Second Strike

The Newsletter for the Superformance Owners Group

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Red Rockets Roll

A Tale of Two Coupes

Peter Brock's personal Superformance Coupe in Monument Valley Utah on a cross country tour from Sebring Florida to Redmond Washington with his delightful wife Gayle. With a potent but tractable 568 horsepower 427 cubic inch engine, world class aerodynamics and a superb chassis, Pete's Coupe is equally at home on the track with the world's top supercars. Peter Brock photo

Coupe or Super Coupe That Is the Question…

The Superformance Coupe has garnered a great deal of attention since its introduction in 2003. It has been featured in a dozen magazines including Road & Track, Car and Driver, and Motor Trend and has earned high marks for its stunning shape, quality of construction, and strong performance.

Strong performance and outstanding aerodynamics give it a shot at supercar status. And fully one third of Coupe owners reporting engine selection have opted for a potent 427 cubic inch Windsor engine as their motive force. In this issue we will look at two 427 Windsor powered Coupes and how they stack up in performance to recognized Supercars.

In This Issue

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The Olthoff No. 5 Coupe

The first Coupe was the One Lap prototype. The next two were factory development prototypes. The No. 4 and No. 5 Coupes, the first production Coupes, were in production in South Africa two years ago when I visited the factory. Coupe No. 5 was the first one completed, I believe. Coupe No. 4 was the first one shipped and went to Dynamic.

Gayle Brock, Peter Brock, Jim Price, and Richard deBeer inspect the No. 5 Coupe under construction at the Hi-Tech plant in May 2003. The No. 4 Coupe is in the bay behind them.

After No. 5 arrived at the Olthoff's shop, it was fitted with a 500 horsepower Roush 402RC engine and a Tremec T-56 6-speed transmission. In this configuration, it provided the technical and performance specifications for the Second Strike issue devoted to the Coupe and the Coupe brochure derived from that edition.

With this drive train, No. 5 was driven to Michigan to provide performance testing for the Coupe article published in Car and Driver in May 2004. It was also an entry in the Car and Driver Supercar Challenge later that year. Unfortunately the engine swallowed a valve during the very first run and dropped out of the competition. Based on the earlier documented performance, it would was a strong contender for top honors, but you have to finish to win. It would be back.

Run and Gun 2004

For the past seventeen years, replica owners from around the country have gathered under the auspices of Kit Car Magazine to determine who is, on that particular weekend, the *Top Dog*. Superformance has always done very well indeed at Run and Gun and 2004 at Gateway International Raceway near St. Louis would be no exception.

To prepare the No. 5 Coupe for the 2004 Run and Gun, Dennis Olthoff worked with Raceparts Distribution Inc. (RDI) in Cornelius, NC, to create a potent 427 cubic inch Windsor engine based on the concept that if horsepower is good, then more horsepower is better.

They started with the Ford Racing/RDI 4-bolt main aluminum block and added a forged steel crank, forged H-beam connecting rods and RDI designed custom forged aluminum pistons to lay a solid reliable foundation for the big ponies to come. To this they added ported Victor Jr. heads with a 10.5 to 1 squeeze factor, shaft mounted Jesel rockers and dual racing valve springs with titanium retainers. The oversized 2.055/1.60 inch valves are activated by a solid roller lifter cam with 258/262 degrees of duration and a huge 0.672 inches of lift at the valve on both sides. The carburetor pad on the Victor Jr. intake was shaved down 3/8 inch for hood clearance and topped with a Holley HP 830 cfm double-pumper 4-barrel.

This combination produced a potent 629 gross horsepower at 6500 rpm and 576 lb-ft of torque at 5000 rpm. Fitted with factory headers and pipes, it produced 580 net horsepower at 6400 rpm and 561 lb-ft of torque at 4700 rpm. Gross horsepower is dyno horsepower with headers and open pipes and without accessories and air cleaner. Net horsepower in installed horsepower with full air intake, full accessories, and full exhaust system installed.

On the weight side of the power to weight equation, the aluminum block is about 80 pounds lighter than an equivalent 4-bolt main cast iron block. To save additional weight Dennis opted for the Tremec TKO-600 5-speed with close ratio fifth, which is 25 pounds lighter than the usual Tremec T-56 6-speed. The loss of the 6th gear would trim a few mph off the top speed potential, but it remained a 200+ mph machine.

The Run and Gun warriors.

Representing the Superformance clan at Run and Gun, from left to right:

- Wally Fasnacht in SP 1806
- Doug Reed in SP 116, the original One Lap car.
- Ron Frohs in SP 723
- Richard Price in S1 28
- Jerry Mullins, owner of SP 199 but driving the Olthoff's PPG car SP 308
- Dennis Olthoff in Coupe No. 5
- William Belcher in SP 163

Run and Gun has three classes, Street, Prepared, and Pro with four sub-classes: A for 400 cubic inches and up, B for under 400 cubic inches, C for 4 and 6 cylinder cars, and D for cars with blowers and/or nitrous. There are three events, road course, autocross, and drags. To be *Overall Top Dog*, you must do well in all three. A strong balanced performance is essential for victory.

The Superformance owners went home with a boat load of trophies. To list a few... William Belcher ran his big inch Windsor in A Prepared and took home a handful of trophies including *King of the Hill* in the drag competition with a 10.919 ET and third in Prepared in the *Overall Top Dog* rankings. Jerry Mullins took quickest ET in B Pro at 11.54 and second fastest in both autocross and the road course. He finished third in Pro class for *Overall Top Dog*. Doug Reed took second at the drags in B Prepared with an 11.893 ET.

The Red Rocket No. 5 Coupe with Dennis Olthoff at the wheel took home eight trophies, more than anyone else at the meet. He had best time of the meet for any class in Autocross at 43.723 seconds. He took first in A Pro on the road course, only 0.56 seconds behind fastest time of the meet. And he set the quickest Pro time at the drags, laying down an 11.131 at 131.22 mph – a full second ahead of anyone else in the Pro class. Good enough for Pro *Overall Top Dog*, the top of the heap in the toughest class.

Second Strike Fall Track Event

Lunch break with the No. 5 Coupe at the Fall Track Event

The next appearance of the No. 5 Coupe was at the Second Strike Fall 2004 Track Event held at Carolinas Motorsports Park near Kershaw, SC. Instructors for the event were Dennis Olthoff along with Mac Demere and Burke Schultz, test drivers for Michelin. Mac is a long time instructor at Second Strike events and a real friend of the Superformance family. He helped me considerably over the course of the weekend with finding and sticking to the right line in SP 218.

Sunday afternoon Mac asked me if I would like to go for a ride in the Coupe. Why not? Super fast car. Phenomenal driver. What's no to like?

I can only describe the experience as stark terror. It was like being strapped in a rocket that runs wide open but hugs the ground like a snake. Mac can do things with a car that I can only dream about. He is far more aggressive with steering, throttle and braking inputs than I am or could be. As a consequence, he spends a good bit of time past the limit of adhesion. A small corrective action and the Coupe hooked right back up without losing a lick. This, I am thinking, is one fast and capable car. After twenty minutes, my lunch started pleading for an early release. Fearful of redecorating the handsome interior of the Coupe, I was about to ask Mac to pull in when he decided on his own to call it a day, thus preserving both my dignity and my manhood.

This is no one-dimensional car. It runs like a scalded dog. But it also turns and stops exceedingly well.

After Kershaw, the No. 5 Coupe and the 427 Windsor parted ways. The engine's next home would be Peter Brock's personal Coupe.

Dennis retains the No. 5 Coupe as the Olthoff rolling test bed, demonstrator and designated butt kicker. Another even more powerful engine was beginning to take shape in Dennis' fertile mind. But that is a story for a later date.

The Brock No. 73 Coupe

Peter's personal Coupe is Amulet Red, one of the 10th Anniversary Mk III colors, with a Wimbledon White half cove. For the engine, Pete picked the Run and Gun 427 Windsor de-tuned for street use. The principle change was replacing the cam with the proprietary design hydraulic roller cam RDI uses in many of their street 427 Windsors. Beehive springs reduced valve train weight. In this configuration, the engine produces 568 gross horsepower at 6200 rpm and 563 lb-ft torque at 4900 rpm. Net output is 524 horsepower at 6100 rpm and 548 lb-ft at 4600 rpm.

The trimmed single plane manifold was retained, a move made possible by an ultra low CV Products NASCAR 14" air cleaner housing. For more on the cam, carburetor and the air cleaner, see **Ultimate Windsor Update** later in this issue.

Peter arrived in Charlotte in January 2005 to take delivery of his Coupe. We spent the day in Mooresville, the NASCAR center of the universe, picking up some of the finishing bits like the CV air cleaner housing from the many NASCAR shops in the area.

The following day, a cold and snowy Saturday, the Olthoffs hosted the Walter Mitty Sports Car Society at their shop. A full house braved the elements to hear guest speaker Brock share his recollections of the Cobra racing programs, the history of the original Daytona Coupe, a side foray into the Cannonball Run, and the development of the Superformance Coupe.

Dennis Olthoff (left) and Tom Cotter (center) laugh as Peter Brock (right) shares a light moment with the Charlotte based Walter Mitty Sports Cars Society. His personal No. 73 Coupe is in the foreground. The Olthoffs' No. 5 Coupe is in the left background.

A warm garage on a chilly winter's day filled with good friends and fast cars. A great talk by an entertaining and informative speaker followed by a hot lunch and lively conversation. Life is good at times.

Peter returned to the Olthoffs' in February to take No. 73 to Jacksonville, Florida, in preparation for the Amelia Island Concours and the races at Sebring.

The grin says it all…

Now that he has had the opportunity to put more than a few miles on a Coupe of his own, how does he feel about it?

"I'm nuts about the car. I love it. It exceeds even my expectations. It is such a pleasant car on the road. It is a great trip car. It is so comfortable cruising at 80 mph. Passing is just a blip of the throttle."

He there upon blipped the throttle and we were quickly taching 6000 in 4th, about 143 mph, on the rural two lane road. I'm thinking, "Yep, he's right. Pretty nice!"

By the Numbers

As with the Mk III, the Coupe owners have demonstrated a proclivity for personalization with color and drive train selections.

The Roush 402RC rated at 500 horsepower coupled with the Tremec T-56 6-speed transmission was envisioned as the standard drive train. Coupe No. 5 was fitted with this drive train when tested for Car and Driver.

However, Coupe owners have selected Windsor engines ranging from 392 to 427 cubic inches with both the Tremec TKO 5-speed and the Tremec T-56 6-speed transmissions. The 392 stroker has proved very popular with Mk III owners and is now in a number of Coupes. It is quite tractable, a good choice for a daily driver, and a performance bargain. At the other end of the performance spectrum are the 427 Windsor engines, primarily from RDI and Roush. These 550+ horsepower powerhouses offer stunning performance.

Coupe Configuration	Car and Driver	Brock's Coupe	Run and Gun
Engine	Roush 402RC	RDI 427	RDI 427
Gross Horsepower	500	568	629
Weight	3066	2986	2961
Transmission	6-speed	6-speed	5-speed
0-60 mph	4.0	3.4	3.3
0-80 mph	6.2	5.3	4.7
0-100 mph	8.7	7.2	7.1
0-120 mph	12.5	10.2	9.4
0-140 mph	17.2	13.2	13.0
0-1320 ft (1/4 mile)	12.2 @ 119 mph	11.4 @ 128 mph	11.1 @ 131 mph
Top speed	206 mph	210 mph	210 mph*

* The top speed on the Run and Gun coupe is rpm limited.

The chart shows performance for the Car and Driver setup in Coupe No.5, Brock's Coupe No. 73, and Coupe No. 5 in the Run and Gun configuration.

And there we have it – two Superformance Coupes. One with a mind boggling 629 horsepower and one a bit tamer and easier to live with but still potent 568 horsepower. They run, they handle, they stop. They cruise comfortably for miles on end. They are even reasonably efficient. Did I mention the head turning good looks?

I am thinking Supercar here. Bring on the best of the rest and let's see.

Supercar Smackdown

How do the Superformance Coupes and other Ford powered supercars stack up against the rest of the world in a Supercar Smackdown? Lately, very well indeed, as this comparison will show.

The World

Three supercars on everyone's list are the McLaren F1, Ferrari Enzo, and Porsche Carrera GT.

McLaren F1

The McLaren F1 was designed in Working, England by Gordon Murray to be the cost is no object supercar to end all supercars. Introduced in 1993, it succeeded on both counts. In the early years, the street cars and race cars were virtually identical, literally offering race car performance on the street. I saw the last new one available for sale in a dedicated plush London Park Avenue showroom in 2001. The price at the prevailing exchange rate was over a million bucks.

The last available McLaren F1 in the London showroom.

With light weight, a diminutive and sleek shape, and a large naturally aspirated BMW DOHC 4-valve V12 pumping out 627 horsepower, the F1 promised unbeatable performance. And it delivered. It ripped through the quarter mile in 11.1 seconds at 138 mph on the way to an astounding 230 mph top speed. Ten years ago this was a quantum leap over any other street legal car in the world and good enough to win on the track. The McLaren F1 remains a very desirable and even more expensive car today and is the benchmark against which all cars with supercar aspirations are measured.

Ferrari Enzo

Ferrari's first shot at a supercar was the strikingly handsome 1984 288 GTO. In appearance, it resembled the Ferrari 308 on steroids. The twin turbocharged high winding V8 produced a remarkable for the time 400 horsepower.

I was fortunate enough to see one first hand at the Ferrari dealer on the Coast Highway in Huntington Beach, California. The car was pure sex even sitting still. If they had heeded my plea for a test drive, I would never have come back. Maybe they would have caught me and maybe not. In my state of mechanically induced intoxication, it would not have mattered.

Ferrari Enzo *Road & Track photo*

At the end of the production run, the $80,000 price new quickly escalated to $250,000 on the collector market. Ferrari learned a big lesson from the 288 GTO. Some folks were willing to pay a lot more money than he was asking for a thinly disguised race car for the street. The super expensive supercar wars had begun. Ferrari followed up with the F40 in 1987 and the F50 in 1995, and the Enzo in 2002, all testimony to the performance and pricing lessons learned.

The 288 GTO, F40, F50, and Enzo represent a steady upward progression in supercar design, performance, and price.

Porsche Carrera GT

Porsche Carrera GT *Road & Track photo*

In the performance world, Porsche is best known for its turbocharged flat sixes. Such an engine powered Porsche's first supercar contender, the extraordinary Porsche 959.

The un-Porsche-like V10 heart of the Carrera GT began in the late 1990's as a purpose built design for the 24 Hours of Le Mans. That effort never came to fruition, but Porsche retained the engine design and wrapped their next generation supercar around it. Like Ferrari with the Enzo, the Carrera GT has lifted Porsche into the supercar stratosphere.

Blue Oval Power

The Ford performance banner has been carried for years by Cobra replica owner/builders, who have continued to put Ford powered machines on the road that would run with the best of them. In the past few years, the performance banner has been picked up by three new Ford powered machines, all interestingly enough with a Le Mans heritage.

Superformance Coupe

Olthoff No. 5 Coupe

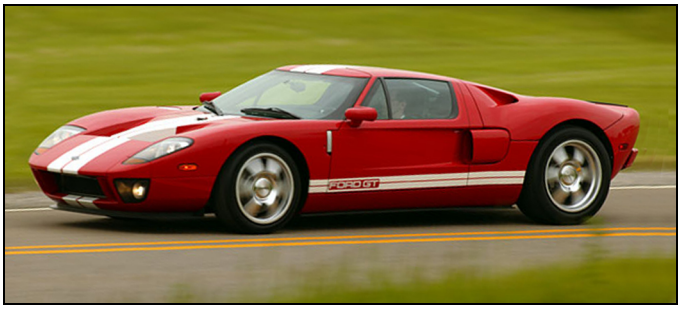
Brock No. 73 Coupe *Peter Brock Photo*

The Cobra Daytona Coupe won at Le Mans in 1964, the first of a string of Ford powered victories that carried it to the World Manufacturers Championship in 1965. The Superformance Coupe was designed for Superformance by Peter Brock, the designer of the original Daytona Coupe. It resembles the original Daytona Coupe, but is slightly larger in every dimension, more aerodynamic, and even better looking. The dashboard gauge and switch layout also resembles the original, giving the interior a racecar feel. Unlike the original, the interior is fully finished, sound proofed, and air conditioned as befits a modern road car. It is far more comfortable than the original and will flat run away from the original in every aspect of performance.

	Original Daytona Coupe	Brock Coupe No. 73
Engine	Ford 289	RDI 427
Gross Horsepower	385	568
Weight	2515	2986
L x W x H	167 x 70 x 46	175 x 74 x 49
Transmission	4-speed	6-speed
0-60 mph	4.9	3.4
0-80 mph	6.9	5.3
0-100 mph	10.1	7.2
0-120 mph	14.2	10.2
0-140 mph	20.0	13.2
0-1320 ft (1/4 mile)	13.1 @ 115 mph	11.4 @ 128 mph
Top speed	189 mph	210 mph

In the heady world of limited production supercars, the Superformance Coupe clearly qualifies as a production car. The Superformance Coupe production numbers will in all likelihood exceed those of the McLaren F1, Ferrari Enzo, Saleen S7, and others.

Ford GT



Ford GT *Ford photo*

The Ford GT 40 won Le Mans in 1966, 1967, 1968, and 1969. The new Ford GT represents an evolutionary adaptation of the legendary GT 40 Mk I (small block) design. It looks remarkably like the original, but is larger in every dimension.

The Ford modular engine is only 28 cubic inches larger than the 1968/69 Le Mans winning 302 small block, but produces more power than the 1966/67 Le Mans winning 427 big blocks. Dual overhead cams (DOHC), 4 valves heads, fuel injection and especially a supercharger make the difference. The Ford GT is quicker than the 1966 Le Mans winning 427 powered GT 40 Mk II. See chart following.

Like the Superformance Coupe, Ford's adaptation of the legendary 1960's Le Mans racer is designed as a fully fitted modern road car. With race car style and performance in a street car, the 3500 car production run is in such demand that dealers routinely add a $200,000 markup.

	1966 Ford GT 40 Mk II	2005 Ford GT
Engine	Ford 427	Ford 330
Horsepower	485 Gross	550 Net
Weight	2682	3350
L x W x H	163 x 70 x 40	183 x 77 x 44
Transmission	4-speed	6-speed
0-60 mph	4.2	3.7
0-80 mph	5.6	5.3
0-100 mph	8.2	7.4
0-120 mph	10.7	9.8
0-140 mph	14.4	12.9
0-1320 ft (1/4 mile)	12.0 @ 129	11.2 @ 131
Top speed	205 mph	207 mph

Saleen S7

Until recently the Saleen S7 was the lone American built and lone Ford powered entry into the supercars wars. Steve Saleen is well known and respected for his High performance Mustang based tuner cars. The Saleen S7 is a potent street machine derived from his successful S7R Le Mans racers. Supercar performance in this thinly disguised racer.

Saleen S7 *Motor Trend photo*

Rather than follow the European approach of power through mechanical complexity and screaming engine speeds, Saleen has opted for power the old fashioned American way – the simplicity of two pushrod activated overhead valves (OHV) feeding big cubic inches. For the S7 engines, Saleen started with the same Ford Racing/RDI aluminum Windsor blocks used in his S7R race cars. These are the same as used the Superformance Coupes reported here, but have the Cleveland style 9.2 inch deck height and Cleveland style Robert Yates heads.

The Numbers Please

	Superformance Coupe No. 73	Superformance Coupe No. 5	Ford GT	Saleen S7	Ferrari Enzo	McLaren F1	Porsche GT
Price	$90,000	$90,000	$155,845 ($350,000)	$400,900	$652,830	$890,000	$460,400
Engine	V8 OHV 2-V	V8 OHV 2-V	V8 DOHC 4-V	V8 OHV 2V	V12 DOHC 4-V	V12 DOHC 4-V	V10 DOHC 4-V
Displacement	7.0 (427)	7.0 (427)	5.4 (330)	7.0 (427)	6.0 (366)	6.1 (370)	5.7 (350)
Intake	1 4-bbl	1 4-bbl	EFI Supercharged	EFI	EFI	EFI	EFI
Gross HP	568 @ 6200	629 @ 6500					
Net HP	524 @ 6100	580 @ 6400	550 @ 6500	550 @ 5900	650 @7800	618 @7400	605 @ 8000
Curb weight	2986	2986	3350	2870	3230	2579	3045
L x W x H	175x74x49	175x74x49	183x77x44	188x78x41	185x80x45	169x72x45	182x76x46
Transmission	6-speed	6-speed	6-speed	6-speed	6-speed	6-speed	6-speed
0-40 mph	1.9	1.9	2.3	2.0	1.9	2.3	2.0
0-60 mph	3.4	3.4	3.7	3.6	3.3	3.2	3.6
0-80 mph	5.3	4.6	5.3	5.2	5.0	4.5	4.8
0-100 mph	7.2	6.8	7.4	7.7	6.6	6.3	7.0
1/4 mile	11.4 @ 128	11.1 @ 132	11.2 @ 131	11.4 @ 127	11.1 @133	11.1 @ 138	11.3 @132
Top speed	210	216	207	220	218	230	205

Supercars

What defines a supercar? If it is exotic materials, mechanical complexity, electronic control systems for everything, and the attendant astronomical price, then the European contingent certainly qualifies. However, it interesting to note that exotic materials, mechanical complexity, electronic control systems, and astronomical prices do not make the cars lighter, more powerful, or quicker, or faster as the data panel clearly shows. So these things do not really define a supercar.

If racing heritage, blistering race car performance on the straights and in the corners, stunning racer-for-the-street good looks, a modicum of creature comforts, and a 200+ mph top speed in a street legal car define a supercar, then these are all certainly supercars.

Two of these cars stand out for another reason. The Superformance Coupe and the Ford GT are both reasonably affordable, at least the before the staggering dealer markup on the Ford GT. The Superformance Coupe at under $100,000 is the supercar bargain of the century.

A Word about the Data…

The information in this comparison comes from published roads tests. A word of caution. The tests were conducted at different times on different tracks with different surfaces, at different altitudes with different atmospheric conditions, and with different drivers.

To take that into consideration, a number of road tests were reviewed for each car. Various tests for the same car varied as much as the results for the different cars. The Ford GT production car was quicker than the early prototype. The early McLaren F1 was quite a bit quicker than the later ones. As a final check, every car was run through the simulator to make sure that the math worked and that the published results were within the bounds of physics.

These cars are so close in performance that the differences shown are not that significant. They are the quickest of the quick and the fastest of the fast. Supercars indeed!

Superformance	Car and Driver May 2004 plus changes to power, weight, and transmission discussed in lead article this issue.
Ford	Ford Motor Company and Motor Trend, Oct 2004
Saleen	Motor Trend, September 2003.
Ferrari	Road & Track, July 2003.
McLaren	Car and Driver, August 1994.
Porsche	Road & Track Road Test Annual 2005.

The Ultimate Windsor – An Update

The First Iteration

The Ultimate Windsor was first featured in Second Strike Volume 5 Numbers 1 and 2 in 2002. These two articles, the first on engine development and the second on gearing, generated more ongoing interest than any articles in the history of Second Strike. At that time there were only a handful of 427 Windsors and only a few were the all aluminum big bore versions. Now there are over 100 owners reporting 427 Windsors, and a high percentage are big bore versions. A number were retrofits into existing cars. Clearly the interest is more than academic.

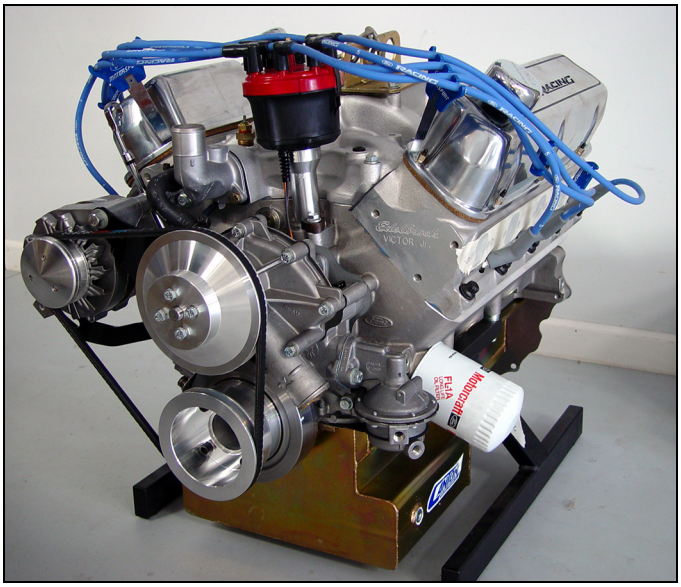
Much has been done to improve *The Ultimate Windsor* since it was first installed in SP 218 two and a half years ago. The changes are reviewed in some detail here because the challenges we faced are common to many owners as I have learned through ongoing correspondence.

In this project I have been working with the engine builder - Preston Miller at Raceparts Distribution Inc. (RDI). Our goal was stated in the original article.

> The goal for this engine design point is then to exceed the power of the [original] competition 427's and to approach the weight to power ratio of the [Ford Racing] C514 in a package that is both tractable and durable – competition performance in an engine that can be comfortably driven on the street.

We added the constraint that it had to be done with carburetion. Fuel injection can improve drivability, but it is really expensive, adding $5,000 to $8,000 to the cost of the engine. And the Weber look-alike fuel injection units that folks drool over are throttle position sensing (TPS) units which are a real bear to set up.

The Ultimate Windsor is based on the Ford Racing / RDI aluminum Windsor block. This is a race bred, race proven block that has been run for years without failure in many Trans-Am cars, the Riley & Scott prototypes, the Saleen S7 race and street cars, and many drag racing applications, some over 2500 horsepower. The Siamese cylinder bores allow a 4.125" bore, which in conjunction with a 4.000" stroke produces 427 cubic inches. In Ford performance terms, that is "the magic number". With a forged steel crank, forged H-beam rods, and forged pistons, the guts of this engine are capable of handling far more than the ponies we are throwing at it.



RDI 427 Prototype awaiting installation in SP 218

At 125 pounds, the aluminum block is about 80 pounds lighter than an equivalent cast iron block. And 80 pounds off the front end of a 2500 pound car does wonders for weight distribution and power to weight ratio. It's like asking your skinny kid sister to get off the hood. SP 218 would rather dig and go than sit and spin.

The main journals are Cleveland size, 2.749", smaller than the standard 3.000" Windsor size. This reduces bearing speed, friction losses, and oil heating. Oil temperatures on the track are low enough that I am considering bypassing the oil cooler.

The Victor Jr. cylinder heads are CNC ported by David Bamber with 2.08/1.60 valves. For the intake, we stayed with a dual plane Edelbrock Performer RPM. We were willing to give up a few top end ponies for bottom end punch and drivability. Dual plane manifolds typically give up 5% in top end power to gain 10% at the bottom end over a single plane.

With 529 horsepower at 5800 rpm and 525 lb-ft of torque at 4200 rpm, we initially exceeded our power goal of 500 to 525 horsepower. But the first design iteration of *The Ultimate Windsor* had some problems.

We fell short of our drivability goals. With a radical cam (252/262 degrees of duration and 37 degrees of overlap at 0.050 lift), the minimum cruise rpm was originally 2400 rpm. Some fiddling with the original Holley 770 Street Avenger got it down to 2000 rpm. With the tall 3.08 rear end, this meant that a 25 mph speed limit (the norm in Davidson and strictly enforced) is 1st gear territory, 35 mph is 2nd gear, 45 mph (the speed limit on the Blue Ridge Parkway) is 3rd gear with 2nd gear for the slow sections and traffic. This gets old fast.

The second problem was misfiring. The plugs would work fine when new and gaped to 0.035", but within a thousand miles would start to misfire. It seemed like a plug fouling problem and at first I thought it was. But when the plugs were pulled and inspected, they were clean and the right color. Puzzling.

Thirdly, even though we met our goal, we were short of power. With the initial cam, the engine should have made peak power in the low to mid 6000 rpm range. Something was hurting high speed power.

A fourth problem, but not an every day problem, was stalling during hard launches at the drag strip.

Drivability Defined

We talked with the technical staffs of a number of high performance parts manufacturers. When we asked about design for drivability, the typical response was, "Nobody ever asks about that". Nobody was really focused on the combined goal of performance and drivability. Clearly we were on our own.

We defined drivability as the minimum rpm that the engine would run on level ground in top gear without bucking. The defining test is to drive the car on a level road in top gear and slow down slowly until the engine starts bucking, then note the engine speed. This result is called the **minimum cruise rpm**. The test is both useful and repeatable, making it a good definition.

Bucking is caused by misfiring. Misfires occur at low engine speeds because of improper fuel/air ratio in the cylinder which is caused, in turn, by poor fuel distribution and poor fuel vaporization. Bucking occurs when the misfiring slows the engine enough to unload then back load the gears, then reload the gears when the engine fires again. Bucking is less likely to occur under load, even a light load, because the gears are loaded and less likely to unload. So bucking is more likely to occur in the lower gears (less aero load) and more likely to occur when backing off, or going down hill.

The things that make big power – big cams, big ports, big valves, and big carburetors are the very things that cause poor fuel distribution and poor fuel atomization at low engine speeds. And that is precisely why making big power in a drivable package is such a challenge.

You can test for power on the dyno. Typically to test drivability, you have to install the engine in the car and drive it. This makes tuning for power and drivability a painful proposition. We noted in testing that the minimum cruise rpm occurred at about the same no load engine speed where the engine pulled 15.5" of manifold vacuum. A simple test, but one that you can do in the dyno room. It also means that more vacuum at low engine speeds means better drivability.

Running on the track with friends is fun. So is a fall cruise with friends through the mountains on North Carolina and Virginia. It is really nice to be able to use the same setup for both.

Modifications

In refining the engine, we used the Dyno 2000 engine simulator to evaluate over 90 combinations of heads, cams, intakes, and carburetors. We put the most promising combinations on the dyno, on the road, and on the track to validate our simulator findings.

Camshaft

We went down many roads before finding the right cam. The first approach was to limit overlap. Overlap is the enemy of drivability. The Ford SVO A351 cam that makes the 392 stroker so tractable has a relatively low 13 degrees of overlap, for example. We also know that larger engines can tolerate more overlap.

To determine the maximum reasonable overlap, we interviewed a number of owners and drove a number of cars with engines ranging from 351 to 514 cubic inches and overlaps ranging from 0 to 37 degrees. Based on this data, we developed a graph of maximum overlap for drivability vs. engine size. The graph indicated that the maximum overlap for 427 cubic inches was around 16 degrees. We picked 20 degrees to push it a bit. It's a guy thing.

We looked at a large number of cam specs for Ford engines. The maximum lobe separation was 114 degrees. Fords typically like 6 to 10 degrees more exhaust duration than intake duration. For 20 degrees of overlap, 114 degree lobe separation, and 8 degrees more exhaust duration, the math give you a 244/252 duration cam. Long duration with wide lobe separation to reduce overlap.

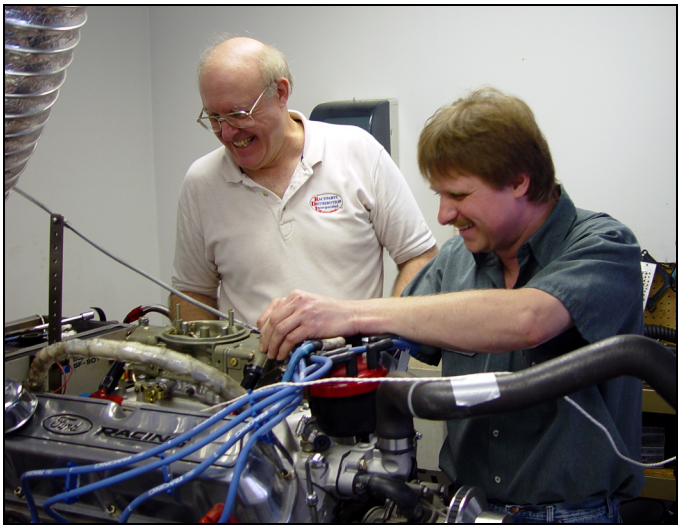
For another look we talked to the experts. The first was David Vizard, noted automotive author and engineer. I have a number of David's books and I am impressed with his work. Like many gear head writers, he has a lot of ideas about what works. Unlike most of them, he proves or disproves his theories with laboratory and on the road experiments. His current lab is at the University of North Carolina at Charlotte.

I met David at a Walter Mitty Sports Car Society meeting several years ago. We were perusing a Vice President's Ferrari F-40 in the parking lot. We are all Vice Presidents by the way. At any rate, I overheard him introduce himself to another Vice President and, recognizing the name, introduced myself. Later I called David and asked him if he had any thoughts about camshafts. Yes he did. We started over lunch and finished up late in the afternoon on his computer. David has developed a sophisticated model that will determine cam specs based on engine and car specs and desired use.

David felt that the long duration cam with wide lobe centers was the wrong approach. His model recommended a cam with a good bit less duration and tight lobe centers, just the opposite of my proposed cam. His point was clear. If you have to spread the lobes to reduce overlap, you have too much duration in the first place.

We also talked with Ken Troutman of KT Engine Development. Ken builds stout engines, mainly for short track. A number of his projects have been published in the trade press. Short track engines need a lot of punch coming out of the corners and big power on the straights. Not too different, if you think about it, from what we were looking for. Ken's cam selection advice comes from countless hours in the dyno room and countless laps on the Carolina short tracks.

Ken recommended a cam that was almost identical to David's recommendation. Two identical recommendations from two folks who approach the problem from two very different perspectives – one intellectual and one experiential. I was starting to feel like the Lone Ranger.



Preston Miller and Ken Troutman prepare the RDI 427 for another pull in the KT Engine Development dyno room.

We let the dyno decide. After a day's testing on the KT dyno with these and a number of other cams, we had a solution. And it wasn't mine. Surprisingly, the two cams made similar power. The big duration, wide centerline cam made less power than the simulator projected. The smaller tight centerline cam exceeded its simulator projection. Obviously the engine liked the smaller cam better. And that is the one we used. As well as it works, the cam still has the right sound at idle. The bystanders still know it is a performance engine.

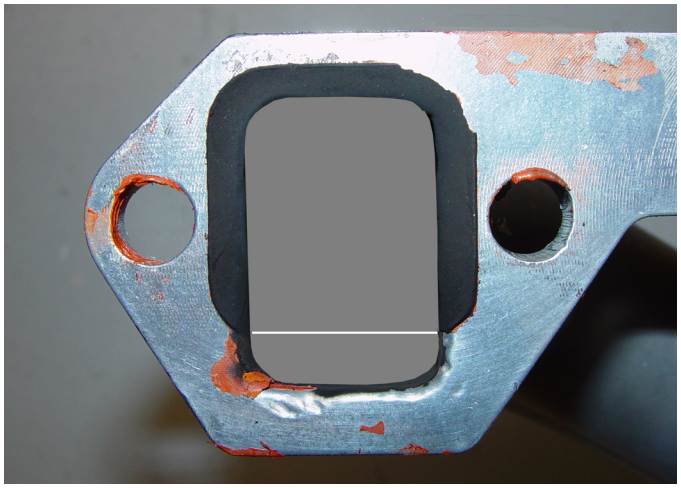
Exhaust

SP 218 had the standard Superformance design for 351W exhaust headers. With the ported Victor Jr. heads, the ports in the heads did not line up with the ports in the headers, giving a 40% blockage. Peak power and peak power rpm were down a good bit from the similar Run and Gun engine with a similar cam and intake, indicating that blockage was costing a good bit of high end power.

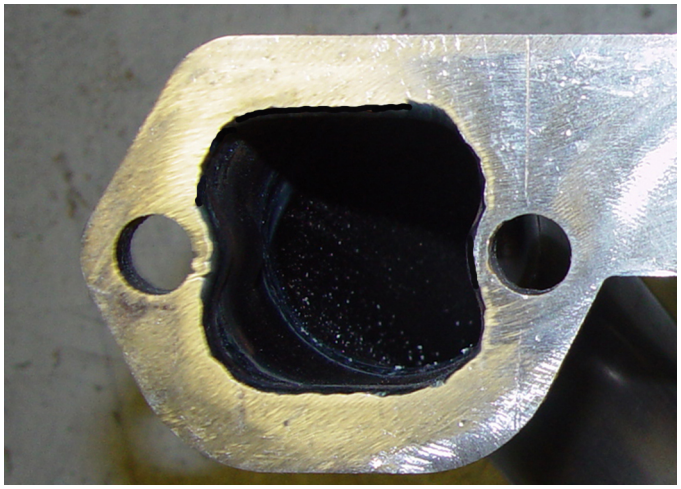
The solution was not easy. The Victor Jr. heads have the exhaust bolt holes in the stock location and the ports are very close to the holes, making it challenging to make a header that

both matches the port and can be bolted on. Duck tape doesn't work on headers. The extensive porting left less than 1/8" of metal between the bolt hole and the exhaust port.

Fortunately some of the best header fabricators in the world live around here. Preston designed and made a flange that matched to port with a dimple around the bolt hole to provide bolt clearance. NASCAR fabricator Kenny Thompson whipped up a set of headers that matched the flange with a matching dimple for bolt clearance. The headers are stepped up from 1 3/4" at the head flange to 1 7/8" at 7" downstream. The exhaust steps up again to 2" when it enters the exhaust pipes. Stepped headers. Trick.



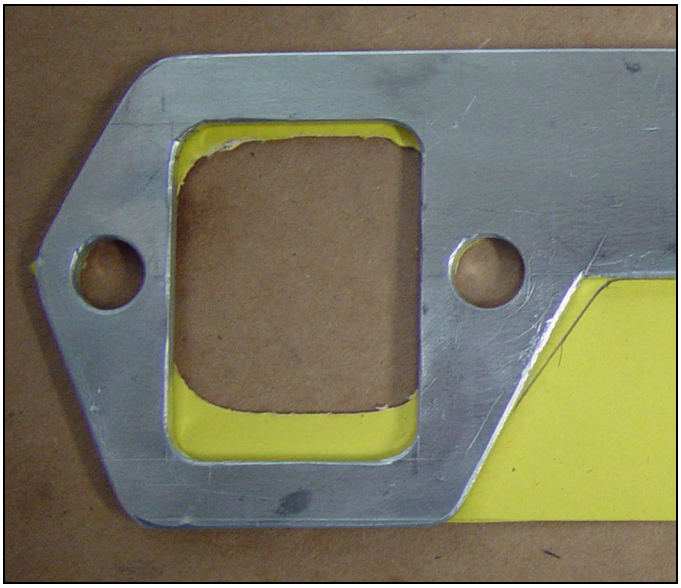
The standard Superformance header. The grey area is the header opening. The black area (exhaust soot) and the white line mark the Victor Jr. exhaust port. The header opening is lower and narrower than the head port. Also note how close the head exhaust port is to the mounting bolt hole.



The new RDI header. Note the dimple around the bolt hole for clearance. Perfect match to the ported Victor Jr. heads.

The headers were jet hot coated and installed with the cam change. The dimple made it possible to install the headers with the smallest 12-point bolts. Not easy, but possible. They did the job. Any power lost with the cam change was re-gained with the exhaust change. They are also beautiful to look at, a real work of art.

Two sets of these headers were fabricated. The other set went in Bill Erwin's SP 1197 for his all-aluminum RDI 408 Windsor with the same CNC ported Victor Jr. heads.



The sheet stock template that Bob Olthoff designed for the optional Superformance headers and sent to the factory for production. The flange port is higher and wider than the standard design, providing a better match to large port and high port aftermarket heads. The cardboard template behind the steel template is for the ported Victor Jr. head. The flange port being larger than the head port has a minimal pressure loss. The encroachment of the flange into the head port beside the bolts has also been reduced on the Victor Jr. heads and eliminated on heads with smaller exhaust ports.

The three photos on this page are the same scale.

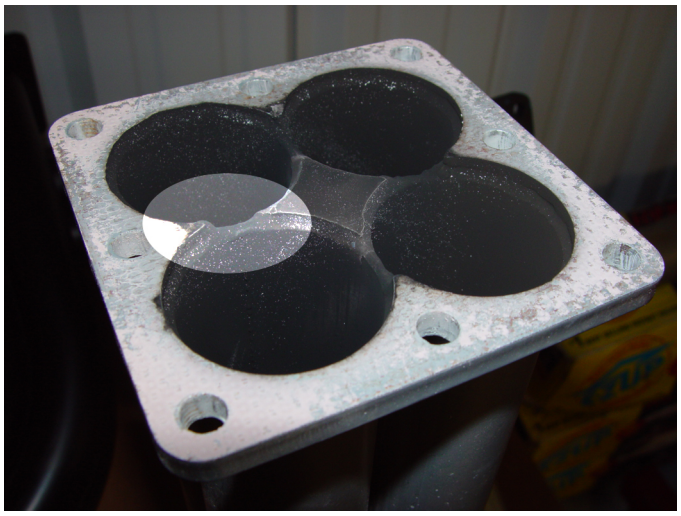
At the time we were redesigning the headers for SP 218, Bob Olthoff was designing some optional 351W headers for Superformance. The standard headers work fine with many of the medium flow aftermarket Windsor heads, but as seen here do not work well with some of the later high flow heads with higher and/or wider exhaust ports. His objective was to make a header flange that better fit the wider variety of aftermarket heads now being used by Superformance owners.

These headers can be ordered from Superformance as an option for new cars or as a replacement part for existing cars.. The part numbers are 01-005-00010 for LH and 01-005-00012 for RH.

The port shape of the Victor Jr. heads was not factored into the option 351W design. Making all the headers harder to install to accommodate the idiosyncrasies of the Victor Jr. heads would not have been the right design point.

If you have Victor Jr. heads and want the headers designed for them, Dennis Olthoff picked up the Victor Jr. header flange design from RDI and fabricated several sets of headers by adapting the RDI Victor Jr. flange to the Superformance 351W headers. This approach is considerably less expensive than the custom fabricated headers on SP 218. If you have Victor Jr. heads and you are interested, contact Dennis at Olthoff Racing.

We made another change in the exhaust.



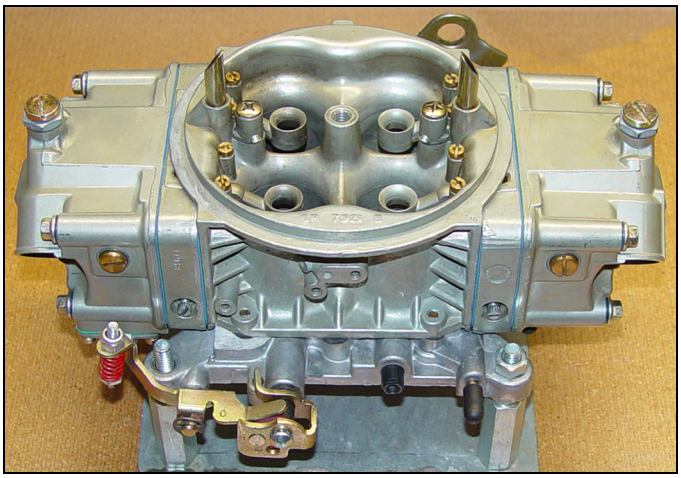
Old Superformance exhaust pipe flange showing gap created in welding process.

New Superformance exhaust pipe flange showing intact bridge between pipes.

In the early Superformance pipes, the bridge between the pipes on the flange was eroded during welding. Consequently the flange gasket could not hold the pressure between the pipes and blew out, allowing gasses to flow from one pipe to another. Another difficulty was the baffle design. The baffles had a series of forward facing scoops punched into them. Helps sound deadening, but hurts flow.

In 2003, Superformance changed the welding technique to save the bridge between the pipes. They also changed the baffle design to a straight pipe. These two changes are worth about 25 horsepower, according to Dennis Olthoff. When I changed the headers, I switched to the new pipes at the same time. The easiest way I can think of to tell if you have the new pipes is to stick an optical probe up the tailpipe to check the baffles.

Carburetor



Holley HP 750 Double Pumper. Mechanical secondaries. No choke horn. Accelerator pumps, idle speed adjustment, and idle mixture adjustment on both primaries and secondaries.

We made the decision early on to stick to a single Holley four barrel. Webers, dual four barrels, three two barrels – they all look sexy as hell. But they don't add to either the power or drivability objectives. Fuel injection is expensive and hard to install and tune. There are other four barrels makes on the market, but they offered no real advantage over Holley and they all have their own quirks.

A properly sized single four barrel passes all the air needed. A properly set up Holley works well in both a straight line and in the corners. It is hard to beat a single Holley four barrel for making solid reliable power at a reasonable cost.

We tested the standard Holley 3310 750 cfm vacuum secondary, Holley Street Avenger 770 cfm vacuum secondary, and the Holley HP 750 cfm double pumper. We selected the Holley HP for a number of reasons.

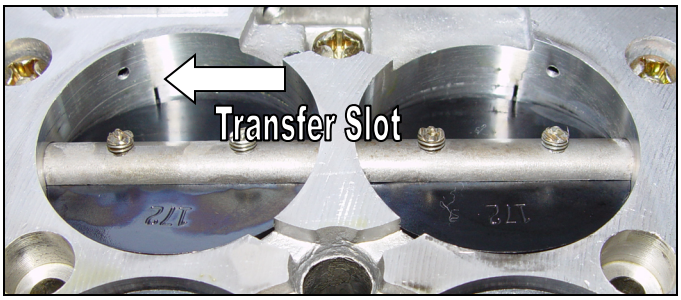
The primary reason was drivability. As part of the drivability testing, I drove Hal Copple's SP 672 "Great Stroker" with the 392 engine. Hal actually has more upgrades on his car than I do, or anyone else I know. One of his upgrades was a Holley HP 750 with vacuum secondaries. I was very impressed with the low speed operation and decided to look into it.

The Holley HP is Holley's latest race carburetor. It is used extensively in NASCAR. It has more sophisticated circuitry than either the standard Holley or the Street Avenger, so it

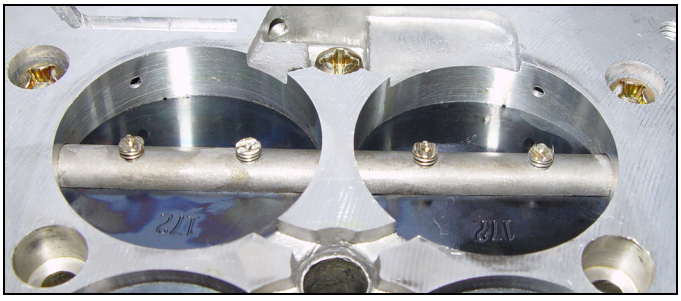
meters better across the entire airflow range. It should. At around $650, it is about two and a half times as expensive.

Engines with low idle speed vacuum require larger idle throttle openings to get the necessary idle airflow. The larger throttle opening overexposes the transfer slot and interferes with the transition from idle to low speed, which make the engine run poorly at low speed. Can you feel it buck?

A large idle throttle setting also makes the engine run on when you shut it off.



Big cams take big air at idle. Opening the throttle too far with the idle screw overexposes the transfer slot.



When the idle screw is set correctly, the transfer slot will be just barely exposed. (Photos of underside of carburetor)

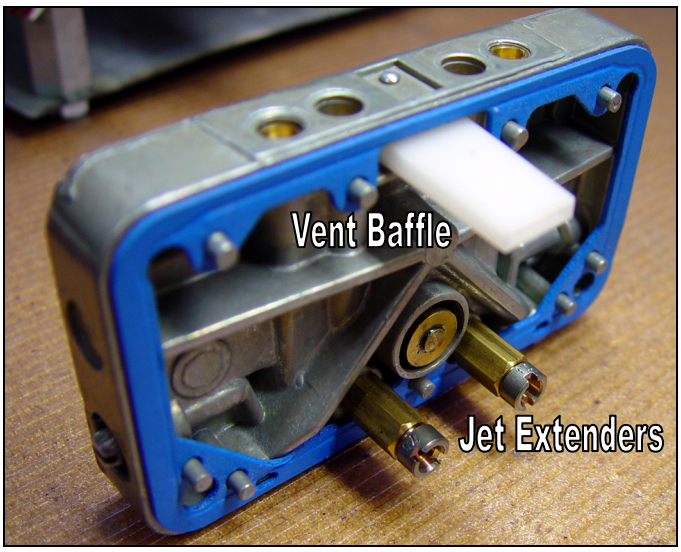
The Holley Street Avenger and Holley HP have idle throttle setting adjustments on both the primary and secondary throttles. Balancing idle airflow across both the primary and secondary makes it easier to get the correct idle airflow without overexposing the primary transfer slot.

Holley HP double pumper also has four corners idle mixture adjustment so you can set the idle mixture on both the primaries and secondaries. Better mixture, smoother low speed operation.

Another tip from Hal for vacuum secondaries. He found in chassis dyno testing that his engine picked up 30 lb-ft of torque in the mid range with the lightest secondary spring that Holley offers. The lighter spring makes the secondaries open earlier. Apparently the engine wants more air than the vacuum secondaries want to give it, even in the mid range. We found the same thing in our dyno testing.

If the light spring works best, it stands to reason that mechanical secondaries would work even better, i.e. a double pumper.

Two reasons are usually given for not using a double pumper. One is over carbureting the engine at low speed. By Holley's charts, a 427 can accept full throttle at anything above 1200 rpm. Trust me. That is not going to be a problem here. The other complaint is excessive fuel consumption from the second pump. Because of an extra set of springs, on the secondaries, the throttle pressure increases when you kick in the secondaries. It is easy to feel it with your foot. There is also that neck snapping acceleration clue. So staying out of the secondaries is easy. No into secondaries, no second pump action, no extra fuel. Again, no problem here.



The HP comes standard with trick parts that have to be added to the other Holley carbs. For example, it comes standard with the vent baffle to prevent fuel sloshing into the bowl vent on hard acceleration and braking. The jet extenders allow the jets to stay submerged, even when a hard launch sends the fuel to the back of the bowl. These should solve my hard launch stalling problems.

The Holley HP was close with out of the box jetting and the standard 1.5 turns on the idle screws all around. Replacing the 73 jets with 76's should put it right on. It pulled an addition 10 horsepower on the dyno as an added benefit.

Without a choke, it does run rough for a few minutes after a cold start. As it turns out, the fast idle is more important than the mixture enrichment, so I'm learning left foot braking.

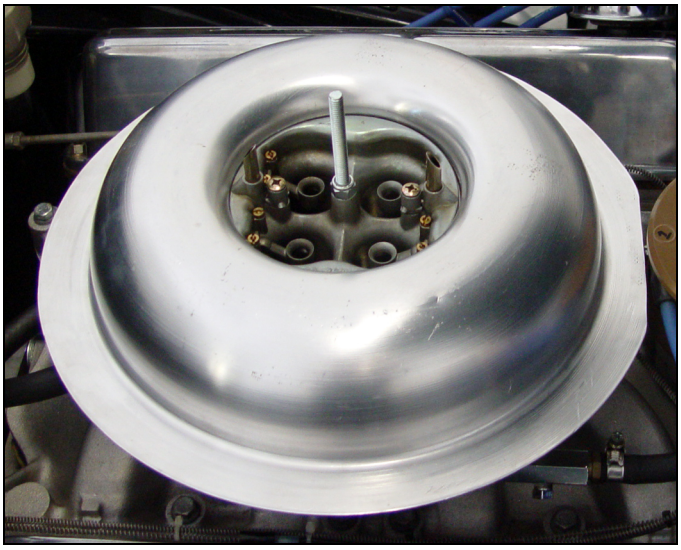
It does sound for all the world like a P-51 on cold start. I do love that sound!

Air Cleaner

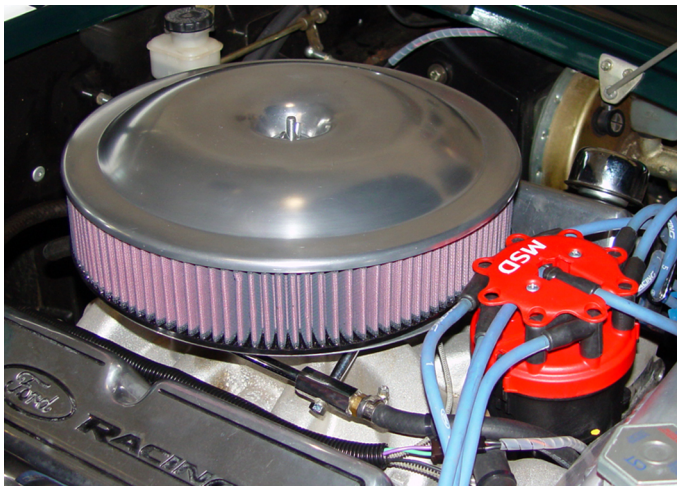
The Holley HP is chokeless and has no air horn for the choke. The smooth inlet shape begged for an equally aerodynamic air cleaner housing. Hal Copple and I found one at Muscle

Motorsports, right down the road from here in Huntersville, NC. Muscle sells new and used NASCAR parts and had a 14" BSR air cleaner pulled of a racer. Hal bought the first one out from under me, but I got the next one. Something about parts with a racing heritage compelled us to buy them. I had to trim about 1/4" off the front edge of the bottom housing to clear the distributor.

The contoured shape has two purposes. It turns the air gently to head straight down into the carburetor. Nice. It also drops down 1.7" over the carburetor allowing the use of a tall filter element. I started with a 4" tall (no kidding) Wix racing element. The hood closed, but the housing rubbed on the strategically placed rub strips under the hood during a day of track testing at Carolinas Motorsports Park. So I switched to a 3" tall K&N filter element.



The highly contoured base drops 1.7" below the top of the Holley to provide hood clearance for a big filter. The flow is turned to direct the air vertically into the chokeless Holley HP. Perfecto!



With a 14" x 3" K&N element, it has more than an inch of hood clearance. The domed top is contoured to match the base as can be seen from the deeply recessed hold down nut.

I happy to report that a 14" x 3" K&N flows plenty of air. The Second Strike **Air Cleaner Calculator** calculates 99 square inches of flow area and around a one horsepower loss. Sweet.

The unit is available from BSR. An identical one is available from CV Products (CV1511). Check the internet for sources.

These tricks do get passed forward. I saw Hal's set up and had to have it. Peter Brock saw mine at Petit Le Mans in Atlanta last year and had to have it. Now we all have it.

Ignition

The high speed misfire was the last problem to get resolved because it was the hardest to find. At first it appeared to be the plugs because changing the plugs would fix the problem, at least for awhile. The problem turned out to be the ignition system.

I have stayed with the Ford Duraspark ignition box for a long time because it has been as reliable as a brick and MSD has failed me time and again. But as it turns out, the Duraspark unit is not strong enough to fire reliably at high engine speeds in a high performance engine. Mine would fire as long as the plugs were gapped no more than 0.035" and were clean. But even a little gap growth or the slightest deposits and it would misfire above 5200 rpm.

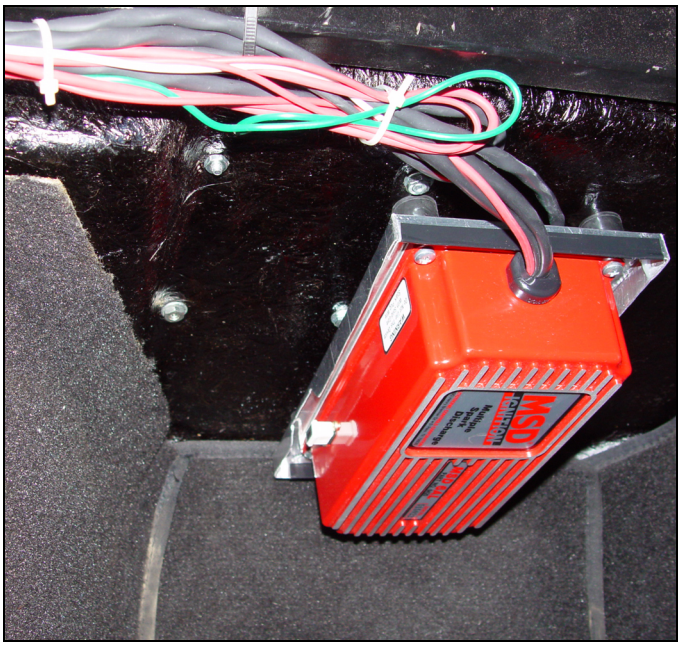
I found the problem by talking with another owner with a similar problem, talking with Dennis Olthoff, and by switching to 0.044" gap platinum plugs, which wouldn't fire even when new. The problem with the Duraspark unit may have been aggravated by possible high resistance in the Superformance wiring loom that prevents full voltage from getting to the Duraspark unit.

Rather than beat my brains out with the wiring harness, I decided to install an MSD 6AL ignition box with built in rev limiter, part 6420. The MSD system bypasses the existing wiring and is wired directly to the battery for power and ground.

As an additional benefit, the MSD unit has multiple spark discharge up to 3000 rpm, firing each plug up to 20 times on each cycle. This is very useful in igniting a less that perfect mixture and contributes to smooth running at low speeds.

Dennis suggested installing it upside down on the roof of the passenger's foot box. This keeps it away from engine heat, a known enemy of MSD units. MSD recommends against an upside-down mounting because water can't drain out. So I fabricated a hat out of sheet aluminum to keep any water from getting in the unit. I ran the power, ground, distributor, ignition, and tach wires through the grommet in the firewall for the oil and water temperature lines. I ran the coil wire through the grommet in the firewall for the speedometer cable.

The MSD unit requires an appropriate MSD coil. I selected the MSD Blaster 2, part number 8202



MSD 6AL unit installed in the passenger's foot box. Notch in hat makes it easier to change rev limiter chip. Rather than cut the wires to length, the excess was bundled and tied to the cowl hoop frame member.

Distributor

The MSD distributor and Blaster 2 coil replaced the originals in the same location. The spiral wrapped MSD coil wires were routed to the coil. The original wires were taped up and wire tied under the fender to get them out of the way.

Testing with initial advance demonstrated that the engine would run a lot better at idle with more initial advance. The engine pulled higher vacuum and idled with a lower idle throttle setting. Both higher vacuum and lower idle throttle setting contribute to improved drivability, so this was a good thing.

One way to increase low speed advance is with a vacuum advance. We tried this. Unfortunately, it didn't work as expected. At low speed cruise conditions, the vacuum fluctuations caused by the cam caused the vacuum advance to fluctuate, causing the power to fluctuate, causing the engine to buck. Just the opposite of what we were looking for.

The MSD distributors are adjustable so you can limit the advance range. Some folks use it to limit full advance. We used it to increase initial advance to 20 degrees with 32 degrees of full advance. Works like a charm.

The distributor we used was the MSD 8584. It has the larger 5 3/8" cap, adjustable mechanical advance, no vacuum advance (which we couldn't use anyhow), and it plugs directly to the MSD ignition box wiring. The distributor gear material has to match the cam. Our cam manufacturer indicated that our cam was in the grey area between steel and cast iron, so we changed to a coated bronze distributor gear, which is compatible with both. This is a task best left to the experts.

Results - Drivability

I am a really happy with the results to date. This engine is so sweet to drive. It can chug along at 1200 rpm in 5th and runs cleanly and quickly to the redline every time.

The cam, carburetor, ignition, and distributor changes have dropped the minimum cruise rpm from 2000 rpm to 1200 rpm. I typically don't drive below 1500 rpm as a matter of preference, but the difference between 1500 rpm and 2000 rpm is a lot as the following speed in gears at rpm chart shows.

Gear	2000 rpm	1500 rpm
1	16	12
2	26	20
3	39	29
4	52	39
5	63	48

I can basically operate one gear taller under any circumstance. So the Blue Ridge parkway would be 4th gear with some 3rd gear instead of 3rd gear with some 2nd gear. And that is a big difference.

What did I give up in performance? Nothing. In fact I gained a lot. The cam and carburetor changes give me a lot more mid range punch. Even with the tall 3.08 rear end, this thing runs like a BIG engine now. And with the exhaust changes, it pulls strongly all the way to the 6500 rpm redline.

We have not run the engine on the dyno with all the changes and probably will not. It is expensive to pull the engine again for a single test. The dyno tests of a number of similar engines indicate gross output of 550 HP at 6300 rpm and 540 lb-ft torque at 4400 rpm, actually up a little bit from the original configuration.

I have about 6,000 miles on this engine since installation, including hundreds of miles at track events and a whole bunch of back road cruising. My overall fuel economy is just under 14 mpg. Tops is between 19 and 20 mpg for interstate cruising. Hard running on the track yields about 7 mpg. The engine size went up 19%. Fuel consumption increased the same amount. This is no surprise since engine size is the dominant factor in fuel consumption for our cars.

I now have an engine that exceeds our original target of 500 to 525 horsepower and is happy as a lark cruising the North Carolina back roads and mountains that Pat and I enjoy so much. It is a marvelous combination of track performance and street civility.

Results - Performance

This summer, I will be doing some instrumented runs with a G Tech Pro Performance Meter to get a rear wheel horsepower curve and some trips to the drag strip to get some time slips.

Using my trusty and proven simulator, I have established these performance goals running the 15" Yokohama street tires.

Weights	**427W**	**C514**
Horsepower	550	600
Curb weight	2548	2749
Weight distribution f/r	45.5% 54.5%	47.5% / 52.5%
Pounds/horsepower	4.63	4.58
Time to Speed		
0-40	2.2	2.3
0-60	3.8	3.9
0-80	5.1	5.7
0-100	7.4	7.5
0-120	9.7	10.3
0-140	13.5	13.5
Time to Distance		
Quarter mile	11.5 @ 129	11.7 @ 129
Speed in Gears		
1st	52 @ 6500	48 @ 6000
2nd	86 @ 6500	79 @ 6000
3rd	127 @ 6500	117 @ 6000
4th	169 @ 6500	156 @ 6000
5th	181 @ 5700	188 @ 5900
Fuel Consumption		
60 mph	18.4 mpg	16.1 mpg
80 mph	16.1 mpg	14.3 mpg

For comparison I have included the same figures for the Ford Racing C514, the 600 horsepower, 514 CID stroker that we used as a target for performance. Ford recommends the 6000 rpm redline for the 2-bolt main C514. Gearing, tires, and everything else is the same in both cases.

We achieved our objective – big block stroker performance in a small block package. The lighter weight and better weight distribution make the difference. Both of these combinations, by the way, would blow the doors off an original competition 427 Cobra. And with comparably sticky tires, both would be in the hunt in the **Supercar Smackdown**, at least as far as acceleration is concerned. Aerodynamics is another story.

Everyone should have life goals. Two of mine were to marry over my head and to have a car that was faster than I am. Based on personal observations, I share both these goals with a lot of Superformance owners. I accomplished the first goal 35 years ago and it has been the greatest blessing in my life. And now I have achieved the second goal. It is some car. It is some fun.

Additional track time at Carolinas Motorsports Park in Kershaw, South Carolina, will validate the performance of the new Ultimate Windsor. This testing is tough duty, but somebody has to do it. *Hal Copple photo.*

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A Footnote
MSD did it to me again. The MSD 6AL box failed with less than an hour on it. Fortunately I was at the Olthoffs when it happened and was able to wire a new unit in to get me home. I have purchased a spare unit which I am in the process of wiring for quick installation as a backup. More on that later.

Second Strike Air Cleaner Calculator

Introduction

Right up there with the big block / small block and carburetor size discussions are the quandaries about air cleaner selection. Does it look right? Will it fit under the hood? Does it do the job without choking my engine? Am I trying to shove a monster under the hood when a smaller unit will do the job?

The Second Strike Air Cleaner Calculator allows you to evaluate different air cleaner designs and will tell you how well each performs on your engine by calculating the pressure drop and horsepower loss over a range of engine speeds. You can then determine if this is acceptable for your circumstances. For a show car, originality and aesthetics may be more important than performance. For a car that sees the track from time to time, performance will be paramount. For performance applications, you should shoot for a pressure loss in the 0.5% to 1.0% range at the peak power rpm. Less is better.

The model is designed primarily to let you know if a filter works for your engine or not. It is not intended to yield precise three digit answers because a precise model would require more input (such as the number and depth of the pleats, flow bench airflow numbers for the material, volumetric efficiency curves and horsepower curves for the engine) than the average owner knows or would be willing to find out. And it really isn't necessary. When picking an air cleaner, it isn't important to know if the loss is 2 horsepower or 2.1. You really want to know if it is 2 (OK) or 10 (maybe) or 20 (not OK). The input has been simplified as much as possible to make the model usable by making a number of simplifying assumptions. The mathematical basis for the calculation is contained in the **Technical** section for those who are interested.

The model is for normally aspirated engines. It is not designed for blowers, turbos or nitrous. This model is for round and oval air cleaners with perimeter filter elements. It is not designed for filter elements in the lid.

Input

Specify Engine

Peak Horsepower at rpm

Specify the peak horsepower and the rpm that the peak horsepower occurs. This should be the gross horsepower - dyno horsepower at the flywheel without installation losses (without air cleaner and accessories, with open headers).

If you have net installed horsepower (with air cleaner, accessories and road exhaust system installed), increase the net installed horsepower by 15%.

Second Strike Air Cleaner Calculator

Help

Help for documentation (requires Adobe reader)

Specify Engine

500 Peak Horsepower

6000 at rpm

427 Cubic Inch Displacement

High Performance Street Engine Type

Specify Air Cleaner

Round Air Cleaner Shape

Oiled Felt Air Filter Type

14 Diameter (outside diameter in inches)

Length (for oval shape, outside length in inches)

3 Height (overall height included molded surfaces)

1 Number of Air Cleaners

Pressure and Power Loss at RPM

Calculate

99 Filter flow Area (in square inches)

16 Filter discharge coefficient

RPM	Pressure Loss (percent)	Horsepower Loss
4,000	0.07 %	0.24
4,500	0.10 %	0.43
5,000	0.13 %	0.65
5,500	0.17 %	0.88
6,000	0.21 %	1.05
6,500	0.24 %	1.07

The Air Cleaner Calculator is on www.SecondStrike.com.

If you have rear wheel horsepower, increase the rear wheel horsepower by 25%. This does not have to be exact. The horsepower is used to calculate the horsepower loss. The rpm is used to set the rpm range in the results.

Cubic Inch Displacement

Specify the actual cubic inches of the engine.

Engine Type

The engine type is used to approximate the volumetric efficiency (VE) curve. See the **Technical** section for details.

Specify Air Cleaner

Air Cleaner Shape

Two shapes are currently supported, round and oval. See **Specs** below for examples

Air Filter Type

Three types are currently supported.

Foam Standard type for the original Stelling & Hellings air cleaner. Foam is typically oiled and is washable and reusable. It is not a particularly good filter and is very restrictive.

Paper Standard for most original equipment and aftermarket air cleaners. Typically offers high filtration. Moderate restriction. Not washable or reusable. Inexpensive.

Oiled Felt Offered by K&N and others. Washable and reusable. Medium filtration. Low restriction. Pretty expensive.

Check the output section for the discharge coefficient of the filter element you selected. The pressure drop is directly related to the discharge coefficient. Lower is better.

Diameter

The outside diameter of the filter element for the round air cleaners. The outside width of the filter element for the oval air cleaners.

For stamped steel air cleaner housings, the diameter of the filter element is about the same as the housing. For cast aluminum housings, the filter element diameter, length, and height are approximately 0.3" less than the same dimensions for housing. Input the filter element dimensions into the model.

Length

The overall outside length of the filter element. Specified for oval air cleaners only.

Height

The overall physical height of the filter element, including any molded surfaces.

Paper and oiled felt filter element typically have a built in molded rubber base and top. These moldings are typically 3/8" thick, so for paper and oiled felt 3/4" is automatically subtracted from the input physical height by the model to calculate the actual flow area.

Foam elements typically do not have the molded top and bottom and the model uses the full physical height to calculate the flow area.

Check the output section for the calculated flow area.

Number of Air Cleaners

Some engines have more than one air cleaner. A two 4-barrel setup might have one oval air cleaner or two small round air cleaners. A four 2-barrel Weber setup might have a single air cleaner, two air cleaners – one for each bank, four air cleaners – one for each carburetor, or even eight air cleaners – one for each stack. The flow area for each filter is multiplied by the number of air cleaners to get the filter flow area.

Results

Click on the calculate button to calculate the results for your input.

Filter Flow Area and Discharge Coefficient

Flow area and discharge coefficient are the two most important factors determining the pressure loss and horsepower loss.

The filter flow area is based on the dimensions, air cleaner shape, air filter type, and number of air cleaners. A higher flow area will reduce the flow speed and thereby reduce the pressure loss. When comparing two air cleaners, the one with the higher flow area will give better results, all else being equal.

The filter discharge coefficient is a measure of the flow efficiency of the filter element. The air filter type determines the discharge coefficient. All else being equal, the filter with the lower discharge coefficient will have a lower pressure loss and horsepower loss.

See the **Technical** section following for the flow area calculation and discharge coefficient technical definition.

Pressure Loss and Power Loss at RPM Table

The pressure loss is expressed as a percentage of atmospheric pressure. A one percent loss in pressure translates into a one percent loss in airflow, which translates into a one percent horsepower loss.

The horsepower loss is based on the estimated horsepower at the stated rpm and the calculated pressure loss. The power curve is approximated from the stated peak horsepower and rpm.

Results are shown from 2,000 rpm below the specified rpm to 500 rpm above.

Specs for Commonly Used Air Cleaners

Round

Stelling & Hellings

Air Cleaner Shape: Round
Housing diameter: 8 inches
Standard element:
Foam 1.75 inches high

Ford Round 13" Air Cleaner

Ford Part No: M-9600-A302
Air Cleaner Shape: Round
Housing diameter: 13 inches
Standard element:
Paper 2.75 inches high

Ford Round 14" Air Cleaner

Ford Part No: M-9600-P302
Air Cleaner Shape: Round
Housing diameter: 14 inches
Standard element:
Paper 1.75 inches high
Available elements:
Oiled felt 2.3 inches
Oiled felt 3.1 inches high
Oiled felt 4.0 inches high

Note: Photographs are approximately the same scale for comparison purposes.

Oval

Cobra Oval Air Cleaner

Ford Part No: M-9600-C302
Air Cleaner Shape: Oval
Hosing diameter: 10 inches
Housing length: 21 inches
Filter diameter: 9.5 inches
Filter length: 20.8 inches
Standard element:
Paper 1.75 inches high
Available elements:
Oiled felt 1.81 inches
Oiled felt 3.00 inches high

Ford Oval Air Cleaner

Ford Part No: M-9600-R302
Air Cleaner Shape: Oval
Housing diameter: 8.375 inches
Housing length: 11.875 inches
Element diameter: 8.125 inches
Element length: 11.5 inches
Standard element:
Oiled felt 3.5 inches high

Typical Results

Case	Air Cleaner	Shape	Type	Dia.	Length	Height	Number	Flow Area	Pressure Loss	Power Loss
1	S&H	Round	Foam	8		1.75	1	44	9.3%	46.5
2	S&H	Round	Foam	8		1.75	2	88	2.3%	11.6
3	S&H	Round	Felt	8		2.4	1	41	1.2%	6.0
4	Ford	Round	Paper	13		2.75	1	82	0.90%	4.5
5	Ford	Round	Paper	14		1.75	1	44	3.1%	15.6
6	Ford	Round	Felt	14		2.30	1	68	0.44%	2.2
7	Ford	Round	Felt	14		3.00	1	99	0.21%	1.1
8	Ford	Round	Felt	14		4.00	1	143	0.10%	0.5
9	Cobra	Oval	Paper	9.5	20.8	1.75	1	52	2.2%	11.0
10	Cobra	Oval	Felt	9.5	20.8	1.81	1	56	0.66%	3.3
11	Cobra	Oval	Felt	9.5	20.8	3.00	1	118	0.15%	0.7
12	Ford	Oval	Felt	8.125	11.5	3.50	1	89	0.26%	1.3

Table 1: Typical Results

The results shown are for:

- 500 peak horsepower
- 6000 rpm
- 427 cubic inch displacement
- High performance street engine type

Pressure loss and horsepower loss are shown at 6000 rpm. Typical results are shown for a number of different elements in Table 1.

Cases 1, 2, and 3 are for the original Stelling & Hellings air cleaner. The small size allowed the air cleaner to fit in the "turkey pan" cold air box under the hood scoop. The small foam element (Case 1) has a whopping 9.3% pressure drop costing 46.5 horsepower. Dyno testing by Superformance owners shows that it may actually worse that this! Case 2 shows the addition of a second 4-barrel and the companion second air cleaner. The second air cleaner doubles the flow area and saves 35 horsepower. The second air cleaner is worth more horsepower than the second carburetor. It may be original, but even with two air cleaners; the Stelling & Hellings is unduly restrictive. It is recommended for show cars only. If you want to keep the turkey pan but are willing to deviate from originality, a 2.4 inch oiled felt element will help. It won't improve the area (remember foam doesn't have the top and bottom caps), but it will eliminate the restrictive foam element. The pressure loss is a bit high at 1.2%, but a whole lot better than 9.3%.

Case 4 is the 13" Ford unit with a paper element. The 13" diameter clears the larger distributors on small blocks and the tall 2.75" element flows better than the stock element on its 14" brother.

Cases 5, 6, 7, and 8 are for a 14 inch diameter round air cleaner. The standard 1.75 inch paper element is inadequate for 427 cubic inches. The use of a 2.33 inch oiled felt element is quite acceptable as is the 3 inch element. Going to a 4 inch oiled felt element provides no real advantage and will cause hood clearance problems even on a small block with a dual plane manifold.

Cases 9, 10, and 11 are for the Cobra oval air cleaner. The standard 1.75 inch paper element is inadequate for 427 cubic inches. The use of the 1.81 inch oiled felt element is adequate, even for an engine of this size. The 3 inch oiled felt element is a tight fit on a small block with a dual plane manifold. Use of the 3 inch element on a big block requires extensive modifications to the housing. It may not be worth it for the gain of a couple of horsepower.

Case 12 is for the Ford oval air cleaner favored by 460 big block owners. The oval shape allows it to snug up into the hood scoop for hood clearance. With the standard 3.5 inch oiled felt element, it is quite adequate for a 427 CID engine. Even with the massive 625 horsepower 514, the pressure drop at the 6250 rpm horsepower peak is only 0.41% with a power loss of only 2.6, still quite acceptable.

Technical

Technical types will like this section. Others can use it as a non-addicting sleeping tonic on restless nights.

Horsepower Loss from Airflow Restriction

The pressure loss, Δp, from airflow passing through a restriction is directly related to the dynamic pressure, q, of the airflow.

$$\Delta p = Cd \times q$$

The discharge coefficient, Cd, is a measure of the efficiency of air flowing though an obstruction. The lower the Cd, the more efficiently the air moves through the obstruction.

The pressure loss is typically stated as a fraction of the atmospheric pressure, p.

$$\Delta p / p = Cd \times \frac{q}{p}$$

The term $\Delta p / p$ is a decimal fraction, i.e. 0.01 means a 1% pressure drop. In working with normally aspirated engines, a 1% pressure drop in the intake side will cause approximately a 1% loss in horsepower.

The dynamic pressure is defined as:

$$q = 1/2 \times \rho \times V^2$$

The term ρ or rho is the atmospheric density. V is the flow speed in ft/sec. The speed can be expressed in terms of SCFM, the airflow in standard cubic feet per minute.

$$V = \frac{SCFM}{60} \times \frac{144}{Area}$$

where the flow area is in sq. in.

For standard sea level atmospheric conditions:

p =	29.92	inches Hg
	406.8	inches H_2O
	14.70	lbf/sq.in.
	2,116	lbf/sq.ft.
ρ =	0.002378	

If we combine these equations and resolve the constants, then for standard atmospheric conditions:

$$\Delta p / p = Cd \times \left[\frac{SCFM}{Area \times 556} \right]^2 \qquad (1)$$

The SCFM can be expressed in terms of displacement (CID), engine speed (RPM) and volumetric efficiency (VE):

$$SCFM = \frac{CID \times RPM \times VE}{2 \times 1728}$$

In terms of displacement and engine speed:

$$\Delta p / p = Cd \times \left[\frac{CID \times RPM \times VE}{Area \times 1{,}921{,}000} \right]^2 \qquad (2)$$

Equations (1) and (2) apply to any device, air cleaner housing, air cleaner element, carburetor, intake manifold, cylinder head, inlet valve, as well as exhaust system components. The pressure loss, and subsequent horsepower loss, can be calculated once the flow area and the discharge coefficient are known.

Flow Area

Paper and Oiled Felt

Paper and oiled felt filter element typically have a built in molded rubber base and top. These moldings are typically 3/8" thick, so for paper and oiled felt 3/4" is subtracted from the input physical height by the model to calculate the actual flow area.

For round elements:

$$Area = \pi \times diameter \times (height - .75)$$

For oval elements:

$$Area = (\pi \times diameter + 2 \times (length - diameter)) \times (height - .75)$$

Foam

Foam elements typically do not have the molded top and bottom and the model uses the full physical height to calculate the flow area.

For round elements:

$$Area = \pi \times diameter \times height$$

For oval elements:

$$Area = (\pi \times diameter + 2 \times (length - diameter)) \times height$$

Discharge Coefficient

K&N supplies the following airflow's for their air cleaner element and competitive elements.

Element	SCFM
Foam	376
Paper	508
Oiled Felt	887

The stated pressure drop is 1.5" of H_2O. Hence

$$\Delta p / p = 1.5 / 407 = .00369 .$$

The test air cleaner element is round, 12 inches in diameter and 3.5 inches high. The flow area for paper and oiled felt is 104 sq. in. The flow area for the foam element is 132 sq. in.

Rearranging equation (1) to determine the discharge coefficient, we get:

$$Cd = \Delta p / p \times \left[\frac{Area \times 556}{SCFM} \right]^2$$

From this equation, the Cd for the air filter elements is calculated as:

Filter Type	Cd
Foam	140
Paper	47
Oiled Felt	16

This means that based on K&N data, paper is 3 times as restrictive as oiled felt and foam is 9 times as restrictive as oiled felt.

It should be noted that the discharge coefficient depends on a number of factors besides the class material, including filter design, number and depth of pleats, and composition of the material. A filter with more pleats or deeper pleats could have a lower discharge coefficient. Wix makes a NASCAR grade oiled felt air cleaner with less restriction (and less filtering) than the K&N element of the same size.

Using one discharge coefficient for each type of material is better than using one discharge coefficient for all types, but it is still an approximation. The discharge coefficients should only be taken as approximations only, not highly precise numbers. Since the pressure loss and the horsepower loss are directly related to the discharge coefficient, these results should only be taken as approximations as well.

The Second Strike Air Cleaner Calculator calculates the pressure drop and horsepower loss through the specified air filter element. Since the majority of the pressure drop and horsepower loss is in the filter element in a well designed air cleaner assembly, this is a reasonable approximation of the loss for the air cleaner assembly as well. However, it should be noted that some air cleaner housing designs are excellent and some are not so hot. Smooth large radius turns are good. Sharp corners are bad. Keep this in mind when choosing between two air cleaner assemblies.

Volumetric Efficiency

The airflow depends on the volumetric efficiency. Various Holley carburetor manuals suggest the volumetric efficiencies for various engine types shown in Table 2.

Engine Type	VE at Peak Torque	VE at Peak Power
Street Stock street engines.	0.75	0.70
High Performance Street Modified engine suitable for street driving.	0.85	0.80
Race Modified engine not suitable for street driving.	0.95	0.90
Ram Tuned Race Modified engine with intake and exhaust runner lengths ram tuned for peak power rpm.	0.95	1.00

Table 2: Assumed Volumetric Efficiency VE

The assumed volumetric efficiency curve is a second order polynomial through the specified points with the peak at the torque peak. The torque peak rpm is assumed to occur at 80% of the power peak rpm.

Superformance and Shelby Settle Differences

Several years ago, Shelby sued the two most successful Cobra replica manufacturers, Superformance and Factory Five, for trademark and trade dress infringement. Ford Motor Company, apparently fearful of loosing rights to the Cobra name in the dispute, joined the legal action on Shelby's side.

This legal battle has been long and bitter and expensive. But the real punishment has been dealt out to us, the enthusiasts who have with loyal devotion kept the Ford and Shelby performance names alive for the past 40 years. Much like kids watching their parents fight their way through a bitter divorce, we have been caught in the middle when we really didn't want to be. As a long-time die-hard Ford and Shelby fan and a really big fan of Superformance, it has been painful for me to watch and I know it has been for others.

Factory Five and Shelby have settled. Superformance and Ford have settled. And now Superformance and Shelby have settled. I for one hope we can all put past differences behind us and get back to enjoying the sport that we all have put a lot into. I certainly hope Shelby and Ford feel the same way.

For those of you who haven't seen it, the Superformance / Shelby press release is reproduced on the Second Strike website. What it really means will not be determined by the lawyers, but by the market. And that remains to be seen.

Bits and Pieces

Submissions

Bits and Pieces is an owner's forum and includes modifications made by individual owners to their Superformance to improve the performance, reliability, individuality, and/or drivability of their cars. Maybe it's just puttering. The decision to use any idea and the proper installation and operation of any idea is entirely the responsibility of the owner.

Second Strike Tech Tips

The Second Strike website has a technical section containing:

- Air cleaner calculator: evaluate various air cleaners for your car
- Gearing calculator: evaluate various transmissions, rear end ratios and tires for your car
- Owners Manuals and Supplements for the Superformance Mk III and Coupe
- Weatherproofing Instructions for Early Mk III

Check in out on the Tech Tips section of:

www.SecondStrike.com

SCOF Technical Library

There is a large and growing technical library of submissions by Superformance owners on the SCOF website. This is a valuable resource for Superformance owners. Check it out on:

http://performanceunlimited.com/scof/score.html

A login and password are required. If you don't have them, there is a link at the bottom of the page to request them. You must be a current Superformance owner registered with Second Strike to receive the password.

Jordan Shifter

The Jordan Shifter was developed by Bob Jordan SP 181 to speed shifting and increase comfort. The Jordan shift lever replaces the original period correct Ford style shift lever. It is shorter for quicker shifts and curved to perfectly fit the hand when it drops from the steering wheel to grab the next gear. If you have ever stabbed your hand with the reverse lockout T or snapped shifted into 5th when you wanted 3rd under the influence of adrenaline, then the Jordan Shifter may be just what you need.

The Jordan Shifter line was recently enhanced with the Jordan Track Shifter, an even shorter and faster shift lever recommend for track use only. There are also a number of new shift knobs as well including stainless steel, polished aluminum, and Q-ball. We can also make shift knobs out of any billiard ball if you want one to match the color of your car.

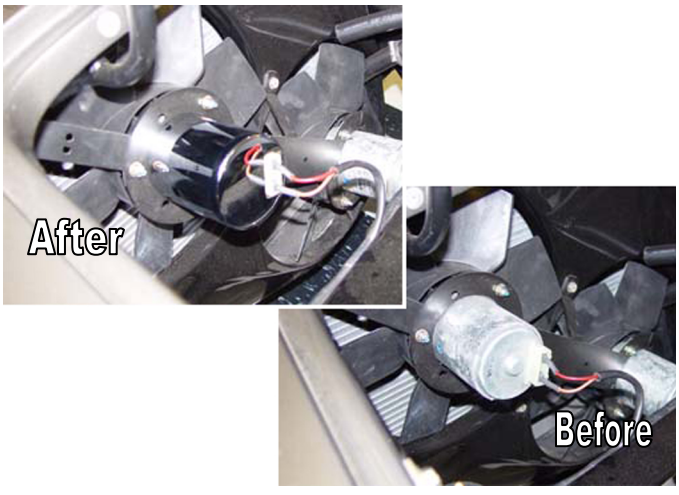
Since its introduction in December of 2002, well over 100 owners have installed a Jordan shifter. It is also now the standard shifter on the Coupe. The Jordan Shifter is available from the Second Strike Store on www.SecondStrike.com.

Fan Motor Covers

At his first car show, Chuck Kendall SP 1591 noticed that the stock fan motors were not up to the dress level of the rest of his polished 351W's engine compartment. We are talking Webers and trick 427 style polished finned aluminum valve covers here. So he designed these brilliant chromed fan covers to do the trick.

Chuck has the covers manufactured in the same Milwaukee factory that does chrome accessories for Harley-Davidson. The cover is made from thin wall precision spun 5052 aluminum, buffed to a luster, then true-chrome plated. The fan motor covers are also available in polished aluminum for owners who have polished aluminum engines.

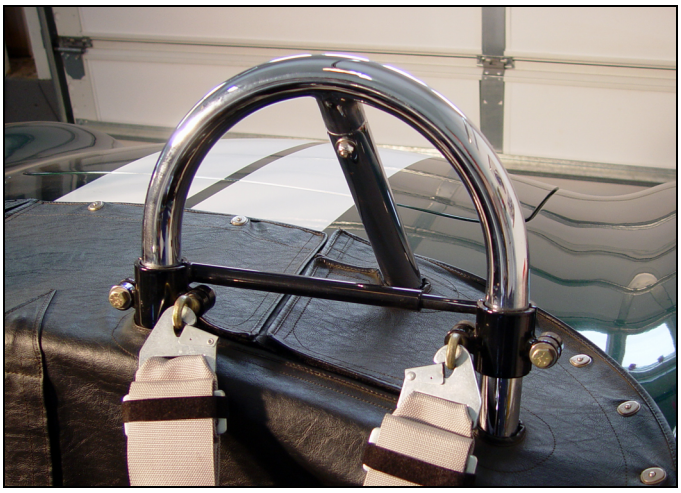
The covers are simple to install. Instructions are provided as well as set screws to secure the covers to the motor housings.



The fan covers were introduced in December of 2003. To date over 100 owners have installed them on their Mk III's. The fan motor covers are available from the Second Strike Store on www.SecondStrike.com.

Roll Bar Mount for Shoulder Belts

Bill Ostrower, the Superformance dealer for the Northeast, developed a roll bar mount for shoulder belts. The mount is similar to the shoulder belt mount used by a number of racing Cobras in the 1960's, so they are period correct. I saw one at Ostrower's Snakepit Automotive on Long Island several years ago and had to take it home. Since I have dual roll bars, I recently acquired a second one for the passenger's roll bar.



I like the roll bar mount for several reasons. It has a "made for racing" look. It uses the dual mount shoulder belts. Some tracks have a problem with the Y-mount shoulder belts. It is easier to use shoulder belts with the tonneau cover folded behind the seat. When I park the car, I put the tonneau cover in place, then unclip the shoulder belts and put them in the trunk for safe keeping.

The roll bar mount for shoulder belts is available from:

Bill Ostrower 516-379-1300 x 1041
Snakepit Automotive, Inc. snakepitauto@aol.com
233 Buffalo Avenue
Freeport, NY 11520

EC: Mk III Accepts Ford DOHC

Effective chassis SP02068, Hi-Tech has introduced the new Mk III chassis that can accommodate the Ford 4.6 DOHC modular engine. The DOHC specific headers, engine mounts, and differential mounts allow the engine to be installed level instead of at 3 degrees like the carbureted engines. In addition, the fuel tank has a fitting for the return feed.

Dynamic Motorsports ordered the first Mk III, SP02105, with the quad cam accessories.

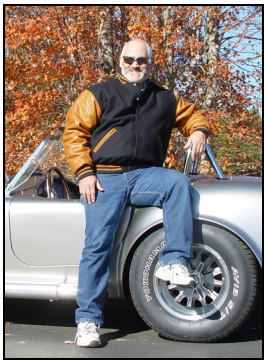
EC: Mk III Uses BTR Differential

Effective chassis number SP02068, the Mk III will use the same BTR differential as the Coupe. The BTR uses a 3.46 rear end ratio. The Mk III uses a limited slip differential. The Coupe uses Hydratrac.

EC: Mk III Windshield Center Rod

From chassis SP02100 on, the center rod on the Mk III windscreen has been discontinued. In place of the rod a 4 inch strip of bonding material (SikaFlex) is used to keep the center top and center bottom of the frame and the glass bonded securely together. In the event of accidental breakage, the glass can be easily removed and replaced. This same method of locating the glass in position has also been introduced on all old style windscreens now being produced.

Second Strike Club Jacket



Second Strike and Jay McArdle SP 1956 developed the club jacket custom embroidered by Jay himself. It has a heavy wool body, leather sleeves, and knit collar and cuffs.

On the back is embroidered the stunning Dan McCrary Mk III drawing commissioned by Second Strike. On the front you can have embroidered at your option the Superformance logo, the Second Strike logo, your name, and your car number.

Body, sleeve, and stitching color are your option as well so that you can tailor your jacket to your specifications.

Actual photo of 5 x 12 MK III embroidered image.

The Second Strike Club Jacket is available from the Second Strike Store at www.SecondStrike.com.

Mk III Owners Manual Updates

Two supplements to the Mk III Owners Manual are available on www.SecondStrike.com under Tech Tips / Owners Manuals and Service Bulletins.

"Three Window Soft Top Installation and Storage" provides instructions for the new Mk III three window soft top.

"Wiring Diagram Updates to Fuse Box No 5 and No 6" updates the wiring diagrams on pages 52 and 53 of the Mk III Owners Manual. These are documentation changes only. No changes are required to the car.

Superformance GT

Superformance GT 001 Ready to Fly

Port Elizabeth, South Africa. May 6th, 2005

Superformance GT 001 - the first production Superformance GT – was crated and flown off to its first public showing this weekend.

Bleary eyed engineers, who have been working round the clock to complete the first car in time to be shown at the Imports and Kit Car Show at Carlisle PA starting May 18th, are proud of the results of the painstaking detail and effort that has gone into creating this authentic replica of the GT 40 Mk II that finished first, second and third in the grueling 24 Hours at Le Mans in 1966.

The first of a half dozen units in various stages of completion on the new GT assembly line at Hi-Tech Automotive's South African plant, the gleaming titanium and black Superformance GT 001 will be followed by two more component vehicles to come off line in May, after which production will progressively be stepped up to a total of six units a month.

Four years in development, the Superformance GT replicates one of the most famous American race cars of the 20th Century. With careful attention to finite detail, the Superformance GT does not pretend to be anything else but an exact replica of the road going version of the original. It is the only assembly line produced replica of the original GT 40 that incorporates an original style monocoque chassis, including a pressed steel roof.

In developing the Superformance GT, the Hi-Tech engineers went to such lengths to ensure absolute authenticity, that more than 90% of the vehicle's parts are interchangeable with the original car – including the chassis.

Soon to follow is the Mk I version of the Superformance GT. Demand is already exceeding the expected supply of both versions, and the order rate will dictate whether production will be stepped up next year.

Long Island, NY. May 14th, 2005

Superformance GT 001 - the first production Superformance GT – landed at JFK on Wednesday after its long journey from the southern tip of Africa, and is being cleaned and spruced up in the Superformance Snakepit workshop of Bill and Dan Ostrower in Freeport, Long Island, for its public debut at the Carlisle Imports and Kit Car Show on May 18th.

Hi-Tech Automotive engineer Justin Price (son of Jim Price) who had been responsible for Project GT from its inception, will join Superformance GT 001 at the Superformance stand at Carlisle to share his in depth knowledge of this exciting addition to the Superformance stable of supercars with the enthusiasts visiting the Show.

So authentic is this replica of the GT 40 Mk II A's that beat Ferrari and finished first, second and third in the 24 Hours at Le Mans in 1966, that it is easier to list the differences

between the original and the Superformance GT: The shifter was moved from the right hand sill to the center tunnel (the original was right hand drive) and this road-going version of the race car is equipped with a custom made air conditioner to make it more user friendly, and the seats were changed slightly to create more space – so much so that the GT can accommodate the 6' 2", 250 lb Jimmy Price with ease.

The Superformance GT differs from other replicas of the original in that it is the only production model to be built with a monocoque chassis that is an exact replica of the original. The chassis sports a formidable stiffness of 10,000 to 12,000 pounds per degree.

Most of the other replicas on the market have easier to build and less expensive space frame chassis and many of their features differ from the original in that they use whatever off-the-shelf components that are available, rather than the original style components hand-crafted in Hi-Tech's ultra-modern factory in South Africa.

When Jim Price decided to replicate the original Mk 1 and Mk 11 A and B, he went the route of making a double of the original so as not to be just another player in a field of nearly correct replicas. The chassis of the Superformance GT will accommodate either a big or a small block engine, and if a customer wishes to install – and can locate – a T44 transaxle and a 427 big block engine with a dry sump, he will have an exact replica of the Le Mans winning car – albeit in left hand drive to be street legal in the US. If he prefers a right hand drive model for off-road use, it will be available from Superformance as a special order.

Like all Superformance products, the Superformance GT comes complete but without engine and transmission. The buyer can decide whether he wants to install either a small block or a stroked 351 Windsor, mate it to a ZF/RBT transaxle – and go cruise the highway like enthusiasts in the 1960's did.

The launch MSRP of the complete Superformance GT without engine and transmission is $65,000. Depending on the drive train the buyer wishes to acquire and install or have installed, he can have his GT on the road for between $80,000 and $90,000.

Meanwhile, Superformance GT 002 and 003 are taking shape on the GT assembly line in South Africa, and more chassis are being assembled before they, too join their siblings on the line.

Full technical specifications and detailed graphics of the detailed features of the Superformance GT – virtually all developed and crafted in the Hi-Tech plant – will soon be posted on www.superformance.com.

Editor's note: Specs are not out yet. This chart compares dimensions of the current Superformance Mk III and Coupe to the 1960's Ford GT 40 Mk I and Mk II. Dimensions of the Superformance GT will be similar.

Comparison of Current Superformance to Original GT 40

	SPF Mk III	SPF Coupe	Ford GT 40 Mk I	Ford GT 40 MK II
Engine	351W	351W	289	427
Weight	2485	3066	2450	2682
Wheelbase	90	93	95	95
Length	152	175	165	163
Width	69	74	70	70
Height	48	49	40	40

Second Strike Club News

Where Is My Newsletter?

It has been about 18 months since the last newsletter. Many folks have written, emailed, and called to know if I dropped dead or lost their address. The answer has been neither.

The Shelby/Ford lawsuit has been expensive all around. (See **Superformance and Shelby Settle Differences**, this issue.) Second Strikes contribution to the effort has been to suspend publication of the newsletters during the lawsuit so that the funds could be used for legal purposes. This was a decision jointly reached by Second Strike and Superformance and one that I fully supported. Now that the differences have been settled I hope that we can start to get back to business as usual.

In the interim, I have relied on the internet to continue to keep in touch with and support Second Strike members. Working with Brett Jackson from the factory, we completed the Coupe Owners Manual and made it available on the Second Strike web site. Three supplements to the Mk III Owners manual have been published on the web site. We added an **Air Cleaner Calculator**, documented in this issue. The **Gearing Calculator** was upgraded to include the Coupe and the new Tremec transmissions. Other Tech Tips have been added as well. The internet is becoming a major part of owner communications. Even the newsletter has web references.

We had a very successful Spring 2004 Track Event at Lowe's Motor Speedway and a successful new venture with Wicks Driving Academy for the Fall 2004 Track Event at Carolina Motorsports Park.

I have made a number of upgrades and modifications of general interest to SP 218. Some are in **The Ultimate Windsor – An Update** and **Bits and Pieces** in this issue. Others will be chronicled in later issues.

We have added a number of very popular new products to the Second Strike Store and enhanced some existing ones.

In the past 18 months, we have registered nearly 500 new owners and updated around 600 registrations.

All in all, Second Strike has been busy. A lot has been going on.

There have been a lot of personal changes as well. I retired. We sold our home of 30 years in Charlotte and moved to Davidson, a small college town 25 miles north of Charlotte. The move brought a lot of changes.

The house is new and wired for electronics including both hard wired and wireless networks, which is nice. It even has three prong plugs. I have a spacious home office which opens out onto a second story porch with rocking chairs and a hammock and a great view of some stunning sunrises.

After years of stumbling over lawnmowers, a dedicated laboratory to carry out all those important research products.

I also have a well outfitted garage and workshop (research lab), perfect for upgrades, modifications, and trying new products. Both the office and workshop have been busy.

Huntersville, Cornelius, Davidson, and Mooresville form a relatively continuous community astride the ancient NC 115 and parallel to the modern I-77, which has brought change to these sleepy Old South towns. Within a twenty minute drive are the shops of most of the top NASCAR teams as well as Lowe's Motor Speedway, Olthoff Racing, RDI, Roush, Yates, Holman-Moody, and a huge number of support shops and stores. Lake Norman, our inland sea, is home of many team owners and drivers This is the V8 center of the universe. If it has to do with going fast in a pushrod V8, you can find it here in abundance. I ran into Dale Jr. at the Davidson post office the other day. Nice kid. He opened the door for me.

Even better, most places can be accessed by a network of twisting , scenic and mostly empty back roads, perfect for testing SP 218 and its newfound good manners.

Pat and I are not leisure folks. Our retirement plan has been to quit working for money and work for good. Pat took a job as Volunteer Coordinator for the local Habitat for Humanity. I pound nails two or three days a week as a Habitat volunteer and Task Leader in training. Our Task Leader class built a house as part of our training. The house became a home Sunday afternoon when it was dedicated and turned over to the new homeowner. Jamie worked side by side with us the whole way. She was excited. So were we.

The greatest blessing in the past year and a half has been the arrival of long awaited grandchildren. Our son Tom and his wife Ami have two new babies, Allison and Madeline. They are of course the two cutest babies on the planet. Call me a heretic, but grandchildren are even more fun to play with than fast cars. And better yet, they live only five minutes away. I will plenty of time for proper gear head training.

Some mornings I get up and ask myself, "What did I do to deserve this?"

Upcoming Events

There are a lot of things going on. Check the Second Strike calendar on www.SecondStrike on a regular basis for events in your neighborhood.

South Africa

South African owners with guests at Gosforth Park

I saved the best for last.

I thought the folks around here were the kings of the V8 crazies. That is until I went to South Africa. There on the southern tip of Africa live some of the biggest Detroit iron fans on the face of the planet.

When we (Peter and Gayle Brock, Doug Reed, Charlie Ponstein, Ronnie Kruger, and your editor) got off the plane after an 18 hour flight, Jimmie Price whisked us off to Gosforth Park in Johannesburg for a welcoming reception with a number of the South African owners and their machines.

At the end of the trip, Greg Erasmus hosted a cookout in his shop in Boksburg, just outside of Johannesburg. Greg is owner of Auto G, the South African Superformance dealership. Other than the accents, I would have thought I was in a garage in Mooresville.

During the course of my journey, I met about half the South African owners including Alan Wynn, Allan Garrow, Andy Henegan, J.A. Rudolph, Bobby Salkow, Bruce Tompkins, Michael Venter, Dunbar Bucknall, Ian Prain, Jack Walters, John Shires, Louis van Heerden, Nick Grobler, Peter Lombard, Pieter Verster, Pierre Le Roux, and Steve Harvey. Allan Garrow is owner of SP 001 and is the registrar for South Africa. He has provided invaluable assistance in keeping the South African registrations current.

A great group of guys. In honor of these defenders of the V8 faith, this edition of the Superformance Photo Gallery is dedicated to the South African owners.

Superformance Photo Gallery

South African owners gather at Gosforth Park (now Wesbank Raceway) to welcome their American guests.

Allan Garrow with
Jim Price, Mike Stenhouse, Peter Brock
SP 001 Royal Blue/White 351C/T-5
Boksburg, South Africa

Alan Wynn
SP 015 Red/White 351W/T-5
Wilgeheuwels, South Africa

Dave Bache
SP 039 Black/Silver 428/BW Automatic
Roodepoort Gauteng, South Africa

Pieter Verster
SP 109 Jewel Green/Ivory 390/Tremec
Pretoria, South Africa

Pierre Le Roux
SP 441 Royal Blue 460/Tremec TKO
Johannesburg, South Africa

Pieter Lombard
SP 477 Avus Blue 351W/Tremec
Sandton, South Africa

Nick Grobler
SP 668 Red/White 351C/T-5
Kempton Park, South Africa

Bobby Salkow
SP 933 Black 460/Tremec TKO
Johannesburg, South Africa

Ian Prain
SP 965 Magenta-Gold/White 302/Cressida
Boksburg, South Africa