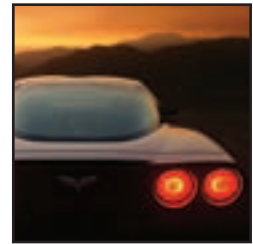


LS SERIES

MINI CATALOG



LS1, LS2, LS3, LS6, LS7 & L92 APPLICATIONS



CRANE
Gams®

LS SERIES CHEVROLET ENGINES V-8 1997–2010 LS1, LS2, LS3, LS6, LS7 & L92 APPLICATIONS

Also Fits 1999–2010 Vortec 4800, 5300, 6000, 6200 Truck & SUV Applications

This mini-catalog offers a sampling of Crane Cams specifically designed for LS Series of engines. They represent some of the most popular camshafts in the product line. Remember we make new grind combinations every day—if you don't see the cam that you want, it can be custom ground for you at no additional charge. For a more comprehensive and complete listing of the entire camshafts catalog options, see our Master Catalog pages 96–106.

Part Number	Grind Number	Advertised Duration Intake	Advertised Duration Exhaust	Duration at .050" Lift Intake	Duration at .050" Lift Exhaust	Degree Lobe Separation	Valve Lift with 1.70 Intake	Valve Lift with 1.70 Exhaust
1449511	HR-206/294-2S-14.5S	270	278	206	214	114	.500"	.500"
Power Band 1400–5500 RPM: Great daily driver or truck towing. For stock 4.8L–5.7L engines. Can use stock valve springs. No computer upgrade required.								
1449051	HR-210/3241-2S-162A	272	280	210	218	116	.551"	.551"
Power Band 1600–6000 RPM: Great daily driver, for stock 4.8–6.0L engines. Good fuel economy, with overall increase in torque and horsepower. Performance valve springs recommended. No computer upgrade required.								
1449091	HR-222/3241-2S-15 3A	284	290	222	228	115	.551"	.551"
Power Band 2300–6500 RPM: Daily driver for 5.7L–6.0L engines with modifications; 10.8+ compression ratio, headers, aftermarket exhaust. Automatic transmission requires 2800–3000 stall speed converter. Performance valve springs and computer upgrades required. Also works with 1.80 rocker arms.								
1449121	HR-224/347-2S1-15 4A	280	287	224	232	115	.590"	.590"
Power Band 2400–6500 RPM: Weekend driver for 5.7L–7.0L engines with modifications; 11.0+ compression ratio, headers, aftermarket exhaust and low-ratio gearing required. Automatic transmission requires 3000–3400 stall speed converter. Performance valve springs and computer upgrades required.								
1449161	HR-228/347-2S-15 0A	283	291	228	236	115	.590"	.590"
Power Band 2400–6500 RPM: Weekend driver for 5.7L–6.0L engines with modifications; 11.0+ compression ratio, upgraded cylinder heads and valve train, aftermarket exhaust and low-ratio gearing. Automatic transmission requires 3200–3600 stall speed converter. Performance valve springs and computer upgrades required.								
1449331	HR-232/353-2S1-14	294	298	232	236	114	.600"	.600"
Power Band 2900–6500 RPM: Weekend driver for 5.7L–6.0L engines with modifications; 11.5+ compression ratio, upgraded cylinder heads and valve train, headers with aftermarket exhaust and low-ratio gearing. Automatic transmission requires 3600–4000 stall converter. Performance valve springs and computer upgrades required.								
1449221	HR-236/347-2S1-15	291	299	236	244	115	.590"	.590"
Power Band 2800–6800 RPM: Pro street and drag racing for 5.7L–8.0L engines with modifications; 11.5+ compression ratio, upgraded cylinder heads and valve train, headers, with aftermarket exhaust, and low-ratio gearing. Automatic transmission requires 3600–4000 stall converter. Performance valve springs and computer upgrades required.								
1449251	HR-240/353-2S-14 4A	302	308	240	246	114	.600"	.600"
Power Band 3000–7000 RPM: Pro street and drag racing for 5.7L–8.0L engines with modifications; 11.5+ compression ratio, upgraded cylinder heads and valve train, headers, with aftermarket exhaust, and low-ratio gearing. Automatic transmission requires 3600–4400 stall converter. Performance valve springs and computer upgrades required.								
98113	Optional Micro-Finishing							
Ultra Pro™ Micro-Finishing: Provides a super smooth finish to reduce friction, enhances surface load-bearing durability and prevents break-down of lubrication film layer. Add optional labor #98113 to the price of your cam.								

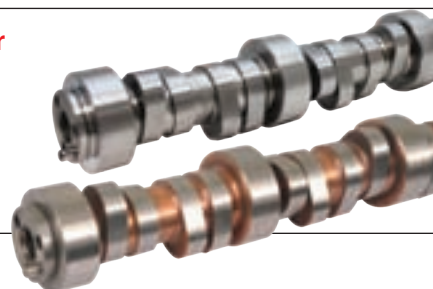
All LS Series Crane Cams are Three-Bolt Design

These cams can be used in single-bolt applications with a conversion timing chain set. See pages 6 & 7 for details and part numbers.



Cams Available In Either 5150 Induction Hardened Billet Steel

Or Optional Billet 8620 Copper Plated Carburized Steel

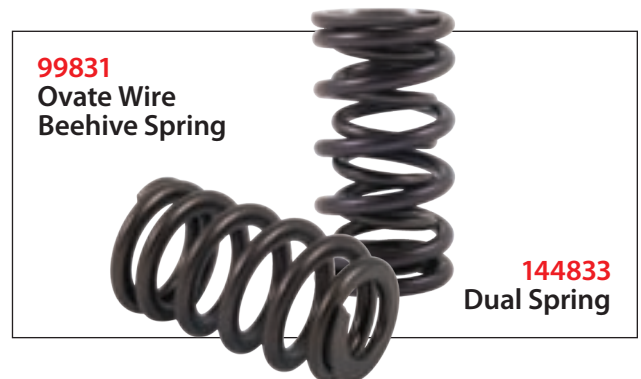


CRANE CAMS VALVE SPRING SETS FOR LS APPLICATIONS

Premium valve spring sets are offered in different designs to match the varying requirements of the hydraulic roller LS engine applications. This includes “beehive” springs using ovate wire and round wire dual and single designs with PAC enhanced processing. For more details refer to Master Catalog pages 336–347.

Part Number	Description of Springs	Outer Dia.	Inner Dia.	Seat Pressure	Open Pressure	Coil Bind	Max Net Lift	Spring Rate
99831-16	Beehive single spring with ovate wire	1.055" 1.290"	0.650" 0.885"	130 lbs at 1.800"	318 lbs at 1.200"	1.140"	.600"	313 lbs/in
99832-16	Beehive single spring with ovate wire <i>Note: Cylinder head will require machining.</i>	1.095" 1.445"	.650" 1.000"	155 lbs at 1.880"	377 lbs at 1.280"	1.210"	.650"	370 lbs/in
144832-16	*Dual spring without damper	1.275"	.667"	112 lbs at 1.800"	352 lbs at 1.150"	1.045"	.650"	352 lbs/in
144833-16	*Dual spring without damper	1.237"	.655"	137 lbs at 1.800"	377 lbs at 1.150"	1.080"	.650"	369 lbs/in
144845-16	Single spring without damper	1.265"	.865"	120 lbs at 1.750"	358 lbs at 1.250"	1.100"	.600"	476 lbs/in
144846-16	Single spring with damper	1.265"	.775"	125 lbs at 1.750"	388 lbs at 1.250"	1.100"	.600"	526 lbs/in
144847-16	*Dual spring without damper	1.298"	.664"	151 lbs at 1.800"	461 lbs at 1.150"	1.080"	.680"	477 lbs/in

*Dual springs require spring seats #144460-16 and seals #99818-16.



VALVE SPRING TO RETAINER & LOCK CROSS REFERENCE

Crane Cams offers matching retainers in both steel and lightweight titanium material. Also offered are matching Machined Steel valve locks. This cross reference chart explains retainer and valve lock options that are available for each valve spring part number. For more details refer to Master Catalog pages 348–357.

When Using Valve Spring Set	Use Retainer Part Number	7° Retainer for 8 mm Valve Stem Dia. Description of Retainer & Material	With Valve Lock Part Number	Machined Steel Single Bead Design Description of Valve Lock
99831-16	99976-16	Steel retainer, multi-fit	99107-1	Multi-fit lock with increased outer diameter
99831-16	99637-16	Titanium retainer, fits stock size lock	99108-1	Stock size lock
99832-16	99976-16	Steel retainer, multi-fit	99107-1	Multi-fit lock with increased outer diameter
99832-16	99637-16	Titanium retainer, fits stock size lock	99108-1	Stock size lock
144832-16	144944-16	Steel retainer, fits stock size lock	99108-1	Stock size lock
144832-16	99975-16	Steel retainer, multi-fit	99107-1	Multi-fit lock with increased outer diameter
144832-16	144661-16	Titanium retainer, fits stock size lock	99108-1	Stock size lock
144832-16	99657-16	Titanium retainer, multi-fit	99107-1	Multi-fit lock with increased outer diameter
144833-16	144944-16	Steel retainer, fits stock size lock	99108-1	Stock size lock
144833-16	99975-16	Steel retainer, multi-fit	99107-1	Multi-fit lock with increased outer diameter
144833-16	144661-16	Titanium retainer, fits stock size lock	99108-1	Stock size lock
144833-16	99657-16	Titanium retainer, multi-fit	99107-1	Multi-fit lock with increased outer diameter
144845-16	99658-16	Titanium retainer, fits stock size lock	99108-1	Stock size lock
144846-16	99658-16	Titanium retainer, fits stock size lock	99108-1	Stock size lock
144847-16	144944-16	Steel retainer, fits stock size lock	99108-1	Stock size lock
144847-16	144661-16	Titanium retainer, fits stock size lock	99108-1	Stock size lock

COMPLETE VALVE SPRING KITS

Crane Cams offers a complete line of premium valve spring kits for LS engine applications. The kits contain all the necessary components; springs, retainers, locks, seals and spring seats. For more details refer to Master Catalog pages 358–359.

Kit Number		Valve Springs	Spring Retainers	Spring Seats	Valve Locks	Valve Seal
144309-1	Kit contains	144832-16	144944-16	144460-16	99108-1	99818-16
144310-1	Kit contains	144832-16	144661-16	144460-16	99108-1	99818-16
144311-1	Kit contains	144833-16	144661-16	144460-16	99108-1	99818-16
144312-1	Kit contains	99831-16	99637-16	N/A	99108-1	99818-16
144313-1	Kit contains	144847-16	144944-16	144460-16	99108-1	99818-16
144314-1	Kit contains	144847-16	144661-16	144460-16	99108-1	99818-16

VALVE SEALS & SEATS

Part Number	Description
99818-16	Valve stem seals, viton material (press over guide)
144460-16	Valve spring lower seats (made from machined steel)
<i>Note: Both are required when using dual valve springs.</i>	



VALVE SPRING SERVICE TOOLS

Part Number	Description	Engine Applications
99472-1	Valve spring "on engine" replacement tool	LS1, LS2, LS6, LS4, LQ4, LQ9
99475-1	Valve spring "on engine" replacement tool	L92, LS3
99474-1	Cylinder pressurization kit	Fits all
99881-2	Checking springs, pair of low tension springs	Fits all



CRANE GOLD RACE™ ALUMINUM ROCKER ARM KITS LS SERIES ENGINES LS1, LS2, LS6, & VORTEC 4800, 5300, 6000

Note: Does Not Fit LS3, LS7 or L92 Heads

Crane Cams stud mount roller rocker arm kits are available for LS Series and Vortec engines using GM style or AFR cylinder heads. The complete kit contains: Gold Race™ extruded aluminum, needle bearing, roller rocker arms, studs, guideplates, pushrods and locking nuts. Kits are available in 1.70:1 or 1.80:1 ratios. Component part numbers are listed below.

STUD MOUNT LS ROCKER ARM KITS

Kit Part Number	Description		Rocker Arms with Nuts	3/8" Screw-In Studs	Guideplates	Pushrods
144750-16	1.70:1 ratio for GM style cylinder heads	Kit contains	144750A-16	99154-16	144650-1	144622-16
144759-16	1.80:1 ratio for GM style cylinder heads	Kit contains	144759A-16	99154-16	144650-1	144622-16
144750AF-16	1.70:1 ratio for AFR cylinder heads	Kit contains	144750A-16	99154-16	144650-1	95627-16
144759AF-16	1.80:1 ratio for AFR cylinder heads	Kit contains	144759A-16	99154-16	144650-1	95627-16



ONE-PIECE PUSHRODS

Part Number	.080" Wall Heat Treated 4130 Chrome Moly
144622-16	7.250", 5/16" diameter for Crane Cams rocker arms with GM style heads
95627-16	7.350", 5/16" diameter for Crane Cams rocker arms with AFR heads
144621-16	7.400", 5/16" diameter stock length

Pushrods are also available in $\pm .050$ " length increments. See Master Catalog page 309.

HYDRAULIC ROLLER LIFTERS

Part Number	For Use in 2000 & Later LS Blocks Only
144536-16	Crane Cams, long travel, hydraulic roller lifters for use with GM alignment bars, provides additional travel for performance cams with big lobe lift and smaller base circle diameter
144530-16	O.E. style replacement, stock travel, hydraulic roller lifters for use with GM alignment bars



SINGLE BOLT APPLICATIONS WITH CONVERSION TIMING CHAIN SETS CRANE CAMS LS SERIES THREE-BOLT DESIGN CAMS

The LS Series of engines rely upon a computerized engine management system to control the sequential fuel injection and ignition firing events. The computer controls both the fuel and spark but it must know what engine cycle is about to occur for each cylinder. Several sensors are required for the computer to perform this task properly. The rotational position of the engine is supplied to the computer by the Camshaft Position Sensor and the Crankshaft Position Sensor. The triggering device for these sensors is either machined into or attached to the camshaft and crankshaft. The locations of the triggering devices and the method used has evolved and changed with the year and version of the engine series. The interchangeability of the three bolt design camshaft can be provided by using the proper timing chain set to convert from one year and series engine to another.

LS1 & LS6

Has a trigger feature (a reluctor ring) machined in the barrel of the camshaft body near the rear of the camshaft. A Camshaft Position Sensor is installed into the engine block and uses this reluctor ring feature to determine the rotational position of the cam. There is also a reluctor wheel attached to the rear of the crankshaft with different sensor points (or teeth) to provide the triggering of the separate Crankshaft Position Sensor. These LS1 and LS6 engines use a three-bolt cam with Crane Cams timing chain set part number **144984-1**. The upper timing sprocket in this set has no timing sensor features.

LS1, Early LS2 & LS6

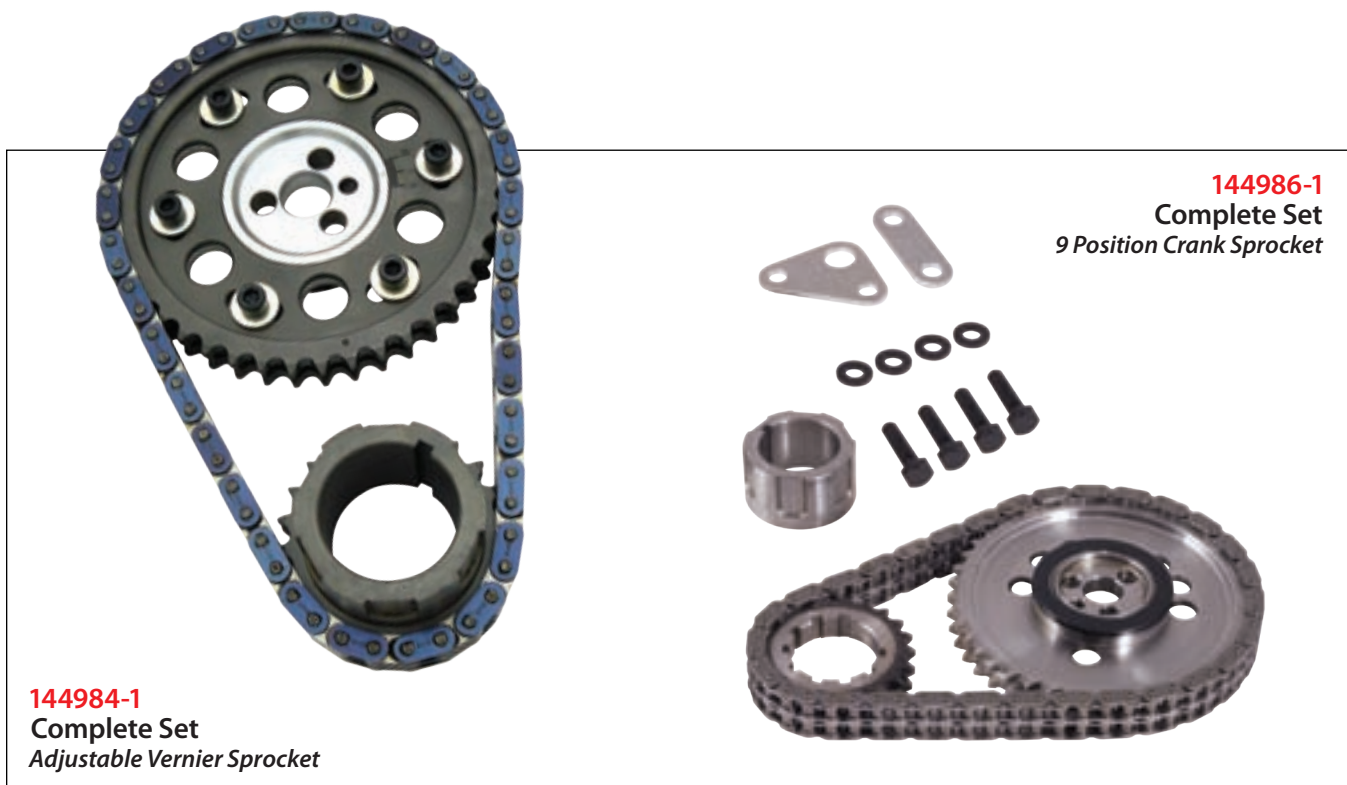
Use a camshaft with three bolts to attach the upper timing chain sprocket. These engines also use a 24 tooth reluctor wheel attached crankshaft, but the early LS2 uses a special timing chain set for a front cover sensor. See application below.

Early LS2

A transitional engine design with a three-bolt cam, a 24 tooth crankshaft reluctor wheel and the camshaft sensor relocated in the front timing cover. A three bolt cam can be used in the early LS2 engine, with conversion timing chain Crane Cams part number **144985-1**. The upper timing sprocket in this set has one timing feature, machined with one long lug.

Late LS2, LS3, LS7 & L92

Use a 58 tooth crankshaft reluctor wheel and the Camshaft Position Sensor is located in the front timing cover of the engine. The cam triggering feature is machined into the upper timing chain sprocket (the sprocket is bolted to the camshaft with a single bolt). This sprocket has machined features (lugs) that are used to trigger the sensor mounted in the front cover. The three bolt design camshaft can be used in all these engine applications if a conversion timing chain set is installed with a three bolt hole sprocket that is machined with the appropriate triggering lugs. This three-bolt cam conversion, for the late LS2, LS3, LS7 and LS92 engines, can be made by using Crane Cams timing chain set part number **144986-1**. The upper timing sprocket in this set has four timing features, machined with two short and two medium lugs.



TIMING CHAIN SETS

Timing Chain Sets	Engine	Cam Sensor	Crank Sensor	Cam Sprocket	Description of Three-Bolt Design
Part Number	Series	Location	Teeth	Sensor Points	Pro Series Steel Billet Timing Chain Sets
144984-1	LS1	Inside Block	24	0	Double roller chain and fully adjustable Vernier cam sprocket
144985-1	Early LS2	Front Cover	24	1	Double roller chain and thrust bearing, nine position lower crank sprocket
144986-1	Late LS2	Front Cover	58	4	Double roller chain and thrust bearing, nine position lower crank sprocket
144986-1	LS3	Front Cover	58	4	Double roller chain and thrust bearing, nine position lower crank sprocket
144984-1	LS6	Inside Block	24	0	Double roller chain and fully adjustable Vernier cam sprocket
144986-1	LS7	Front Cover	58	4	Double roller chain and thrust bearing, nine position lower crank sprocket
144986-1	L92	Front Cover	58	4	Double roller chain and thrust bearing, nine position lower crank sprocket

144984-1
Symmetrical Sprocket
No Cam Sensor Trigger Features
LS1 & LS6 Applications



144985-1
Upper Sprocket
One Timing Sensor Trigger Feature
Early LS2 Application



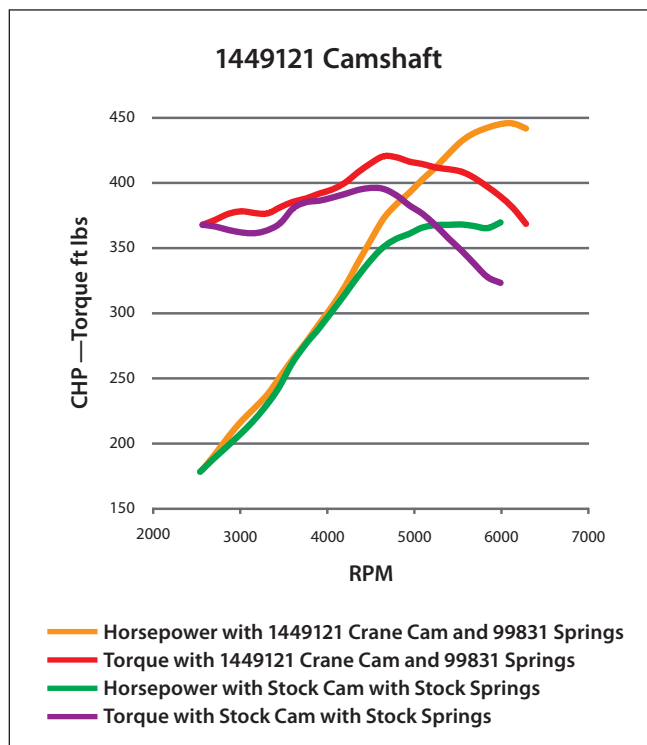
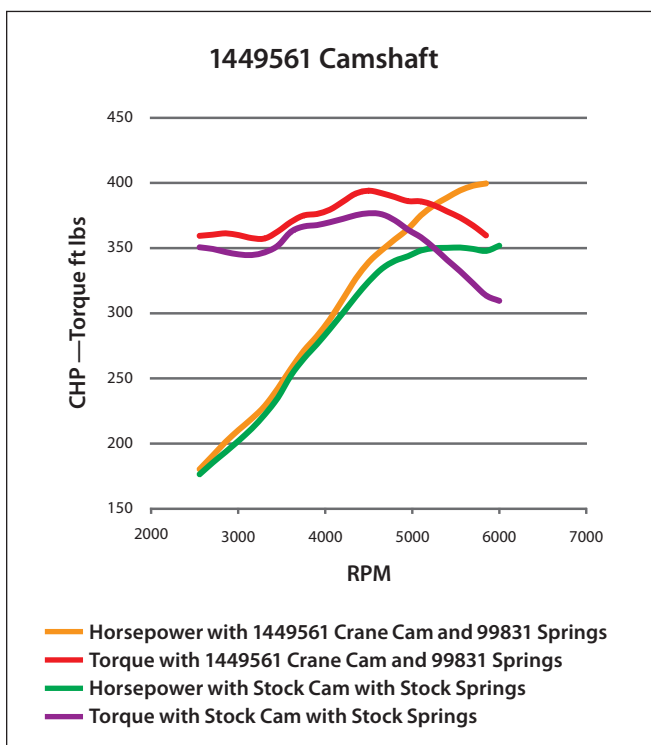
144986-1
Upper Sprocket
Four Timing Sensor Trigger Features
Late LS2, LS3, LS7 & L92 Applications



ENGINE DYNO TESTS

Crane Cams, using an independent dyno facility, tested two different versions of Crane Cams LS Series camshafts that are popular for street application. A stock baseline was first created using a GM camshaft and stock valve springs. The Crane camshafts were then installed in the engine for comparison. Crane Cams part number **1449561** is designed for a “daily driver” using a stock to mildly modified 4.8L to 6.0L engine. Crane Cams part number **1449121** is more of a “weekend driver” for engine starting at 5.7L to 6.0L that have more engine modifications, but are still designed for street usage. The test was performed using Crane Cams valve spring set **99831-16**. The testing proved that the Crane camshafts produced substantial improvements in horsepower over the stock baseline along with very broad useful torque band, perfect for LS streetable power. The test results are listed below.

The testing was performed on a Superflow 902 engine dyno. The engine was a 5.7L (347 cu/in) package with aftermarket forged flat top pistons with deeper valve reliefs producing 10.8:1 compression ratio. Stock LS6 cylinder heads were used with a stock LS6 intake manifold, stock injectors and a 75 mm throttle body. The standard rocker arm ratio of 1.70:1 was maintained. Dyno headers were used with 2” diameter primaries going into a 3 ½” collector. The test was run with 93 octane pump gasoline. The GM cam was #12561721 with a duration at .050” of 197° intake and 201° exhaust/valve lift .467” intake and .479” exhaust. This basic engine package was chosen to represent an average starting point for street engine applications. To produce compatibility with the computer, the engine was tuned using HPTuners for each test. This is a normal required procedure when a camshaft is changed in an LS computer controlled engine. The dyno tests were programmed to run from 2,500–6,300 RPM.



TEST 1—1449561 SPECIFICATIONS & RESULTS

- Grind number HR-216/3241-2S-15
- Advertised duration 278° intake, 286° exhaust
- Duration at .050” 216° intake, 224° exhaust
- Valve lift .551” on both intake & exhaust
- Lobe separation angle 115°
- Installed on 110° intake centerline
- Engine produced 419 peak horsepower at 5,850 RPM
- Peak torque 413 ft/lbs at 4,500 RPM

TEST 2—1449121 SPECIFICATIONS & RESULTS

- Grind number HR-224/347-2S1-15 A4
- Advertised duration 280° intake, 287° exhaust
- Duration at .050” 224° intake, 232° exhaust
- Valve lift .590” on both intake & exhaust
- Lobe separation angle 115°
- Installed on 111° intake centerline
- Engine produced 445 peak horsepower at 5,850 RPM
- Peak torque 420 ft/lbs at 4,650 RPM