	SET OF Lifters x 1
12595365	Lifter Guides x4
346-1163	Lifter Guide Bolts x4
346-7840	Damper Bolt
11515758	Front Cover Bolts x 8
346-3904	Front Cover Gasket x 1
346-0223	Water Pump Inlet Gaskets x 2
346-0141	LS Valley Cover Gasket x 1
346-8830	Machined Valley Plate with Bolts
346-4031	Small Bore MLS LS head Gasket x Pair
346-7944	Header Gasket Pair
346-4224	LS AFM DOD PLUG KIT 2006-2019 KIT FOR 1 ENGINE



Part No.	Description	Part No.	Description
346-0003	6.0/6.2 LS BASIC DOD/VVT DELETE KIT W/ DELPHI LIFTERS	346-0004	6.0/6.2 LS BASIC DOD/VVT DELETE KIT W/ MOREL LIFTERS
12499225	Lifters x 16	7717 SET	OF Lifters x 16
12595365	Lifter Guides x4	12595365	Lifter Guides x4
346-1163	Lifter Guide Bolts x4	346-1163	Lifter Guide Bolts x4
346-7840	Damper Bolt	346-7840	Damper Bolt
11515758	Front Cover Bolts x 8	11515758	Front Cover Bolts x 8
346-3904	Front Cover Gasket x 1	346-3904	Front Cover Gasket x 1
346-0223	Water Pump Inlet Gaskets x 2	346-0223	Water Pump Inlet Gaskets x 2
346-0141	LS Valley Cover Gasket x 1	346-0141	LS Valley Cover Gasket x 1
346-8830	Machined Valley Plate with Bolts	346-8830	Machined Valley Plate with Bolts
346-4411	Large Bore MLS LS head Gasket x Pair	346-4411	Large Bore MLS LS head Gasket x Pair
346-7944	Header Gasket Pair	346-7944	Header Gasket Pair
346-4224	LS AFM DOD PLUG KIT 2006-2019 KIT FOR 1 ENGINE	346-4224	LS AFM DOD PLUG KIT 2006-2019 KIT FOR 1 ENGINE

Options with DOD Kits

Part No.	Description
346-0000	Up grade to improved cooling head gaskets for more HP and more RPM
12633906	LS Front cover with Sensor and Seal
Camshaft	Add any Straub GTA Camshaft to kit from pages _____
346-6481B	Cam Sprocket for 3Bot Camshaft
346-6127	Cam Bolt for 3 Bolt LS Camshafts



LS ROTATING ASSEMBLIES

4340 Forged Performance Crankshafts

Straub Tech 4340 crankshafts will give you strength, reliability, and performance to meet the demands of your competition engine. We use premium non-twist forgings, machined to exact specifications. Cranks are heat treated and nitrided to insure strength and reliability. Journals are precision ground to industry specs to enable proper bearing tolerances. Straub Tech offers its customers the best crank available for the money without sacrificing reliability or performance.

- Premium Line Cranks
- Counterweights leading edges radiused for reduced windage
- Large radius/filet on all journals
- Indexed oiling passages with large chamfer
- Lightening holes drilled in all throws

Premium Competition Line of Crankshafts

Includes all of the above with these additions.

- Counterweight leading edge is shaped with large radius to reduce windage
- Counterweights have additional machining to reduce weight
- Lighten hole diameter increased for greater strength and weight reduction

Premium Ultra-Comp Line of Crankshafts

Includes all of the above with these additions.

- Counterweights have been pendulum cut to reduce center mass and move to outer leading edge. This reduces mass without sacrificing strength.
- Gun Drilled main journal for maximum reduction in weight.



LS Chevy with GM Reluctor Wheel

Part No.	Series	Stroke	Reluctor Wheel	Min Rod	Weight	Balance
346-4024	Premium	4.00"	28 Tooth	6.125"	52	Neutral
346-4058	Premium	4.00"	58 Tooth	6.125"	52	Neutral
346-4124	Premium	4.125"	28 Tooth	6.125"	54	Neutral
346-4158	Premium	4.125"	58 Tooth	6.125"	54	Neutral
346-5362	Premium	3.622"	58 Tooth	6.125"	51"	Neutral
346-2362	Premium	3.622"	24 Tooth	6.125"	51"	Neutral



H-Beam Connecting Rods

Straub Tech H-Beam Connecting Rods are forged from 4340 steel. All of our rods are magnafluxed, heat treated, stress relieved, shot peened, and sonic tested to ensure they provide the strength required for high horsepower applications. All rods are produced on CNC machinery and are finished in the USA to ensure precise big end and pin end bore sizes.

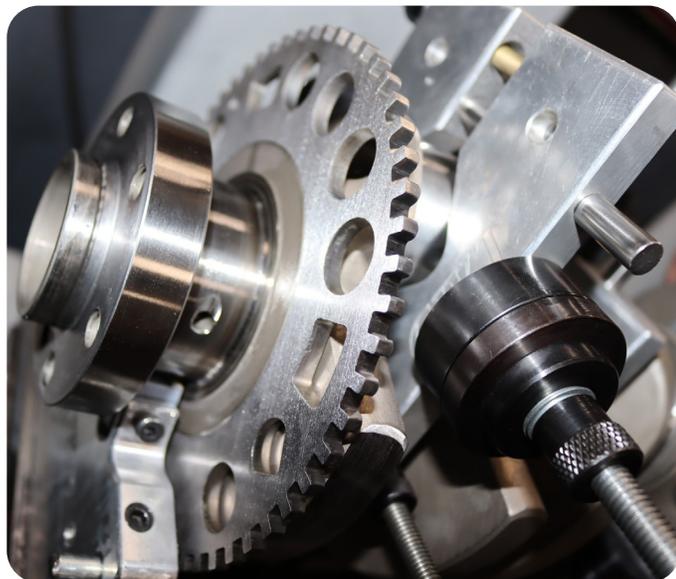
We weight match all of our sets of rods to + or -1.5 grams to make balancing easier. Silicon bronze bushings are installed for use with floating pins. Bolt lube and torque specifications are included. Straub Tech only uses ARP's proprietary material, ARP2000 for bolts. These rods are rated 1100 horsepower in SBC, LS, and SBF, and 1200 horsepower in BBC applications.

ARP2000 Material: An exclusive, hybrid-alloy developed to deliver superior strength and better fatigue properties. While 8740 and

ARP2000 share similar characteristics – ARP2000 is capable of achieving clamp loads in the 215,000-220,00 PSI range. ARP2000 is used widely in short track and drag racing as an up-grade from 8740 chrome moly in both steel and aluminum rods. Stress corrosion and hydrogen embrittlement are typically not a problem, providing care is taken during installation.



Part No.	Rod Length	Journal Size	Pin Bore Size	Weight*
346-6125	6.125"	2.100"	.928"	648 gms



STRAUB/FISHER ELITE SERIES LS PISTONS

Straub Technologies has always taught customers that it is a combination of parts that makes power. To ensure that our customers are getting the correct combination, we worked with a piston manufacturer to develop our own piston line to go with our cylinder heads.

Straub Tech went with a 2618 Alloy for its strength properties in high temperature applications. Its resistance to fatigue cracking during detonation gives our customer another layer of protection. Each piston is T-6 heat treated which promotes hardness and yield strength in the 2618 alloy.

Our **Spherical Dish and Dome configurations** use technology developed in the highest form of racing. The Spherical Dish is a continuance of the combustion chamber design in the head. This promotes a more efficient burn in the chamber giving the customer more horsepower. The compression dome has minimal flame travel interference allowing the piston to optimize flame travel for more horsepower.

In the ring land and the skirt area we have focused on sealing up the engine and reducing wear for longer engine life. We have hard **anodized the top ring land** and the crown of the pistons. This reduces the chance of micro-welding and provides thermal protection to the rings. We went with lateral gas ports to enhance ring sealing and not be acceptable to getting plugged like vertical gas ports. The **skirts are coated** with **Line2Line**.

4130 steel pins, retained by round wire locks. Every piston is designed to use a **1.2 / 1.2 / 3MM** ring pack for reduced ring drag! Pistons are sold in sets of 8 and come with pins and locks. Rings sold separately.



Part No.	Bore	Over Sizes	Stroke	Rod	Comp Height	CC	Pin Size	Weight / Pin
STR 346-IC546C	3.780"	005/010/020/030	3.622"	6.125"	1.304"	3cc Flat Top	.927"	399/121gr
STR 346-IC548C	3.780"	010/020/030/040	3.622"	6.125"	1.304"	-5cc Dome	.927"	425 / 121
MAH 930219005	3.905"		3.622"	6.125"	1.314"	16cc Dish	.927"	422 / 118
STR 346-IC528C	4.000"	010/030/070/080	3.622"	6.125"	1.304"	4cc Flat Top	.927"	456 / 121
STR 346-IC552C	4.000"	005/010/020/030	4.000"	6.125"	1.115"	4cc Flat Top	.927"	418 / 121
STR 346-IC532C	4.000"	010/030/070/080	4.000"	6.125"	1.115"	20cc Dish	.927"	413 / 121
STR 346-3303	4.125"	STD/030	4.000"	6.125"	1.115"	-7cc Dome	.927"	428 / 121
STR 346-IC534C	4.000"	010//030/070/080	4.100"	6.125"	1.065"	20cc Dish	.927"	413 / 121
MAH 930226525	4.125"		4.125"	6.125"	1.050"	6cc Flat Top	.927"	427 / 118



GM Engine Sensors

Straub Tech offers a complete line of OE Supplier sensors for GM engines.

Part No.	Application
346-1720	Camshaft Position Sensor 12591720 12627501 GM
346-5546	LS 58X Crankshaft Position Sensor GM 12585546 AC 213-3520
346-1211	4.8L Camshaft Sensor 12561211
346-4973	Sensor, Map (LR4/LY2) LR4, LQ4
346-0228	Sensor, Crankshaft 4.8L LR4, L
346-8814	Sensor, Coolant Temp 4.8L, All Chevrolet GMC
346-4228	Sensor, Map (LY2/L20) 4.8L LY2, L20, L96 Hummer
346-1234	Sensor, Oil Pressure 4.8L, L20, L96, Chevrolet GMC
346-6386	GM Engine Coolant Sensor 15326386
346-6751	GM Air Intake Sensor Replaces 1984-2009 25036751 and 25037225
346-1437	GM Oxygen Sensor 19211437, 25166816
346-3852	Gen 3 LS Throttle Position Sensor (TPS) 17123852





Ignition Coil

Part No.	Description
12573190	LS2 coil (GM# 12573190, AC Delco D514-A) 120 milliamps 3X Normal LS coils

Street Wire

Straub Tech Street Wire Sets are 100% USA Made wire. 8.5mm RED Wire sil/epdm.smag 500 OHM per foot with Braid. All Terminals are stainless steel. Spark plug boots are High Temp Gray. All Distributor Boots EPDM.



500 OHM Red Wires

Part No.	Description
61199	Universal 8 cyl. Set 180 Spark Plug Boot Set
61239	Universal 8 cyl. Set 90 Spark Plug Boot Set
62819	LS Corvette Wires, ALL with 180 Boots
62829	LS GM Camaro/Silverado with 180 Boots



Super Wire

Straub Tech Super Wire Sets are 100% USA Made wire. 8.5mm BLACK Wire 25 OHM per foot with Braid. All Terminals are stainless steel. Spark plug boots are High Temp Gray. All Distributor Boots EPDM.

THIS IS THE HIGHEST QUALITY RACING PERFORMANCE WIRE MADE TODAY.

25 OHM Black Wires

Part No.	Description
81193	Universal 8 cyl. Set 180 Spark Plug Boot Set
81203	Universal 8 cyl. Set 45 Spark Plug Boot Set
81233	Universal 8 cyl. Set 90 Spark Plug Boot Set
82813	Custom LS Corvette Set 45* boots 8" Lead
82823	Custom GM LS-General 180* boots 8" Lead
82843	8.5 Black GM LS General 180 12" Lead
82853	8.5 Black GM LS-1 45 Boot 12" Lead

Coil and Plug Kits

Our coil and plug kits include your choice of Street Strip Wires, our RED 500 OHM or our Race wire, Black 25 OHM. Our wires are made in the USA and feature the finest in materials used. These kits come with or without the GM Coil Bracket

Part No.	Description	Coil Bracket
346-3190R	Kit with 8 coils and your choice of wire length in our RED 500 OHM Series	No
346-3190RK	Kit with 8 coils and your choice of wire length in our RED 500 OHM Series	Yes
346-3190B	Kit with 8 coils and your choice of wire length in our Black 25 OHM Series	No
346-3190BK	Kit with 8 coils and your choice of wire length in our Black 25 OHM Series	Yes



Valley Covers

Our Valley Cover is an aftermarket plate machined from 6061 plate aluminum. With performance builds not needing the OEM sensors this plate allows for the use of any head or intake to be used. Plate is in natural finish and comes with the genuine GM bolts.

Part No.	Description
346-8830	LS1/2/3 Valley Cover with bolts
346-8805	2004-Up Valley Cover with bolts



Plumbing Kits

Plumbing kits for the "off gassing" or steam venting. These kits and plumbing layout were designed by RYRE for the LS Spec engine used in various divisions of circle track racing. These kits used along with the head gaskets maximize cooling in high performance NA or boosted applications.



Part No.	Description
346-4444	Base plumbing kit for heads only. Customer supplies lines from T's to radiator
346-4445	Complete plumbing kit with expansion tank included. Allows for remote mount.

Straub Tech Swag

Straub Tech has the “Swag” to make you look good in the winners circle!! All shirts and hats are screen printed in the USA by small business!!!!



Short Sleeve T Shirts (Lightweight)

Size	Description	Color
Small	Straub Tech Front/Cam Lobes Valve Events on back	Black
Medium	Straub Tech Front/Cam Lobes Valve Events on back	Black
Large	Straub Tech Front/Cam Lobes Valve Events on back	Black
X-Large	Straub Tech Front/Cam Lobes Valve Events on back	Black
XX-Large	Straub Tech Front/Cam Lobes Valve Events on back	Black
XXX-Large	Straub Tech Front/Cam Lobes Valve Events on back	Black
XXXX-Large	Straub Tech Front/Cam Lobes Valve Events on back	Black



Long Sleeve Shirts (Lightweight)

Size	Description	Color
Small	Straub Tech Front/Cam Lobes Valve Events on back	Black
Medium	Straub Tech Front/Cam Lobes Valve Events on back	Black
Large	Straub Tech Front/Cam Lobes Valve Events on back	Black
X-Large	Straub Tech Front/Cam Lobes Valve Events on back	Black
XX-Large	Straub Tech Front/Cam Lobes Valve Events on back	Black
XXX-Large	Straub Tech Front/Cam Lobes Valve Events on back	Black
XXXX-Large	Straub Tech Front/Cam Lobes Valve Events on back	Black



Hoodies No Zipper (Midweight)

Size	Description	Color
Small	Straub Tech Front/Cam Lobes Valve Events on back	Black
Medium	Straub Tech Front/Cam Lobes Valve Events on back	Black
Large	Straub Tech Front/Cam Lobes Valve Events on back	Black
X-Large	Straub Tech Front/Cam Lobes Valve Events on back	Black
XX-Large	Straub Tech Front/Cam Lobes Valve Events on back	Black
XXX-Large	Straub Tech Front/Cam Lobes Valve Events on back	Black
XXXX-Large	Straub Tech Front/Cam Lobes Valve Events on back	Black

Hoodies with Zipper (Midweight)

Size	Description	Color
Small	Straub Tech Front/Cam Lobes Valve Events on back	Black
Medium	Straub Tech Front/Cam Lobes Valve Events on back	Black
Large	Straub Tech Front/Cam Lobes Valve Events on back	Black
X-Large	Straub Tech Front/Cam Lobes Valve Events on back	Black
XX-Large	Straub Tech Front/Cam Lobes Valve Events on back	Black
XXX-Large	Straub Tech Front/Cam Lobes Valve Events on back	Black
XXXX-Large	Straub Tech Front/Cam Lobes Valve Events on back	Black



Straub Tech Hats (Embroidered)

Size	Description	Color
S/M	Straub Tech	Black
S/M	Straub Tech	Gray
S/M	Straub/Fisher Engines	Black
S/M	Straub/Fisher Engines	Gray
L/XL	Straub Tech	Black
L/XL	Straub Tech	Gray
L/XL	Straub/Fisher Engines	Black
L/XL	Straub/Fisher Engines	Gray



Straub Beanies (Embroidered)

Size	Description	Color
All	Straub Tech	Black
All	Straub/Fisher Engines	Black



Straub Visor

Size	Description	Color
All	Straub Tech	Black



LS & LT PERFORMANCE CATALOG
CALL 423-391-7774 FOR QUOTE



STRAUBTECHNOLOGIES.COM
198 INDUSTRIAL PARK ROAD
PINEY FLATS, TN 37686