

The Perfect LT5

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The '06 Z06 Killer

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A Short List of Highly Refined LT5's

- The 500 hp 350
- The 530 hp 368
- The 550 hp 368
- **The 565 hp 385**
- The 600 hp 415
- The 650 hp 415

The 500 hp 350

- **Pro**

- Very resistant to wear and tear
- Nicasil liners
- Cast aluminum pistons
- Best oil control
- Best bang for the buck

- **Con**

- Not a '06 Z06 killer

- **Easily kills '00 through '04 Z06's**

The 530 hp 368

- **Pro**
 - 530 hp
 - Light weight pistons and rods
- **Con**
 - Downgraded wear and tear
 - Not a '06 Z06 killer
- **Leaves '00 through '04 Z06's far behind**

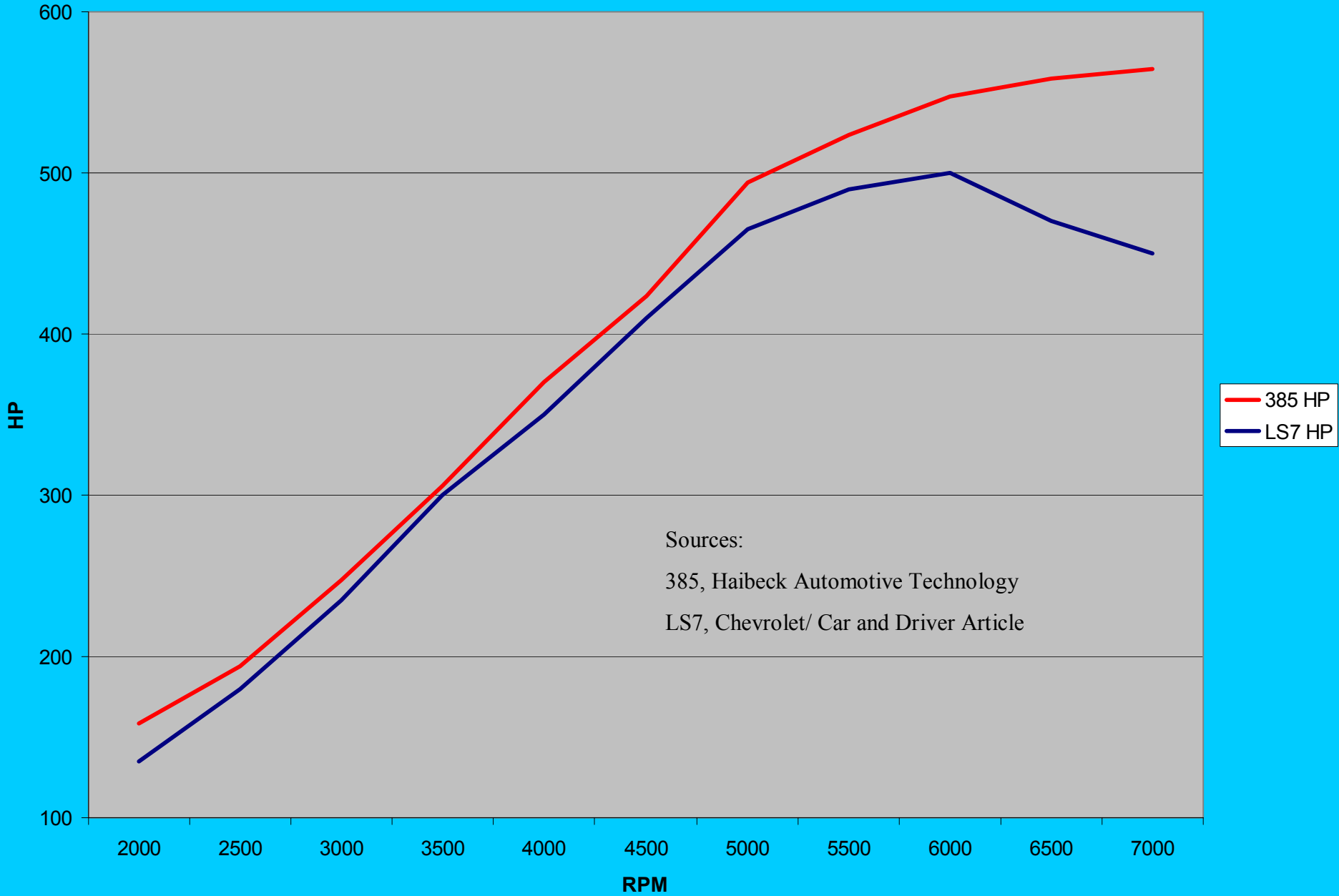
The 550 hp 368

- **Pro**
 - 550 hp
- **Con**
 - Downgraded wear and tear
 - Rough idle at 900 rpm
- **Aggravates '06 Z06's**

The 565 hp 385

- **Pro**
 - '06 Z06 killer
- **Con**
 - Better wear and tear than a 415
 - Smooth idle like stock a LT5
- **Teaches '06 Z06's a lesson**

385 Verses LS7 Horsepower



Sources:
385, Haibeck Automotive Technology
LS7, Chevrolet/ Car and Driver Article

The 600 hp 415

- **Pro**
 - Plenty of power
- **Con**
 - Less oil control than a 385
 - Undesirable rod ratio places a lot of lateral load on the outer piston skirt at BDC
- **What's a '06 Z06?**

The 650 hp 415

- **Pro**

- More power comes from long duration camshafts

- **Con**

- Less oil control than a 385
- Undesirable rod ratio places a lot of lateral load on the outer piston skirt
- Rough idle at 900 to 1000 rpm

Important Technical Issues for Increased Displacement LT5's

- **Liners**
- **Rod ratio**
- **Oil control**
- **Pistons**
- **Tuning**

Liners

The stock liners are aluminum with a Nicasil coating

Nicasil is used for coating the cylinders of high quality engines. It is superior to iron and hard-chromed cylinder walls. It is a coating made up of nickel and silicon carbide. The Nicasil coating is very hard and durable thus providing a very long wearing surface for the piston and rings. The silicon carbide particles that are dispersed throughout the nickel form adhesion spots on which oil can collect. This is one reason why engines with Nicasil coated cylinders last longer. They have improved cylinder lubrication. The Nicasil coating impregnates the cylinder walls with silicon. The result is a lower coefficient of friction, thus reducing engine heat and wear.

Liners

Increased Displacement LT5's

The bore is increased from 3.9 to 4.0 inches with thinner liners. With a stock stroke this yields a 368 ci displacement.

Generally chrome-moly iron sleeves are utilized. A popular source is the Los Angeles Sleeve Company.

It's difficult to properly fit to piston to the liner. We use a proprietary honing procedure to obtain the required cylinder straightness and piston fit.

We fit the pistons with .002 inch cylinder to wall clearance. Piston slap is minimized.

No galvanic corrosion has been encountered

Four Inch Liner

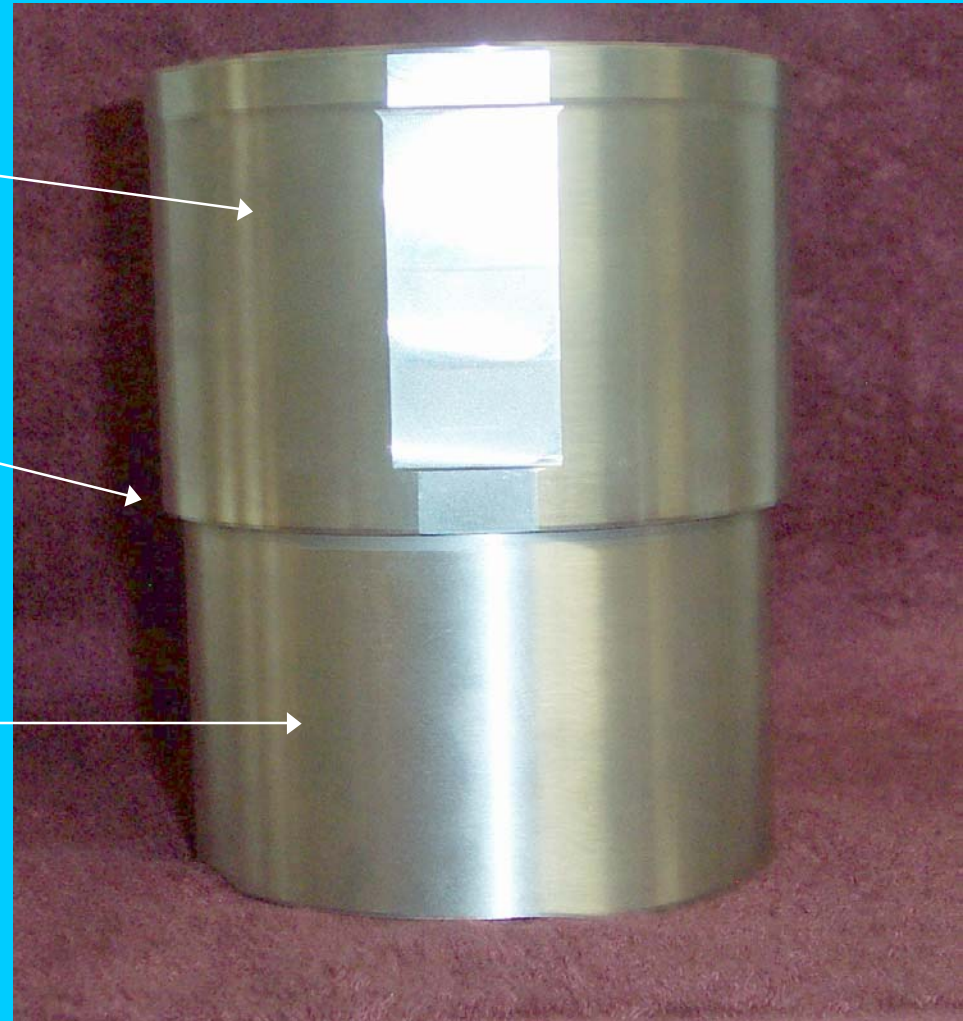
About .240" thick



Lower clamp point



.085" thick



Rod Ratio

- Effects performance and durability. The rod length is mostly dictated by the height of the block. A long rod and a high ratio are better.
- Generally rod ratios between 1.6 and 1.8 are considered good. Note that the range is .2
 - Small block Chevy $5.70/3.480 = 1.64$
 - Stock LT5 $5.74/3.661 = 1.57$
 - **LT5 385** $5.85/3.830 = 1.52$
 - LT5 415 $5.85/4.125 = 1.42$
- A lower rod ratio increases the side thrust on the piston. It increases the rate of acceleration of the piston at BDC.

Engine C.I.	Bore Size	Stroke Length	Pushrod Length
AMC V8 Engine			
304	3.750	3.440	7.794
360	4.080	3.440	7.794
390	4.165	3.570	7.794
401	4.165	3.680	7.794
Buick V8 Engine			
350	3.800	3.850	9.682
400	4.000	3.850	9.378
455	4.313	3.900	9.378
Chevrolet V8 Engine			
265	3.750	3.000	7.794
267	3.500	3.484	7.794
283	3.875	3.000	7.794
302	4.000	3.000	7.794
305	3.736	3.480	7.794
307	3.875	3.250	7.794
327	4.000	3.250	7.794
350	4.000	3.480	7.794
396	4.094	3.760	8.280/9.252
400	4.125	3.750	7.794
402	4.125	3.760	8.280/9.252
427	4.250	3.760	8.280/9.252
454	4.250	4.000	8.280/9.252
Chrysler V8 Engine			
273	3.630	3.310	7.500
318	3.910	3.310	7.500
340	4.040	3.310	7.500
360	4.000	3.580	7.500
383	4.250	3.380	8.575
400	4.340	3.380	8.575
413	4.180	3.750	9.315
426H	4.250	3.750	10.82/11.74
426W	4.250	3.750	9.375
440	4.320	3.750	9.315
Ford V8 Engine			
289	4.000	2.870	6.876
302	4.000	3.000	6.876
302 BOSS	4.000	3.000	6.876
351W	4.000	3.500	8.144
351C	4.000	3.500	8.408
351M	4.000	3.500	9.500
390	4.050	3.871	9.620
400M	4.000	4.000	9.500
406	4.130	3.780	9.620
427	4.230	3.780	9.620
428	4.130	3.984	9.620
429	4.360	3.590	8.550
460	4.360	3.850	8.550
Pontiac V8 Engine			
301	4.000	3.000	8.120
326	3.781	3.750	8.693
350	3.875	3.750	9.130
389	4.063	3.750	9.130
400	4.120	3.750	9.130
421	4.094	4.000	9.130
428	4.120	4.000	9.130
455	4.150	4.210	9.130
Oldsmobile V8 Engine			
260	3.550	3.385	8.234
307	3.800	3.385	8.234
330	3.939	3.385	8.234
350	4.057	3.385	8.234
394	4.125	3.688	8.234
400 (65-67)	4.000	3.975	9.750
400 (68 & 69)	3.870	4.250	9.750
403	4.351	3.385	8.234
425	4.125	3.975	9.750
455	4.125	4.250	9.750

'06 Z06

Bore 4.125

Stroke 4.00

Oil Control

- **Only fair on a stock LT5. 600 to 1200 miles per quart when run at high power output.**
- **Dependent on piston ring sealing and piston ring design.**
- **The 368 and 385 use a wide oil control ring. A standard tension oil control ring is available.**
- **The 415 uses a narrow oil control ring. Only a low tension oil control ring is available.**
- **The wide oil control ring is 3/16" or 4.75 mm. The narrow ring is 3 mm.**

415 Oil Control Ring Land

The piston pin location is as high as possible. The oil control ring has been reduced in size to make room for the pin. The width has been reduced from a normal 4.75mm to 3 mm.



Pistons

- **We and most others use JE Pistons**
- **Excellent quality. Easy to customize specifications.**
- **We use 4032 high silicon (12%) alloy for engines that will be touring. This alloy allows tighter piston to cylinder fitment.**
- **Softer 2618 alloy can be used for serious racing. Piston slap is greater with 2618.**

Tuning

- **Need to prevent excess detonation**
 - **Correct fueling**
 - **Correct ignition spark advance. Test the knock control system.**
 - **Runaway detonation will often lead to failure of a head gasket.**

Power to Weight Ratio

- **The Bottom Line**

- '06 Z06 weight 3130. Power 500.

- Source, Corvette Museum www site.

- Power to weight ratio, $3130/500 = 6.26$**

- '93 385 ZR-1 weight, 3483. Power 565.

- Source, '93 owners video. John Heinrich.

- Power to weight ratio, $3483/565 = \underline{6.16}$**

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