THE HOOD SCOOP

March 2008

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Gateway GTO Association Photo Album

If you have photos of past events or if you take pictures of future events that you think would be good for our Photo Album, please put your name and date and a description of the event on the back and send them to the Photo Album Editor.

Advertising Guidelines

Classified ads up to 50 words are free to members; add 10 cents per word for any ad over 50 words. Payment is due upon submission.
(members need to update ads at 3 month intervals or ads will be dropped). Classified ads up to 50 words for non-members are $5.00 per issue.

Advertising rates are:
$300 or more - Includes your logo on our Website Home page, your logo and information on our Website Sponsor page, and Website Related Links page, ½ page ad in our Newsletter, and a trophy presented in your name at the annual car show.
$200 - Includes your logo on our Website Home page, your logo and information on our Website Sponsor page, and Website Related Links page, and ½ page ad in our Newsletter.
$50 - Includes ½ page ad in our Newsletter and your logo and information on our Website Related Links page.
$35 - Includes your logo on our Website Related Links page.

The Hood Scoop is published as an informative news bulletin to keep our members up to date on past, present, and future events.

Gateway GTO Club Information

The Gateway GTO Association was initially formed in the summer of 1984 by a group of seven. They all had a common interest in the Original Muscle Car, the Pontiac GTO. As a form of communication we publish a monthly newsletter called "The Hood Scoop". The purpose of this newsletter is to keep our members informed of all upcoming activities as well as providing interesting event coverage. The club meets every first Wednesday of the month at Wiliker's Restaurant, 1566 Country Club Plaza, and St Charles, MO 636-9471441

Membership dues are $20.00 per year and all renewals are required to be paid by December 31st. You are allowed to have one associate member.

Club Sponsor

As a GatewayGTO member please consider joining the GTO Association of America

The Gateway GTO Association
is an official chapter of the
GTO Association of America
http/www.gtoaa.org

Visit us at www.gatewaygto.com

The **GATEWAYGTO Association** is an affiliated chapter of **THE GTO Association of America (GTOAA)** the Premier National Organization for GTO Enthusiasts. Each month **GTOAA** members receive **The Legend** magazine, a Golden Quill Award winning publication. Members can read the technical articles and have access to the **GTOAA** Technical Advisors Staff. They may use the 50 words of free classified advertising monthly, view the feature articles on some of the most interesting GTOs. They may have access to the **GTOAA** Club Store.

For an on-line preview of **The Legend**, go to www.gtoaa.org.

To become a member of **GTOAA** fill out the application form, or go to www.gtoaa.org and go to Membership App. link.

The **GTOAA National Meet** is hosted by various local chapters and is held annually in various cities across the United States. The acclaimed Concours and Popular Vote Car Shows bring some of the finest GTOs together for superb viewing. Other highlights include many renowned Technical and Special-interest speakers, multi-day swap meet, drag racing, cruises, and other great events.

GTOAA MEMBERSHIP

$35.00 US starting January 2008

www.gtoaa.org/

GTOAA Membership Application Form

Mail completed form to

GTOAA, PO Box 455
Timnath, CO 80547-0455

☐ New ☐ Renewal

PLEASE PRINT LEGIBLY

Name _____

Address _____

City _____

State _____ Zip _____ - _____

Phone (_____) _____

Your GTO Ownership

Year Body Style Engine

_____

_____

_____

Individual Membership Fees

USA	$35
Canada	$40
Overseas	$50

(Canada & Overseas in US funds)

Additional family members (associate membership) $5 each

Please check method of payment

Check Money Order MasterCard Visa

☐ ☐ ☐ ☐

Add $2.00 if paying by credit card

Card # _____

Expiration date _____

InterBank # (MasterCard) _____

Signature _____

Feb 05 Gateway GTO Club Meeting Minutes
By Vic Nettle

INTRODUCTIONS:
At 7:08 Tom anounced that it has been decided to have out meetings at Wiliker's Restaurant for the rest of the year. Bigger room than at Culpepper's. Nice menu, big portions, good waiter (Jake).

Persons present introduced themselves for the edification of persons present who might not yet know everybody. We had a preponderance of single occupancy vehicles with 22 vehicles and 27 members present including: Virginia Anderson, Tony Bezzole, Will Bowers, Bill Fenlon, Kerry Friedman, Steve Hedrick, Marty Howard, Paul Jensen, John Lally, Earl Lewis, Joe and Bev Mayweather, Mark Melrose, Vic and Joyce Nettle, Jerry Novak, Brian and Andrew O'Sullivan, Tom Oxler, Terry and Gail Schott, Chris Simmons, John Taylor, Rich and Richard Vie, and finally Shauna Wollmershauser. Each gave a thumbnail of salient details like cars owned, past presidencies, current offices held, occupation, age, etc.

OLD BUSINESS:
Marty told of the Comedy Club outing attended by only 8 persons who all enjoyed the 3 comedians at the 8 to 10 PM performance which was packed.

The revised Constitution and Bylaws as drawn up by Mark and published in the newsletter and on the website were voted on by a quorum and were unanimously accepted.

NEW BUSINESS:
Dinner theater on March 15th Steve is getting the tickets if you still want to join the group you need to call him.

March 23rd is the Easter car show at the lower Opera parking lot. Meet at the McDonalds South of Highway 40 on the East side of Hampton at 8 AM to caravan to the park at 8:30 sharp. $25/car entrance fee at the gate.

Dyno Day at Rankin April 12th directions link is on the website calendar.

Illinois Cruise on May 3rd. Itinerary yet to be determined by Darrell May (who is still enjoying warmth in Ft Myers Florida).

POCI Dave Sinclair car show May 17th

Behlmann car show June 7th , 14th = rain date.

Drag Day June 28th at Benton IL. Meet at Fairview Heights IL Kinko at 7AM. See Calendar.

GTOAA Nationals July 12th in Saratoga Springs which is over 1000 miles East of here.

Westport Charity car show Sept. 7th. Kerry needs raffle items and door prizes.

Halloween Party Oct 25th. A hall has yet to be secured. (it is Bill Fenlon's 34th birthday).

Car Show at DQ Halls Ferry and Lindberg the first Saturday of each month May – Sept.

Hyperformance (spelling unsure) is having a car show in April date TBD. Brian will update us.

John Johnson is going to give the club a tour of his model railroad exhibit in Mexico. Date TBD.

There is a car show in Mexico too, details yet forthcoming from John Johnson.

The Riverport swap meet has moved to Gateway International and will be on April 27th.

$5/car parking fee.

Eureka swap meet at 6 Flags on March 29th.

Dennis Kirban (kirbanperformance.com) has oil additive for old cars with flat tappet camshafts.

Behlmann has 3 G8-GT automobiles arriving imminently.

Motor trend has articles about the G8 which paint it in a favorable light compared to Dodge Charger and the new Challenger.

Marty mentioned a movie titled "Bonneville" which should appeal to us "Ponti-yackers".

Marty is now an AARP safe driving instructor and for $10 can give you a course in safe driving which could save 10% on your insurance. Call Marty.

TECHNICAL:

1) Shauna will be installing an Australian Blower on her 06 GTO for more power.
2) Paul is in the process of installing a centrifugal Procharger for more power on his 06 GTO.
3) Tom's 66 is at Cecils getting a total paint job. It had deteriorated lower windshield and rear window metal but will be as good as new when finished.
4) Will put a date code correct engine in his 67 GTO convertible.
5) Marty put a mini High Torque started in his 69 GTO and it works well as long as the battery is charged sufficiently.
6) A K&N cold air intake has been installed on the MRSGTO 06 (Terrie's car, Tom says).
7) Steve has added 88 gallons to the fuel capacity of his BIG tow vehicle. Fewer (but more costly) fuel stops on future trips.

CLUB MEMBER HEALTH ISSUES:

Saundra Melrose is moving slowly (says Mark) after receiving a 7 inch incision from a diverticulitis/abscess operation. Get well soon.

Mark Obukowicz is an a suicide watch since Brett Favre retired (says Tom).

Ray Brunkhorst is having problems with rheumatoid arthritis and will not be able to enjoy drag day. We hope you get better soon, Ray.

Steve's mother has had a severe stroke rendering her left side paralyzed. She is in rehabilitation. Fortunately her mind is not impaired. We all wish her a speedy recovery too.

Terrie is sick with the flu. Get well soon.

ADJOURN:

The meeting adjourned at 8:56 PM after the 50/50 ($29/$29) was won by Virginia Anderson.

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edmunds INSIDE LINE

Pontiac Reinvents Itself

By Scott Oldham, Inside Line Editor in Chief
Date posted: 02-21-2008

The conversation went something like this: "Hey, Steve, come by with the Bee. Let's see how it stacks up against this 2008 Pontiac G8 GT."

Motorhead Steve lives up the street. His dad was a Dodge dealer back in the 1960s. The guy knows option codes from the muscle car era like they're his kids' names and has a tattoo on his left forearm that reads "Mopar is Mom." More important, he just bought himself a screaming yellow 2007 Dodge Charger SRT8 Super Bee. We knew he wouldn't hesitate.

"Now?" he asked.

"Now."

"Be there in five."

Ten minutes later we were lined up.

Declining Numbers at an Even Rate

Honestly, we didn't think we had a chance. The 2008 Pontiac G8 GT is powered by a 6.0-liter V8 rated at 361 horsepower at 5,300 rpm and 385 pound-feet of torque at 4,400 rpm. Steve's Mopar, a virtual twin to the one we tested a few months ago, is packing a 6.1-liter V8 pumping 425 hp and 420 lb-ft of torque.

We clicked off the Pontiac's traction control with the clearly marked button ahead of its shifter and brake-torqued the big V8 to 2,000 rpm. To our right we could hear Steve do the same. On the count of three we went for it.

Both cars left clean, with just a turn or two of tire slip. Then Steve pulled a fender on us. No surprise considering his Bee's torque advantage. But that's all he had. Past 60 mph the Mopar was still just a fender ahead. The Pontiac's six-speed automatic clicked off clean, crisp gearchanges just before its 6,000-rpm rev limiter, and kept pace with that Charger well past 100 mph.

We raced again. And again. And again. It was like a scene out of Woodward Avenue circa 1969, only we were in sedans, with sunroofs and heated seats, on a deserted, burned-out industrial section of downtown Los Angeles. Every race was a carbon copy of the first.

We lost. But not by much.

Steve wasn't happy. His Mopar had more power, louder paint and many more stickers than the G8 GT. It also costs more than the Pontiac, which carries a base price of $29,995 and tops out at $32,745 with our red car's sunroof, leather and big wheel and tire option. No, Steve wasn't happy at all.

Let's Do the Math

Doug Houlihan, GM's global vehicle chief engineer based in Melbourne, Australia, told us his car should run from zero to 60 mph in 5.3 seconds and cover the quarter-mile in 13.8 seconds at 101 mph.

Seemed about right. The Super Bee we tested ran to 60 mph in 5.3 seconds and the quarter-mile in 13.6 seconds at 106 mph. We hadn't tested this red 2008 Pontiac G8 GT yet, but Steve's Bee had us by a fender at 60 mph and 105 mph.

The next morning at our test track, the G8 GT ran as expected, perfectly splitting Houlihan's numbers and the Bee's previous performance. The Pontiac launches to 60 mph in 5.4 seconds and covers the quarter-mile in 13.7 seconds at 104 mph.

"How's that?" you ask. "The Mopar packs so much more muscle under its hood. Why doesn't it smoke the Pontiac?"

Honestly, we're not really sure. At first we figured the Pontiac was just lighter. It sure feels that way from behind the wheel. But it isn't. At 4,106 pounds, the 2008 Pontiac G8 GT weighs only 56 pounds fewer than that Bee we tested. Transmission? Maybe. The Pontiac's six-speed automatic is an absolute performance advantage over the Bee's sluggish five-speed. We also have to consider the Mopar's heavy 20-inch rims and rubber, which don't do it any favors on the dragstrip. The Pontiac's optional 19-inch wheels and summer tires are certainly lighter, which makes it easier for the car to accelerate. These things matter, but don't fully explain how the G8 keeps up. Or why the Bee isn't quicker.

Plus the Pontiac has more gear in it. The rear-wheel-drive G8 GT manages this miracle with a 2.92:1 rear axle ratio. At 80 mph in top gear, its tach reads a lazy 2,000 rpm. Put some shorter gears in this sedan and Steve would've been looking up the G8's four exhaust pipes.

Think down the road, and the G8 GT should run with the Challenger SRT8, which shares its drivetrain and platform with the Super Bee SRT8. And the Camaro SS, which is based on the G8's underpinnings, should have no problem keeping up with the Challenger.

More Than Just Thrust

And when the road turns, things get even better. All G8s, V6- or V8-powered, get the same suspension tuning. GM calls the setup FE2, and it delivers a ride and handling compromise that falls just short of perfect.

With our test car's optional 245/40R19 Bridgestone RE050A tires providing the grip, this big, heavy sedan is fast on a mountain road. Very fast. But it also rides right, with proper compliance, buttoned-down body motions and a tight overall feel. The one misstep is a rear suspension that can feel a tick underdamped over some surfaces, especially when the G8's huge 19.2-gallon fuel tank is full.

With that tank topped off with premium (GM recommends regular but says premium maximizes performance), our scales say 51.4 percent of the G8's weight is carried by its front tires. Pontiac says that evens out to a 50/50 split when there's a driver and a passenger aboard. We flogged it with an empty right seat and found the G8's balance to be ideal. There's good turn-in, slight understeer at the limit and power oversteer when you want it.

Even with its standard stability control off, the G8 GT is fast, stable and just plain fun to toss around. So there may be a bit more body roll than there should be, and the steering wheel feels a bit large at first, but neither gets in the way of the fun or the pace. We also have to thank Pontiac for the G8's soft rev limiter and the rev-matching downshifts of the six-speed automatic. Together they add to the G8's lick on a mountain road but not necessarily in our handling tests.

At the test track, the G8 GT circles our skid pad at 0.85g and zips through our slalom course at over 65 mph. These numbers are behind smaller cars like the BMW 335i and the Infiniti G35 S, however, all but match the performance of the Dodge Charger SRT8 and the last BMW 535i we tested.

The G8 GT's four-wheel disc brakes are also worthy. They help produce a stopping distance from 60 mph of just 109 feet with excellent fade resistance, and they can hang with the best from Germany. But they're also activated by a soft pedal that provides little feel. It's the one real dynamic flaw in an otherwise impressive package.

No Sunfire Required

Unlike the most recent GTO, the Solstice or the laughable Grand Prix GXP, the G8 GT feels like a fully finished automobile. This is a car that's actually ready for public consumption. The entire public. No double-wide trailer or Sunfire ownership required.

This time Pontiac's engineers cared how their car felt, not just how it performed. For the first time in a long time, they decided to sweat the details. And the result is a Pontiac without any goofy missteps, colossal blunders or overtones of trailer-park style. They even resisted the temptation to put a big silly wing on it, leaving the G8's two hood scoops and four real exhaust pipes to state its case.

Restraint also found its way to the G8's interior. When you consider its well-shaped seats, simple white-on-black gauges and two-knob climate controls, it's clear that Pontiac's designers didn't take any unnecessary risks. Instead they built an honest, interesting interior that doesn't try too hard. Even our test car's optional red-on-black interior fails to feel overdone.

Pontiac obviously looked to Audi for the overall look and layout of the interior, and the results are a real argument for such acceptable plagiarism. Tactile feel is high and the interior's simple layout works. The driving position is also spot-on thanks to a tilt and telescoping steering wheel and a height-adjustable driver seat.

No, it's not perfect. There's no redline on the tach, in manual mode the shifter is still pushed to upshift and pulled to downshift (only BMW and Mazda get this right), and those digital gauges on the center stack must have been borrowed from a 1982 Datsun Z. The exhaust is also just too damn quiet. Yet forgivable all. These are just misdemeanors from a car company with a long list of felony offenses.

Rear seat room is also worth mentioning. You can play volleyball back there. And the trunk? Huge: 17.5 cubic feet.

Better Than the 6000 STE

And so we're smitten. Won over. The Australian-built 2008 Pontiac G8 GT is the best Pontiac since John Z. invented the GTO. No, not that GTO. The first GTO in 1964. You know, the one Ronny and the Daytonas immortalized in song. The one that started the whole muscle car thing. The Tiger.

No, we're not kidding.

The G8 GT is better than the 6000 STE, the Bonneville SSEi, the Grand Prix GTP, the G6 GXP and the Aztek UGLY. It even makes the Solstice feel like a half-ass effort. When it hits dealers in early March, the 40,000 examples of the G8 being shipped in from Down Under will reinvent Pontiac along the way.

Pontiac needs a win and the G8 is it. Just ask Motorhead Steve.

The manufacturer provided Edmunds this vehicle for the purposes of evaluation.

edmunds INSIDE LINE℠

2008 Pontiac G8 Buzz Station

edmunds INSIDE LINE

Rattle off the specs of the 2008 Pontiac G8 GT and you'd swear you're talking about BMW's new M3 sedan.

The 2008 G8 packs four doors, rear-wheel drive, a big V8, a six-speed automatic transmission and near 50/50 weight distribution. GM has even gone so far as to equip the G8 with a twin-pivot MacPherson strut front suspension with tons of caster, which is exactly the equation that provides BMW with its legendary steering feel.

Just two line items would throw you off, though: The V8 is a stump-pulling 6.0 liters large and the price tag, not so much at $29,995.

It's an absolute stretch to think that GM has anything but a winner on its hands. But who needs to hypothesize? We could attest to the G8's capabilities before it debuted at the 2007 Chicago Auto Show.

That's because the G8, like the ill-fated GTO, will be built in GM's Holden factory in Australia. In fact, it's already in production down there, so we made the trip to do some preproduction testing. Twice. Once to throw around the 2007 Vauxhall VXR8 version, which is sold in the United Kingdom, and a second time to test the Australian- market Holden Commodore SS.

Despite having to use our left hand to shift, we were able to crack off a 5.3-second burst to 60 mph and blow through the quarter-mile in just 14.1 seconds. Yep, there's something about throwing a Corvette engine into a sedan that's so bad it's oh so good. The big news is that this Zeta platform will also cradle the V8 of the much-anticipated 2010 Chevrolet Camaro.

Though the 362-horsepower V8 has the singular duty of making the G8 scramble, Pontiac's displacement-on-demand technology will allow the giant engine to run on four cylinders when the full 391 pound-feet of torque is unnecessary. And if you're not into dusting WRXs at every stoplight, there's the base Pontiac G8. Priced at $27,595, it'll be powered by a 3.6-liter V6 that makes 261 hp at 6,300 rpm and 250 lb-ft of torque at 3,200 rpm. We figure the six should be good for a 7.5-second 0-60-mph run.

"This car is everything we think a Pontiac should be," said Bob Lutz, GM's vice chairman of global product development, at the G8's 2007 Chicago Auto Show debut. "It's a return to tradition. And it's what Pontiac fans have been clamoring for for years. An athletic, beautiful, powerful rear-wheel-drive sedan."

The G8 promises to be a looker, too. The flared fenders add a bit of DTM touring car appeal and the G8 GT's sinister hood scoops will give your buddy in the BMW not one, not two, but three sets of symmetrical nostrils approaching in his rearview. From the rear, its quad exhaust, clear taillights and chopped window line are all attitude.

According to Mark LaNeve, GM's vice president of North American sales, the G8 is a car that will pioneer a new direction for Pontiac toward rear-wheel drive, emphasizing true performance at affordable prices.

It's about time.

Editorial Director Kevin Smith says:
I'm not quite as smitten with the G8 as some of my pals here, but I agree it's a very nice automobile. Smooth, comfy, attractive, functional, quick. What else is there?

Well, how about some noise, for starters? If I'm going to have a proper V8 engine answering my right toe, I'd like to hear it go to work. And if bystanders get to hear it, too, hey, I can share. Not that I'm insecure about wimpy-sounding cars, but the enjoyment of a good motor vehicle is at least partly visceral, so I just don't get corking up a nice big motor when you don't have to.

And beyond the too-tentative aural performance, the G8 leaves me un-thrilled in other ways. Not unimpressed, exactly, because it really is a fine piece of work and loads better than anything Pontiac has offered in recent memory. But I'm unmoved when I expected to be entertained.

For example, the shape is pleasant and modern, but not very sexy or distinctive to my eye. The interior is capably designed, but why are there nine different surface textures, just on the black pieces I can see from the driver seat? The ride and handling are good, but there's a slight dartiness in the steering and the brake pedal has to squish through that too-familiar GM cushion at the top of its travel. And the car is acceptably fast, but between upshifts that are sometimes waffly and that too-conservative exhaust plumbing, it's hard to get excited about the powertrain.

Far too many buts.

The last time Pontiac sourced a V8-powered rear-driver from Australia, it was to revive the exalted GTO name, and that ended badly. But not because the car was too quiet. I guess I hoped the G8 would learn the lessons of styling, refinement and poise the GTO had to teach, but build on its guttural big-bore attitude. Instead, I think Pontiac got too aggressive about refining the wrong things.

SPECIFICATIONS	
Length (in):	196.1
Width (in):	74.8
Height (in):	57.7
Wheelbase (in):	114.8
Front Track (in):	62.7
Rear Track (in):	63.3
Turning Circle:	37.4
Legroom, front (in):	42.2
Legroom, rear (in):	39.4
Headroom, front (in):	38.7
Headroom, rear (in):	38.0
Shoulder room, front (in):	59.1
Shoulder room, rear (in):	59.1
Maximum Seating Capacity:	5
Cargo Volume (cu-ft):	17.5
Max Cargo Volume, rear seats down (cu-ft):	17.5

VEHICLE	
Model Year:	2008
Make:	Pontiac
Model:	G8
Style:	GT 4dr Sedan (6.0L 8cyl 6A)
Base Price:	$29,995
Price as Tested:	$32,745
Options on Test Vehicle:	Premium Package, Power Tilt-Sliding Sunroof, Sport Package
Drive Type:	Rear-wheel drive
Transmission Type:	6-speed automatic
Transmission and Axle Ratios (x:1):	I = 4.03, II = 2.36, III = 1.53, IV = 1.15, V = 0.85, VI = 0.67, R = TBD, Diff = 2.92
Engine Type:	V8
Displacement (cc / cu-in):	5,967 cc (364 cu-in)
Block/Head Material:	Aluminum / Aluminum
Valvetrain:	Overhead valve, 2 valves per cylinder
Compression Ratio:	10.4
Redline (rpm):	6,000
Horsepower (hp @ rpm):	361 @ 5,300
Torque (lb-ft @ rpm):	385 @ 4,400
Brake Type (front):	12.64-inch ventilated disc, two-piston caliper
Brake Type (rear):	12.76-inch ventilated disc, single-piston caliper
Steering System:	Speed-proportional rack-and-pinion power steering
Steering Ratio:	TBD
Suspension Type (front):	Independent, MacPherson struts, coil springs and stabilizer bar
Suspension Type (rear):	Independent, multilink, coil springs and stabilizer bar
Tire Size (front):	P245/40R19
Tire Size (rear):	P245/40R19
Tire Brand:	Bridgestone
Tire Model:	RE050A
Tire Type:	Summer performance
Wheel Size:	19 by 8
Wheel Material (front/rear):	Aluminum Alloy
Manufacturer Curb Weight (lb):	3,995
Curb Weight As Tested (lb):	4,106
Weight Distribution, F/R (%):	51/49
Recommended Fuel:	Regular unleaded
Fuel Tank Capacity (gal):	19.2
EPA Fuel Economy (mpg):	15 city/24 highway
Edmunds Observed (mpg):	TBD

SAFETY INFORMATION	
Front Airbags:	Standard
Side Airbags:	Standard dual front
Head Airbags:	Standard front and rear
Knee Airbags:	Not available
Antilock Brakes:	4-wheel ABS
Electronic Brake Enhancements:	Brake assist, electronic brakeforce distribution
Traction Control:	Standard
Stability Control:	Standard
Rollover Protection:	Not available
Tire Pressure Monitoring System:	Tire pressure monitoring
Emergency Assistance System:	Not available
NHTSA Crash Test Driver:	Not tested
NHTSA Crash Test Passenger:	Not tested
NHTSA Crash Test Side Front:	Not tested
NHTSA Crash Test Side Rear:	Not tested
NHTSA Rollover:	Not tested
IIHS Offset:	Not tested

Handling Rating (Excellent, Good, Average, Poor or Very Poor):	Good
Db @ Idle:	48.1
Db @ Full Throttle:	76.9
Db @ 70 mph Cruise:	68.1
Acceleration Comments:	Why is there no redline on the tach? Isn't this a sport sedan with a powerful engine? Bizarre, especially since manual mode holds gears and will bang off the rev limiter all day long. Quickest accel times came in Sport setting with transmission shifting on its own. There's very little wheelspin at launch. I suspect a manual transmission would be notably quicker.
Handling Comments:	Transition to oversteer isn't as intuitive as I'd like. Perhaps this is due to minimal roll stiffness. Once the tail is out, however, the G8 GT is easily controlled. Little roll stiffness also means there's an uncomfortable amount of time between weight transfer in transitions in the slalom. Otherwise, handling is good with predictable limits. Oh, and stability control can be fully disabled.
Braking Comments:	Some fade became obvious after 5-6 stops, but the distances continued to come down to a world-class 109 feet. Some ABS kickback is noticeable through the pedal, but the overall brake feel -- at least prior to the minor fading -- is confident.

CONDITIONS FOR TESTING	
Temperature (Fahrenheit):	63.0
Humidity:	48%
Elevation (ft):	TBD
Wind:	0.0

PERFORMANCE	
0 - 30 (sec):	2.0
0 - 45 (sec):	3.6
0 - 60 (sec):	5.4
0 - 75 (sec):	7.9
1/4 Mile (sec @ mph):	13.7 @ 104.1
30 - 0 (ft):	28
60 - 0 (ft):	109
Braking Rating (Excellent, Good, Average, Poor or Very Poor):	Good
Slalom (mph):	65.7
Skid Pad Lateral acceleration (g):	0.85
Handling Rating (Excellent, Good, Average, Poor or Very Poor):	Good
Db @ Idle:	48.1
Db @ Full Throttle:	76.9
Db @ 70 mph Cruise:	68.1
Acceleration Comments:	Why is there no redline on the tach? Isn't this a sport sedan with a powerful engine? Bizarre, especially since manual mode holds gears and will bang off the rev limiter all day long. Quickest accel times came in Sport setting with transmission shifting on its own. There's very little wheelspin at launch. I suspect a manual transmission would be notably quicker.
Handling Comments:	Transition to oversteer isn't as intuitive as I'd like. Perhaps this is due to minimal roll stiffness. Once the tail is out, however, the G8 GT is easily controlled. Little roll stiffness also means there's an uncomfortable amount of time between weight transfer in transitions in the slalom. Otherwise, handling is good with predictable limits. Oh, and stability control can be fully disabled.

WARRANTY INFORMATION	
Bumper-to-Bumper:	3 years/36,000 miles
Power Train:	5 years/100,000 miles
Corrosion:	6 years/100,000 miles
Roadside Assistance:	5 years/100,000 miles
Scheduled Maintenance:	Not available

ZDDPlus, LLC.
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ZDDPlus™ Tech Brief #1

Introducing ZDDPlus™

Who is ZDDPlus, LLC?

ZDDPlus, LLC is a company formed by classic car enthusiasts to meet the needs of classic car aficionados. We have seen that the automotive industry in general is changing in response to the environmental and financial pressures of today, with little concern for the classic car industry. We are engineers and automotive technicians by trade, and bring many years of problem solving experience to the task of keeping our classic cars operational and running better than new. We hope that one of the solutions we have designed for our own use will meet your needs as well. We have developed
ZDDPlus™ to address the need of classic car owners for an oil that will meet the specifications of the original oil for which their engines were designed.

Why do we need ZDDPlus™ ?

As part of an effort to reduce vehicle emissions, the US EPA offers vehicle manufacturers "credits" for early implementation as well as penalties for violation of emission reduction standards. The EPA's program called for 100,000 mile catalytic converter life by 2004, 120,000 miles by 2007, and 150,000 miles by 2009. To achieve these goals, automotive manufacturers have pressured their oil suppliers to remove substances from motor oils that would shorten the service life, including the proven EP (extreme pressure) additive ZDDP (zinc dialkyldithiophosphate). Zinc and phosphorus from the ZDDP can be present in small amounts in the exhaust gas of an engine depending on the amount of oil which is consumed in combustion. These elements can coat the catalyst reducing the amount of catalyst exposed to the exhaust gases, ultimately increasing emissions at the tailpipe. As a result of the EPA mandate, the ZDDP level in engine oils has been declining since the mid-1990s, roughly coinciding with the implementation of OBDII.

ZDDP has been an important additive to engine oils for over 60 years, and has an excellent track record at protecting the sliding metal to metal cam lifter interface. Historically ZDDP has been added to oils in amounts resulting in approximately 0.15% phosphorus, and 0.18% zinc. ZDDP protects by creating a film on cams and flat lifter contact points in response to the extreme pressure and heat at the contact point. The film of zinc and phosphorus so formed provides a sacrificial wear surface protecting the base metal of the cam and lifter from wear. In the course of normal service, this conversion of ZDDP to elemental zinc and phosphorus depletes the ZDDP level in the oil. Studies show that depending on the specific engine and severity of duty, after 2000-4000 miles of operation the level of ZDDP can drop below that considered adequate to provide wear protection to the cam and lifters.

If you are currently putting mileage on your classic vehicle and using the latest API grade SM oil, you are almost certainly doing irreversible damage to your engine.[1]
According to the SAE Tech Bulletin # 770087 [2], operation of a flat tappet engine without adequate EP additives such as ZDDP quickly leads to lifter foot scuffing and cam lobe wear. Camshafts are typically only surface

[1] Anderson, William C., 'New Oils and Old Cars', Old Cars Weekly, **48** (2007-08-30)
[2] Pless, Loren G., and Rodgers, John J., 'Cam and Lifter Wear as Affected by Engine Oil ZDP Concentration and Type', SAE pub **770087**, **4** (1977)

hardened leaving the core ductile for strength. According to the SAE bulletin, once cam lobe wear reaches 0.0002", "subsequent wear is usually rapid and catastrophic". Two ten-thousandths of an inch is one fifth the thickness of an average human hair.

In order to make engines last in the absence of ZDDP, virtually all IC (internal combustion) engines designed in the last ten years utilize roller lifters. Today, ZDDP has been removed from practically all automotive engine oils, rendering them unsuitable for use with older engines with non-roller lifters.

ZDDPlus™ is the ONLY EP (Extreme Pressure) component which re-establishes the ZDDP levels that our classic car's engines were designed for, while allowing the car owner to use the base oil of their choice. While some off the shelf additives may have some ZDDP, the amount per bottle is small, and when enough is used to get the proper concentration of ZDDP there is a quart or more of unspecified oil that comes along with it. This dilution of 20% of your oil with an unspecified oil also means that there is 20% less of the proper additive package. The chart below compares the amount of ZDDP in ZDDPlus™ to GM EOS, a leading additive which claims to provide ZDDP based wear protection. Since the amount of ZDDP in oils varies widely, this has not been figured into the chart.

5 Quart Oil ZDDP Dosing

Product	bottle size	zinc % by weight	phosphorus % by wt	P:Zn ratio
ZddPlus	4 oz	6.35	5.09	0.802
GM EOS	16 oz	0.71	0.53	0.746

Target Zinc Concentration	Ounces of **ZddPlus**	Ounces of GM EOS	
0.07	1.55	13.54	
0.08	1.77	**15.47**	----- 1 bottle EOS
0.09	1.99	17.41	
0.10	2.21	19.34	
0.11	2.44	21.27	
0.12	2.66	23.21	
0.13	2.88	25.14	
0.14	3.10	27.07	
0.15	3.32	29.01	
0.16	3.54	30.94	
0.17	3.76	**32.88**	----- 2 bottles EOS
0.18	**3.99**	34.81	----- 1 bottle ZddPlus
0.19	4.21	36.74	
0.20	4.43	38.68	
0.21	4.65	40.61	
0.22	4.87	42.55	
0.23	5.09	44.48	
0.24	5.31	46.41	

Why do we need additives?

Modern engine oil is a precise mix of base oil with additives totaling almost 10% of the oil by volume. These additives are more expensive than the base oil by volume, and oil companies are in business to make a profit. Common sense says that these additives are there with good reason.

Modern engine oil is a multi-purpose fluid in an engine, carrying the heat away from hot spots and releasing it in the sump as well as providing lubrication to critical areas which need protection against wear. Different additives are put in the oil in order to address the needs of each specific engine system that is supplied with oil:

- The crankshaft and connecting rod bearings discharge oil into the spinning reciprocating assembly, and an anti-foaming additive keeps the oil from turning into foam.
- The heat developed on high pressure contact areas can exceed the breakdown temperature rating of the base stock, so heat stabilizers are added in order to fight viscosity breakdown and ashing.
- In multi-viscosity oil, the multi-viscosity characteristic is established by an additive.
- Acids and byproducts of combustion are neutralized by another additive.
- An additive helps keep particulates from combustion in suspension.
- Detergents are added to lower the surface tension to a specific value to help keep contaminants in suspension and off of the metal engine parts. Some detergents also interact with the EP additive to gain an additional level of wear protection.
- The sliding cam to cam-follower interface in a non-roller lifter engine requires a special EP additive, which has historically been the ZDDP that is now removed from all API rated automotive oils.

ZDDPlus™ contains the proper amount of ZDDP to give a 0.18% Zinc and 0.13% phosphorus level when a single 4 oz. bottle is added to a normal 5 quart oil change. This level of zinc and phosphorus is the level designed into pre-OBDII oils. The ZDDP present in the oil may make this amount higher. Using ZDDPlus™ affords you total control over the characteristics of the oil in the engine by allowing you to use the full 5 quarts of high grade automotive oil of your choice.

What about off the shelf additive and supplements?

API oils have always been more than adequate for the engines designed when the oil was current. The use of current API grade oils has always been adequate to satisfy car manufacturer's requirements and warranty demands. Historically, with few exceptions newer API grades have superceded the performance of their predecessors. The removal of ZDDP has resulted in a clear change to that philosophy. It has never been necessary or desirable to include additives or supplements to any API rated oil to meet car manufacturer's specifications or warranty requirements. In virtually all cases, off the shelf additives amount to little more than automotive snake oil. **Current additive technology has yet to develop an EP anti-wear agent as effective as ZDDP.** Consequently, if these additives actually had adequate levels of ZDDP, they would be incompatible with modern engines and void manufacturer's warranties.

Due to this unprecedented turn of events in emissions requirements, ZDDPlus™ should not be confused with an off the shelf additive. ZDDPlus™ should be considered a replacement for a missing oil component critical for older cars.

Why can't we use diesel CI/CJ-4 rated oils?

There are some diesel engine rated oils on the market which may still have some ZDDP in them. There are problems associated with using these oils in a normal gasoline engine which can become severe in a high performance gasoline engine. One issue is the high amount of detergent additive, and another is the high viscosity.

High detergent oil has a lower surface tension and lower shear pressure rating which can cause higher bearing wear in gas engines. A diesel engine needs oil with very high detergent capabilities in order to hold the large amount of combustion byproducts in suspension, but it is not optimized for a gasoline engine. The bearing journal size to displacement ratio on a gasoline engine is designed around the use of a lower detergent oil and relies on a high shear rating to the oil.

The other problem with high detergent oil is that it actually reduces the friction reduction that the ZDDP affords, especially in a high performance, high valve spring pressure engine.

The viscosity rating of most diesel rated oils is higher than optimum for our higher revving gasoline engines, and can cause oil starvation in bearings at high RPMs.

Why can't we use racing oils?

There are some racing oils which maintain a level of ZDDP. Racing oils are optimized for short term severe duty in contrast to an oil that has been designed for day in, day out street operation. The additive package in racing oil does not have the same detergent characteristics which are designed into extended service oils. As a result, racing oils may not have the capability of neutralizing acids and keeping contaminants in suspension. Also, the breadth of choice of viscosity so important to correct street engine operation over a broad temperature range is not available in racing oils.

By using ZDDPlus™ in addition to a modern high quality oil of the proper viscosity for your gasoline engine, the correct EP lubrication level is established, and the oil characteristics remain optimized for your engine.

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ZDDPlus™ Tech Brief #2

ZDDP and Cam wear: just another Engine Oil Myth?

In the Dec. 2007 GM Techlink publication for GM dealers and technicians, GM Engineer and author Bob Olree speculated that the current spate of cam and lifter failures being caused by newer oil is a myth, similar to other myths which have persisted in automotive mythology. He opens with the statement:

"Engine Oil Myths -
Over the years there has been an overabundance of engine oil myths. Here are some facts you may want to pass along to customers to help debunk the fiction behind these myths. "

This is of course absolutely true. In the absence of facts, rumors are generated and persist far beyond any applicability to the situation which gave them life. Olree then continues, giving individual cases to illustrate his point. We examined each of the cases in an effort to decide whether or not his point is valid.

Case 1 – Pennsylvania Crude Myth

"The Pennsylvania Crude Myth -- This myth is based on a misapplication of truth. In 1859, the first commercially successful oil well was drilled in Titusville, Pennsylvania.
A myth got started before World War II claiming that the only good oils were those made from pure Pennsylvania crude oil. At the time, only minimal refining was used to make engine oil from crude oil. Under these refining conditions, Pennsylvania crude oil made better engine oil than Texas crude or California crude. Today, with modern refining methods, almost any crude can be made into good engine oil.
Other engine oil myths are based on the notion that the new and the unfamiliar are somehow "bad.""

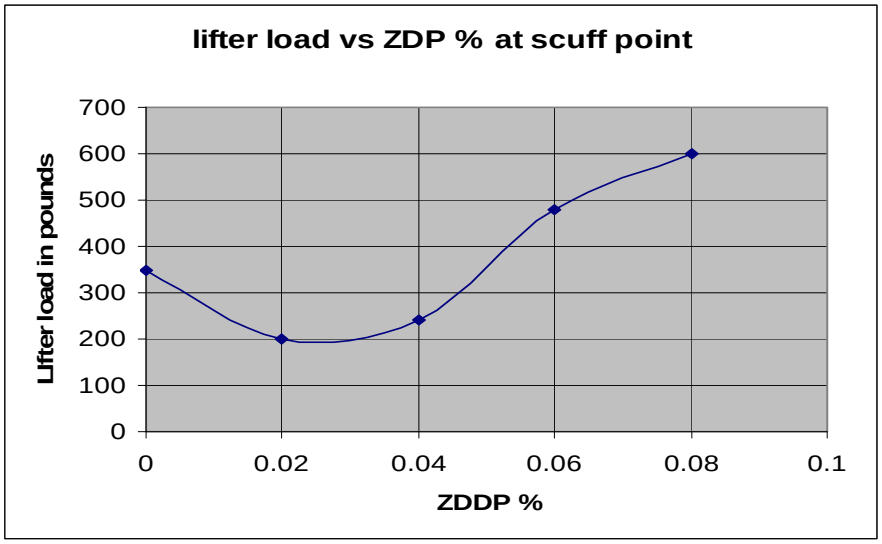
It is human nature to be unsure about new technology. We agree that the situations vis-à-vis Pennsylvania Crude oil and detergent oil is adequately explained by this aspect of human nature. The working fundamentals of many modern technologies such as engine oils are far beyond the grasp of an average person. When reading Bob Olree's comments, we also acknowledge that they are applicable to an average vehicle and engine. There are few people who have as much direct experience with the issue of ZDP and API test Sequences as he has.

However, to describe the current situation where oils are being marketed with little or no ZDDP as merely another "new or unknown = bad" myth does not do the facts of the situation justice.

There are no test reports we know of which conclude that any low or zero ZDDP oil is compatible with older flat tappet high performance engines.

There ***is*** on the other hand, research that concludes that the minimum ZDDP requirement is directly related to the lifter foot pressure. In one SAE paper it is reported that: *"at a ZDP level corresponding to 0.02% phosphorus, scuffing occurred at 200 pounds lifter load, while it required 240 and 480 pounds lifter load for oils containing 0.04 and 0.06% phosphorus, respectively, to initiate scuffing. At 0.08% phosphorus concentration, no scuffing occurred up to 600 pounds lifter load, the test hardware limit. Scuffing occurred at 350 pounds lifter load with no ZDP (0% phosphorus)."* [1]

This relationship can be graphed:



The older engines we are concerned about may have lifter foot pressures several times that of a low performance engine such as those used in the Sequence III tests, and their wear characteristics are not predicted by common Sequence III testing methodology.

Case 2 – Synthetic Oil Myth

"The Synthetic Oil Myth -- Then there is the myth that new engine break-in will not occur with synthetic oils. This one was apparently started by an aircraft engine manufacturer who put out a bulletin that said so. The fact is that Mobil 1 synthetic oil has been the factory-fill for many thousands of engines. Clearly, they have broken in quite well, and that should put this one to rest."

One of our engineers drives a 1996 Chevrolet Impala SS with an LT1 engine which was filled at the factory with Mobil 1, and has never had any other oil in it. It has indeed broken in well, and at over 200,000 miles it still has very little blow-by. So, while we would tend to agree with Mr. Olree's conclusion for my Impala SS and in general, we also know that the ring and engine block materials in different engines have very different break-in requirements, so a statement such as Mr. Olree makes should not be thought of as a maxim that applies to all engines ever made. As a matter of fact, it is surprising that an engineer would use one data point to conclude for all engines WITHOUT valid test results to back up the statement. If he does have the data (it would not be surprising given the amount of research he has been associated with) and was merely trying to keep the article short we would love to see it.

Case 3 – Starburst Oil Myth

"The Starburst Oil Myth -- The latest myth promoted by the antique and collector car press says that new Starburst/ API SM engine oils (called Starburst for the shape of the symbol on the container) are bad for older engines because the amount of anti-wear additive in them has been reduced. The anti-wear additive being discussed is zinc dithiophosphate (ZDP).
Before debunking this myth, we need to look at the history of ZDP usage. For over 60 years, ZDP has been used as an additive in engine oils to provide wear protection and oxidation stability. ZDP was first added to engine oil to control copper/lead bearing corrosion. Oils with a phosphorus level in the 0.03% range passed a corrosion test introduced in 1942. In the mid-1950s, when the use of high-lift camshafts increased the potential for scuffing and wear, the phosphorus level contributed by ZDP was increased to the 0.08% range. In addition, the industry

[1] P. Bennett, "A look at the Effects of Lubricant Additives on Surfaces," SAE 107A (SAE 580111).

developed a battery of oil tests (called sequences), two of which were valve-train scuffing and wear tests. A higher level of ZDP was good for flat-tappet valve-train scuffing and wear, but it turned out that more was not better. Although break-in scuffing was reduced by using more phosphorus, longer-term wear increased when phosphorus rose above 0.14%. And, at about 0.20% phosphorus, the ZDP started attacking the grain boundaries in the iron, resulting in camshaft spalling. By the 1970s, increased antioxidancy was needed to protect the oil in high-load engines, which otherwise could thicken to a point where the engine could no longer pump it. Because ZDP was an inexpensive and effective antioxidant, it was used to place the phosphorus level in the 0.10% range. However, phosphorus is a poison for exhaust catalysts. So, ZDP levels have been reduced over the last 10-15 years. It's now down to a maximum of 0.08% for Starburst oils. This was supported by the introduction of modern ashless antioxidants that contain no phosphorus.
Enough history. Let's get back to the myth that Starburst oils are no good for older engines. The argument put forth is that while these oils work perfectly well in modern, gasoline engines equipped with roller camshafts, they will cause catastrophic wear in older engines equipped with flat-tappet camshafts.
The facts say otherwise.

Backward compatibility was of great importance when the Starburst oil standards were developed by a group of experts from the OEMs, oil companies, and oil additive companies. In addition, multiple oil and additive companies ran no-harm tests on older engines with the new oils; and no problems were uncovered. "

We have never been able to find the results of these tests on older engines. We would need to study those reports to see exactly which engine types and cam/follower types were involved. The fact is that all API test sequences we have studied use non-performance engines with low spring pressures, indeed in the Sequence IIIG test, the static lifter load is 350 pounds[2]. Many high performance engines have as much as 500 pounds or more of lifter foot pressure. Referring to the Bennet data, this would indicate that in order to keep from scuffing, a ZDP level of .065 % minimum would need to be ensured.

Case 3 – Starburst Oil Myth continued…

"The new Starburst specification contains two valve-train wear tests. All Starburst oil formulations must pass these two tests.
- Sequence IVA tests for camshaft scuffing and wear using a single overhead camshaft engine with slider finger (not roller) followers.
- Sequence IIIG evaluates cam and lifter wear using a V6 engine with a flat-tappet system, similar to those used in the 1980s.
Those who hold onto the myth are ignoring the fact that the new Starburst oils contain about the same percentage of ZDP as the oils that solved the camshaft scuffing and wear issues back in the 1950s. (True, they do contain less ZDP than the oils that solved the oil thickening issues in the 1960s, but that's because they now contain high levels of ashless antioxidants not commercially available in the 1960s.) "

We wish that it were true that all modern oils contained 0.08% ZDP. Our recent tests of two major name brand oils bearing the SM API grade contain <0.06% Phosphorus, therefore cannot contain even that much ZDP.
We know that there are technologies other than ZDDP which can function as effective EP anti-wear agents for some engine designs, as proven with newer engines with roller cam followers. The most recent SM formulations in particular have shown a move to Boron based EP additives, with a concurrent further lowering in some oils to <0.06% Phosphorus. We have been testing virgin oils on an ongoing basis, and most quality oils in early 2007 have had a phosphorus level in the 0.05% to 0.08% range. We recently tested two new oils: Mobil 1 Extended Performance SM 10w-30 and Valvoline Premium SM 10w-30 oil. We had the oils tested for both zinc and phosphorus following the ASTM AA and D-4951 methods respectively. The results showed <0.06% Phosphorus in either oil. While this is good news for the owners of new cars with catalytic converters, it does mean that in order to retain the API SM certification they both claim, there has to be an EP additive different than ZDDP incorporated into both formulas.

Case 3 – Starburst Oil Myth continued…

[2] **Olree**, Robert M., and McMillan, Michael L., 'How Much ZDP is Enough?', SAE pub **2004-01-2986, 9** (2004)

”Despite the pains taken in developing special flat-tappet camshaft wear tests that these new oils must pass and the fact that the ZDP level of these new oils is comparable to the level found necessary to protect flat-tappet camshafts in the past, there will still be those who want to believe the myth that new oils will wear out older engines.
Like other myths before it, history teaches us that it will probably take 60 or 70 years for this one to die also.“

Our study of the ASTM test sequences IIIE, IIIF, IIIG, IVA and VE required to achieve API certification reveal that NONE were developed using high performance engines. Indeed, these tests were developed using relatively low performance engines intended to model average current and emerging vehicle engine wear characteristics. This makes absolute sense considering that the purpose of the ILSAC/API specifications is to provide a standard set of performance criteria for oil to be used in new over-the-road automobiles and trucks. The standards are not intended to infer any degree of backwards compatibility with older or specialty engines. In one statement Olree himself while investigating the amount of ZDDP needed to protect engines stated: “Arguing that modern oils should pass tests developed 25 years ago to protect engines built 30 years ago is a rather useless exercise [3]”. Since he is studying the situation from the perspective of designing the lubrication for the next generation of motors, I see his perspective for making such a statement. In doing so he is acknowledging that the test is not specifically designed to quantify an oil’s performance with older engines. Unfortunately, “those” engines are the ones we enthusiasts run and care about.

It is our belief that there is no overt movement in the oil industry to create new oils that are bad for older engines as some conspiracy theorists may speculate. There certainly IS a movement in the oil industry to create new oils which are tailored to the specifications and requirements *primarily* of newer cars, and *secondarily* of older vehicles. This does not mean that they are concerned at all with 30 years old muscle cars. To the automotive industry an OLD car is 10 years old. The cars we care about are invisible to the OEM industry. While we have great faith in the engineering behind the new oils, we also notice that backwards compatibility with 100% of old engines is not on the product spec sheet. The oil manufacturers obviously know of the importance of the ZDDP to older flat tappet engines, as many of them are steering owners of these engines toward their ZDDP formulated diesel oil line, showing they acknowledge the need for ZDDP in these engines. Unfortunately the characteristics and available viscosity ranges of diesel oil may not be suitable for our engines.

As Bob Olree knows better than we do, the amount of investment and research required to define, specify and perfect a set of tests and resulting standards is huge, and off-the-cuff recommendations like one sees in advertisements for oil supplements are poorly thought out and ill-advised. Our position on the right oil and additive package to use is simple: an individual should be using the oil specified at the time of manufacture of the specific vehicle. Period. An engine is a fantastically complex and well thought out machine, and we believe that almost all oil additives are simply get rich schemes, impose unnecessary cost, and are unneeded at best, dangerous at worst.

Our conclusion and current recommendation is to augment one of the new and superior base stock modern oils of the correct viscosity with additional ZDDP in order to bring the oil’s EP characteristics to that for which the engine was designed. We know from years of oil testing that ZDDP is compatible with all base stocks and other additive packages including the newer Boron EP additives, so there is little risk in adding it to achieve the equivalent of 0.12% phosphorus, a level similar to that formulated into SF or SG oils.

[3] **Olree**, Robert M., and McMillan, Michael L., ‘How Much ZDP is Enough?’, SAE pub **2004-01-2986, 11** (2004)

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ZDDPlus™ Tech Brief #6

Diesel Oil as Replacement Oil for SM Oil

Many people are pointing to Diesel or Heavy Duty oils as good replacements for the newer SM oils with reduced ZDDP levels. Many Heavy Duty oils are sold as dual duty oils, for both Heavy Duty Gasoline and Diesel usage with a caveat: They are not intended to be used for vehicles manufactured after 1988 equipped with long-life catalytic converters.

An indication that the situation vis-à-vis EP agents in oil has changed can be seen by examining aftermarket cam manufacturer's current recommendations. Aftermarket cam manufacturers have always had to deal with a certain amount of failure due to incorrect lubrication at the time of assembly and resulting failure due to incorrect break-in. Even though they may have had to deal with this issue, the recommendation for oil to use after break-in was historically plain high-quality oil. Since 2001 with the introduction of API SL and in 2007, SM oil, many have begun recommending the use of higher ZDDP oils such as certain Diesel and Heavy Duty oils[1,2]. Explaining why, they reveal that they are dealing with an increased occurrence of cam failure in warranty. While in general they are quick to blame the situation on current oil formulations and lack of correct break-in, the situation is more complex. The past ten years has seen the rise of imported low cost cam components into the US aftermarket, and certainly some of the increased failures can be attributed to lower quality control on certain of these.

Regardless of the root cause, the fact that the cam manufacturers are placing increased emphasis on specifying oils with high levels of ZDDP underscores its importance to high-performance engines.
So what are the issues pertaining to the use of Diesel rated oils in an older gasoline engine with flat-tappets?

1) Diesel oil is engineered with a higher amount of dispersant and detergent package to deal with the increased amount of soot and other hydrocarbon combustion by-products present in a Diesel engine. This high amount of detergent can increase the decomposition temperature of the ZDDP[3] which will reduce it's effectiveness as an anti-wear agent, especially when a vehicle is used for short trips, and does not achieve a full warm-up condition. Diesel engines are engineered with this constraint in mind, unlike gasoline engines.

2) Typically the viscosity range for Diesel oils does not include the very low 5W and 10W values or any EC (Energy Conserving) oils, limiting its use in a passenger car engine which calls for one of these EC oils. The practical downside of this is the loss of the 1.4% or more fuel savings (relative to API standard oil) which the EC oils may provide. Also, there have been some engine designs recently with decreased main and rod bearing clearances which were specifically designed to use the lower weight EC oils which may experience higher than normal bearing temperature due to insufficient oil flow if the higher viscosity oils are used[4]. The bearings sizes and clearances in Diesel engines are engineered with this in mind, unlike gasoline engines.

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[1] http://www.compcams.com/Technical/Instructions/Files/255.pdf

[2] http://www.cranecams.com/pdf/548e.pdf

[3] S.Shirahama and M. Hirata, Nippon Oil Co., Yokahama, Japan, "The Effects of Engine Oil Additives on Valve Train Wear", Lubrication Science, 0954-0075, pg 383

[4] B. Cockbill and J. Bennett, Ford Motor Co., "The Effects of Crankcase Oil Viscosity on Engine Friction At Low Temperatures", SAE 2000-01-2052

3) The increased amount of metallic-based detergents can cause excessive ash deposits in the combustion chamber and on exhaust valves. In some worst cases these deposits may cause detonation. This detonation could be potentially problematic, especially in high-compression, turbocharged or supercharged engines.

4) Use of this higher ZDDP content oil gives better EP wear protection than SM oils for high-performance gasoline engines with high flat-lifter foot pressures, but small amounts of blow-by containing extra zinc and phosphorus can be detrimental to the life of catalytic converters. On the other hand, many performance enthusiasts feel that they would rather protect the cam and lifter even if the cost was a slightly reduced catalytic converter life.

In general, there are fewer choices for Diesel rated oil than for regular SM oils. This means that one may not be able to find the right combination of viscosity range, base stock (fossil or synthetic), or additive package in a Diesel oil. There are a wide variety of high quality SM oils manufactured these days which are widely distributed and competitively priced. This gives you the best chance of picking the exact characteristics in the low-priced oil of your choice. To this oil you can just add a single 4 oz bottle of ZDDPlus™ to bring the EP characteristics to the level offered by the heaviest-duty oils made in the 1970's or 1980's. This approach represents the most flexible and least expensive way to get the proper oil for your classic or high-performance car engine.

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ZDDPlus™ Tech Brief #7

Oil Additive Dosing and Dilution

A common problem cropping up in discussions of oil additives is the use of incorrect dosing amounts, usually due to a misunderstanding of how dilutions and resulting concentrations are calculated. In chemical formulation (unlike cooking) the quantity of a specific atom or molecule determines its characteristics when combined with other chemicals. Since the weight of a single atom or molecule is a known quantity, we measure bulk amounts of chemicals by weight. When calculating the concentration of various atomic or molecular constituents in a mixture, we are looking for that particular element or molecule's weight as a fraction or percentage of total mixture weight. If volumes are used instead of weights, measurement or dosing errors will often occur. The difference is most substances differ in density from each other; therefore similar volumes of these substances will have different weights. In order to correctly figure out weight fractions from a mixture of substances of differing densities or atomic weights, density or atomic mass of each constituent must be factored into the calculation.

In the case of determining relative amounts of chemicals such as the phosphorus in an oil additive, we must factor the relative density of the additive separately to that of the oil. Various grades of motor oil have a density of between .82 and .88 grams per cm^3, depending on viscosity and additive package. 0.86 grams per cm^3 is an average value we use when calculating oil additive dilutions that we arrived at after measuring many different 10w30 motor oils. For the density of ZDDPlus™ we use the average value of 0.99 grams per cm^3. For the density of EOS we measured 0.91 grams per cm^3. Once density has been factored in, we can use straight volumes for dilutions.

Directly measuring the amount of ZDDP in an additive is extremely difficult due to the mixture of different alcohols used in its manufacture, and the resulting range of atomic weights of the ZDDP molecules. The most common way to indirectly measure the ZDDP content is to use one of several ASTM test methods to measure the phosphorus and zinc content. Zinc can often be added to oils as an acid neutralizing agent, so zinc is not a reliable indicator of ZDDP. Since phosphorus is found in oils predominantly in the form of ZDDP, we use it as the measurement criteria for ZDDP. If you are using a phosphorus test result as an indicator, the correct way to state ZDDP level is to state an amount of ZDDP that results in a certain phosphorus level. Phosphorus is also the element identified as most potentially compromising to the catalytic converter, so there is a maximum 800 ppm or 0.08% phosphorus level specified in the SM oil classification. SF oil was in common use back in the time of older high-performance cars with flat tappets and higher than current valve-spring pressures. The best heavy-duty oils of that time contained a level of ZDDP which resulted in a phosphorus level measured in the range of 1200 to 1600 ppm. Recent testing of modern SM oils reveals that many contain around 600 ppm of phosphorus. Therefore, to accurately estimate the total amount of phosphorus in the final oil, we add this 600 ppm to the amounts due to the additives. Once we have figured out the phosphorus level, zinc can be calculated in the same manner if desired.

Another factor affecting the final concentration of ZDDP and the measured phosphorus in an oil mixture is the method used by the person performing the oil change. If one uses 16 oz of EOS and a particular engine's oil sump will not allow more than, say, 5 quarts without risk of foaming from crankshaft splashing, then an amount of oil equal to the volume of the EOS additive should be taken out of the new oil. If the 4 oz bottle of ZDDPlus™ is added this is not likely to be a problem. ZDDPlus™ was designed for correct dosing when used with 4 – 6 quarts of oil. With these factors in mind, we calculate the final phosphorus and zinc levels as follows:

Method 1: additive volume + 5 quarts oil:

For EOS

EOS	is	16 oz + 5 qts oil (160 oz)	= 176 oz total sump fill volume, resulting in an 11:1 dilution ratio.	
EOS	P	6210 ppm @ 11:1 dilution	= 565 ppm + 600* ppm from oil	= 1165 ppm or 0.117%
EOS	Zn	6820 ppm @ 11:1 dilution	= 620 ppm + 800* ppm from oil	= 1420 ppm or 0.142%

For ZDDPlus™

ZDDPlus™	is	4 oz + 5 qts oil (160 oz)	= 164 oz total sump fill volume, resulting in a 41:1 dilution ratio.	
ZDDPlus™	P	42700 ppm @ 41:1 dilution	= 1041 ppm + 600* ppm from oil	= 1641 ppm or 0.164%
ZDDPlus™	Zn	57277 ppm @ 41:1 dilution	= 1397 ppm + 800* ppm from oil	= 2197 ppm or 0.220%

* typical value found in SM oil

Method 2: additive volume + (5 quarts oil – additive volume):

For EOS

EOS	is	16 oz + (5 qts – 16 oz) of oil	= 160 oz total sump fill volume, resulting in a 10:1 dilution ratio.	
EOS	P	6210 ppm @ 10:1	= 621 ppm + 600* ppm from oil	= 1221 ppm or 0.122%
EOS	Zn	6820 ppm @ 10:1	= 682 ppm + 800* ppm from oil	= 1482 ppm or 0.148%

For ZDDPlus™

ZDDPlus™	is	4 oz + (5 qts - 4 oz) of oil	= 160 oz total sump fill volume, resulting in a 40:1 dilution ratio.	
ZDDPlus™	P	42700 ppm @ 40:1	= 1068 ppm + 600* ppm from oil	= 1668 ppm or 0.167%
ZDDPlus™	Zn	57277 ppm @ 40:1	= 1432 ppm + 800* ppm from oil	= 2232 ppm or 0.223%

* typical value found in SM oil

Method 1 for any oil sump of capacity (x): additive volume + (x) quarts of oil:

For EOS

Calculate EOS dilution ratio using (x) quarts of oil:

EOS is 16 oz + (**x***32) oz of oil = ((**x***32) +16) oz total sump contents volume, resulting in:
(((**x***32) +16)/16) = **y**: 1 dilution ratio.

Calculate EOS phosphorus at dilution ratio using (y) from above:

EOS P 6210 ppm @ **y** : 1 = (6210/**y**) = $\mathbf{z_p}$ ppm

Calculate total phosphorus in final oil with EOS using (z_p) from above:

$\mathbf{z_p}$ ppm + 600 ppm from oil = ($\mathbf{z_p}$+600) ppm or (($\mathbf{z_p}$+600)/10,000) %

Calculate EOS zinc at dilution ratio using (y) from above:

EOS Zn 6820 ppm @ **y** : 1 = (6820/**y**) = $\mathbf{z_z}$ ppm

Calculate total zinc in final oil with EOS using (z_z) from above:

$\mathbf{z_z}$ ppm + 600 ppm from oil = ($\mathbf{z_z}$+800) ppm or (($\mathbf{z_z}$+800)/10,000) %

For ZDDPlus™

Calculate ZDDPlus™ dilution ratio using (x) quarts of oil:

ZDDPlus™ is 4 oz + (**x***32) oz of oil = ((**x***32) +4) oz total sump contents volume, resulting in:
(((**x***32) +4)/4) = **y** : 1 dilution ratio.

Calculate ZDDPlus™ phosphorus at dilution ratio using (y) from above:

ZDDPlus™ P 42700 ppm @ **y** : 1 = (42700/**y**) = $\mathbf{z_p}$ ppm

Calculate total phosphorus in final oil with ZDDPlus™ using (z_p) from above:

$\mathbf{z_p}$ ppm + 600 ppm from oil = ($\mathbf{z_p}$+600) ppm or (($\mathbf{z_p}$+600)/10,000) %

Calculate ZDDPlus™ zinc at dilution ratio using (y) from above:

ZDDPlus™ Zn 57277 ppm @ **y** : 1 = (57277/**y**) = $\mathbf{z_z}$ ppm

Calculate total zinc in final oil with ZDDPlus™ using (z_z) from above:

$\mathbf{z_z}$ ppm + 600 ppm from oil = ($\mathbf{z_z}$+800) ppm or (($\mathbf{z_z}$+800)/10,000) %

The above calculations for the 5 quart oil changes give typical results when used in many classic V8 engines. If you wish to calculate your dosing using an oil having different phosphorus or zinc levels than the typical 600 ppm P and 800 ppm Zn for SM oils, then substitute your values in the calculations.

If your engine has a 4 quart oil sump, the values will be approximately:
11% higher P for EOS: 1290 ppm for 4 quart vs. 1165 ppm for 5 quart.
10% higher Zn for EOS: 1558 ppm for 4 quart vs. 1420 ppm for 5 quart.

15% higher P for ZDDPlus™: 1894 ppm for 4 quart vs. 1641 ppm for 5 quart.
15% higher Zn for ZDDPlus™: 2536 ppm for 4 quart vs 2197 ppm for 5 quart.

We believe that the one bottle 4 oz ZDDPlus™ dosing is safe for use in 4 quart oil changes. If you feel that you would rather have your 4 quart oil change Phosphorus or Zinc concentrations closer to that shown above for 5 quarts, then merely use ¾ of a single bottle (3 oz) in an oil change. If the top is replaced snugly, the ZDDPlus™ will be usable in the next change, when added to ½ (2 oz) of a 4 oz bottle to equal the 3 oz dose.

If your engine has a 6 quart oil sump, the values will be approximately:
8% lower P for EOS: 1078 ppm for 6 quart vs. 1165 ppm for 5 quart. 7%
lower Zn for EOS: 1325 ppm for 6 quart vs. 1420 ppm for 5 quart.

12% lower P for ZDDPlus™: 1471 ppm for 6 quart vs. 1641 ppm for 5 quart.
12% lower Zn for ZDDPlus™: 1969 ppm for 6 quart vs. 2197 ppm for 5 quart.

The approximately 12% drop in P and Zn when using one 4 oz. bottle of ZDDPlus™ in a 6 quart oil change is negligible, and will give EP anti-wear protection for the cam and lifters of engines with even the highest spring pressures.

Referring to the results above using either method for a 5-quart oil fill, the addition of one 16-oz bottle of EOS would get you half way to an optimum level for a classic high-performance car, but carries with it 16 ounces of oil different from the oil you add it to. However, one 4-oz bottle of ZDDPlus™ gives the proper amount with a comfortable safety margin, and you choose all but 4 oz of the oil's characteristics with your favorite oil. If you factor in normal depletion rates, then only ZDDPlus™ has the potential to maintain adequate protection for duration of a 3000+ mile oil change.

ZDDPlus can be purchased at

Ames Performance Engineering
Kirban Performance Products
Tin Indian Performance
Paddock Performance & Restoration Parts
Performance Years
YearOne

ZDDPlus, LLC.
Burlington, NC 27215
www.zddplus.com

ZDDPlus™ Tech Brief #8

The Automotive and Oil Industry vs. the Aftermarket Viewpoint on ZDDP

There are some automotive industry representatives who are addressing the "flat-tappet and ZDDP" issue by claiming that the whole situation is hype, and there is nothing to worry about. Some say that the ASTM Sequence III tests are adequate to ensure that an oil which will pass that test will protect all flat-lifter based valve trains.

On the other side of the issue, the classic and performance car world is seeing wear and premature failure problems with OEM and aftermarket flat-lifter cam valve trains, which throw doubt on these industry statements.

Let's break this complicated situation into its component issues and examine each issue from both viewpoints.

History

ZDDP levels in motor oils have been reduced steadily since the time of SF oils in an effort by the automotive industry to comply with EPA guidelines regarding catalytic converter life. The most recent oil classification "SM" calls for no more than 0.08% phosphorus in motor oils. Phosphorus is one of the two major metallic constituents to ZDDP, the other is zinc.

The Automotive and Oil Industry Viewpoint

All oils are required to pass a battery of tests, including the Sequence III test, before they can obtain an oil industry certification. The Sequence III test utilizes a flat-lifter engine, and (among other parameters) is intended to quantify an oil's ability to protect flat-lifters and other components against wear. If an oil has a certification, then it is safe to use in flat-lifter engines. Any wear being seen out in the field is due to improper break-in or inferior cam or lifter quality.

End of story.

The Classic and High-Performance Car Industry Viewpoint

We are seeing a marked increase in cam and lifter wear in both OEM cams as well as aftermarket cams, especially in high-performance, high-lifter-foot pressure engines. Many aftermarket engine rebuilders are switching exclusively to roller cams for this reason. This remedy does not help the classic or high-performance car owner who wants to keep an engine stock, or just plain does not want to rebuild his engine with a roller cam due to the expense or because the engine is running well. Why is the automotive industry insisting that no problem exists when we are dealing with it in increasing measure day after day?

Our Analysis

We know of no ASTM or other reported research which concludes that an oil with little ZDDP is compatible with older flat-tappet high-performance engines.

There ***is,*** on the other hand, research that concludes that the minimum ZDDP requirement is directly related to the lifter foot pressure. In one SAE paper it is reported that: *"…at a ZDP level corresponding to 0.02% phosphorus, scuffing occurred at 200 pounds lifter load, while it required 240 and 480 pounds lifter load for oils containing 0.04 and 0.06% phosphorus, respectively, to initiate scuffing. At 0.08% phosphorus concentration, no scuffing occurred up to 600 pounds lifter load, the test hardware limit. Scuffing occurred at 350 pounds lifter load with no ZDP (0% phosphorus)."*

Figure 1 shows the graph of this relationship. Keep in mind, this would not represent the valve spring pressure at full lift; this is the lifter load, which is the open spring pressure times rocker ratio. This load is merely the static load due to the spring pressure. The actual load on the lifter foot is the sum of the static spring pressure, the frictional loading in the valve train, and the inertial loading of the mass of the valve train. The inertial loading is important in engines, which are designed to run at high rpms; indeed it equals the static spring pressure at the rpm where the inertial moment of the valve train masses causes the valves to effectively decouple from the cam, a phenomenon called "float". This means that at the point of valve float, the dynamic pressure on the lifter foot is **twice** the static spring pressure times the rocker ratio plus the frictional loading. While it is true that no engine is run at such a high rpm for any period of time, it makes the point that the lifter foot pressure in a high-performance engine can be much greater than that in a Sequence III test engine, which is run at a constant 3600 rpm with relatively weak springs.

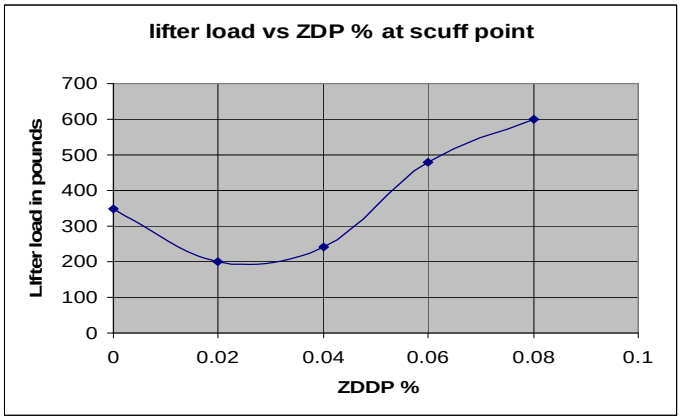

figure 1

The older engines may have lifter foot pressures several times that of a low-performance engine such as those used in the Sequence III tests. Consequently, their wear characteristics are not entirely predicted by common Sequence III testing methodology. The fact is all test sequences we have studied use non-performance engines with low spring pressures, indeed in the Sequence IIIG test, the static lifter load is 350 pounds. Many high-performance engines have as much as 500 pounds or more of lifter foot pressure. Referring to the Bennet data, this would indicate that, in order to keep from scuffing, a ZDDP level of 0.065% minimum would need to be ensured.

A factor not considered in this equation is that the ZDDP level steadily declines after initial oil fill due to the ZDDP being used up as it performs its job. Referring to the ZDDP depletion chart in figure 2, monitoring the actual ZDDP levels using Infra Red Absorption Spectroscopy shows that as the components in ZDDP are plated out on moving parts, the ZDDP concentration in the oil drops accordingly. This particular chart was derived from a study performed by the Noria Co. and Wooten Consulting, with equivalent ZDDP levels overlaid on the raw absorptance data. The significance of using Infra Red Absorption Spectroscopy is that it indicates the amount of ZDDP molecules present, not just the presence of atomic phosphorus or zinc. When ZDDP is being depleted in an engine, except for extremely small amounts that are consumed in combustion, the phosphorus and zinc are still in the oil sump, but are in forms that are not active as EP agents.

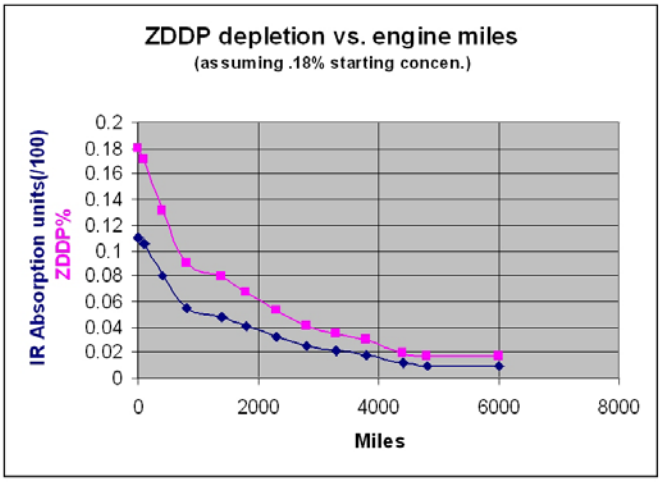

figure 2

If one factors depletion into the equation for a high-performance motor with 500 pounds of lifter foot pressure, Bennet's work indicates that a ZDDP level associated with minimum level of 0.065% phosphorus would be required to inhibit scuffing. If an initial sump fill of a SL-type oil with ZDDP giving a 0.08% phosphorus level was used, the depletion curve as shown on figure 2 would indicate the phosphorous level would drop below the 0.065% point in the first 500 miles or less. This means that if one desires a 3000-mile oil service interval and wishes to keep a high-performance flat-tappet engine protected, the initial ZDDP fill should give a phosphorous level much higher than this. The actual rate of ZDDP depletion after an oil change will vary greatly depending on the application, but this data shows a potential pitfall to thinking that the initial phosphorus level in the virgin oil is a constant. In the Barnes and Wooten article, they note that even though the ZDDP level is dropping, some additional EP protection is afforded by the ZDDP partial decomposition products, so there is probably some leeway in the actual depletion curve depicted in figure 2.

Although the SM spec calls for a maximum of 0.08% phosphorus, we wish it were true that all modern oils contained even 0.08% phosphorus in the form of ZDDP. Our recent tests of two major name brand oils bearing the SM grade contain at or less than 0.06% phosphorus. We know that there are technologies other than ZDDP which can function as effective EP anti-wear agents for some engine designs, as proven with newer engines with roller cam followers. The most recent SM formulations, in particular, have shown a move to Boron-based EP additives, with a concurrent further lowering in some oils to less than 0.06% phosphorus. While this is good news for the owners of new cars with catalytic converters, it does mean that in order to retain the SM certification they both claim, there has to be an EP additive different than ZDDP incorporated into both formulas, or that neither was intended to be used in high-performance flat-tappet engines.

Again, our study of the ASTM test sequences IIIE, IIIF, IIIG, IVA and VE required to achieve certification reveal that NONE were developed using high-performance engines. Indeed, these

tests were developed using relatively low-performance engines intended to model average current and emerging vehicle engine wear characteristics. This makes absolute sense considering the purpose of the oil specifications is to provide a standard set of performance criteria for oil to be used in new over-the-road automobiles and trucks. The standards are not intended to infer any degree of backwards compatibility with older or specialty engines. In one statement GM Engineer Robert Olree, while investigating the amount of ZDDP needed to protect engines, stated: "Arguing that modern oils should pass tests developed 25 years ago to protect engines built 30 years ago is a rather useless exercise [1]". Since he is employed to design lubrication for the next generation of motors, his perspective is understandable. In saying this, he is acknowledging the test is not specifically designed to quantify an oil's performance with older engines. Unfortunately, some of "those" engines are the ones we enthusiasts run and care about.

The classic or high-performance car owner is left with a few choices if they want to provide their car with proven motor protection for their flat-tappet engine: Use modern specialty oils, which claim to have ZDDP levels at or near the level in heavy-duty SF oils OR Use a modern SM oil with a ZDDP additive to bring the EP protection up to that provided by the ZDDP level in SF oil.

A check of current pricing on some specialty oils shows the average price per quart to be in the $8.00 and up price range, some as high as $12.00! This gives a 5-quart oil change a cost between $40.00 and $60.00. A cheaper solution is to buy a high-quality name brand SM oil of the exact viscosity range your engine calls for in gallon or 5-quart jugs. These can be found for between $12.00 and $25.00 for premium synthetic types. To this oil add the appropriate amount of a ZDDP EP additive to a target phosphorus level of 1300 to 1600 ppm. There are a few ZDDP additives on the market, namely the recently reintroduced GM EOS and ZDDPlus™. The main difference between these two EP additives is the relative concentration and cost. In order to achieve a phosphorus level of 0.14% you would need to add more than two bottles of EOS, and at $12.00 per bottle online, or $19.00 and up at the GM dealer, that would give you an additional $24.00 to $38.00 cost added to the price of the oil. Using a single bottle of ZDDPlus™ at only $9 is more economical.

Our conclusion and current recommendation is to augment one of the easily found, inexpensive new SM oils of the correct viscosity with additional ZDDP in order to bring the oil's EP characteristics back to that for which the engine was designed. It is easier and less expensive than searching for a specialty oil. We know from years of oil testing, ZDDP is compatible with all base stocks and other additive packages, including the newer Boron EP additives. So, there is little risk in adding it to achieve the equivalent of 0.12 to 0.14% phosphorus, a level similar to that formulated into SF or SG oils.

[1] **Olree**, Robert M., and McMillan, Michael L., 'How Much ZDP is Enough?', SAE pub **2004-01-2986, 11** (2004)

Gateway GTO Association

For Sale

Literature:
1964-1972 GTO Restoration Guides New from club store $15.00 **Contact** Chris Simmons @ 636-456-3653

Die Cast
GMP 1:18 Die Cast GTO's 1970 Blk Judge, 1972 Red GTO, $89 each plus shipping 1970 Triple Black convertible $350 plus shipping **Contact** Harry Smelcer 636-230-6120 or harry71gto@charter.net

Wanted

1970 GTO Red upholstery or hard plastic interior trim panels. Good/Nice used or better is OK. **Contact** John Johnson 573-581-8013 johnjohn@midamerica.net

68-70 GTO Rally II 14x6 steel wheels JA and JL, also Plain stamped wheels for 68-69 coded HG **Contact** John Johnson 573-581-8013 johnjohn@midamerica.net

Services Available

Tony's Carburetor Rebuilding
Call Tony Bezzole between 9am-1pm @ 314-878-6892

ABC DJ Productions
All types of occasions from weddings to retirement parties. Disc Jockey & Karaoke. **Contact:** Mobile Marty Howard @ 636-724-8641

Cee – Jay Auto Body ASE & I – CAR Certified shop 2123 East 23rd Street Granite City, Ill **Contact:** Cecil Morton @ 618-877-8254

JOHN NOVELLI's PONTIAC GTO RESTORATION WEB PAGE

64 GTO 65 GTO 66 GTO 67 GTO THE JUDGE
64 GTO HISTORY 65 GTO HISTORY 66 GTO HISTORY 67 GTO HISTORY
HURST HEAVEN HURST HISTORY 65 BLACK BEAUTY TRIPOWER INSTALLATION
http://webpages.charter.net/jnovelli/index.htm
CARS AND PARTS FOR SALE

Tentative Schedule of Events 2008

MARCH:

5th	**GTO MEETING** 7pm Wiliker's Restaurant, 1566 Country Club Plaza, St. Charles, MO (CLUB SPONSORED point value 20 - 40)
15th	**A PLOT OF MURDER** dinner theater murder mystery $23.00 per person to Steve Hedrick no later than Feb. 16th. (CLUB SPONSORED point value 20 - 40)
23rd	**EASTER SHOW lower** lot Forest Park is early to get spots together (CLUB SPONSORED point value 20 - 40)
29th	**SWAP MEET** Eureka Chamber of Commerce 1st Annual 7am-6pm
30th	**SWAP MEET** Knights of Columbus Bonne Terre, MO

APRIL:

2nd	**GTO MEETING** 7pm Wiliker's Restaurant, 1566 Country Club Plaza, St. Charles, MO (CLUB SPONSORED point value 20 - 40)
12th	**DYNO DAY** at Ranken Tech (http://www.ranken.edu/AboutRanken/Directions.asp) 9am (CLUB SPONSORED point value 20 - 40)
13th	**RANKEN SHOW** 10am-4:30 reg form at http://www.ranken.edu/AlumniRelations/carShowReg.asp
27th	**SWAP MEET CAR SALE** Gateway INT Raceway (Formerly at Riverport) 314-830-0873

MAY:

3rd	**ILLINIOS CRUISE** (CLUB SPONSORED point value 20 - 40)
7th	**GTO MEETING** 7pm Wiliker's Restaurant, 1566 Country Club Plaza, St. Charles, MO (CLUB SPONSORED point value 20 - 40
10th	**PERRYVILLE CAR SHOW** Knights of Columbus parking lot
17th	**POCI SINCLAIR** 10-3 (CLUB SPONSORED point value 20 - 40)
31 - June 1	**MUSCLE CAR REUNION** http://www.musclecarreunion.com

JUNE:

4th	**GTO MEETING** 7pm Wiliker's Restaurant, 1566 Country Club Plaza, St. Charles, MO (CLUB SPONSORED point value 20 - 40)
7th	**BEHLMANN SHOW** (CLUB SPONSORED point value 20 - 40)
8th	**HOT ROD POWER TOUR** Springfield MO
14th	**BEHLMANN RAIN DATE**
28th	**DRAG DAY** Benton, IL eat at Cathy Ann's, Benton IL after races. Please inform Shauna, as reservations are necessary. 636-734-0690

JULY:

2nd	**GTO MEETING** 7pm Wiliker's Restaurant, 1566 Country Club Plaza, St. Charles, MO (CLUB SPONSORED point value 20 - 40)
8th	**POCI NATIONALS** Spearfish, SD (CLUB SPONSORED point value 70 - 100)
12th	**DRAG DAY RAIN DATE**
15th	**GTOAA NATIONALS** Saratoga Springs, New York (CLUB SPONSORED point value 70 - 100)

AUGUST:

6th	**GTO MEETING** 7pm Wiliker's Restaurant, 1566 Country Club Plaza, St. Charles, MO (CLUB SPONSORED point value 20 - 40)
17th	**MUSEUM of TRANSPORT** All Pontiac Show (CLUB SPONSORED point value 20 - 40)
23 rd	**SKYVIEW DRIVE INN** (CLUB SPONSORED point value 20 - 40)

SEPTEMBER:

3rd	**GTO MEETING** 7pm Wiliker's Restaurant, 1566 Country Club Plaza, St. Charles, MO (CLUB SPONSORED point value 20 - 40)
7th	**WHEELS IN MOTION** (CLUB SPONSORED point value 20 - 40)
13th	**POCI WAGNER** (CLUB SPONSORED point value 20 - 40)
21st	**GTO PICNIC Vago Park** (CLUB SPONSORED point value 20 - 40)
26th - 28th	**ROUTE 66** CRUISE Springfield IL

OCTOBER:

1st	**GTO MEETING** 7pm Wiliker's Restaurant, 1566 Country Club Plaza, St. Charles, MO (CLUB SPONSORED point value 20 - 40)
4th	**QUALITY CAR SHOW** Bluff City sponsored show
11th	**MUSCLE TOUR** being organized by Chris Winslow (CLUB SPONSORED point value 20 - 40)
25th	**HALLOWEEN PARTY** (CLUB SPONSORED point value 20 - 40)

NOVEMBER:

5th	**GTO MEETING** 7pm Wiliker's Restaurant, 1566 Country Club Plaza, St. Charles, MO (CLUB SPONSORED point value 20 - 40)

DECEMBER:

13th	**HOLIDAY PARTY** Hawkins House

4450 NAZARETH HILLS DRIVE
ST LOUIS MO 63129