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THE TOYS OF SUMMER 20 Hot Convertibles

VOLUME 63

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COVER

45 Toys of Summer

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FOCAL POINT

TUNEUP FOR LE MANS

Audi's dorsal-finned R18 Ultra ran like a locomotive at the 12 Hours of Sebring, the No. 2 car of Allan McNish, Dindo Capello and Tom Kristensen winning by four laps over its No. 3 sister car. Is this a preview of what will happen at the Circuit de la Sarthe in June?

PHOTO BY RICHARD DOLE

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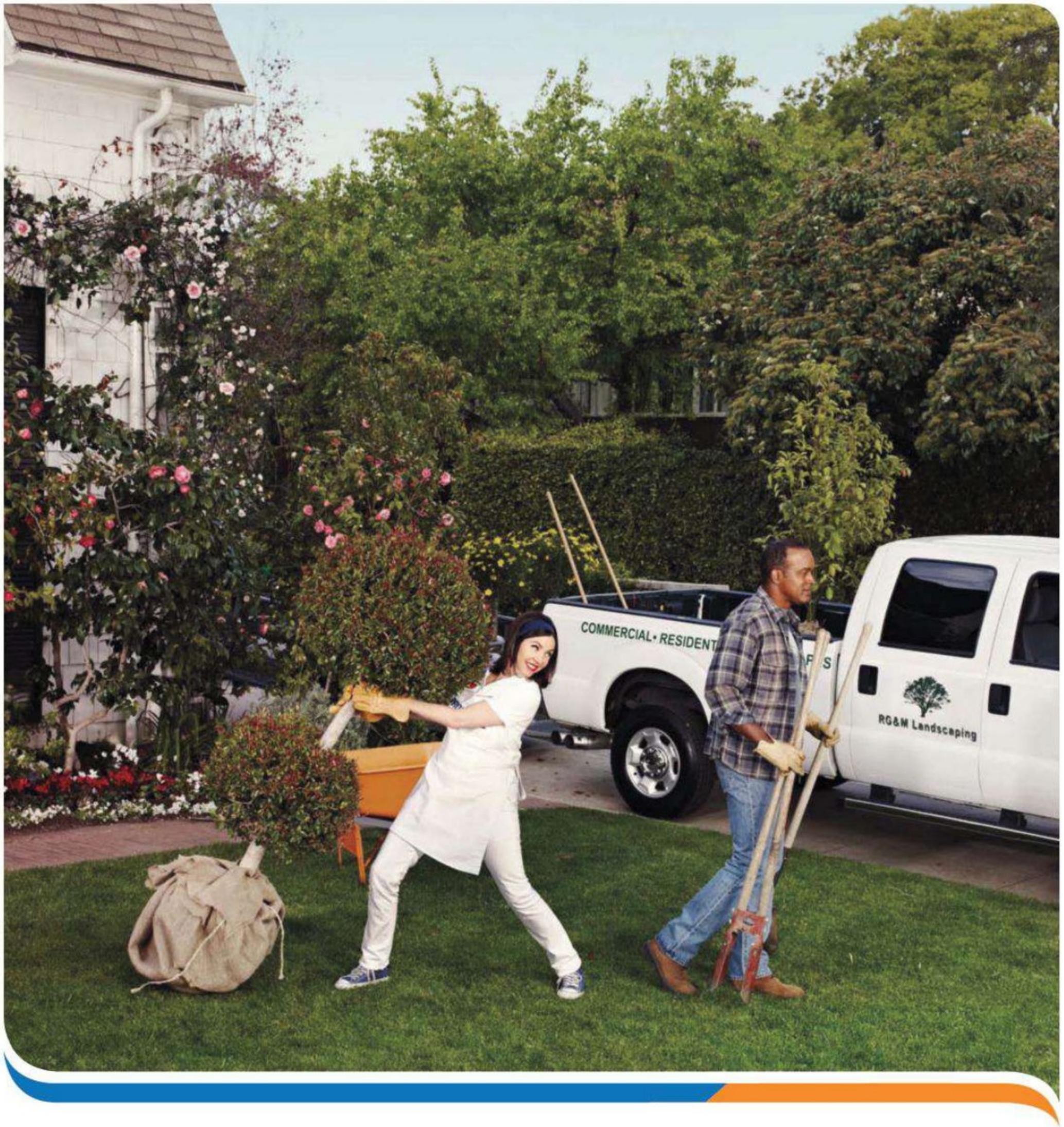
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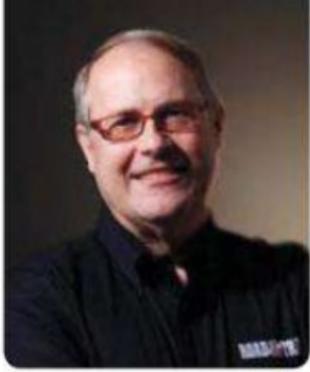
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ROAD AHEAD

BY MATT DeLORENZO
EDITOR-IN-CHIEF

The SUV: Scourge or Savior?

ONE THING THAT HAS UNITED MANY ENVIRONMENTALISTS and some enthusiasts is a mutual disdain for sport-utility vehicles. These large, car-cum-trucks are often seen as gas-guzzling, road-hogging physical embodiments of the worst in conspicuous consumption.

Oddly, for all the opprobrium heaped on this class of vehicle, the SUV lives on, like a certain undead count from Transylvania, but this time seemingly immune to whatever stakes society tries to drive into his heart.

It wasn't long ago Porsche purists reacted with aghast at the idea of the Porsche Cayenne. However, since then, many of these faithful have come to terms with the idea of an off-roader from Zuffenhausen. And to be honest, Porsche, then independent, might not still be around if it wasn't for the volume and profits produced from this vehicle in a segment far from the company's core business. In fact, so successful has Cayenne been, Porsche now plans a little brother called Macan. While the concept of a high-end SUV was not unheard of (see Land Rover/Range Rover), the acceptance of the Cayenne has opened the door to new luxury entrants from unlikely sources, the most recent being Bentley, which displayed a concept at Geneva, and Lamborghini, which showed its version of an SUV at the Beijing auto show.

While economics plays a large role in the thinking of these two limited-production makers of high-end cars, the other reason is not quite so obvious, a result of the law of unintended consequence. In most other

segments, particularly the mass market, an SUV is viewed as the largest, most fuel-inefficient and invariably most profitable entry in the lineup. However, if your *raison d'être* is to build lavish, high-profit, high-powered vehicles with 8, 10 or 12 cylinders, quite the opposite can be true. By building an SUV, which in some markets actually have a lower set of emissions and fuel economy standards applied to them than high-powered automobiles, a manufacturer like Bentley or Lamborghini can actually use an SUV to reduce its carbon footprint.

Stephan Winkelmann, Lamborghini's chief executive, notes that if the company decided to build its sexy SUV, he favors the use of a twin-turbo V-8 hybrid system that will get better fuel economy and emit less CO₂ than the V-10 Gallardo or V-12 Aventador. Further enticing Lamborghini to enter the SUV market is the fact that there is nothing quite like this concept on the market today, whereas the other model under consideration, the 4-door Estoque concept presented in Paris nearly two years ago, would face competition from the likes of the Aston Martin Rapide. So, the appeal of an SUV lies not just in the economic prospect of larger volumes (Lamborghini predicts a worldwide market of about 3000 of these vehicles, which is nearly double the 1602 cars it sold last year), but also the contribution that such a vehicle could make in reducing carbon emissions.

The same holds true for Bentley. While the reception its SUV concept received in Geneva can be charitably put as less than enthusiastic, such a vehicle in production, like the Lamborghini, could leverage a corporate VW platform and provide the basis for introducing diesel, hybrid or electric technology that could reduce overall emissions and increase fuel economy, offsetting the W-12 Continental GTs and Mulsannes.

Similar reasoning can be found at other manufacturers such as Maserati with its Grand Cherokee-based Kubang, yet another candidate for dieselization or hybridization in a model range that is currently only gasoline-fueled. So it seems that SUVs will soldier on for the foreseeable future, this time in the service of some pretty rarefied marques. And will probably spawn a new market for SUV license frames that read, "My other Lamborghini is a car."

■ Bentley believes that there is room for an SUV positioned much higher than Range Rover and Porsche Cayenne Turbo as shown by the lavish EXP 9 F concept that was shown in Geneva.



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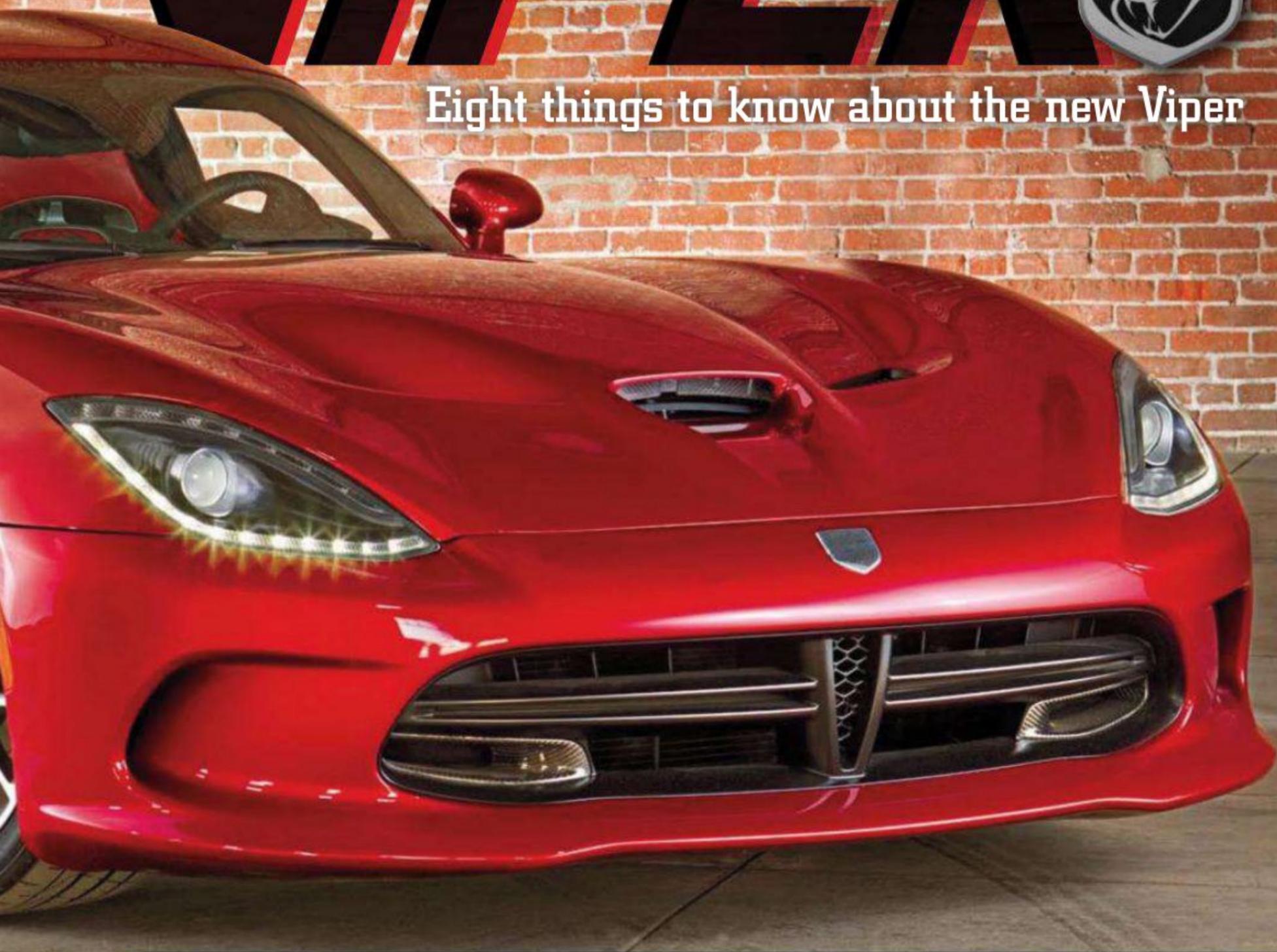
The redesign of the fourth-generation Viper began in the fall of 2009, in secret and off the books. Behind locked doors, Ralph Gilles and his team of designers headed by Mark Trostle began working on the shape of an all-new car. Their secret wasn't kept from the new boss for long, as Fiat CEO Sergio Marchionne gave it approval and direction. Gilles recounts, "He wanted to make sure the new car wasn't a relic; it had to be something contemporary but still respectful of its heritage." The result was a clay model that Sergio liked so much he showed it to dealers shortly after the Viper assembly line closed in July 2010. Two years later and the car Gilles fondly refers to as "Sergio and Ralphie's Viper" has been revealed at the New York Auto Show and is slated to go into production by the end of this year.



2013 SRT VIPER



Eight things to know about the new Viper



1 CHASSIS

Steel space frame is an evolution of the previous model's but is 40 lb. lighter and 50 percent stiffer. Front track is a half-inch wider, weight distribution is 49/51 percent and curb weight estimated at 3320 lb.

2 STABILITY CONTROL

Can be fully disabled, but there is also a track mode and launch control. ABS is now 4 channels instead of 3.

3 WHEELS AND TIRES

Wider Pirelli tires replace Michelins (295 front/355 rear) mounted on 18 x 10½ front, 19 x 13 rear wheels.

4 TRANSMISSION

Revised 6-speed Tremec with new tighter gear ratios and a new 3.55:1 final drive ratio. The estimated top speed of the new Viper is 206 mph, reached in 6th gear. Limited slip differential carries over.

5 BODY

Hood, roof and decklid are carbon fiber; doors and rockers are aluminum. All vents functional including the B-pillar scoops for the differential cooling. Windshield and side-view mirrors are the only carryover parts.

6 TRACK PACK

Option includes lightweight StopTech 2-piece brake rotors, monotube Bilstein dampers and stiffer springs.

Viper's redesign features a clamshell-style hood over its revamped 8.4-liter V-10 and a completely new leather-trimmed interior with improved ergonomics.



QUESTIONS WITH **Ralph Gilles**

PRESIDENT, CEO OF SRT AND SENIOR VICE PRESIDENT OF PRODUCT DESIGN FOR THE CHRYSLER GROUP



With an MBA from Michigan State and a BA in industrial design from the College for Creative Studies, it would seem Ralph Gilles is cast in the mold of other executives. But he's also a racer; he's competed in Targa Newfoundland and the One Lap of America. He's also served as a judge at Pebble Beach. But we think Gilles is really cool because he has a kart track at his house.

7 ENGINE

This evolution of the 8.4-liter V-10 produces 640 bhp and 600 lb.-ft. of torque with a redline of 6200 rpm. The design features a 7-lb.-lighter composite intake manifold, new forged pistons, aluminum flywheel and hydraulic engine mounts. Stiffer yet lighter block reduces weight by 25 lb.

8 INTERIOR

New cockpit is trimmed in leather, the transmission tunnel is lower, pedals remain adjustable and the dash features a center-mounted LCD tach. Sabelt-sourced seats feature a thin shell design allowing for more head room and 1.6 in. of height adjustability.

—Shaun Bailey



1

Will the new Viper be offered as a convertible?

There's nothing official but I would love to do a convertible. When we designed the new Viper, we prepared for it. If you look at the panels such as the roof, you can see that it's been designed to be easily removed.

2

Why is the coupe being built before the convertible?

There is a growing trend with track driving these days and we know the coupe is much more popular there. In the past, the coupe outsold the convertible every time, and I wanted the new Viper to be more track focused, so it was important to start with a coupe.

3

Is a V-8-powered Viper still a possibility?

We looked into it, but the V-8s we have in our portfolio physically would not fit. We even looked into V-8s from Maserati—there are no agreements between Maserati and us, but just to look—but the cylinder heads were too big.

4

What are you most proud of with the new Viper?

The overall shape, it's just gorgeous. We wanted to design a car that managed to be beautiful and aggressive at the same time.

5

Will there be future SRT-specific models to follow?

God, I hope so. We don't know, but this paves the way and we will be exploring other opportunities.



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Convertibles

COMING SOON

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PHOTO-ILLUSTRATION BY CHRIS DOANE

2014 Ferrari F12 Spider

PRODUCING 730 BHP FROM ITS 6.3-LITER V-12 ENGINE, THE F12berlinetta is boasted as Ferrari's fastest production car to date. And with an honor such as that, a Spider trim seems only natural. Using technology from the 458 Italia Spider, we believe the F12 would most likely be a retractable hardtop, especially considering Ferrari saved 55 lb. on the convertible Italia, which favors aluminum over canvas. With the F12's formidable powertrain, the Spider is expected to be the fastest roadster to wear the Prancing Horse.

2014 McLaren MP4-12C Roadster

WITH RIVAL HOUSES FERRARI AND LAMBORGHINI OFFERING TOPLESS variants of their models, it seems that McLaren will be joining the roofless bandwagon with a roadster version of the MP4-12C. According to our sources, the MP4-12C Roadster will rely on a folding hardtop of either aluminum or carbon-fiber construction instead of a soft-top. The 592-bhp twin-turbo 3.8-liter V-8 should remain the same, although the addition of weight that comes from chassis stiffening may throw off the fore/aft balance a bit. That said, we expect the McLaren engineers to stay true to the estimated performance figures of the coupe: 0-60 mph in 3.2 seconds, quarter mile in 10.9 sec. and 205-mph top speed.



PHOTO-ILLUSTRATION BY CHRIS DOANE



PHOTO-ILLUSTRATION BY CHRIS DOANE

2014 Subaru BRZ Roadster

OUR SOURCES SAY THAT TOYOTA ENGINEERS HAVE GIVEN A roadster version of the Scion FR-S a green light for production. If that's correct, a Subaru-badged BRZ iteration should follow suit—unusual for a brand not known for convertibles. But then again, Subaru wasn't known for their rear-drive cars, either. If it does happen, the lightweight chassis paired with a 200-bhp 2.0-liter engine would put the iconic Mazda MX-5 square in its sights... although the Subaru BRZ Roadster would likely cost somewhere in the neighborhood of \$30K.

2015 Audi A3 Cabrio

THE THIRD-GEN A3 MADE ITS DEBUT AT THE 2012 GENEVA Auto Show as a 3-door hatch, which won't make it to our shores. However, Audi execs promise that the U.S. version will be a 4-door sedan and an A3 Cabriolet is also part of the global product lineup. Although three engine options were announced at Geneva (1.4-liter TFSI, 1.8-liter TFSI and 2.0-liter TDI), we hear that a turbocharged 2.0-liter would most likely be the American candidate. A plug-in hybrid or e-tron version is also a possibility. Look for the A3 Cabriolet to arrive within a year or so of the sedan's 2013 debut.



PHOTO-ILLUSTRATION BY LARSON

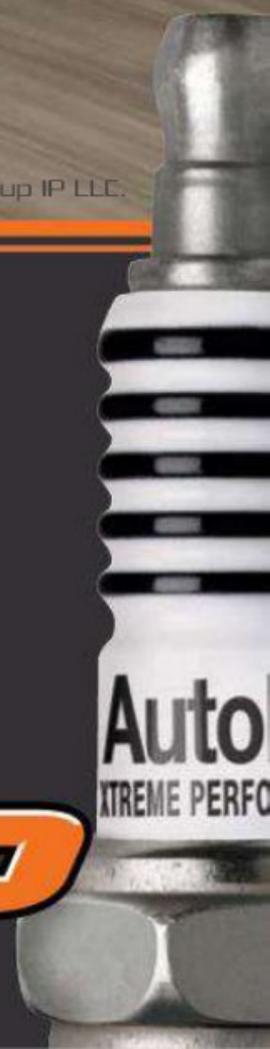


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LAMBORGHINI URUS CONCEPT

The fighting bull's third charge

WITH JUST TWO VEHICLES, THE Aventador and Gallardo, in its lineup, Lamborghini has been searching for a third model to boost its sales and improve its fortunes. At the 2010 Paris show, the company unveiled the Estoque concept, a 4-door sedan. While the show car was highly praised, the Italian

automaker felt that it would face competition head-on from the Aston Martin Rapide and from below its market position from the likes of the Porsche Panamera Turbo.

As a result, it has refocused its effort on the SUV market, which really doesn't have any high-priced, high-perform-

ance entries with the sort of extreme attitude for which Lamborghini is known. So at this year's Beijing Auto Show, it has taken the wraps off the Urus concept that not only provides a third model range, but also is unique in its market positioning. Lamborghini CEO Stephan Winkelmann says in order to be successful, the company would expect to sell 3000 worldwide, nearly doubling last year's combined sales of 1602 of its V-10 and V-12 exotics.

Although there is no firm commitment to build the SUV, Winkelmann says that it would likely be powered by a twin-turbo V-8 with a hybrid system putting out

600 combined hp. The extreme styling from Filippo Perini looks as if an Aventador has been dropped on an SUV chassis, while in the flanks, some of the Estoque's lines can be discerned. In addition to the Urus riding on massive 24-in. wheels, Winkelmann maintains that one of its key attributes is that it must have a low overall height, in this case just 65.3 in. Winkelmann said that when the decision is made to go forward (it depends on the approval of a new platform by the VW Group) it could take as long as four to five years for it to reach production, which means the 2017 model year at the earliest.—*Matt DeLorenzo*



2013 MERCEDES-BENZ SL65 AMG

When a boosted V-8 isn't enough...

AS THE TOP SL, THE NEW AMG version features a distinctive front fascia that incorporates a two-blade grille and lower inlet finished in gloss black. The distinctive three-pointed star is mounted on

two fins with airfoil profiles.

Powered by a twin-turbo 6.0-liter V-12, the SL65 AMG makes a prodigious 621 bhp and 738 lb.-ft. of torque. Mercedes said this missile is capable of accelerating to 60 mph

in 3.9 seconds with a top speed of 186 mph. Boasting 17 more bhp than the previous SL65's engine, the V-12 has been reworked with new turbochargers featuring an enlarged spiral cross section, new manifolds and wastegate channels to optimize airflow. On the exhaust side of the engine, AMG has modified the pipe layout to reduce backpressure.

The V-12 engine is mated to an AMG Speedshift Plus 7-speed sequential-shift transmission with a single automated clutch. The drivetrain has four individual drive modes including a fuel-saving start/stop mode.

Like the other new SLs in

the line, this latest model takes advantage of high-strength, lightweight aluminum construction—the only steel in the body is found in the windshield surround. Carbon-fiber composite body panels are also used to further reduce weight.

The new SL65 AMG is also fitted with an adaptable 2-mode sport suspension, plus 6-piston front and single-piston rear calipers clamping down on 15.4-in. front and 14.2-in. rear rotors.

The car is slated to hit showrooms this November, while the V-8 SL63 will go on sale in July. Prices for both AMG roadsters have yet to be announced.—*MDL*

Trust...V1 earns it one ambush at a time

Bogey Counter

Tells how many: Radar hiding within a false alarm? Two radars working the same road? Reads instantly.

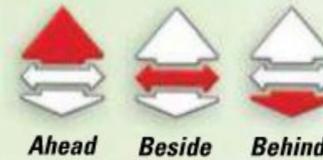
Radar Strength

More LEDs glow as radar strengthens.



Radar Locator

Tracks one or more radars at the same time; points to each.



RECEIVED BY EMAIL

V1 SEZ:
"LONE RANGER ONCOMING."

Hello Mr. Valentine:

Here's how much I trust my V1. Two beeps and I go Condition Red.

I was on 98 through Florida's panhandle. Only a two laner but the swath it cuts through Tyndall AFB is wide enough for a freeway, a broad ribbon of grass without interruption for a dozen miles, flat as the nearby Gulf of Mexico. A car pulled off the pavement is visible for miles, heh, heh, which means the speed nazis have no place to hide. So they adapt.

V1 gave me two beeps, weak ones, arrow pointing ahead. Then silence.

A few more beeps, arrow ahead, a singleton on the Bogey Counter. Then nothing. Traffic was light, only two cars in sight, one a half-mile ahead, another just a red speck in the distance. And a semi oncoming just my side of the speck.

More beeps, getting stronger, arrow still forward. The car ahead looked about even with the semi. A two-beep warning, by itself, isn't much to go on, but V1 tells me more—one Bogey ahead, strengthening as I go, says "lone ranger coming at me." So I locked the cruise on a legal 60 and waited.

Just as I met the 18-wheeler, "Beeeeeeeeeeeeeep!" And there he was, a Florida black-and-tan tucked in tight behind the semi trailer where oncoming cars couldn't see him, holding his instant-on till I was too close to defend. It's a wicked trap, but V1 had him every time he zapped the cars ahead.

All I had to do is trust V1. How can you not trust a detector that points to the trap?

Mick D. (identity protected)
Tallahassee, FL

RECEIVED BY EMAIL

V1 SEZ: "DON'T BELIEVE IT'S JUST A TRAILER!"

Hey Mike:

I gotta tell you about the Blue-Light Special that V1 found for me. It was Saturday morning and I was in my grins car heading to her house to pick up Danny boy for the day. Heck yes, I took the ridge route.

This road was all fun back before the rock slide. Now it's interrupted by a 25-mph construction zone and a "your speed is" trailer.

No workers today, of course, but the trailer still woke V1 up. As I braked, a string of crotch rockets zoomed large in my rearview, five of them, right on my butt as I passed the trailer.

V1'S WARNING OF A NEW BOGEY.
"De-deet," said V1. Then "de-deet" again. And another "de-deet." The Counter showed four signals where I normally see one. One arrow pointed behind to the trailer as usual, but that leaves three in the wild. The flashing arrow points ahead.

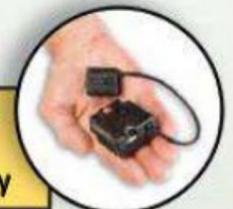
We'd barely cleared the zone when the rockets blew by me, exhausts shrieking, the bikes laid over for the uphill left hander. They vanished over the crest. Me, I just moseyed, eyes out for three jokers. Just over the hill—Bingo!—a sheriff SUV hidden in the bushes. That's joker no. 1. Two more somewhere.

At that point the view opens as the road sweeps right over the valley. And maybe a half-mile ahead, light bars strobing blue, jokers no. 2 and 3 angled across the road, blocking five bikers still astride their motionless sickles.

V1 really works, except for those who don't have one yet.

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Radar Fanatic

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FISKER ATLANTIC

Project Nina's new name

THE SECOND AND SMALLER PRODUCT RANGE IN FISKER'S LINEUP WILL BE CALLED the Atlantic, which the company will build at the Wilmington, Delaware, plant acquired from General Motors.

Known as Project Nina, the Atlantic is the size of an Audi A6/BMW 5 Series and will feature the same range-extended EV technology as the larger Karma. While the electric motors and batteries will be similar, the range-extending turbocharged 2.0-liter 4-cylinder will be sourced from BMW instead of GM. No firm timetable has been set for the vehicle's introduction, however.—MDL

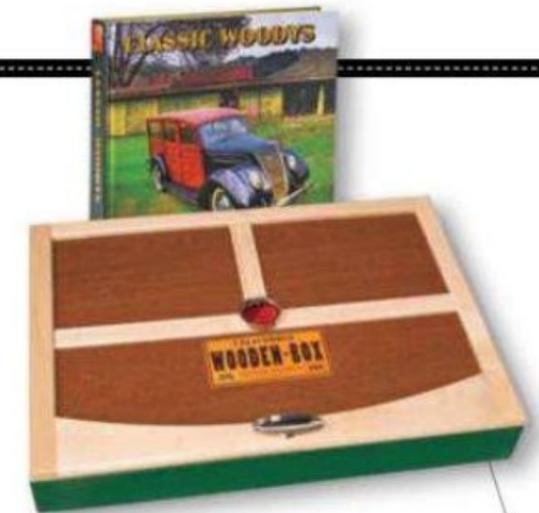
CLASSIC WOODY'S

By David Fetherston

WHEN DAVID FETHERSTON SET OUT to do a book on Woody station wagons, he decided to cover the subject thoroughly. The result is a massive 400-page work that comes in a large wooden box that looks very much like the tailgate on my 1948 Ford Super Deluxe wagon. And the book nicely covers Woody wagons from every manufacturer, from Buick to Studebaker, plus minor brands such as American Bantam, Willys, Nash and Reo among others.

The author describes and details the history of Woody wagons and presents them in wonderful photographs. Fetherston notes that this was a five-year adventure and is a self-published book available only through his website: dfwoodybook.com. He also caps the run at 500 books in the box, and for owners and lovers of Woody wagons, this is a wonderful and remarkable treasure.

The thoroughness of David's work is illustrated by the attention to people who refurbish, renew and restore



Woody's, and I was delighted to see an envelope of business cards from these experts, including one from Suzanne and Doug Carr of the Wood'N Carr in Signal Hill, California, as they were terrific in helping us with our Woody restoration some 21 years ago.

The world of Woody wagons is a magical place, and people just love to look at them, inside and out. They are truly works of art from a bygone era that capture the hearts of young and old. If you are an enthusiast of these wonderful automobiles, you may want to jump online and contact David Fetherston.—Thos L. Bryant

\$495 (includes wooden box, wood samples, window stickers, business cards of experts and a plastic Woody model, plus free shipping).

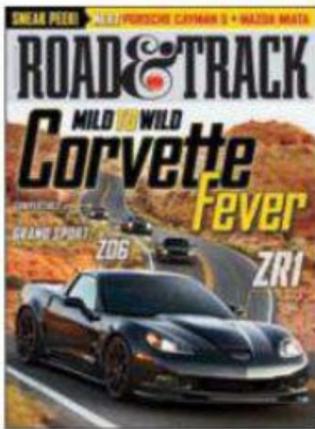


*FORMULATED
FOR FANATICS*





YOUR TURN



Not so sticky



In "Corvette Fever" (Road Test Comparison, April 2012), you list the standard Chevrolet Corvette's skidpad results at 0.82g. More than 100 cars listed in the Road Test Summary have higher skidpad ratings. Is it possible that cars like the Buick Regal, Nissan Maxima and Hyundai Sonata have better results than a Corvette? Even the Nissan Leaf had a rating of 0.81g.

Lou Patrie
Gilbert, Arizona

The Corvette's skidpad rating is tire-related. Both the base convertible (which had the optional Magnetic Ride Control suspension) and coupe utilize the same wheel/tire package, as can be seen in their skidpad figures (0.84g and 0.82g, respectively). The tire in question, Goodyear's F1 Extended Mobility Tire (EMT), is a relatively heavy run-flat tire and doesn't offer a high level of steady-state cornering force. They're fine for transitions, though, as the base cars' softer suspension suits the tires nicely.—Ed.

KEEPING IT CLEAN: Just read and enjoyed the article on high-octane fuels ("Premium Fuel Futures," April 2012). I was surprised when you discussed detergent packages that you didn't mention the Top Tier Gasoline website www.toptiergas.com. This site includes BMW, GM, Honda, Toyota, VW and Audi's established standards for effective detergent packages, as well as listing the fuel providers that meet the Top Tier standards with all grades of gasoline.



John German
International Council on Clean Transportation
Ann Arbor, Michigan

PROS AND CONS: Matt DeLorenzo's editorial (Road Ahead, April 2012) on electric vehicle market share makes the assumption that liquid fossil fuels will always be easily and cheaply available. Electric vehicles are more efficient, pollute less and use domestic energy sources (both my EVs carry a "Powered By American Electrons" bumper sticker). And, as you're discovering, they can be a real hoot to drive.

Frank John
Brooklin, Maine

By 2030, we will still be using fossil fuels for 85 percent of our transportation needs. There is real progress being made in both emissions and efficiency of the gasoline internal combustion engine. The problem with plug-in electric and hybrid electric vehicles is that the manufacturing process for the lithium-ion battery is extremely dirty. If you are buying one of these hybrid or plug-in electric vehicles to reduce your carbon footprint, I would encourage you to do some research on both the battery manufacturing process and the battery disposal process.

Carl LaVerghetta
Arnold, Maryland

HONDA TUNES: I was thrilled to read Dario Franchitti's beautifully written essay on his experience driving the historic 1965 Honda RA 272 Formula 1 car (Feature, April 2012). Dario's comment about the sound of the

RA 272 brought back interesting memories for me. In 1965, I had a night job working at a restaurant in La Crescenta, California. Ronnie Bucknum was testing the RA 272 in Japan, but when he was stateside, he would occasionally come in. On one of his visits he gave me an original audio tape of him lapping the Suzuka test course in the amazing new car. The tape includes warm-up, start, pitstops, esses, etc. As Dario Franchitti explained in his article, the sound of the Honda is remarkable.



David Bagnard
Garden Valley, Idaho

NORMAL NOISES: I want to correct a characterization concerning noise, vibration and harshness (NVH) and buzz, squeak and rattle (BSR) in Tech Tidbits, April 2012. It is not a matter of frequency. Rather, NVH deals with noises or vibrations that occur when the vehicle is functioning as it should. BSR deals mainly with things gone wrong during the design stage or assembly process. In large companies, BSR and NVH engineers may work in different departments. In smaller companies, they are often the same guy.

Tom Reinhardt
Boerne, Texas



CLASSIC BEAUTIES:

I was very pleased to see the excellent story on GTOs by old friend Chuck

Queener (whom I met in 1968 through mutual friend Phil Hill). Curiously, when Henry Manney III, then R&T European Editor, returned home in 1967 after a 10-year career overseas, we had lunch at the R&T offices. Henry told me he had a problem...owning two Ferraris. One had to go. He offered me the GTO with a high finish at the Le Mans 24 Hours...or John Surtees' personal 330 GT Coupe in maroon color. "Take your pick. \$6000 for either one!" My, how times have changed.

Jim Sitz
Grants Pass, Oregon

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PHOTOS/ILLUSTRATIONS BY BRIAN BLADES, JOHN LAMM & CHUCK QUEENER





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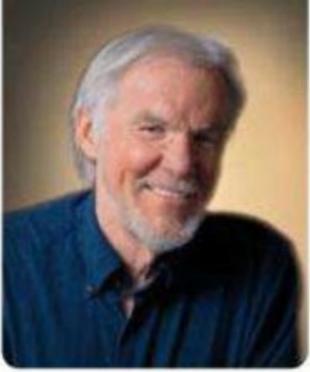
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SIDE GLANCES

BY PETER EGAN
EDITOR-AT-LARGE

A Couple of Sliders

ONE SPECIFICATION YOU WON'T FIND IN THE 1997 Ford Econoline Owner's Manual is how many stripped-down Crossle Formula Ford frames will fit side by side in the cargo bay.

The answer is "two."

I happen to know that because I loaded two of them into my own Econoline last month and took them from our place in Wisconsin down to Sterling, Illinois. This pleasant little city lies along the banks of the Rock River and is the home of a race-car fabrication shop called Prince Race Car Engineering.

I met the owner, Pat Prince, many years ago at the SCCA Runoffs at Road Atlanta, where he was fettling the victorious Lotus Super Seven he'd built with 1977 D-Production Champion Tom Robertson. I had several beers and a big plate of barbecued ribs with Pat and Tom one night at a crowded joint near the track, and we've been friends ever since.

I was building a Super Seven race car myself at the time, so we had a lot in common. Lotus Seven owners are not like other people, you see; our weirdness gives off a beatific, radium-like glow that only those of the true faith can perceive. Picture the Twelve Apostles, if they all owned cars with weak rear axles.

Okay, so Lotus owners are indeed blessed. But why two Crossle frames, you might ask. Don't most people have just one?

Well, yes, and I had just one until a few months ago. Then my friend Pete Wood called and said: "After 20 years of racing my Crossle, I'm finally hanging it up. A guy from France is buying the car, but I've got a spare bent frame in my shop and wondered if you'd like to have it."

"How did it get bent?"

"I was coming out of Turn 8 at Road America

and my steering wheel broke off. I hit the bridge abutment at the Carousel. It was a glancing blow, but it bent a few tubes. I was going to have it fixed, but I found a good used frame before I got it done. Would you like the old frame? It's free to a good home."

"Sure," I said. "I'll come right over and get it."

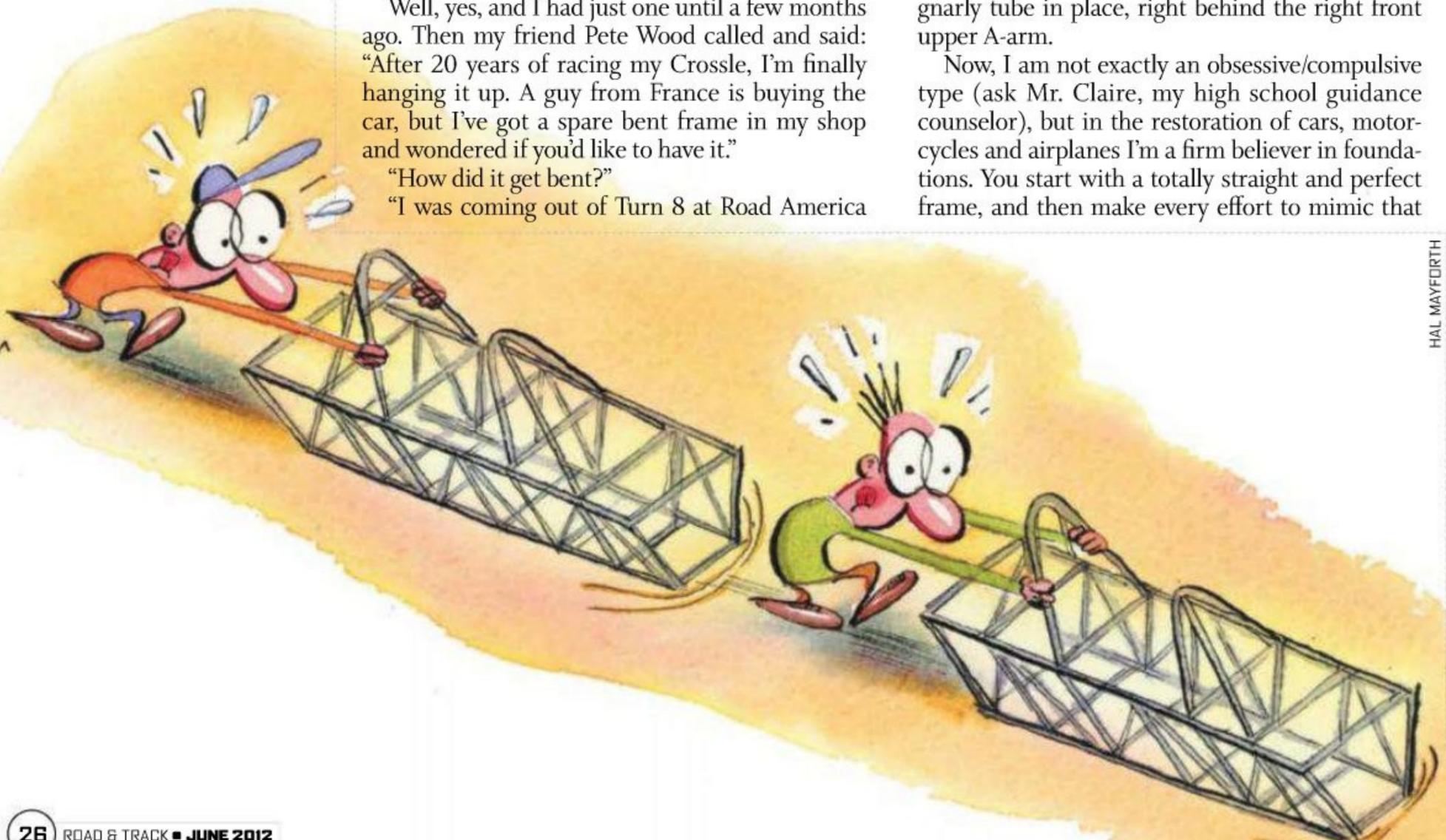
Who can turn down a spare bent race car frame? Hardly anyone with an ounce of sense. And, to paraphrase Chet Atkins, I have more sense than most people have in their little finger. So of course I ran right over to Pete's shop and loaded the thing into my van.

Pete's frame was actually a 35F model, which is just a slightly upgraded version of the 32F, in that it allows you to remove the starter motor without so much gnashing of teeth. The frames are interchangeable, and this particular one had been completely bead-blasted down to bare metal, with all those typically beautiful Anglo-Celtic brazed joints visible. Fully prepped for straightening. A nice spare to have.

Meanwhile, back at my own shop, there lurked upon two sawhorses the bare frame from my own Crossle. This one—derived from the car I bought last summer and raced twice—was in slightly better shape. It had been restored only a year or two earlier and neatly powder-coated. The frame was square, vis-à-vis suspension pickup points, but the restoration shop had left a slightly bent and gnarly tube in place, right behind the right front upper A-arm.

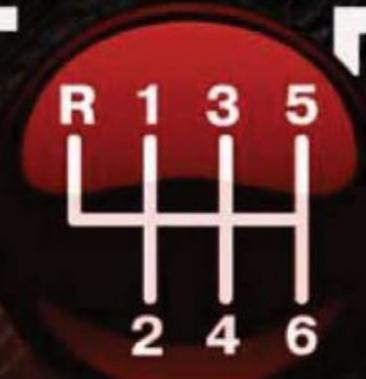
Now, I am not exactly an obsessive/compulsive type (ask Mr. Claire, my high school guidance counselor), but in the restoration of cars, motorcycles and airplanes I'm a firm believer in foundations. You start with a totally straight and perfect frame, and then make every effort to mimic that

"Who can turn down a spare bent race car frame? Hardly anyone with an ounce of sense."



HAL MAYFORTH



THE DIFFERENCE BETWEEN
DRIVING
 AND JUST GOING THROUGH THE
M  **TIONS.**

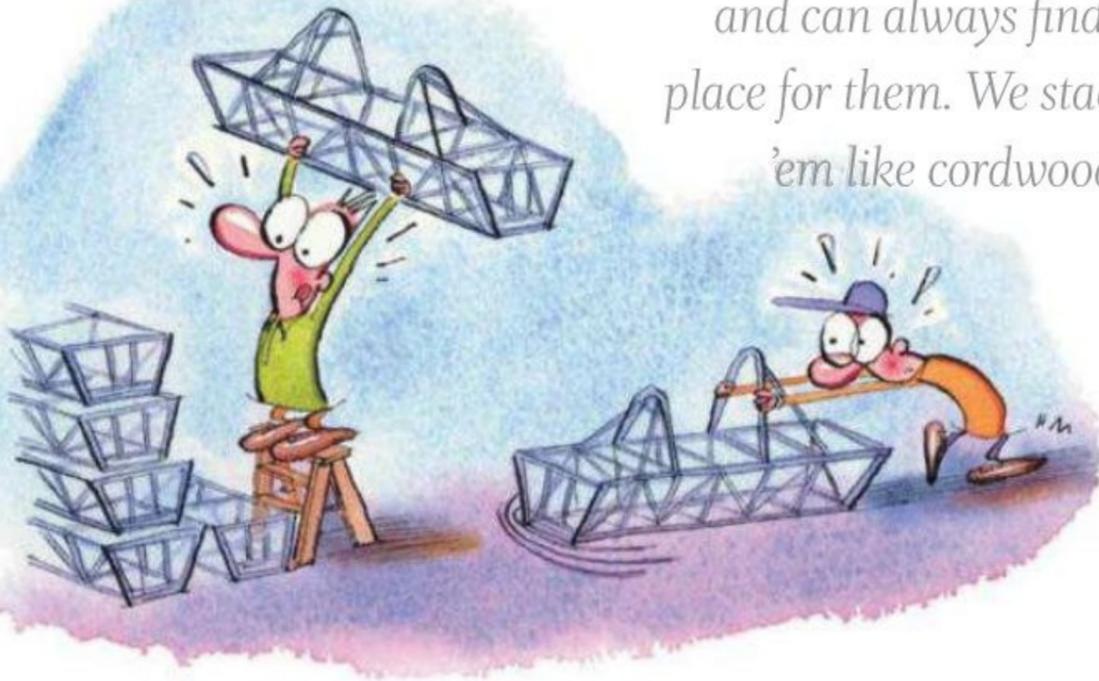
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“Ah!” Pat said happily,
 “a couple of sliders! We
 love sliders around here
 and can always find a
 place for them. We stack
 ’em like cordwood.”



HAL MAYFORTH

perfection in each piece that goes back on the machine. Any omission or failure of effort along the way will come back to haunt you. You'll probably miss a few things anyway, but you have to make the effort not to.

Basically, I'm not truly happy until I've held every part in my own hands and examined it under a bright light. A race car is really just a vast collection of personal esthetic and technical choices, so I like to arrange things to fit my own prejudiced sense of order and appearance. The project essentially becomes a mirror of your own soul, and you hate to have “Dorian Gray” written on the side of your race car.

So that bent section of tubing in an otherwise nicely restored car has been bothering me every time I look at it, kind of like a picture of Scarlett Johansson with one tooth blacked out. You try not to notice the tooth, but it doesn't work.

Therefore, when I took the drivetrain out to fix a broken clutch and get the engine rebuilt at the end of the season, I just kept going. In one feverish weekend (blame the Red Bull) I had the Crossle completely stripped down to the bare tub. The car all but exploded into various piles of parts; suspension over there, wheels stacked in the corner, fuel cell on a shelf, instruments and wiring nested in a box, etc. At that point I called Pat Prince.

“I've got two Crossle chassis,” I told him, “and they both need repair. Would you be able to look at them?”

“Sure,” he said, “but we don't have room for two rollers in the shop right now.”

“These are just bare frames,” I said. “No suspension or wheels.”

“Ah!” Pat said happily, “a couple of sliders! We love sliders around here and can always find a place for them. We stack ’em like cordwood.”

So I slid the two coffin-shaped sliders into the back of my van and drove them down to Sterling. Pat looked at both frames and said it would cost about the same amount of money to refurbish either one. He noted that Pete's old 35F frame was a bit stouter—and already bead-blasted—so I said, “Let's go with that one.”

There was actually a little extra historical incentive here, because Pete's old frame used to belong to my longtime buddy (and current guitarist in our garage band), Pat Donnelly. He raced it in the mid-'80s, at which time it was painted dark blue and in immaculate condition. In some odd, nostalgic way it would be cool to have Pat's old chassis fixed up and back on the track. Call it a recycling of mandalic vibrations. Very green.

So the old Donnelly/Wood chassis is now in Sterling, about to be reborn. Meanwhile, I've been spending my evenings and weekends preparing parts to go back on the car. Repacking wheel bearings, installing new CV joints on the halfshafts and greasing them. (I've been very greasy lately.) I've also replaced one rear stub axle (bad splines) and disassembled the Hewland gearbox, which needed a new input shaft. More worn splines.

The engine—which failed to blow up despite a wavering 20 psi of oil pressure—is with Steve Knapp at Elite Engines, getting the full rebuild and dyno treatment. And a new \$600 oil pump. The old one looked like an InSinkEerator after too many spoons had gone through it.

I should hasten to say here that I'm not complaining; this car's several looming problems were reflected in the reasonable price I paid for it, and most work on the car had been very nicely done. Much money had been spent on costly new parts—and paint as well.

But I may get the bodywork repainted anyway. It has a very nice black paint job right now, but looks just a bit Darth Vaderish for my tastes. I might replicate the paint job on my old Reynard Formula Continental, which was white with blue numbers. I tend to see myself as more Lancelot than Black Prince, though no one else apparently sees me as either. Maybe it's my Midwestern accent.

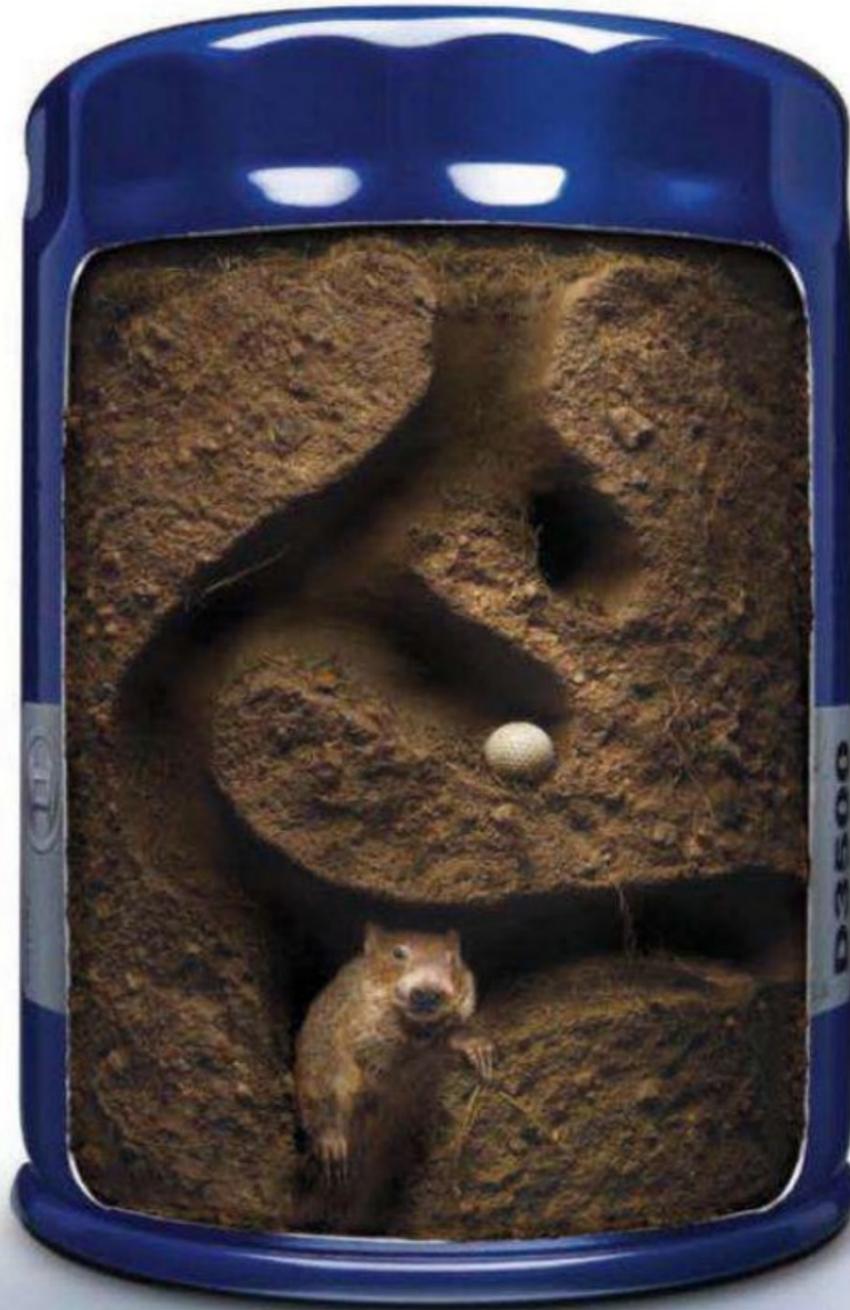
Barb is a bit perplexed by this total rebuilding of a car that appeared to be very nice. “I thought all it needed was a new clutch and an engine rebuild,” she said.

“It did,” I said. “But making a race car exactly the way you want it is half the fun of vintage racing. Maybe more than half. We're not trying to win a world championship here; the car's the thing. Also, it's a long winter.”

I didn't tell her I would never have bought the car if it didn't need help.



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COUNTER STEER

BY SAM MITANI
INTERNATIONAL EDITOR

Go Green the Simple Way: Change Tires

ANY RACING DRIVER OR PIT CREW BOSS WILL TELL you that the simplest way to make your car go faster around a racetrack is to switch to better tires. It seems that this philosophy may also hold true in getting better fuel economy and cutting down the level of CO₂ in the air. And just like with automobiles, new tire technologies are born at the racetrack.

Yokohama Tire first began using orange oil in its tire compound in 2009 for its Advan ENV-R1 race tire. This product combined orange oil with natural rubber to form a new compound that the company dubbed “Super Nano-Power Rubber,” which reduced petroleum content by about 10 percent while increasing the tire’s recyclability. And the best part was it still maintained performance equal to or better than a conventional racing slick in terms of both grip and durability. The ENV-R1 was the spec tire for the Porsche GT3 Challenge in the American Le Mans Series, and race cars shod with the tire took 1–2 overall at the 2009 25 Hours of Thunderhill. This technology has spilled over to the passenger car segment with the introduction of the Avid Ascend in March, the company’s first mass-market tire infused with orange oil technology.

“The Ascend lasts 20 percent longer than the conventional touring tire. It has lower rolling resistance, which means that the customer saves more than 100 gallons of fuel throughout the life of the tire. This can translate to \$380 in savings. Plus, the overall carbon footprint reduction of the Avid Ascend is better by more than 2000 pounds,” said Pat Keating, manager of technical engineering at Yokohama.

Another tiremaker using racing as a platform to promote its green tire values is Michelin. The French tire company sponsors the Green X Challenge, which awards race cars that go the farthest and the fastest with the smallest environmental footprint for energy used.

Michelin makes a number of energy-efficient passenger tires, and each one is stamped with the label “GreenX” on its sidewall. Forrest Pat-

erson, technical director at Michelin, explains how GreenX goes from the racetrack to the public road.

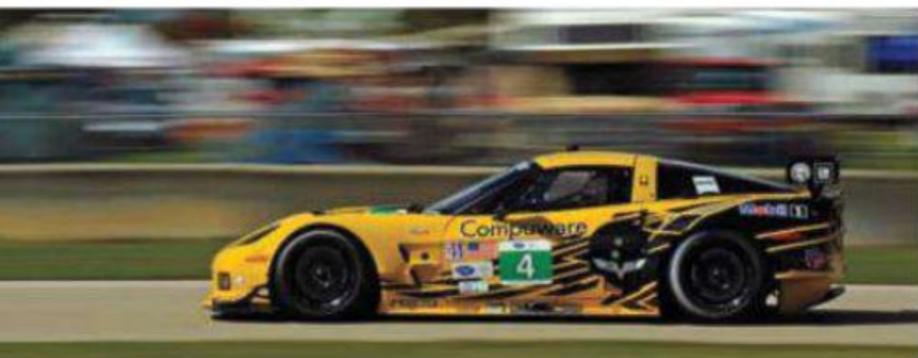
“The key to our motorsports strategy is continuing development of technologies that can be applied to future generations of our passenger car tires. We take key items from races and evaluate how they affect our research and development efforts in the passenger tire segment. With the addition of silica in the tread, which helps to lower rolling resistance of the tires, we were able to help consumers improve fuel efficiency without compromising performance in traction, grip and tread life. This means that GreenX performance is available for almost any type of vehicle or usage,” he said.

In mid-March, during the 12 Hours of Sebring, these green tires were on full display. First was the Patrón Porsche GT Challenge where all the race cars were on Yokohama’s orange oil-infused ENV-R2 slicks. (And no, they don’t smell like oranges; nor do they polish the track surface to a sparkling shine.) In the faster classes, a number of participants also used Michelin tires. In fact, the much-hyped DeltaWing made an appearance, wearing “green” Michelins.

It seems ironic that racing has become a test bed for green technology for tires. But as Patterson points out, race tires with superior rolling resistance means fewer tires used, which translates to less raw material (rubber, oil, steel, etc.) consumed to make those tires, less energy (electricity, steam, human energy) needed to convert those raw materials into tires, fewer transport trucks rolling down the road to deliver the tires from the warehouse to the racetrack (less fuel, less traffic, less noise) and fewer tires flowing into the recycling stream after the race is over.

It seems obvious that these characteristics apply to our daily lives as well. As for me, I’ve already swapped my worn tires in favor of these new green ones on my personal ride...so I’m relatively guilt-free when I stomp the throttle from time to time.

“Racing has become a test bed for green technology for tires.”



■ Michelin-shod Corvettes and Yokohama tires on Porsches push the envelope for performance and recyclability.



PHOTO BY F. PEIRCE WILLIAMS

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What Matters to You?

Today, America needs fresh leadership to lead us as a nation out of this economic crisis. Leadership must come not only from our political leaders but also from the average citizen. The exporting of American jobs is a trend that must be stopped and reversed. When I walk into my local hardware store, I typically find 85% of the goods for sale are manufactured 7,000 miles away. Recognizable American brands have been forced by shortsighted management and buyers at large national chains to build factories overseas just to save a lousy \$.50 on a tape measure. To these ruthless buyers, it is all about the money. Rarely are product quality, the political system, human rights, animal rights and environmental costs to the planet considered, not to mention the cost to our society of exporting not only jobs, but an entire factory!

At MacNeil Automotive, we are doing our part for the American economy and for our 300 million fellow citizens and neighbors. My philosophy is that if my neighbor doesn't have a job, sooner or later I won't have a job either. For example, we used to have our All-Weather Floor Mats manufactured in England by a company that used antiquated, inefficient equipment. They made a decent floor mat for us, but we thought we could build a better floor mat for our customers using modern American technology, American raw materials and skilled American workers. So in 2007 we transferred all of our floor mat manufacturing back to the United States. Today, we build the best fitting, highest quality automotive floor mats in the world, right here in America.

Our machine shop is equipped with 17 CNC machining centers including four 4 axis mills and one 5 axis mill that produce between 30 to 50 injection and thermoforming molds per month. We have one shift of highly skilled American Journeymen toolmakers and apprentices, but our machines run 24 hours a day, 7 days a week. There is not a more efficient tool and mold making operation in the world - and guess what, it's right here in America. →



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David MacNeil
Founder/CEO

WeatherTech®

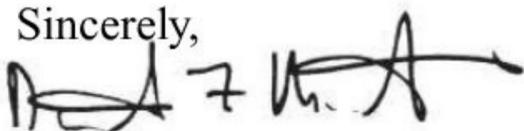
Furthermore, all of our CNC mills are manufactured in Oxnard, CA by Haas. Our 1,000 ton injection molding machines are made in Bolton, Ontario of American and Canadian components. Our thermoforming machinery is made in Carol Stream, IL. The raw steel and aluminum billets which make up our tooling are sourced from American steel and aluminum mills such as Vista Metals in Fontana, CA. The raw materials that make up our All-Weather Floor Mats, FloorLiners, Cargo Liners and Mud Flaps are manufactured in Bellevue OH, Arlington TX, Wichita KS and Jasper TN. Our forklifts are made in Columbus IN and Greene NY. Our warehouse racking is manufactured in Tatamy PA.

At MacNeil Automotive, we are also very aware of sustainability and our responsibility to the environment. We are proactive in controlling waste and recycling all of the unused raw materials from the manufacture of our tooling and products including: aluminum, steel, rubber, TPO, TPE, paper and cardboard.

As you can see, we are as dedicated to designing, developing and manufacturing the finest automotive accessories for our consumer and OEM clients as we are passionate about supporting the American economy, preserving the American industrial infrastructure, and keeping the “money” in our family, a family of 300 million people from all over America.

Life is simple; be good to your fellow man, be kind to animals and the environment, and place building a quality product, supporting your country and your fellow American worker before profit. And, one last thing - let's all do our best to balance family time with work time as our children are the future of America.

Sincerely,



David MacNeil, Founder/CEO



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Drives

JUNE 2012

- CHEVROLET SONIC LTZ VS MINI COOPER S COUPE VS FIAT 500 ABARTH
- DODGE AVENGER R/T
- KIA RIO SEDAN
- MERCEDES-BENZ F-CELL
- SUBARU IMPREZA 2.0i



CHEVROLET SONIC LTZ



VS



MINI COOPER S COUPE

TINY TURBO TRACK TERRORS!

THERE'S GROWING INTEREST IN THE SHRUNKEN-car segment largely due to their tidily packaged efficiencies, but manufacturers are also seeing an opportunity to capitalize on their intrinsic fun factor—being small and lightweight, they also happen to handle well. Thanks to turbochargers and some additional go-fast tweaks, what was once just affordable transportation is now genuinely entertaining to sling around an autocross or a few corners at, say, the local kart track—assuming you ask permission first, like we did.

Chevy's Sonic LTZ may look like a bit of an outlier in this group but that's because the upcoming RS model, which benefits from suspension upgrades, revised gear ratios and aesthetic treatments, wasn't available at the time of testing. Despite having the least power, the most weight (carrying two extra doors) and wearing H-rated tires, it posted some pretty respectable numbers. Its softer suspension allowed more body roll than the other two, though it understeered less than the Abarth.

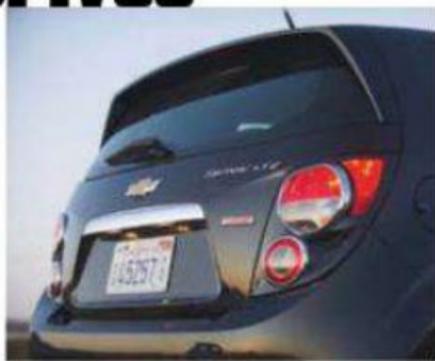
	2012 Chevrolet Sonic LTZ	2012 Fiat 500 Abarth	2012 Mini Cooper S Coupe
List price	\$17,235	\$22,000	\$24,600
Price as tested	\$18,695	\$26,050	\$32,150
Curb weight	2825 lb	2590 lb	2760 lb
Weight dist, f/r %	62/38	63/37	62/38
Layout	front engine/front drive	front engine/front drive	front engine/front drive
Engine	1.4-liter turbocharged dohc 16V I-4	1.4-liter turbocharged sohc 16V I-4	1.6-liter turbocharged dohc 16V I-4
Transmission	6-sp manual	5-sp manual	6-sp manual
Horsepower	138 bhp @ 4900 rpm	160 bhp @ 5500 rpm	181 bhp @ 5500 rpm
Torque	148 lb-ft @ 2500 rpm	170 lb-ft @ 2500 rpm	177 lb-ft @ 1600 rpm
Tires	Hankook Optimo H428, 205/50R-17 88H	Pirelli P Zero, 205/40R-17 84W	Continental ContiSportContact 3 SSR, 205/45R-17 84V
0-60 mph	7.8 sec	6.6 sec	6.6 sec
0-100 mph	23.6 sec	17.9 sec	17.1 sec
0-1320 ft (1/4 mile)	16.2 sec @ 86.9 mph	15.1 sec @ 92.5 mph	15.0 sec @ 93.8 mph
Top speed	125 mph	129 mph	139 mph*
Braking, 60-0 mph	126 ft	129 ft	119 ft
Braking, 80-0 mph	223 ft	234 ft	208 ft
Skidpad	0.84g	0.85g	0.92g
Slalom	69.4 mph	70.2 mph	70.7 mph
**Lap Time	1:11.4	1:09.6	1:08.1
Our mileage	29.4 mpg	29.2 mpg	26.7 mpg
EPA city/hwy	29/40 mpg	28/34 mpg	27/35 mpg

* Electronically limited. ** Grange Motor Circuit.

PHOTOS BY BARRY HATHAWAY



FIAT 500 ABARTH

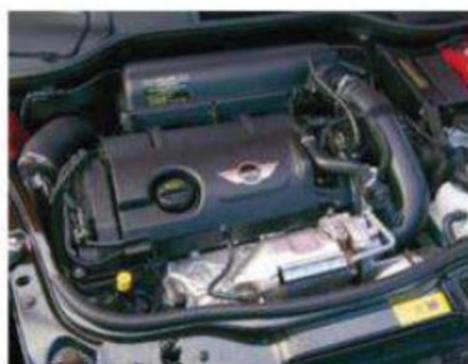


But what hindered it most around our 0.8-mile circuit was its lack of inner wheel-spin mitigation (electronic or mechanical), which puts your patience to the test at corner exits. Its interior is tastefully functional and the most ergonomically friendly of the bunch, and with its as-tested price tag under \$19K, the Sonic may prove to be the no-brainer choice for some.

The Mini Coupe S sports styling that only a mother, or ardent Mini fan, could truly adore. Like it or hate it, the improved dynamics from a stiffened chassis paired with the

■ The Sonic LTZ is the ergonomic champ, but we wish the sportier RS had been available.

boosted 1.6-liter and snappy gearbox makes for a winning combination—especially around any tight circuit. As the sticky Continentals gradually came up to temp, there was oversteer to be had, which is a boon in anything slow and decreasing in radius. While the decisive dynamic victor of this test, the Coupe does fall short of cargo space, user friendliness and rear visibility. If we stripped this car of every non-performance-related pleas-



antry, it would still command a price slightly over \$26K.

The long awaited Abarth version of the Fiat 500 has arrived with much of its Italian charm intact. Unfortunately, this also means a classically tall and upright driving position with a steering wheel column that won't meet you halfway. Get past these oddities (and the busy analog gauge cluster) and it's nothing but *amore* from thereon. There are audible hisses of turbo-spool and a wonderfully raspy exhaust note produced from its hydraulically valved MultiAir engine—not to mention twist that puts it neck and neck with the Mini. As mentioned before, there's a surprising amount of understeer given its weight and wheelbase (90.6 in.), but I suspect that conser-

■ Mini's turbo 1.6 has much more power than the 1.4 units found in the Sonic and Abarth.



■ An upright driving position and a tough-to-reach steering wheel characterize the Abarth.

vative alignment settings were implemented to avoid what could've been precarious high-speed twitch. On a strictly utilitarian note, the Abarth has more usable space than the larger Mini Coupe.

Each candidate has its strengths, and none is perfect, but I was most impressed by the Abarth's attitude, style and enthusiasm behind the wheel. All three, however, deliver on the concept of big fun in a small package.—Jonathan Elfalan

MORE ONLINE roadandtrack.com/FiatMiniSonic

2012 DODGE AVENGER R/T

Pentastar V-6 and firmer suspension transform this Dodge

AS A RATHER MAINSTREAM front-drive midsize sedan, the Dodge Avenger typically doesn't appear on our radar, but for 2012 there's a new R/T model fitted with firmed suspension, sportier looks and an excellent 3.6-liter Pentastar V-6, a smooth 4-cam engine that produces a healthy 283 bhp and is mated to a 6-speed automatic transmission.

Leaving a stoplight with lots of throttle, there's a hint of torque steer, but the Avenger impressed us with its improved overall refinement and well-damped suspension, which offers 18 percent more roll stiffness than a standard Avenger's. At the track, all-season tires kept limits low, but the R/T exhibits nicely snubbed body motions. With 62 percent of its 3630-lb. curb weight on the Avenger's front wheels, understeer is the primary handling characteristic, but it's felt only at the track and in aggressive street driving.

Inside, we like the unique gauge cluster with center-mounted tach, the leather-covered steering wheel, the soft-touch dash and the overall comfort of the heated front sport seats. And in addition to being quiet, the Avenger R/T is remarkably roomy, able to accommodate four large adults—and perhaps a small child—in good comfort, owing to a boxy greenhouse that also translates to excellent head room.

At \$27,440, fitted with options such as satellite radio, navigation and a 40-gig hard drive, the new Avenger R/T was a pleasant surprise. While we weren't bowled over by its handling numbers, it's quick, and it impressed us with its refinement, suspension tuning and value. The standard front-drive American sedan, even based on a chassis due for replacement soon, has come a long way.—Andrew Bornhop

List price	\$25,995
Price as tested	\$27,440
Curb weight	3630 lb
Engine	3.6-liter dohc 24V V-6
Transmission	6-sp automatic
Horsepower	283 bhp @ 6400 rpm
Torque	260 lb-ft @ 4400 rpm
0-60 mph	6.2 sec
0-100 mph	15.8 sec
0-1320 ft (1/4 mile)	14.7 sec @ 96.3 mph
Braking, 60-0 mph	134 ft
Braking, 80-0 mph	238 ft
Our mileage	est 20 mpg
EPA city/hwy	19/29 mpg

*Electronically limited.



R&T TESTED

0-60 MPH
6.2
SEC

0-1/4 MILE
14.7
SEC

TOP SPEED
118*
MPH

SKIDPAD
0.84
G

SLALOM
61.5
MPH

PHOTO BY BRIAN BLADES

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from the company that invented the art.
Introducing the 2013 SL.



It is one thing to have built a roadster of true icon status, and quite another to have repeated this exploit five times over. From its very first edition to the all-new 2013 model, no automobile has captured the hearts of aficionados like the celebrated Mercedes-Benz SL. And this generation's innovation will stun even the most impossible to impress. With an advanced chassis constructed of nearly 90% aluminum, the new SL is close to 300 pounds lighter. And with its bi-turbo V-8 producing a spectacular 429 hp, it will reach 60 mph in a scorching 4.5 seconds. The 2013 SL. The very definition of the modern luxury roadster. MBUSA.com/SL



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2012 KIA RIO SEDAN

Solid subcompact with some flair

IT'S DIFFICULT NOT TO PAY attention to Kia these days. The fastest growing brand in 2011 not only is turning heads with stylish design, it is keeping up the momentum by rolling out value-driven—and good-looking—models like the Kia Rio sedan. Fitted with a 138-hp, 1.6-liter direct-injection 4-cylinder engine mated to either a 6-speed manual or automatic, the Rio has impressive EPA ratings of 30 mpg city/40 mpg highway. The Rio

cruises effortlessly with minimal road or wind noise. The car's front MacPherson strut and rear torsion beam suspension handles normal road duties with competent grip. Opt for the sportier SX trim and you'll get thicker anti-roll bars to keep the car steadier through turns. Inside the cabin, the Rio sedan features a clean instrument panel where all the knobs and buttons are within easy reach.

To break out of the "boring" mold usually associated with subcompacts, Kia allowed us a few laps in the Rio B-Spec race

car. The folks at Kinetic Motorsports are offering a \$14,000 kit to transform the road-going Kia 5-door into a proper road racing machine. Running at a track outside of Orlando, Florida, the B-Spec offered good power and excellent handling—somewhat of a surprise from a front-driver. The B-Spec race series enables car enthusiasts to go

racing with street-legal vehicles at minimal cost.

Not in the racing mood? The 2012 Kia Rio sedan is a great buy for those looking for a solid and spacious little run-about. There are three levels currently available: LX, EX and SX. Pricing for this new sedan starts at \$13,400.

—Patrick Hong



RGT TESTED

0-60 MPH

9.1
SEC

0-1/4 MILE

17.1
SEC

TOP SPEED

101
MPH

SKIDPAD

0.81
G

SLALOM

62.6
MPH



PHOTO BY BRIAN BLADES

List price	lease only, see text
Price as tested	na
Curb weight	3850 lb
Motor	permanent magnet
Transmission	1-speed
Power	100kW (134 hp)
Torque	214 lb-ft
0-60 mph	9.1 sec
0-1320 ft (1/4 mile)	17.1 sec @ 81.2 mph
Braking, 60-0 mph	123 ft
Braking, 80-0 mph	225 ft
Our mileage	48.4 mile/kg (mpg-equivalent)
EPA city/hwy	52/54 mpg-equivalent

factory its own electricity onboard. And EVs exhibit all that off-the-line torque.

In more normal driving, the car's range gauge spent a goodly amount of time in a high 60s mpg-equivalent mode. In fact, so frequent was the gauge's real-time recalculating that

we tended to use it for driving-technique refinement rather than range assessment.

Best readings seemed to profit from a rather heavy foot off the line, quick acceleration to the desired cruising speed, then feather-footing to maintain the ambient pace. Come to think of it, this technique works as well with traditional cars. You know the kind I mean—those old-fashioned ones with internal combustion.

—Dennis Simanaitis

2012 MERCEDES-BENZ F-CELL

An EV that happens to make its own E

THE HYDROGEN HIGHWAY, already something of a reality in our neighborhood, recently got even more real. Mercedes-Benz gave us experience with an F-Cell sedan. And Shell cooperated by adding a quartet of hydrogen pumps at a nearby station. Only a few miles from our offices, this one is about equally close as our other hydrogen station at the Univer-

sity of California, Irvine.

The Mercedes F-Cell is a B-Class 5-door, one of 28 in our area. The others are on 24-month/30,000-mile leases for \$849/month, including insurance—and fuel. The hydrogen infrastructure is too immature at this point to establish formal pricing, but this local hydrogen sells for \$3.99/kg (think equivalently \$3.99/gal.

of conventional fuel).

The F-Cell traveled 223 miles during its week with us and consumed a total of 4.6 kg of hydrogen, thus delivering 48.4 miles/kg. In all candor, we might have been more conservative, but it's entertaining to scoot around in this FCEV. That is, recall that a fuel-cell car is nothing but an EV that happens to manu-

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Drives



2012 SUBARU IMPREZA 2.0i

Practical fun

LIKE IT OR NOT, CARS evolve. Some into things we like more, others not. For the majority of Subaru's customers, the new Impreza has morphed for the better. This 5-door 2.0i Premium model is bigger than the one it replaces. Ingress is easy with large doors and plenty of head room. Attention has been paid to improving the interior with soft-touch materials, and while this makes the Impreza friendlier to all occupants, Subaru hasn't forgotten key driving fundamentals like a 3-spoke steering wheel and manual transmission.

Yes, the available CVT is more fuel efficient, but the 5-speed we have here is a joy to shift and still returns decent mpg. The clutch is easy and steering nicely weighted. The numbers don't show it, but the Impreza remains fun to toss around—with Subaru's all-wheel-drive grip to pull

the sprightly performer out of any hole it may find. Standard equipment with the manual transmission is a viscous center differential that makes handling in a slide utterly predictable.

You won't find a 6th gear in the transmission, but no worries; the new 2.0-liter boxer engine revs freely and offers smooth linear torque, pulling hard early enough to allow tall gearing. It'll do 62 mph in 2nd gear and spin smoothly at 80 on the highway. Devoid of a nav system (an available option), our car's black-metallic center console looked and functioned beautifully. A double-DIN stereo is a nice

List price	\$19,595
Price as tested	\$20,845
Curb weight	3180 lb
Engine	2.0-liter dohc 16V F-4
Transmission	5-sp manual
Horsepower	148 bhp @ 6200 rpm
Torque	145 lb-ft @ 4200 rpm
0-60 mph	7.8 sec
0-100 mph	21.2 sec
0-1320 ft (1/4 mile)	15.9 sec @ 88.1 mph
Braking, 60-0 mph	133 ft
Braking, 80-0 mph	238 ft
Our mileage	25.5 mpg
EPA city/hwy	25/33 mpg

*Electronically limited.

touch, easily allowing personalized stereo installations, while a remote dash display provides ancillary data, like fuel economy and time. The Impreza is a year-round, do-everything runabout that seamlessly blends practicality and the fun of driving.—Shaun Bailey

MORE ONLINE roadandtrack.com/Impreza2

PHOTOS BY BRIAN BLADES



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It's a nice day, go outside and play! They're words of wisdom from mothers the world over and, if heeded into adulthood, result in a desire for a wind-in-the-hair, bugs-in-the-teeth experience. And in the automotive world, that means a convertible. So here are 20 ways to make the most of a nice day. There are plenty of convertibles out there, but only a few will quicken your pulse while allowing you to bask in the sunshine. So get out there and enjoy these toys of summer. Mom says so.

THE TOYS OF SUMMER

20 Hot Convertibles



1
TOP OF SUMMER

2013 PORSCHE BOXSTER

Pure athleticism

BY PATRICK HONG PHOTOS BY STEPHANE FOULON



Come for the more masculine shape and upscale interior; stay for the new Boxster's brilliant handling.



ST. TROPEZ, FRANCE—Like a little brother always fighting for attention, the all-new 3rd-generation mid-engine Porsche Boxster and Boxster S are eager to be set apart from their rear-engine big brother. And there is no better way to get that message across than top-down cruising under the sun in a bright yellow Porsche Boxster S, listening to the full-bodied exhaust note mixed in with the crisp Mediterranean morning air rushing by.

The new Boxster (codenamed 981) is 1.3 in. longer, has a 2.4-in.-longer wheelbase and sits 0.5 in. lower. Thanks to more extensive use of aluminum in the chassis compared to the outgoing model's, weight savings of 55 lb. (Boxster) and 77 lb. (Boxster S) are achieved. Overall, the base Boxster weighs 2888 lb. and the Boxster S tips the scales at 2910 lb.

The new mid-engine Porsche rides on all-around modified strut-type suspension. The steering system utilizes an electromechanical assist that takes place of the hydraulic setup used previously. There are two gearboxes available, the standard 6-speed manual or the optional redesigned 7-speed PDK, Porsche's own twin-clutch transmission retuned for more precise shifting.

The 981 Boxster is powered by a direct-injected 2.7-liter flat-6 with VarioCam Plus that's rated at 265 bhp and 206 lb.-ft. of torque. That's a gain of 10 bhp but a 7 lb.-ft. decrease compared to the previous engine. That said, the Boxster shows at least a 12-percent fuel economy improvement and can still launch from a standing start to 100 km/h (62 mph) in an estimated 5.5 seconds equipped with the optional Sports Chrono Package and PDK transmission.

Opt for the sportier Boxster S, and a larger 3.4-liter flat-6 with similar technological content resides amidships. The 315-bhp (plus 5 bhp) and 266-lb.-ft. (no change) powerplant with at least 10-percent better fuel economy can still propel you to 100 km/h (62 mph) in an estimated 4.8 sec.

On the outside, the new Boxster sports a more aggressive stance. Thanks to wider, more sculpted fender flares front and rear, the svelte



look of the past gives way to a more muscular appearance. The newly designed vertically stacked headlights take cues from the company's 918 hybrid sports car. Inside, the new Boxster has an upscale feel, thanks to design cues similar to those seen in the Panamera and the 911. The traditional 3-gauge look is still there, but now the far right one is a multi-functional display where you can choose other views such as a close-up map—a helpful addition to the main display where you can see a larger map, tire pressures, engine vital signs, etc.

On the curvy mountain roads near St. Tropez, our test car for the day—a yellow Boxster S equipped with Sport Chrono Package and 7-speed PDK—was the perfect companion.

Put the Boxster S in Sport Plus mode and everything comes alive. Not only does the engine note sound more explosive when you romp on the throttle, the 7-speed PDK also matches your eagerness to tackle corners. In manual mode, summon the gear you want with the paddles and the PDK responds instantly. In automatic mode, the PDK upshifts smoothly with a slight pause—not because it takes long to swap gears, but to make the engine sounds normally associated with manual shifting. And even through tight and winding switchbacks, the car seems to hold gears, or downshift quickly and precisely, almost as if it knows your wishes at every turn.

On a few of the World Rally Championship stage roads north of Nice, the Boxster S' steering and handling are absolutely impeccable. The confidence-inspiring way in which the Porsche turns into the apex and holds the trajectory makes you feel and look like a pro driver. In fact, with the car's wider front track (by 1.6 in.), a mid-corner adjustment asking for a tighter line is no problem. The car just grants your wish with minimal fuss and understeer. Throttle on through the corner exit and the Boxster S rushes forward, more with pure athleticism than with brute force.

The 2013 Porsche Boxster starts at \$49,500. The Boxster S is quite a bit steeper, at \$60,900. We can't wait to put these new Boxsters through our regular performance tests.

MORE ONLINE  roadandtrack.com/Boxster



ASTON MARTIN V8 VANTAGE ROADSTER

■ The new Aston Martin V8 Vantage Roadster picks up many features already seen on the Vantage S. The smoother-shifting Sportshift II 7-speed automatic transmission, 10-mm-wider tires, bigger front brakes and quicker steering ratio are meant to give even the base Vantage a sportier feel. Complementing the car's improved handling are a few exterior changes such as the front splitter and rear diffuser. The Vantage Roadster is a toy of summer of which James Bond would approve.



MINI ROADSTER

■ The Mini Roadster trades a polarizing helmet-roof design for a clean, manually operated soft-top that succeeds in creating a flattering profile and infinitely better rear visibility. All Roadsters continue to employ all versions of the fuel-efficient 1.6-liter inline-4 paired with excellent 6-speed gearboxes. Even with mild weight gain and inherent loss of torsional rigidity, this Roadster further underscores Mini's reputation for building cars that are perhaps best described as front-drive nirvana.





4 TOYS OF SUMMER

2013 MERCEDES-BENZ SL550

Mountain roads or
Rodeo Drive? Both.

STORY & PHOTOS BY JOHN LAMM

suspension, ESP stability control and other electronic saviors in your hip pocket as you turn in to the somewhat unknown. Being a Mercedes, the car has plenty of safety backup systems, from numerous airbags to a pair of rollover bars to special head restraints. Modern cars such as this roadster give one a lot of leeway and you'd be silly to stuff one.

You'd also pay dearly to fix your \$105,500 SL550.

This is the 6th-generation production SL, a descendant of the legendary 300SL Gullwing that came into being mainly because equally legendary U.S. importer Max Hoffman offered to buy a batch if Mercedes would build them.

They did, he did, and 60 years later we have a new SL that arguably shares more with that original than its predecessors. The 300SL was decidedly masculine, strong shoulders emphasized by creases along the tops of the wheel arches. Successive SLs were less masculine, the pretty pagoda-top version

MARBELLA, SPAIN—Bending and climbing, barely two lanes wide and scattered with scree, a mountain road on Spain's Costa del Sol might not seem the ideal test track for Mercedes' new luxury twin-turbo 429-bhp V-8 SL550, but we're lovin' it.

An SL550 can exercise its 516 lb.-ft. of torque through a 7-speed manual-shift automatic to 60 mph in about 4.5 seconds and heavy-breathe (that's 13.0 psi) to its electronically topped 130-mph limit. No doubt the SL would be great fun on a road circuit or a highway off in the hinterlands. But there's something special about rushing down a pine tree-lined lane of tarmac then across a narrow bridge before slipping around a cliff-edged bend.

It helps that you have Mercedes' suspension, ESP stability control and other electronic saviors in your hip pocket as you turn in to the somewhat unknown. Being a Mercedes, the car has plenty of safety backup systems, from numerous airbags to a pair of rollover bars to special head restraints. Modern cars such as this roadster give one a lot of leeway and you'd be silly to stuff one.

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actually graceful and somewhat feminine.

With the 2013 SL, we're back to added muscles, broader shoulders and a more forceful face. Some might argue it's a bit too aggressive; others will love the new SL for its athletic stance.

We're here to talk convertibles and what can be more convertible than a well-finished coupe that flips its hardtop to become a roadster in less than 20 seconds? Mercedes offers two lids. Standard is glass, the option called Magic Sky Control. It can be clear or, at a button's push, dark to offer shade.

Needless to say, the SL is comfortable with the top up, but the surprise is how cozy it is with the top down. As the temperature drops you can raise the side windows, then the windblocker behind the driver/passenger, turn on the heated seats and get the (optional) Airscarf whisking warm air on your neck...or any variation of these amenities.



The system works so nicely, you might stop, get out and be surprised how cool the ambient temp has become.

So get back in the SL, back into the 12-way adjustable seats, the environment of leather and polished wood, looking at the light-faced gauges ahead, then across to the systems screen. Below that is the COMAND multi-function controller, which is still a bit obtuse, but better than past iterations. The sound system—standard Harman-Kardon or optional (\$6400) Bang & Olufsen—will accept any media other than, perhaps, cassette tapes or brain waves to play your tunes. Mercedes is particularly proud of its new Front-Bass, which uses the forward body structure to enhance the woofers.

That structure is a new story for Mercedes. As with models from Audi, Ferrari and Jaguar, the SL has gone over to an aluminum chassis and bodyshell. This unibody mélange of castings, extrusions and panels is said to cut 242 lb. from an equivalent steel body-in-white, though overall torsional stiffness is up 20 percent. Aluminum is also used for suspension components, while magnesium is utilized in the roof frame.

Saving what some consider the best for last, the SL's direct-injected V-8 has 0.8 liters less displacement, yet 12 percent more horsepower and 32 percent greater torque than the previous 5.5-liter powerplant. What's more, it has stop/start and improved fuel economy.

While the new SL550 takes easily to nasty roads in Spain, it will be just as capable in its more native environs—place such as Palm Beach, Beverly Hills or Greenwich.

MORE ONLINE  roadandtrack.com/SL550



■ The SL550's variable-tint glass top is novel, but you'll want to stow the roof at every chance. The Airscarf system and heated seats ward off the chill; the 429-hhp twin-turbo V-8 provides the thrill.



5 TOYS OF SUMMER

2013 427 CORVETTE CONVERTIBLE

■ The long-awaited Convertible Vette with the heart of a Z06 is here. Its 505-hhp 7.0-liter V-8 resides in the wide-body steel chassis of a Grand Sport and promises a 190-mph top speed. Standard equipment includes MR suspension and a manual transmission. The 427, the last C6 model, is a fitting tribute to the Corvette's 60th anniversary.

AUDI R8 GT SPYDER

■ Some toys are cooler than others, and this lightweight GT painted in a flat metallic Sepang Blue is positively frosty. It's an exercise in supercar restraint, like a diamond lit with a single spotlight, not the whirly disco ball that is the Lamborghini Aventador J. Shedding some 187 lb. from a regular Audi R8 Spyder, the GT makes better use of its 560-hhp V-10, propelling it to a not so subtle or quiet 197 mph. Available only with an automated single-clutch transmission, the GT is focused singularly on open-air speed. All-wheel-drive launches and mule-kick paddle shifts thrust the GT to 60 mph in under 3.8 seconds while providing a V-10 exhaust note to stir the soul, and incur the envy of friends and neighbors. It's just what every summer needs.

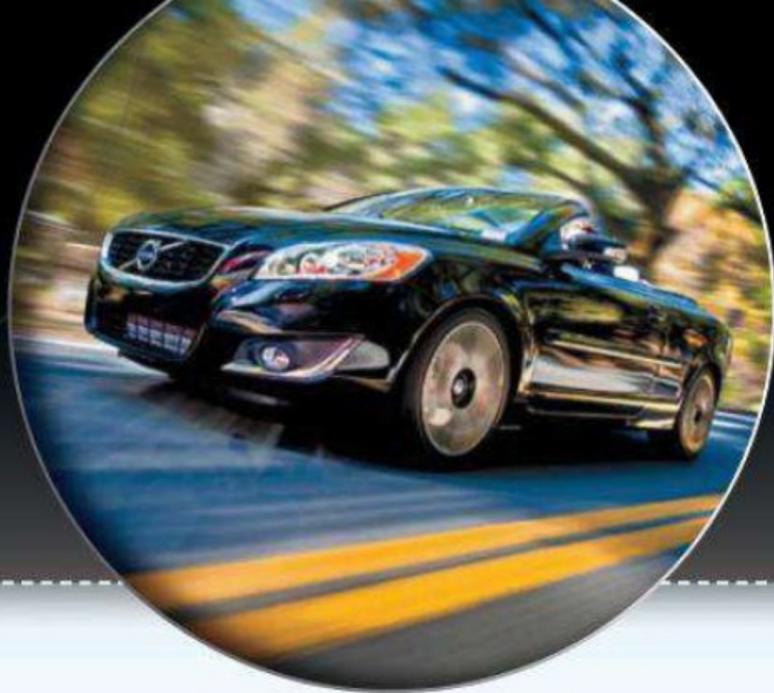
6 TOYS OF SUMMER



7
TOYS OF SUMMER

VOLVO C70 INSCRIPTION

Volvo's C70 Inscription is a shot in the arm to the aging though still desirable retractable hardtop. Available with either Black Sapphire Metallic or Ice White paint and eye-catching 18-in. "Midir" wheels, the \$3900 Inscription package also includes an indulgently stitched leather dash and active xenon headlights. With help from racing partner Polestar, the turbo inline-5 now makes 250 bhp. Just 500 units will come to North America.



8
TOYS OF SUMMER

JAGUAR XKR-S CONVERTIBLE

Rare breed of open-air cat

SAN DIEGO—What's remarkable about Jaguar's sensuous XKR-S Convertible is that it really does drive like the coupe version, only you're sitting outside. Of course, Jag designed the XK as a convertible, then added a roof for those poor folks devoid of motoring soul, so it's supposed to have the same rigidity and polished manners as the coupe. And it does.

That means the open-air XK's steering points precisely, doesn't bind with understeer as you wind in more lock, the cowl absolutely does not shake and with the top up the wind is something to infer from the speedometer. Furthermore, blessed with an active differential and nuclear thrust from its 550-bhp supercharged V-8, the headlining XKR-S definitely has the claws to gracefully tear up any bit of road you please.

But it's the XK's civilized aerodynamics that make it such a convertible delight. Unless it's raining or you have a note from your doctor, the top should be powered down. That's because the XK's sharply raked windshield and noticeably tumble-homed side glass guide the wind over and around the cockpit. A small wind blocker aft of the front seats completes the near targa-like enclosure, such that even at an observed 175 mph there may be wind noise, but the cockpit remains surprisingly draft free.

Wild excursions aside, the open XK stays reasonably hushed until 90 mph, when wind noise strains conversations. But below that, the lack of buffeting, the heated seats and steering wheel, plus the eager power and grippy handling make the XKR-S a most civilized—and fast—open-air-transport. —Tom Wilson

MORE ONLINE  roadandtrack.com/JagC





9 TOYS OF SUMMER

VW GTI CABRIOLET

Cast aside any notions that this new 4-seat GTI Cabriolet is a "chick's car." The turbocharged engine boasts 207 bhp, routed to the front wheels via a manual or DSG gearbox, both with six speeds. In true GTI fashion, the suspension is sporty and the seats are adorned with tartan fabric. What's more, the cloth top opens in less than 10 seconds. You won't find a "basket handle" rollbar in this new GTI Cabrio, but pop-up protection is standard.



10 TOYS OF SUMMER

SHELBY GT350 CONVERTIBLE

Open top, balanced performance

LAS VEGAS—After I hopped out of the Shelby 1000 development car (May issue) at the company's headquarters in Las Vegas, the new GT350 Convertible—even in supercharged 525-bhp form—felt like a pussycat. This is a refined automobile, with slightly softer Ford Racing suspension and big Baer brakes serving to perfectly complement the wheel-spinning power of the blown 4-cam 5.0-liter V-8.

Yep, the new Shelby GT350 Convertible has an OE level of refinement, with an easy-to-modulate clutch and a tractable V-8 that idles smoothly and can be loafed along at parking lot speeds with nary a difficulty. Feed it a little throttle, though, and this Mustang gets out of the hole in a hurry, able to hit 60 mph in the low 4s while emitting a particularly throaty sound from the center-outlet Borla exhaust and just a hint of whine from the Whipple blower. And structurally, this topless Mustang feels remarkably stout, because that's how Ford builds 'em these days.

The A-pillar-mounted trio of gauges (for fuel pressure, oil pressure and boost) serves as a constant reminder that this is a high-performance post-title Mustang, one that's also fitted with a serialized Shelby dash plate, special bodywork, unique badging and embroidered floor mats. Prices for Shelby's supercharged GT350 package—coupe or Convertible—begin at \$33,995. While that's by no means inexpensive—and this price is in addition to the cost of a standard Mustang GT—you'll be getting a turn-key open-air Mustang with great heritage dating back to the precious few original GT350 Convertibles of 1966.—Andrew Bornhop

MORE ONLINE roadandtrack.com/GT350

11 TOYS OF SUMMER

MAZDA MX-5 MIATA SPECIAL EDITION

Nothing's new under the skin, but this Special Edition dazzles with its retina-pummeling appearance. The SE stands apart with black paint for its retractable hardtop, side mirrors and trim. As for body color, you've got a choice of either Velocity Red or Crystal White Pearl, contrasting against 17-in. Black Gunmetal wheels; inside, it's done up with black leather and contrasting gray stitching. Just 450 units will be offered in the U.S., starting at \$31,225 for the 6-speed manual version.



12
TOYS OF SUMMER

PORSCHE 911 CABRIOLET

A topless 911 is the best 911



GRAN CANARIA, SPAIN—An island of barren rock that juts from the sea off the coast of North Africa, Gran Canaria is a remote outpost, yet boasts a sinuous road leading from small village to smaller village. With nary a cloud in sight and the weather calling for a light sweater, it is the perfect place to sample Porsche's newest drop-top 911.

The new Cabriolet based on the 991 platform is sublime, top up or down. All features of the new

coupes—the sporting 350-bhp Carrera and exuberant 400-bhp Carrera S—carry over. The only difference is the addition of a power retractable roof, one that will raise or lower in 13 seconds, even while the car is moving at 30 mph. Although it may appear to be the old top on the new car, it's anything but. Like every other aspect of the 911, it's new and improved.

The new 911 coupe has a superbly stiff chassis, so little reinforcement is necessary for the convertible transformation. The folding roof was kept to the same compact package size and weight of its predecessor, meaning that it stows behind the rear seats into a 22 x 9 in. box and adds about 155 lb. to the coupe's curb weight. Unlike the previous top, this one replaces thin steel bows with die-cast magnesium panels that interlock like puzzle pieces, much like a retractable hardtop would, but because they're covered in canvas and insulation they form a near perfect silhouette of the coupe, one with no unsightly part lines. Top up, you can run your hands over the surface and find few soft spots, none large enough where a would-be thief might get a knife through, and fewer still where a hand could be inserted. Thus, this top is as secure as a hardtop, but significantly lighter. It's also just as warm and quiet, with just the hum (or howl) of the direct-injected flat-6 out back.

The greatest pleasure of the Cabrio, however, is the enjoyment of driving a 911 while being able to smell the breeze coming off the beach, or maybe a pine forest after a recent rain. Top down in the 911 Carrera S, it's easy to grin. Push a button and a wind deflector unfolds from the rear haunches over the back seats. Trick stuff, as before it had to be removed from the trunk, unfolded and manually installed.

The new 911 is sensational, with all the performance and precision we've come to expect. Its 7-speed manual is intuitive and crisp, its new electric steering assist surprisingly refined. Gone are the steering jitters, for good or bad. Rough roads are now smooth, at least as felt through the steering.

This 911 Cabrio perfection isn't cheap, costing roughly \$11,600 more than the base Carrera, meaning it'll be hard to get one out the door for under \$100,000. But it's worth it for the grin and the tan.—Shaun Bailey

13
TOYS OF SUMMER

BMW 650i CONVERTIBLE

❖ Supple performance and spirited touring, the big BMW 6 Series-based convertible does it all with finesse. We particularly like the 400-bhp twin-turbo V-8 when it's paired with a 6-speed manual. There's no wanting for luxury in this roadster, whose available options read like those of a 7 Series. If you prefer something a little more efficient, there's the 640i and if you can wait a winter, an M6 isn't far off.



MORE ONLINE  roadandtrack.com/911Cabrio



14 TOYS OF SUMMER

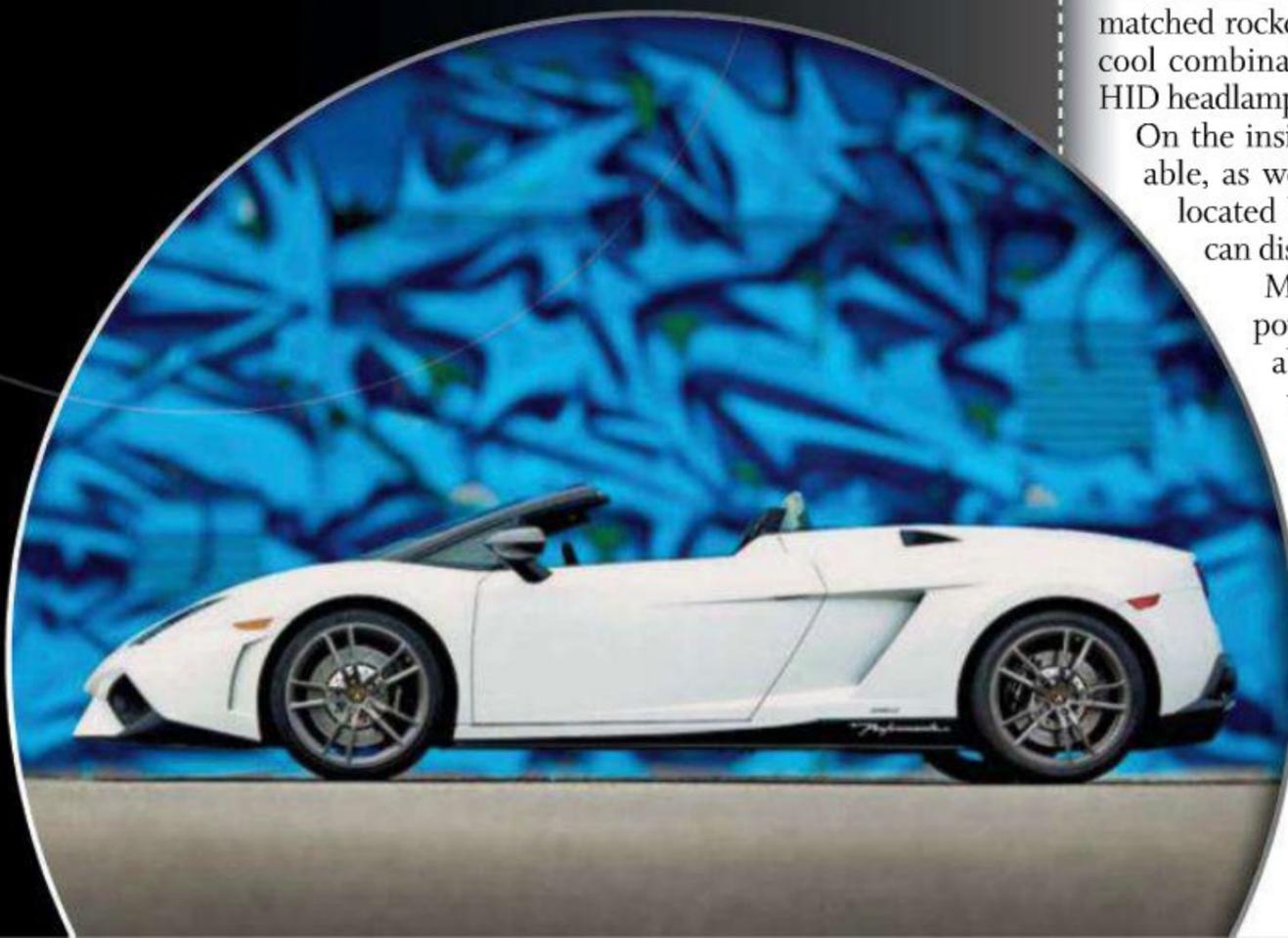
FERRARI 458 SPIDER

At the wheel of the new 458 Spider, you'll feel as if any road that challenges this Ferrari's incredibly well-sorted chassis will soon meet its demise. Pirelli tires stick with little audible protest, while effortlessly quick steering and a 7-speed paddle-shift dual-clutch gearbox make it simply one of the most proficient and fast sports cars. Ferrari says it's the first mid-engine berlinetta to sport an all-aluminum retractable hardtop, one that deploys or retracts in 14 seconds flat. A vented aluminum decklid hides the 570-hp direct-injected V-8 that is flaunted under glass in the Italia coupe, but affords access to the high-def symphony produced by a resonator Ferrari has tuned specifically for an open-air audience. It'll squeeze out standing ovations at a glorious 9000 rpm.

15 TOYS OF SUMMER

LAMBORGHINI GALLARDO LP570-4 SPYDER PERFORMANTE

If you're a narcissist and an adrenaline junkie who happens to look good with messed-up hair, the Lamborghini LP570-4 Gallardo Spyder Performante is the supercar for you. This ultimate lightweight drop-top was introduced last year, and hasn't changed a bit, but that's not a bad thing. It has the ability to increase your heart rate, whether you're admiring it from across the street or strapped in and unleashing its 5.2-liter V-10. This engine, mounted amidships, lets out a glorious roar revving to an 8500-rpm redline while delivering 398 lb.-ft. of torque and 570 bhp. When all four tires bite the tarmac, thanks to all-wheel drive, the 3274-lb. supercar will sling you to 62 mph in 3.9 seconds on its way to a hair-ruffling 201-mph top speed.



2013 FORD MUSTANG CONVERTIBLE

16 TOYS OF SUMMER



RECEIVING THE SAME CHANGES AS THE 2013 Mustang coupe, the convertible model features a host of visual updates that bring it closer to the potent GT500. A new hood, with functional heat extractor vents, sits on top of an all-new grille and front fascia. Finishing off the exterior are color-matched rocker panels, new LED taillights (with cool combination turn and backup lights) and HID headlamps with LED foglights.

On the inside, new seat options will be available, as well as a 4.2-in. color LCD display located between the tach and speedo that can display engine and infotainment data.

Mechanically, the Mustang bumps power to 420 bhp and has an available 6-speed automatic transmission with a gear selector switch on the shift lever, and for manual transmission-equipped cars, hill assist to prevent rollback when on a grade.—Calvin Kim

MORE ONLINE  roadandtrack.com/MustangC

17 TOYS OF SUMMER

BENTLEY CONTINENTAL GTC

Who needs a W-12 when you can have this V-8?

RIOJA, SPAIN—Depriving any car of two liters and four cylinders, let alone 67 bhp and nearly 30 lb.-ft. of torque, ought to blunt its performance—even more so when said car is the heavyweight Bentley Continental GTC. But actually the opposite is true. With its new 4.0-liter twin-turbo V-8, this latest iteration of the convertible Continental takes on a whole new and more involving persona.

While the W-12-powered GTC is stunningly rapid with a blistering top speed, it never feels particularly agile; not surprising given that it weighs the best part of 5300 lb. and has all-wheel drive. The V-8 GTC is marginally lighter, yet the car's character has been transformed into a more agile, eager performer. Central to this is a soundtrack that ranges from a mellifluous woofle to a hard-edged roar that will have you driving your favorite canyon road just to savor the echo.

As a result of a slightly lighter front end, the steering has become more responsive and direct; the car tucks its nose in and sweeps through bends with an accuracy those familiar with the W-12 wouldn't believe.

And while the engine is giving away some thrust—though 500 bhp and 487 lb.-ft. aren't to be sniffed at—the addition of ZF's 8-speed automatic ensures seamless shifts and vivid performance: a 0–62 mph time of 5.0 seconds and a 187-mph top speed keep the GTC up with its rivals. But where the V-8 GTC comes into its own, trouncing rivals on the way, is fuel consumption: 14 mpg city/24 mpg highway. With sharper styling and Bentley's sumptuous handcrafted interiors, this is the best GTC yet.—*Ian Adcock*

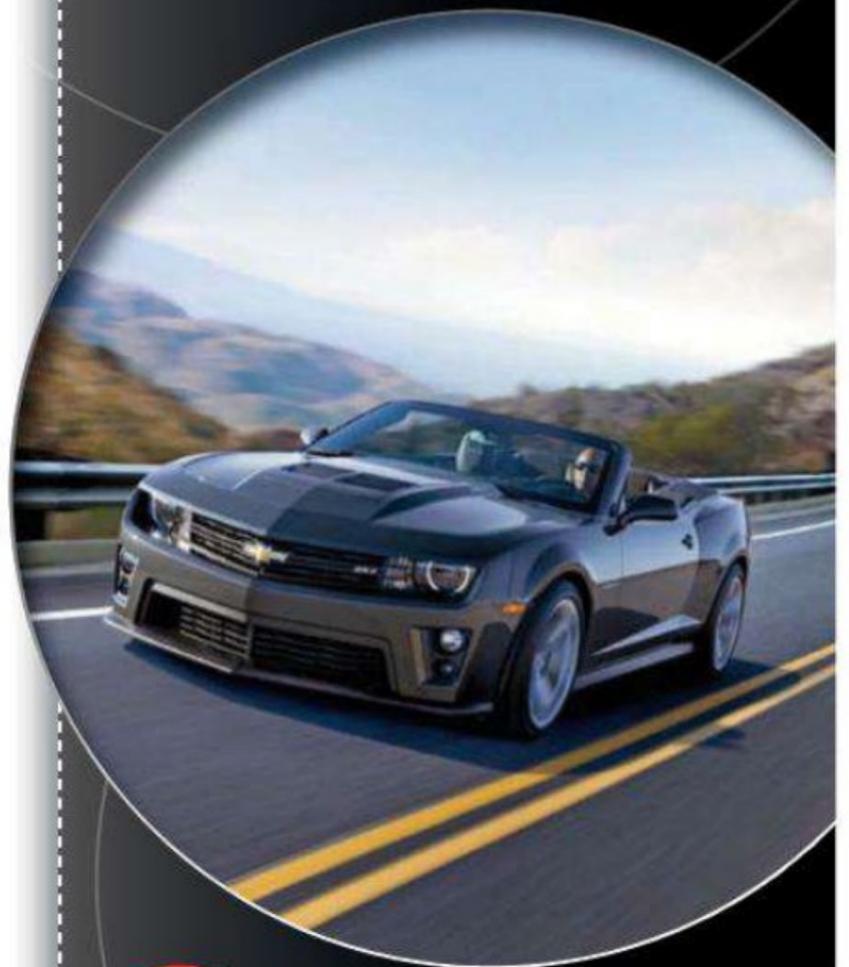
MORE ONLINE  roadandtrack.com/BentleyGTC



18 TOYS OF SUMMER

2013 FORD SHELBY GT500 CONVERTIBLE

⚡ The horsepower war is in full swing. Ford's GT500 brings a competition-crushing 650 bhp to the fight. Like the coupe, the Convertible will be offered only with a manual transmission and electronically adjustable dampers. This summer it'll be the car to beat at impromptu drag races, but we suspect there will be few challengers.



19 TOYS OF SUMMER

2013 CHEVROLET CAMARO ZL1 CONVERTIBLE

⚡ Nothing beats a ragtop pony car when it comes to cruising. Infused with 580 bhp, PTM and MR suspension, the ZL1 wants to avoid traffic and take the long windy road to the beach instead. Just like the ZL1 coupe, it's available with either a manual or automatic transmission.



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MERCEDES-BENZ SLS AMG ROADSTER



New Mercedes, old haunts

BY PETER EGAN PHOTOS BY MARC URBANO



YOU KNOW YOU'RE TRULY IN SOUTHERN CALIFORNIA WHEN you're cruising down sunny, palm-lined Hollywood Boulevard past Grauman's Chinese Theatre in a new Mercedes SLS AMG Roadster and Donald Duck gives you the thumbs up.

Okay, it wasn't the real Donald Duck; just a person (we hope) inside a costume, but it was a genuine Randy Newman moment. Look at that mountain, look at those trees...look at these women. There ain't nothin' like 'em nowhere.

So what was I doing there, freshly flown in from the frozen-but-melting tundra of Wisconsin? Fulfilling another difficult and dangerous assignment, that's what. I'd been told, "We'd like you to take a new Mercedes SLS AMG Roadster on some of your favorite top-down roads in Southern California and report your impressions of the car."

This is the kind of assignment my friends think I get all the

time, but I almost never do. Anyway, I told them, "I'm your man. I'll be right out."

Quite the assignment. And quite the Mercedes waiting for me in the R&T parking lot in Newport Beach.

A low, solid bolide of a car in a deep, dark Le Mans Red, glowing like the embers of a freshly fallen meteorite. Straight out of the AMG performance center, the SLS' 6.2-liter (ignore the traditional "6.3" logo on the side) puts out 563 bhp of rumble and thrust, fed through a 7-speed paddle-shifted dual-clutch transmission. The aluminum frame and lavish use of carbon fiber have kept the heft down to a respectable (these days) 3915 lb.

From the front, this thing looks formidable indeed. With that big tri-star emblem and speed strakes on the hood and side vents, it delivers two possible messages to those who





■ The SLS AMG's thunderous 563-bhp V-8 is pushed back so far it practically touches the firewall; carbon-ceramic brakes are equally impressive. Below, a meeting of the super-heroes at Grauman's.



glance at their rearview mirrors: 1. You are being pursued by Moss and Jenkinson in their 300SLR, or 2. You appear to have cheated out on your own car purchase, Mr. Big Shot film director. Or neurosurgeon. Whatever. This baby has a window sticker that says \$242,675 at the bottom. The base price is a mere \$196,100, but there are nice little upgrades (the AMG carbon-ceramic brakes, for instance) that cost almost as much as a Chevy Cruze.

One thing this car doesn't have is much trunk space. Photographer Marc Urbano and I spent a good hour condensing our luggage and his camera gear into a couple of soft gym bags. Who needs clean socks anyway? Portago seldom changed his Izod shirt, I'm told, and he got dates with Linda Christian.

All luggage cares are forgotten when we fire up the engine. The naturally aspirated dohc V-8 growls like a slightly manic 427, and as we hit the road I realize that this engine's huge torque and smooth surge to its 7200-rpm redline could easily spoil you for anything else—other than maybe a Corvette Z06. When you accelerate, you and your passenger both say, "Nice!" at the same time.

It's a little cool and windy on our first convertible day in Southern California, but we put down the top anyway. Mercedes says the top goes down electrically in 11 seconds flat, at any speed below 30 mph, but my watch says 9 sec. flat, and the Mercedes "Aircar" system blows warm air (or cool, if you prefer) on your neck from vents in the seatbacks. Heated seats, too. Very comfortable, we are.

First favorite old road? Why, the one that was recommended by former *Cycle World* Managing Editor Steve Kimball on my

first weekend in California—in January of 1980.

"Go from Newport Beach down the 405 Freeway to San Juan Capistrano and take 74, the Ortega Highway, over the mountains to Lake Elsinore. Stop at the Lookout Café for coffee, then ride down the mountainside to Elsinore and eat a breakfast of chorizo and eggs at the little Mexican restaurant on Main Street. Then go down to Temecula and take De Luz Road to Fallbrook, near the Marine base. From there, you can either take the Coast Highway back home, or take I-15 up to the Corona Airport to look at old airplanes." (Steve and I were both airplane buffs who would get our pilot's licenses that year.)

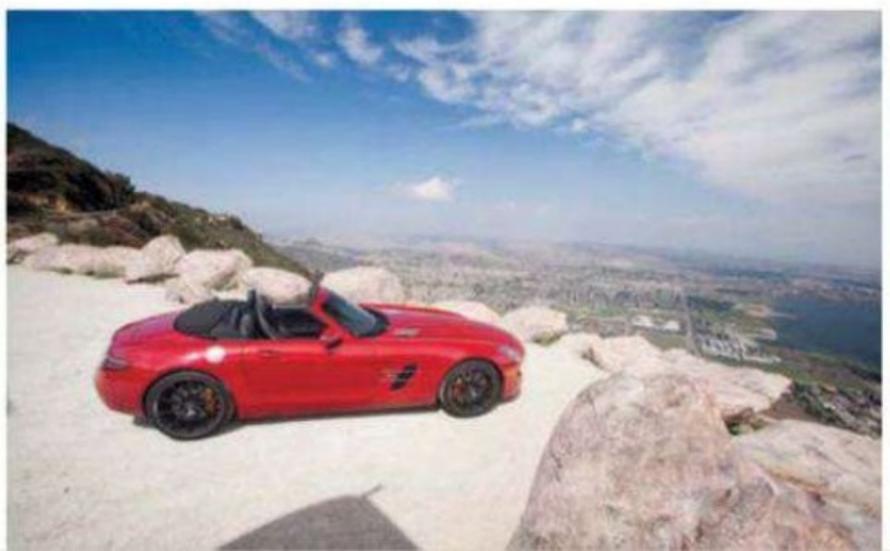
So that's what Marc and I did with the SLS. The Ortega highway is a stunning mountain road with a jaw-dropping vista at its crest. We descended into Lake Elsinore, had our obligatory chorizo, then headed down to Temecula.

I said to Marc, "Did you ever have a Temecula drop on your neck when you were walking in the jungle?"

"What?" he asked.

"It just sounds like that kind of word," I said.

We somehow found De Luz Road on instinct, and wove



BRICKYARD

BEAUTIES

Indianapolis—there's no place quite like it. To celebrate the 100th anniversary of the first Indy 500 (won by Ray Harroun in the Marmon Wasp), we're offering these exquisite prints for sale—each featuring a winning car from a dramatically different era. Beautifully photographed and signed by John Lamm, these images are large (22 x 30) and printed on high-quality stock—ready to be framed and hung on the wall of your den.



1912 Indy National
RTINATIONALP: \$99.95

It took Joe Dawson more than 6 hours to win the 1912 Indy 500 in this National. That's Bobby Rahal at the wheel, with Peter Egan as his riding mechanic.



**1962 Indy 500 Watson
Leader Card Roadster**
RTIROADSTERP: \$99.95

Before the rear-engine revolution, front-engine Roadsters ruled. Rodger Ward drove this classic Offy-powered Watson Roadster to victory in 1962.



**1965 Indy 500
Lotus 38 Ford**
RTICLOTUSP: \$99.95

Jim Clark led 190 of the 200 laps in 1965, proving the superiority of the rear-engine design at Indianapolis. Has a prettier car ever raced at Indy?

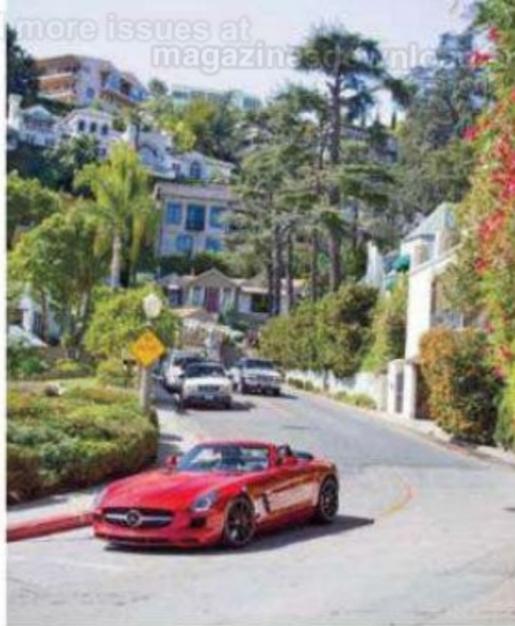


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▣▣ Profiling at Paradise Cove (above) and through Laurel Canyon neighborhoods (left), the SLS AMG is a sure cure for board-dom.

down the valley full of water crossings (mostly dry now) and old ranches. At the end, I took the airport option. Barb and I kept our 1945 Piper J-3 Cub at Corona for several years. Another old haunt. The airport was a little forlorn on this dark, windy weekday (Bob's Chili and Chow Hall closed!) so we motored up the freeways and found a hotel in Pasadena. Next day, the L.A. Tour.

Beautiful, warm day. Down Sunset Boulevard for the obligatory Guitar Center stop, then back up Hollywood Boulevard past Donald Duck, turning onto Laurel Canyon where folk-rock stars were once thick as flies—Joni Mitchell, Crosby, Stills, etc. Then west on the famous Mulholland Drive, a long sinuous road down to the coast, famous for night racers and James Dean Porsche hi-jinks. At the coast we backtracked slightly to Paradise Cove, home of a restaurant on the water and, years ago, James Garner's trailer in *The Rockford Files*.

On every trip Barb and I ever took to Monterey, we stopped at Paradise Cove for breakfast. One week a great white shark ate a kayaker—including much of the kayak—right in front of the



restaurant. Popular breakfast spot for everyone, apparently.

North on the Coast Highway past the lovely but expensive Santa Barbara, turning inland on the scenic Highway 164 past Lake Cachuma. This leads to a nice little triangle of historic villages (Buellton, Solvang, Santa Ynez and Los Olivos), joined by meandering roads through the Central Coast vineyard country. The movie *Sideways* being a virtual travel guide, we stayed at the Windmill Motel in Buellton and dined that night at the Los Olivos Café. Good pinot. On the way home we took Santa Rosa Road to 101, then exited for a quick run down to the coast to Jalama Beach County Park. Both perfect sports car roads.

In a nearly perfect sports car. And I say "nearly" only because the nav system took a little practice and the front air dam scrapes on everything. Dynamically, however, the Mercedes is a piece of work. Balanced and thrilling to drive, with phenomenal brakes and suspension that never beats you up, even on the stiffest shock setting. Paddle shifters that can be set to several levels of aggressiveness (all good) and an engine that sings both powerful bass and tenor. What we have here is a car of great substance and silken brutality. The complete package; a perfectly civilized daily driver that really comes into its own on your favorite back roads.

Or just cruising under palm trees, top down, and waving at famous ducks. Ain't nothin' like 'em nowhere.

0-60 MPH
3.5
SEC

0-1/4 MILE
11.5
SEC

TOP SPEED
197*
MPH

SKIDPAD
0.98
G

SLALOM
71.9
MPH

R&T TESTED

▣▣ The SLS AMG's center-stack screen offers up a multitude of modes and settings. Clockwise from top left: Track mode, a friction-circle display with brake force and throttle position, suspension/chassis settings, and power, with side displays of torque and throttle.



List price	\$196,100
Price as tested	\$242,675
Curb weight	3915 lb
Engine	6.2-liter dohc 32VV-8
Transmission	7-sp paddle shift automatic
Horsepower	563 bhp @ 6800 rpm
Torque	479 lb-ft @ 4750 rpm
0-60 mph	3.5 sec
0-100 mph	7.6 sec
0-1320 ft (1/4 mile)	11.5 sec @ 125.3 mph
Braking, 60-0 mph	116 ft
Braking, 80-0 mph	201 ft
Our mileage	13.9 mpg
EPA city/hwy	14/20 mpg

* Electronically limited.



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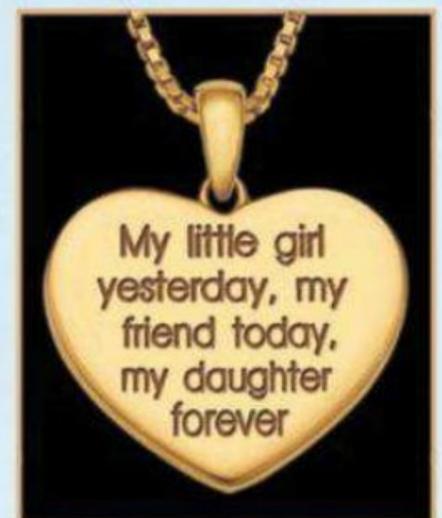
Exquisitely crafted.

This stunning pendant features an exquisite pink rose and four brilliant green peridot "leaves." A dazzling diamond is nestled within the rose, just as your daughter is nestled forever in your heart. Hanging gently from an 18-inch chain, this pendant beautifully puts into words all that she means to you.

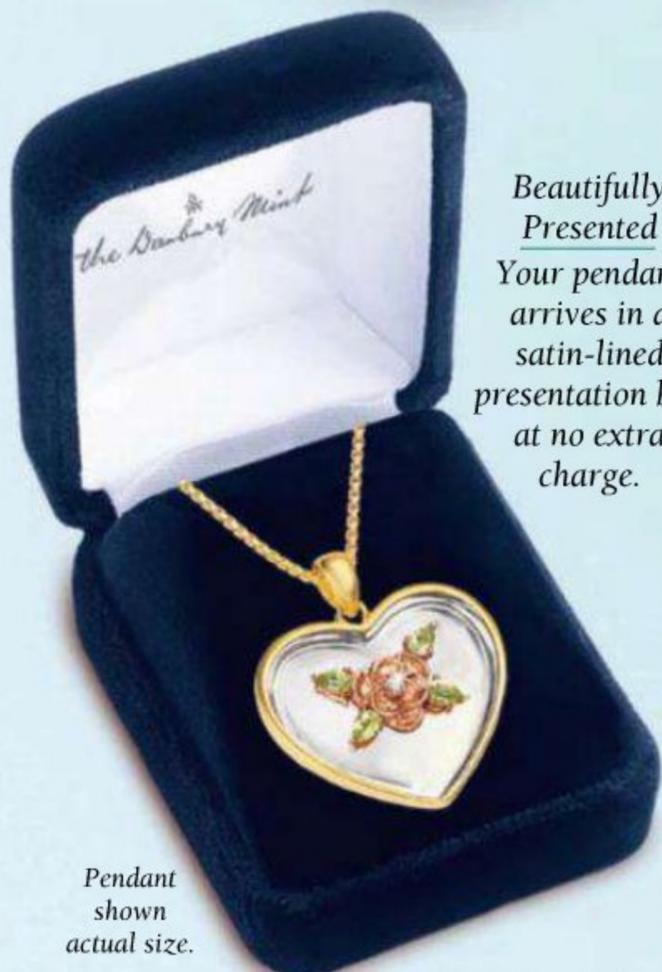
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For delivery in time for the next special occasion, don't delay — order today!



The back is beautifully engraved with a loving sentiment.



Beautifully Presented
Your pendant arrives in a satin-lined presentation box at no extra charge.

Pendant shown actual size.

The Danbury Mint
47 Richards Avenue
Norwalk, CT 06857

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Signature _____

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the Danbury Mint

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Please print clearly.

Address _____

City/State/Zip _____

Send no money now.

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Passenger Side



2nd Row



3rd Row



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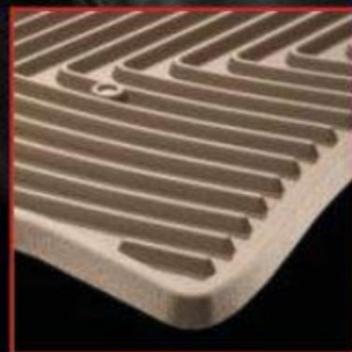
Passenger Side



2nd Row



3rd Row



Texture



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SNAIL. IT'S SLANG FOR TURBOCHARGER, THE NAME DERIVED from the spiral-shaped housings of the turbine and compressor that harness an engine's exhaust energy and subsequently squeeze the intake charge into welcoming cylinders. More air (with an appropriate extra dose of fuel) equals more power, enabling a "snail" car—in a most ironic twist—to far out-accelerate even the speediest slime-trailing gastropod.

The great thing about turbos is that when not asked to make additional power, they loaf along rather innocuously, exacting

little to no penalty in fuel economy. So in these times of ever-tightening CAFE and emissions standards, automakers are starting to embrace smaller-displacement turbocharged engines that rival the power of their brawnier non-turbo forebears, yet sip fuel instead of making rude slurping sounds at the pump.

Two such examples of the trend are the all-new BMW 328i, a slightly larger yet slightly lighter 3 Series with a 2.0-liter four making 240 bhp; and the Mercedes-Benz C250 Sport, cosmetically refreshed for 2012 and fitted with a 1.8-liter powerplant



SQUEEZE

PLAY

Two Teutons with forced-induction 4-cylinders fight for your hearts and wallets

BY DOUGLAS KOTT PHOTOS BY BRUCE BENEDICT

HEAD TO HEAD TEST

rated at 201 bhp. As for transmissions, the Mercedes-built 7-speed 7G-tronic Plus automatic is the C250 Sport's sole gearbox, making the BMW's new ZF 8HP45 8-speed automatic a natural fit for comparison purposes, though a 6-speed manual is standard. We actually welcomed these 2-pedal sports sedans, as many times a turbocharged engine paired with an automatic is like a mustard-slathered corn dog at the county fair...it just seems right. The torque converters tend to mask tip-in turbo lag, and the automatic's no-lift shifts minimize turbo rpm drop-off

for a virtually uninterrupted flow of power through the gears.

This all sounds good on paper, but how about in real-world execution? To find out, we drove to the quaint gold rush town of Julian, California, a place that offers Zagat-worthy apple pie and small-town charm as well as close proximity to great driving roads. For two days, we cornered, braked, transitioned, accelerated; we pondered the cars' subtleties, argued their merits and scrutinized their weaknesses. Finally, we subjected them to our usual battery of instrumented tests. Here's what we found.



BMW 328i VS. MERCEDES-BENZ C250 SPORT



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❖ The C250's interior redesign for 2012 is sporty in a classy way, carried off with appealing materials and bright metallic accents. Seats' flattish side bolsters don't offer the support we'd like, however.



MERCEDES-BENZ C250 SPORT

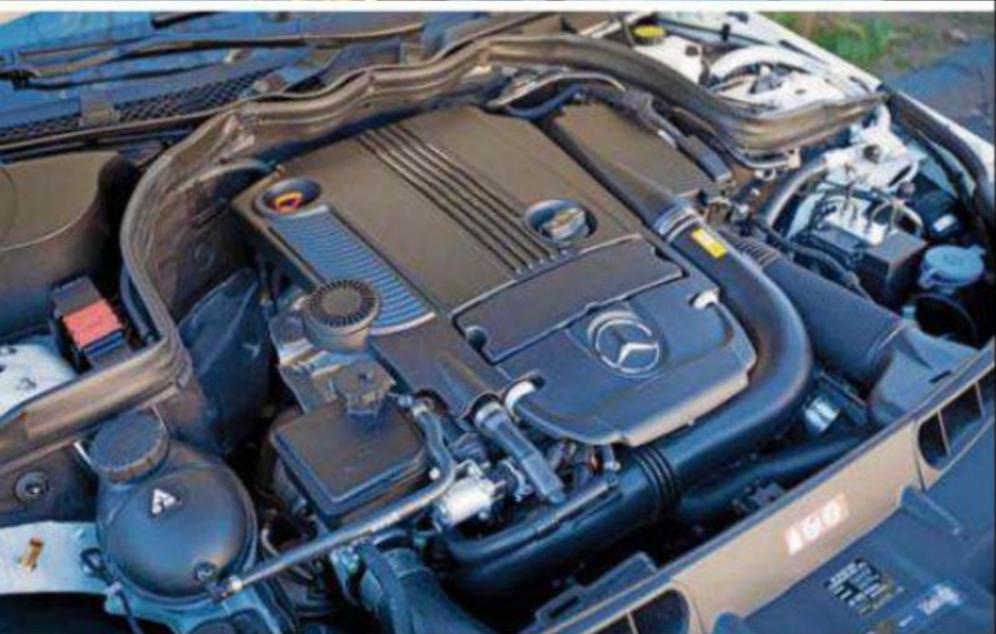
0-60 MPH
6.4
SEC

0-1/4 MILE
14.8
SEC

TOP SPEED
130*
MPH

SKIDPAD
0.91
G

SLALOM
69.1
MPH



❑ Although the Mercedes corners flatter than the BMW and exhibits impressive grip, the frustratingly numb steering hinders the chassis' communication with the driver. Though direct-injected turbo 4-cylinder gives up 0.2 liters of displacement and 39 bhp to its Munich rival, it's a responsive, willing engine.

ALTHOUGH MERCEDES' W204-PLATFORM C-CLASS HAS BEEN around since 2007, it's still sultry and sexy, having aged as gracefully as Annette Bening. And this year's exterior updates—including more sharply chiseled fasciae, newly shaped headlights and bejeweled LED taillight clusters—have effectively staved off the stylistic equivalent of Bingo arm. The C250 Sports' lowered ride height, chunky-spoked AMG wheels in staggered sizes and the white-hot intensity of LED light bars beneath the headlights impart an athleticism and seriousness of purpose that the BMW lacks.

So why does the Mercedes receive this comparison's consolation prize? Well, there's the simple matter of its power-to-weight ratio: less power (down 39 bhp and 26 lb.-ft. of torque to the Bavarian) and nearly equal in weight (the Merc is lighter, though only by a negligible 25 lb.), so its 0–60 time of 6.4 seconds relinquishes a full second to its competitor. That's still not slow by any means, but what's particularly egregious in this sports sedan is its decidedly non-sporting gearbox. Even when the throttle is firewalled, the 7-speed downshifts arthritically even in Sport mode, and manual intervention (tipping the gear selector lever left for downshifts, right for upshifts) doesn't seem to hasten the process. The turbo spools quickly so throttle response is quite good, but when that postponed shift finally does arrive, there's a jerky surge unbecoming of a fine German sports sedan.

While we're harping on dynamic inadequacies, the Mercedes' steering is a big disappointment, with nebulous on-center feel and little increase in weighting as more lock is dialed in. You'd think a car with truckloads of steering caster (the C250's front wheels tilt over so far at full lock it almost looks like the suspension is broken) would self-center like nobody's business, but the rack's assist somehow robs the driver of valuable information at the contact patches. So while the Mercedes matches the BMW's 0.91g skidpad rating and even squeaks past it in the slalom (69.1 mph, versus the BMW's 69.0), there's not much warning as the limit approaches, a situation worsened by the quiet (though impressively grippy) Continentals. Both cars have strong brakes with reassuringly firm pedals, but the Mercedes repeatedly posted shorter stopping distances from both 60 and 80 mph.

Inside, things are far more agreeable, with a new T-shaped dash/center stack layout that's more dynamic and cohesive than its Munich rival's. We liked the silky detent feel of the COMAND system's control knob and its straightforward menus, and the deeply shrouded trio of main gauges are bold without being overly theatrical, in contrast to the BMW's meat-and-potatoes dials. The Mercedes' seats are not as supportive, though, and dimensionally, everything seems just one size smaller—the rear seats are a bit of a press-fit for 6-footers, and the narrow-sided trunk won't accept a golf bag without folding part of the rear seat down.

The C250 Sport, warts and all, has a ton of potential just beneath the surface that could be mined with some calibration changes. It's a bit unfair that, in car years, the Mercedes is a septuagenarian up against this precocious toddler from BMW. Still, the Mercedes boasts some attributes the BMW lacks, like a more solid structure (you can hear it in the chunky *whump* of door closure, for instance) and its more uniform panel gaps and seams. And the Mercedes' price includes the "Sport" stuff (sport steering wheel, aluminum interior trim, etc.) that's an extra \$2500 hit for the 328i.



▣▣ The 328i's Valvetronic-equipped turbo four is torquey and smooth, and paired with an excellent 8-speed automatic. Interior is a little fussier than the Merc's (that iDrive screen looks like it should retract into the dash but doesn't; the shifter looks like a *Star Wars* prop), but the overall driving environment is first rate, with deeply bolstered sport buckets and a properly meaty 3-spoke steering wheel.



BMW 328i

0-60 MPH
5.4
SEC

0-1/4 MILE
13.9
SEC

TOP SPEED
155*
MPH

SKIDPAD
0.91
G

SLALOM
69.0
MPH

1ST**Points 391.4**
2012 BMW 328i

SOMETIMES YOU GET YOUR ANSWER within the arc of a single corner. On turn-in, the 328i's wheel writhes as a direct conduit to the tread blocks, the chassis takes a set like Djokovic anticipating the return of serve, and the gearbox intuitively drops two cogs for a meat-of-the-powerband corner exit. It's a fantastically precise and—with the exception of some subtle brake tugging from the Dynamic Traction Control—pure experience, but we'd expect nothing less from the automaker that cut its teeth building some of the world's best sports sedans.

The new N20 4-cylinder uses a twin-scroll turbo and is more advanced than the C250's powerplant. While both engines have direct fuel injection and stepless phasing of both camshafts, the BMW's engine has the ValveTronic system that "throttles" the engine solely by tweaking the lift of the intake valves, reducing pumping losses and helping the 328i achieve an impressive highway figure of 33 mpg. The BMW's start/stop system feels decidedly lumpy on refire (see "Start/Stop" on [page 104](#) for more information), but it's defeatable and it no doubt aids economy.

It's a great engine, its displacement advantage over the Mercedes lending a torquier, more relaxed demeanor. It also pulls far harder near redline, full gallop

when the C250 is starting to lope. Sixty mph arrives in a fleet 5.4 sec., and its quarter-mile posting of 13.9 sec. is nearly a second quicker. The gearbox is an enthusiastic cohort, especially in Sport + mode (available with our test car's \$900 Adaptive M Suspension), where requests from the steering wheel paddles or your right foot are met pronto with crisp, no-wasted-motion shifts.

In our track testing, finding the limits was a far more natural process, aided by a touch more body roll and a "square" tire setup (225/45-18 Goodyears all around, versus the C250's staggered 225/255 fitment). Less tread width out back allowed for working the BMW's tail a bit more, drawing you further into the driving experience without compro-



■ If you can get past the BMW's somewhat ungainly hood, you'll experience dynamic bliss. Steering becomes increasingly communicative as cornering force builds, and the chassis feels light and ready to change direction on a whim.

The Results

PERFORMANCE

Performance points based on proportional scale (normalization).

	2012 BMW 328i	2012 Mercedes C250 Sport
0-60 mph time	30 pts 30.0	25.3
0-1/4 mile time	30 pts 30.0	28.2
Slalom	30 pts 30.0	30.0
Skidpad	30 pts 30.0	30.0
Braking, 60-0 mph	30 pts 28.3	30.0
Braking, 80-0 mph	30 pts 28.2	30.0
Fuel economy, EPA	20 pts 20.0	18.5
SUBTOTAL	200 pts 196.5	192.0

SUBJECTIVE

Subjective ratings based on points awarded in each of 12 categories by editors and scored based on a proportional scale.

	2012 BMW 328i	2012 Mercedes C250 Sport
Driving excitement	20 pts 20.0	16.8
Engine	20 pts 20.0	17.0
Gearbox	20 pts 20.0	13.0
Steering	20 pts 20.0	13.7
Brakes	20 pts 20.0	20.0
Ride	20 pts 20.0	18.0
Handling	20 pts 20.0	17.9
Exterior styling	15 pts 12.0	15.0
Interior styling	15 pts 13.4	15.0
Seats	10 pts 10.0	8.4
Ergonomics/controls	10 pts 9.5	10.0
Luggage space	10 pts 10.0	8.4
SUBTOTAL	200 pts 194.9	173.2

POINTS STANDINGS

Points based on a proportional scale, independent of price.

TOTAL POINTS (400 PTS)	391.4	365.2
FINAL STANDINGS	1	2
	2012 BMW 328i	2012 Mercedes C250 Sport

STANDINGS, PRICE DEPENDENT

Points based on a proportional scale; points range based on percentage of top price.

Price as tested	191.2	200.0
	\$50,870	\$41,880
Price-sensitive total points	582.6	565.2
PRICE-SENSITIVE STANDINGS	1	2
	2012 BMW 328i	2012 Mercedes C250 Sport

mising grip or unduly impairing stability, as attested by slalom and skidpad times nearly identical to those of the Mercedes. But the wheel/tire package doesn't look as cool.

While you're pulling those g's, the deep buckets of the Sport Line package offer a firm cradle of lateral support. The new 3 Series' interior design has a lot going on...many angles, textures and finishes, the focal point being a large iPad-like screen that juts out of the center dash. The thickly padded 3-spoke wheel just feels right in your hands, and there are gizmos galore—a full-color head-up display, and an especially well thought-out cruise control system with a digital display of the selected speed, adjusted by bumping a little nub switch on the wheel. The iDrive system, much maligned in its early days, has evolved to become quite user-friendly. Different menus are pulled up with lateral nudges of the controller

knob, versus the C250's vertical format.

For the most part, we're enthralled with the BMW's dynamics, but much pensive chin scratching took place over the cautiously evolutionary styling. It's very much a junior 5 Series from the rear—all well and good—but the front end's new low-set headlights combined with the high "forehead" of a puffy hood (no doubt leaving a bit of crush space to comply with pedestrian impact regs) impart a bit of a porpoise look to the nose.

Marine mammal references notwithstanding, the BMW emerged from our test as the clear winner—and a spendy one at that, its as-tested price of \$50,870 nearly \$9000 dearer than that of the Mercedes, thanks to a lengthy roster of options. But if you're a fan of freakishly good handling feel and satisfying wells of fluidly delivered torque, maybe the price of admission is within your comfort zone.

In My Opinion



Douglas Kott

SENIOR
FEATURE
EDITOR

My inner aesthete is sold on the C250 Sport, all hunkered down and alluring despite the gray around its temples. And it'd be my pick if I could overlook the sleepy gearbox and steering devoid of nerve endings. So it's the 328i that wins by default, at least on Planet Kott: brilliant chassis, overachieving engine, superb driving environment, but with a body not exactly built for sin.



Calvin Kim

ASSISTANT
ROAD TEST
EDITOR

These two cars share many attributes—turbo inline-4 engines, rear drive and a compromise between sport and luxury—but they also have striking differences. Visually, the boxier and more classic C250 appeals to me. But dynamically, I have to go with the BMW. While it may seem like a tossup, in reality, I would get whichever model came with a manual gearbox, and in this case, that would be the BMW.

BONUS CONTENT:



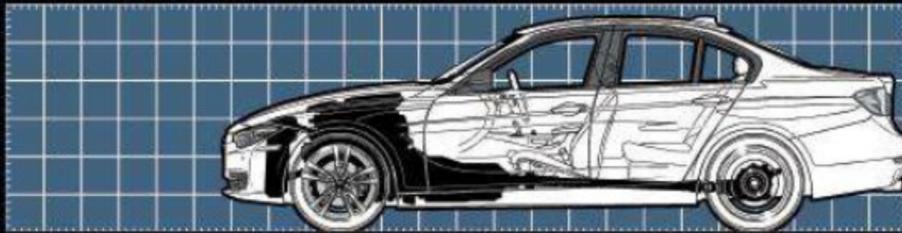
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2012 BMW 328i SEDAN

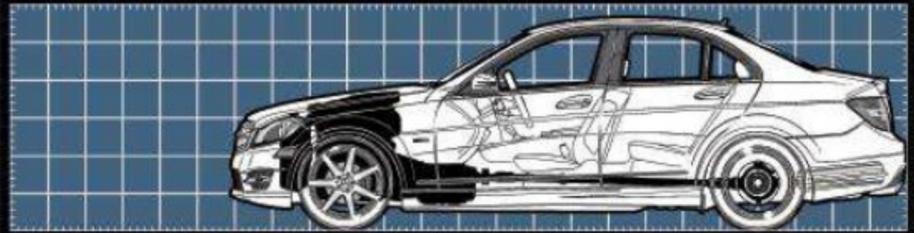
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SCALE: 10 IN. (254 MM) DIVISIONS

2012 MERCEDES-BENZ C250 SPORT

WWW.MBUSA.COM



DRAWING BY TIM BARKER

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ROAD & TRACK

List Price: \$34,900 Standard equipment: dual front, side & curtain airbags, AM/FM/HD/CD/MP3, Auto Start Stop, auto. climate cntrl, cruise cntrl; pwr windows, mirrors & door locks. Options: Premium Pkg (leather, keyless entry, pwr front seats & moonroof) \$3600, Tech Pkg (nav system, head-up display) \$2550, Sport Line (18-in. wheels, sports seats & wheel, alum. trim) \$2500, premium sound (\$950), Adaptive M Suspension (\$900), xenon lights (\$900), park distance cntrl (\$750), BMW Assist (enhanced Bluetooth and USB) \$650, metallic paint (\$550), misc options (\$1725), dest charge (\$895). **As Tested: \$50,870**

List Price: \$34,800 Standard equipment: dual front, side & curtain airbags, AM/FM/HD/CD, auto. climate cntrl, cruise cntrl; pwr windows, sunroof, front seats, mirrors & door locks. Options: Premium Pkg (prem. audio w/ satellite radio, MP3 interface, 10-way heated seats w/ 3-position memory, split/fold rear seats, pwr steering column) \$2500, 18-in. AMG 7-spoke wheels (\$1040), COMAND (nav system, voice control for audio, telephone & navigation, 10-gig music hard drive) \$930, Keyless-Go (\$650), rearview camera (\$460), burl walnut trim (\$325), rear deck spoiler (\$300), dest charge (\$875). **As Tested: \$41,880**

SPECIFICATIONS

GENERAL DATA

	BMW 328i	Mercedes-Benz C250 Sport
Curb weight	3560 lb	3535 lb
Test weight	3735 lb	3705 lb
Weight dist (w/ driver), f/r, %	50/50	52/48
Wheelbase	110.6 in.	108.7 in.
Track, f/r	60.3 in./61.9 in.	60.4 in./59.6 in.
Ground clearance	5.5 in.	4.1 in.
Length	182.5 in.	180.8 in.
Width	71.3 in.	69.7 in.
Height	56.3 in.	56.3 in.

ENGINE

	BMW 328i	Mercedes-Benz C250 Sport
Type	alum. block & head, turbocharged dohc 16V inline-4	alum. block & head, turbocharged dohc 16V inline-4
Displacement	1997 cc	1796 cc
Bore x stroke	84.0 x 90.1 mm	82.0 x 85.0 mm
Compression ratio	10.0:1	9.3:1
Horsepower (SAE)	240 bhp @ 5000-6000 rpm	201 bhp @ 5500 rpm
Torque	255 lb-ft @ 1250-4800 rpm	229 lb-ft @ 2200-4300 rpm
Redline/limiter	6500/6750 rpm	6400/6450 rpm
Fuel injection	direct	direct

CHASSIS & BODY

	BMW 328i	Mercedes-Benz C250 Sport
Layout	front engine/rear drive	front engine/rear drive
Body/frame	unit steel	unit steel
Brakes	Front: 12.3-in. vented discs/ 1-piston sliding calipers	11.6-in. vented & drilled discs/ 1-piston sliding calipers
	Rear: 11.8-in. vented discs/ 1-piston sliding calipers	11.8-in. discs/ 1-piston sliding calipers
Assist type	vacuum, ABS	vacuum, ABS
Wheels	cast alloy, 18 x 8	cast alloy; 18 x 7½ f, 18 x 8½ r
Tires	Goodyear EfficientGrip/P run-flats, 225/45R-18 91Y	Continental ContiSportContact 3; 225/40ZR-18 92Y f, 255/35ZR-18 94Y r
Steering	rack & pinion, electric assist	rack & pinion, hydraulic assist
Steering ratio	14.6:1	14.0:1
Turns, lock to lock	2.8	2.7
Suspension, f/r	MacPherson struts, coil springs, elect. adj tube shocks, anti-roll bar/multilink, coil springs, elect. adj tube shocks, anti-roll bar	MacPherson struts, coil springs, tube shocks, anti-roll bar/multi- link, coil springs, tube shocks, anti-roll bar

ACCOMMODATIONS

	BMW 328i	Mercedes-Benz C250 Sport
Seating capacity	5	5
Head room, f/r	38.8 in./36.0 in.	37.3 in./35.5 in.
Front leg room	45.8 in.	44.5 in.
Rear knee room	24.5 in.	23.0 in.
Trunk space	13.0 cu ft	12.4 cu ft

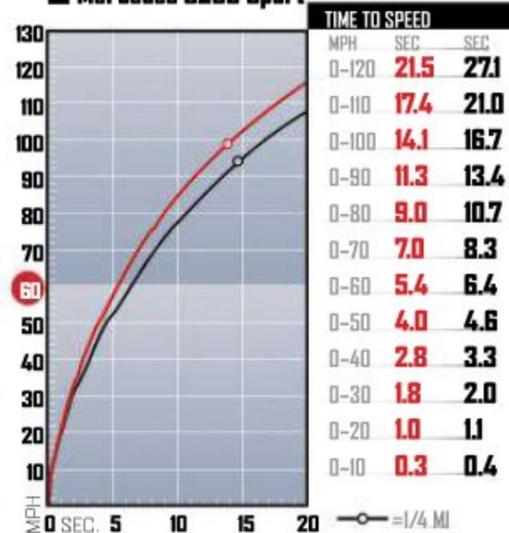
FUEL ECONOMY

	BMW 328i	Mercedes-Benz C250 Sport
Our driving	24.0 mpg	22.8 mpg
EPA city/highway	23/33 mpg	21/31 mpg
Capacity/range	15.8 gal./355 miles	17.4 gal./374 miles
Recommended fuel	premium	premium

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PERFORMANCE

■ BMW 328i ■ Mercedes C250 Sport



ACCELERATION

	BMW 328i	Mercedes C250 Sport
Time to distance, seconds 0-1320 ft (1/4 mile)	13.9 @ 99.5 mph	14.8 @ 94.4 mph

BRAKING

	BMW 328i	Mercedes C250 Sport
Minimum stopping distance		
From 60 mph	124 ft	117 ft
From 80 mph	219 ft	206 ft

HANDLING

	BMW 328i	Mercedes C250 Sport
Lateral acceleration*	0.91g	0.91g
Balance	mild understeer	mild understeer
Slalom speed**	69.0 mph	69.1 mph
Balance	mild understeer	mild understeer

*200-ft skidpad; **700-ft slalom, 100-ft spacing.

INTERIOR NOISE

	BMW 328i	Mercedes C250 Sport
Idle in neutral	51 dBA	54 dBA
Maximum, 1st gear	75 dBA	73 dBA
Constant 50 mph	70 dBA	71 dBA
Constant 70 mph	73 dBA	73 dBA

DRIVETRAIN

	BMW 328i	Mercedes-Benz C250 Sport
Transmission:	8-speed automatic	7-speed automatic
Gear Ratio Overall ratio (Rpm) Mph		
1st	4.71:1 14.84:1 (6750) 34	4.38:1 13.45:1 (6450) 34
2nd	3.14:1 9.92:1 (6750) 51	2.86:1 8.78:1 (6450) 52
3rd	2.11:1 6.65:1 (6750) 76	1.92:1 5.89:1 (6450) 78
4th	1.67:1 5.26:1 (6750) 96	1.37:1 4.21:1 (6450) 109
5th	1.29:1 4.03:1 (6750) 126	1.00:1 3.07:1 (5600) 130*
6th	1.00:1 3.15:1 est (6500) 155*	0.82:1 2.52:1 (4600) 130*
7th	0.84:1 2.65:1 est (5450) 155*	0.73:1 2.24:1 (4100) 130*
8th	0.67:1 2.11:1 est (4350) 155*	
Final drive ratio	3.15:1	3.07:1
RPM @ 60 mph in top gear	1700	1900

* Electronically limited.

TEST NOTES

■ The 328i's gearbox helps it achieve segment-busting numbers. To get these results, fully disable DSC, and left-foot brake while progressively adding throttle. Release the brakes when revs begin to stabilize. The C250's sluggish trans lets down its peppy motor. It launches similarly to the BMW, albeit at a reduced pace.

TEST CONDITIONS:

- TEMPERATURE: 68° F
- HUMIDITY: 34%
- ELEVATION: 350 FT
- WIND: CALM
- LOCATION: IRVINE, CA

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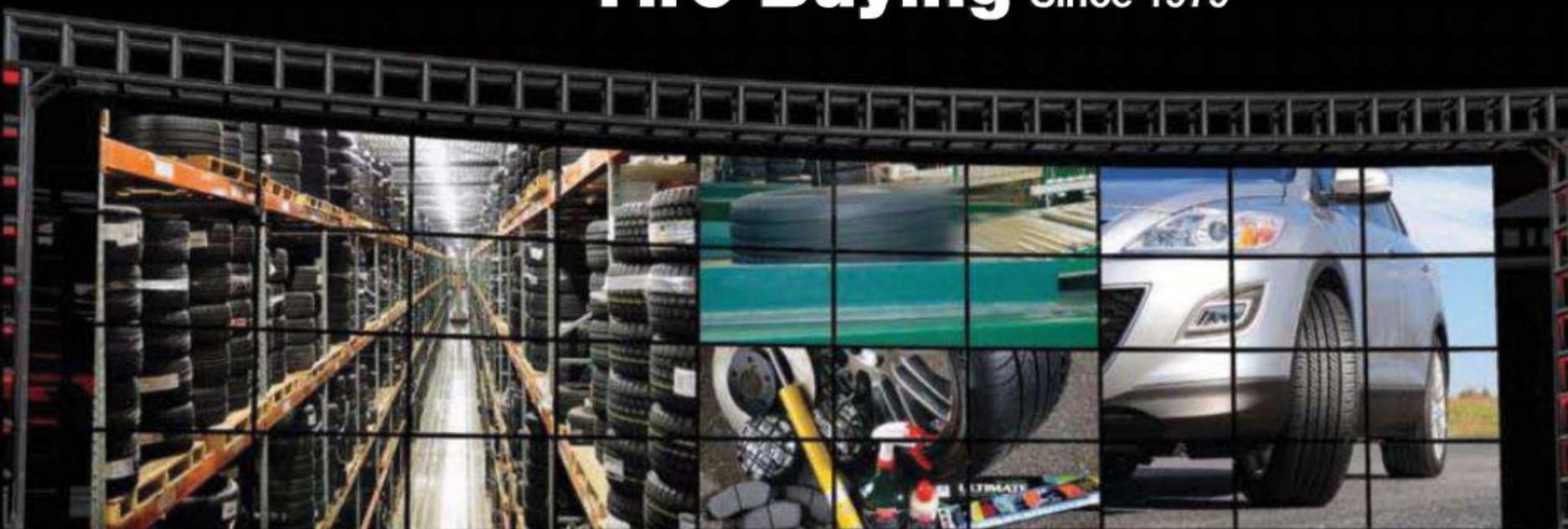


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Continental



EXTREME CONTACT DW

Maximum Performance Summer

Developed for the drivers of sports cars, sports coupes and performance sedans, the ExtremeContact DW (Dry & Wet) is designed to deliver good ride quality and serious performance on both dry and wet roads.

Visible "DW" Wear Indicators

A visible "DW" indicates appropriate tread depth for dry and most wet road conditions. After the "W" has worn away, the remaining "D" indicates appropriate tread depth for dry conditions only.

205/50ZR-16	215/50ZR-17 ^{XL}	255/45ZR-17	235/50ZR-18	265/40ZR-18 ^{XL}	235/35ZR-19 ^{XL}	275/30ZR-19 ^{XL}
205/55ZR-16	225/45ZR-17	265/40ZR-17	245/35ZR-18	275/35ZR-18	245/35ZR-19 ^{XL}	275/35ZR-19 ^{XL}
215/55ZR-16	225/50ZR-17	275/40ZR-17	245/40ZR-18	275/45ZR-18	245/40ZR-19	275/40ZR-19
225/50ZR-16	235/45ZR-17	285/40ZR-17	245/45ZR-18	285/30ZR-18	245/45ZR-19	285/35ZR-19
225/55ZR-16	235/50ZR-17	215/40ZR-18 ^{XL}	255/35ZR-18	285/35ZR-18 ^{XL}	255/35ZR-19 ^{XL}	245/40ZR-20 ^{XL}
205/45ZR-17 ^{XL}	245/40ZR-17	225/40ZR-18 ^{XL}	255/40ZR-18 ^{XL}	285/40ZR-18	255/40ZR-19 ^{XL}	255/35ZR-20 ^{XL}
205/50ZR-17 ^{XL}	245/45ZR-17	225/45ZR-18	255/45ZR-18 ^{XL}	295/35ZR-18	265/30ZR-19 ^{XL}	275/35ZR-20 ^{XL}
215/45ZR-17 ^{XL}	255/40ZR-17	235/40ZR-18 ^{XL}	265/35ZR-18 ^{XL}	225/40ZR-19 ^{XL}	265/35ZR-19	245/35ZR-21 ^{XL}

NOTE: Like all summer tires, the ExtremeContact DW is not intended to be driven in near-freezing temperatures, through snow or on ice.



EXTREME CONTACT DWS

Ultra High Performance All-Season

Available in 83 sizes from 16" to 22"

Developed for drivers of sports cars, sports coupes, performance sedans and sport trucks, the ExtremeContact DWS (Dry, Wet & Snow) is designed to satisfy year-round driving needs by blending dry and wet road performance with light snow and slush traction.

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Crossover/SUV Touring All-Season

Available in 36 sizes from 16" to 20"

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Tire Brand	Rating
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Hankook	8.0
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Pirelli	6.5
Sumitomo	6.0
Uniroyal	5.5
Yokohama	5.0



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Developed for drivers of coupes, sedans, minivans and crossover vehicles, the new AVID Ascend is designed to blend long treadwear, low rolling resistance and all-season traction, even in light snow.



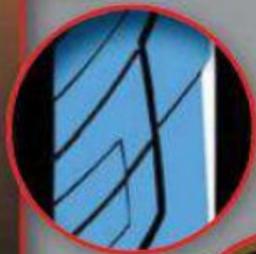
The AVID Ascend is Yokohama's first tire line manufactured in the United States to feature **Orange Oil technology** that uses oil extracted from renewable orange peels to improve the molecular bond between natural and synthetic rubber.



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175/65R-15	P205/70R-15	P235/60R-16	195/60R-15	P205/60R-16	225/65R-17	P215/60R-16
P185/60R-15	215/70R-15	P215/60R-17	195/65R-15	215/55R-16	P235/60R-17	205/50R-17
P185/65R-15	P205/55R-16	P215/65R-17	P205/65R-15	215/65R-16	235/65R-17	P215/50R-17
P195/60R-15	P205/60R-16	P225/55R-17	185/55R-16	225/60R-16	P215/55R-18	P215/55R-17
P195/65R-15	P215/60R-16	P225/50R-18	P195/60R-16	225/70R-16	P225/55R-18	225/45R-17
				225/65R-16	P225/60R-18	225/50R-17
				235/65R-16	235/55R-18	235/45R-17

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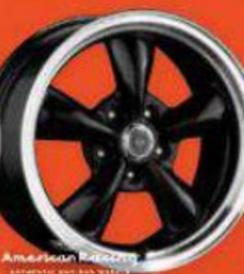
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ELBRUS
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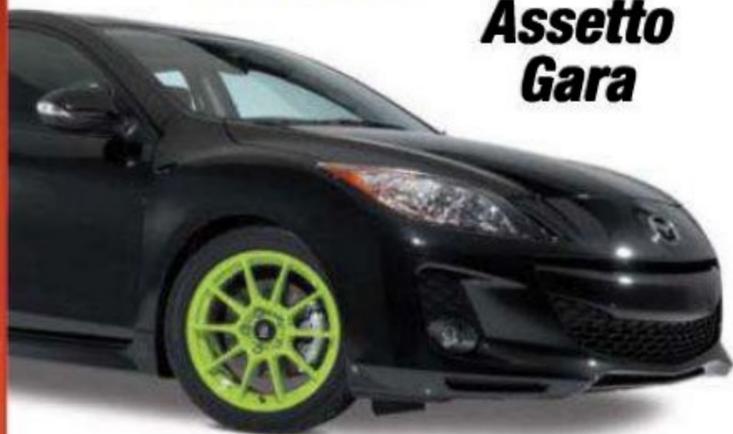
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Gifts for Dads and Grads

Besides warmer weather, June brings with it Father's Day and graduations.

Here are a few gift ideas to help mark the occasion.

BY CARTER JUNG



Griffin Helo TC Assault

www.griffintechnology.com

\$60

Remote-controlled vehicles such as cars are fun, but driving the real thing is often much more exciting. Helicopters, however, are on another level in terms of accessibility and cost. Not the RC version. Griffin's Helo TC Assault is

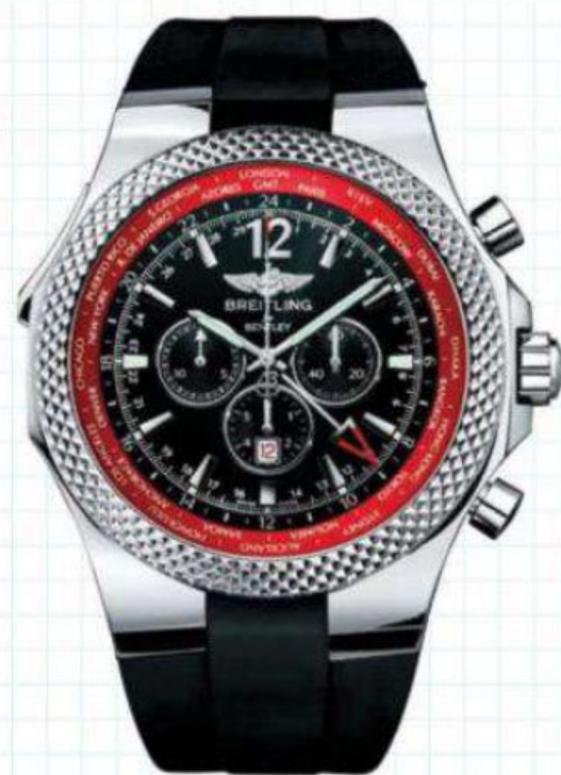
relatively affordable and easy to operate using the iPhone's capacitive touchscreen. Best of all, the chopper comes equipped with plastic missiles that actually fire. Inter-office quibbles will never be the same.

Exoto 1964/65 Cobra Daytona Coupe & Trellis Set

shop.roadandtrack.com

\$675

This Exoto set combines two 1/18-scale models, the 1964 Cobra Wood Trellis and the 1965 Cobra Daytona Coupe. The former recalls Pete Brock's plywood body buck that was used to shape and construct the streamlined aluminum body of the beautiful Cobra Daytona Coupe. The Exoto model is similarly handbuilt of wood. The latter depicts CSX2601, the Cobra that would go on to win the 1965 FIA World Manufacturer's Championship, driven by Bob Bondurant and Jo Schlesser. For fans of Shelby or vintage motorsports, this is a must-have.



Breitling Bentley GMT V8

www.breitling.com

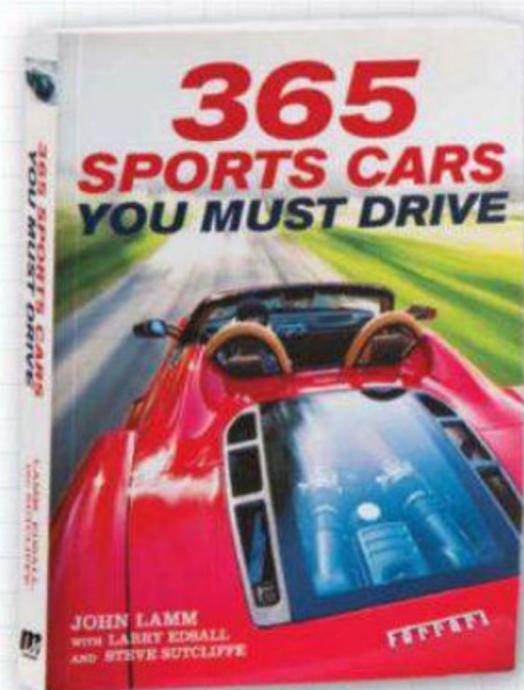
\$10,590

To commemorate the launch of the V-8 engine in the Bentley Continental GT, Breitling has released the Bentley GMT V8 watch. Limited to 250 pieces, the self-winding Breitling chronograph boasts a 49-mm steel case and a rubber strap. The black face is contrasted handsomely by the red inner bezel and accents on both the second and additional hour hands. Exclusive to the Breitling for Bentley collection is the 30-second chronograph, a feature where the second hand completes a full turn in half a minute instead of the full 60 seconds.

365 Sports Cars You Must Drive

Signed By John Lamm
shop.roadandtrack.com
\$22

If a genie ever granted a wish to drive a different car every day during the span of a year, this would be the ultimate guide. Written by automotive journalists Larry Edsall, Steve Sutcliffe and our very own John Lamm, the 320-page book covers car



manufacturers that range from the kooky (Crosley, the coveted (Triumph) to the crazy (Ferrari). Filled with gorgeous pictures and autographed by John Lamm himself, the "guide" highlights each of the 365 cars, providing little-known fun facts.

Meguiar's Brilliant Solutions Paint Restoration Kit

www.meguiars.com
\$27

For aging cars with exterior paint that has accumulated a bit too much "character," Meguiar's has put together an all-in-one collection of cleaners, wax and tools to help bring back the shine. Packaged as the Brilliant Solutions Paint Restoration kit, the box comes with the company's Gold Class wash and carnauba wax, Quik detailer, Ultimate compound, clay bar, wax applicator pads and microfiber towels, and

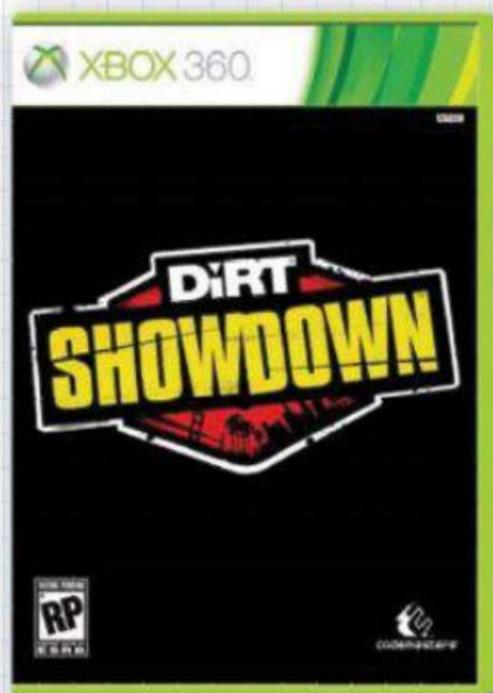


is enough to rejuvenate up to two cars. All of the products are clear-coat safe.

Dirt Showdown

www.codemasters.com
\$60

Dirt, the rally racing franchise built on the legendary Colin McRae, is expanding its dusty operations with a new brand of game. In *Dirt Showdown*, the game play moves from sim-based to arcade action with pick-up-and-play accessibility. Players will compete in global locales in events such as demolition derbies, racing and hoonigans (think skate parks, where success is mea-



sured by speed, style and destruction. While this title is no training exercise for would-be rallycrossers, it is an exercise in entertainment.

Id America Spark Headphones

www.idamericany.com
\$60

Spec-wise, the Spark in-ear headphones offer what many other high-end competitors do: 3.5-mm jack, in-line microphone and control module, and additional ear tips in varying sizes. A closer look at the aluminum ear buds, however, reveals a

design influence only car guys would appreciate: a sparkplug. Sound quality on the Spark is superb and the handy leather carrying case is a nice touch. The Spark headphones are available in nine color combinations.





Hub Carbon-Fiber Prizm

www.hubinnovations.com
\$35

"Sexy" isn't an adjective one would use to describe a tablet stand but with its curved open-frame architecture, that's exactly what the Prizm is. Created with Phil Frank, the designer behind the carbon-fiber Saleen S7, the carbon-fiber Prizm is constructed with the lightweight and durable material. A 2-piece set, the Prizm has sleek legs that slide apart at the middle for ease of storage when not in use. Hub also offers the tablet stand in aluminum in a range of colors.

Breck Rothage Metallic Corvette Print

shop.roadandtrack.com
starts at \$129

The year 1963 was the first year of the Corvette coupe and the only year this Chevrolet had a split rear window. With its beautiful lines, powerful 360-bhp engine and unique rear glass, it is an automotive icon. As an homage to the car, Breck Rothage has released a brilliant metallic



print showcasing the side profile of a silver Corvette ghosted by the silhouette of its rear. Each print is signed by the artist and will

be offered in three sizes in limited numbers: 18 x 12-in. (limited to 100 prints), 24 x 16-in. (50 prints), and 36 x 24-in. (30 prints).

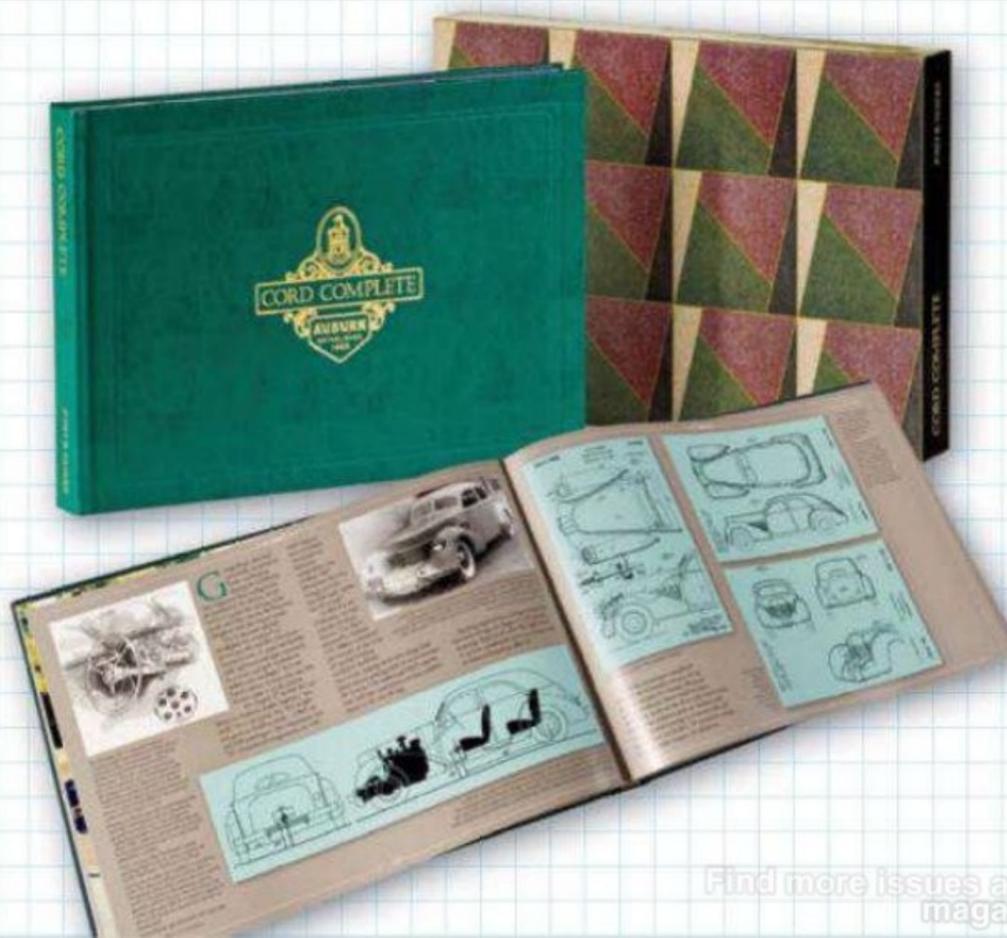
Alpine IVE-W535HD Receiver

www.alpine-usa.com
\$700

For people who choose to use their smartphones for navigation, Alpine's new IVE-W535HD receiver is



worth considering. The double-DIN-sized head unit boasts a 6.1-in. VGA screen for high-res viewing. While it's far from cheap, it does include high-end features such as a DVD player, built-in HD Radio, Bluetooth, 18W x 4 internal amplifier, Pandora compatibility and rear USB port. Our only complaint? We wish it had an auxiliary input on the face of the deck.



Cord Complete

By Josh B. Malks
Publisher: Robert Pease
cordbook@gmail.com
\$129 + \$10 (shipping & handling)

If Dad or Grad is into classic automobiles—or maybe just wonderfully executed books—the oversize (14 x 10 in., 304 pages, 7.1 lb.!) *Cord Complete* may well fit the bill. The book focuses on the famed Models 810 and 812, likely the futuristic shapes

enthusiasts think of when the Cord marque is mentioned. Amazing details, artfully presented, make this a real pleasure to peruse even if you hadn't previously known the Cord motto, "Via Una... Cor Unum," "One Way... One Heart."



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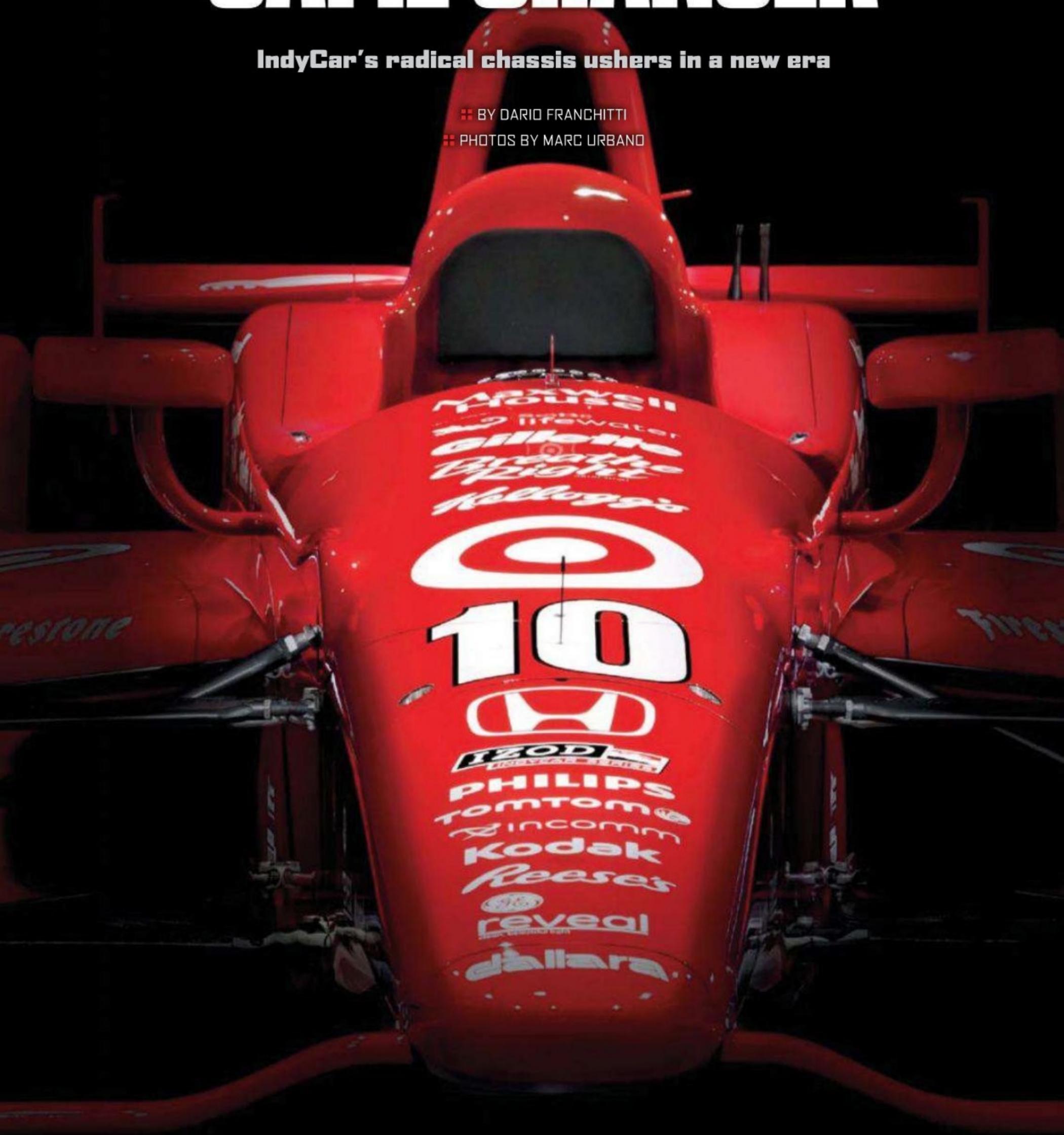
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A R O A D & T R A C K E X C L U S I V E

GAME CHANGER

IndyCar's radical chassis ushers in a new era

BY DARIO FRANCHITTI
PHOTOS BY MARC URBANO



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Dallara DW12-Honda

An up-close (and personal) look at the all-new chassis with IndyCar Champ Dario Franchitti

For the first time since 1997, the IndyCar series has an all-new chassis. By rules, all 33 of the carbon-tub cars competing in the Indy 500 on May 27 will be Dallara DW12s, named in honor of the late Dan Wheldon. Dallara Automobili of Italy builds the cars, which have been designed to keep costs down (the price for the chassis is capped at \$349,000) while improving the safety of the drivers, thanks largely to rear bodywork designed to prevent rear wheels from touching in the tight racing that takes place in the series, particularly on the ovals.

The Dallara featured here is a Target Chip Ganassi car—Dario Franchitti's Honda-powered ride, in Speedway trim. So we felt it only appropriate that Dario himself would walk us around his DW12, commenting on the various parts and pieces that deserve a race fan's attention. As it sits now, Dario's car is fitted with Dallara's 2012 aero package, although Chevrolet and possibly Lotus have packages in the works for 2013.

Now, we hand it over to Franchitti:

“It's good the new chassis designation DW12 pays tribute to Dan Wheldon. He had so much to do with the initial development, I think it's a nice tribute and another way of keeping him in people's thoughts.”

“The looks come from the safety considerations and I'm hoping that when the body kits come in 2013 we'll get some better-looking cars.”

“Not surprisingly, this new car feels different. It has a more rearward weight balance. It does handle differently. We're still looking for some answers to get it to do what we want it to do...but it's the same for every team up and down the paddock.”





“I think they changed a lot of the front geometry of the car. Now when you hit a curb, you got a lot more kickback in the steering wheel. That takes a bit of getting used to; it's not a good trait for the car to have as hitting a curb wrong could result in a broken wrist, and it's another new thing we're getting comfortable with.”

“One big difference is that the new car has a hand clutch instead of a normal clutch. You can set it up as you want, but imagine having the clutch paddle on one side and the shift paddle on the other. It's a tricky system, difficult to modulate. Of course, we use it only when we leave the pits, but imagine you are in the pit lane in your box and you have full lock to one side or the other. First, you have to wait for the fuel probe to be pulled out before you can select a gear. Then you'd pull in the clutch lever and with your right hand select 1st gear on the paddle. Next you have to modulate the clutch while you're also steering out of the pit box.”

“When it comes to setting up the car for Indy, it's going to be a new world for us. This could prove to be a trickier car because it's new and there's a steep learning curve. We knew that old car so well. Last year, my first timed lap at Indy was 224 mph because the guys knew the setup was good from the year before, and I was very confident in them and my feeling for the old car. This is going to be a big trip into the unknown.”

“Inside the cockpit, instead of the seat being the only deformable structure, now we have the seat sitting in about two inches of special impact foam in all directions. I'm hoping this will translate into a safer car.”



“The new cockpit offers a much different view. You have a newly shaped windscreen, especially on the ovals. We had that very profiled windscreen before and now it’s very much like a Formula 1 car where there’s maybe an inch of plastic pointing straight up [not on photo car]. So it feels different. The seat position is changed and your feet are a bit higher.”



“Initially they had two big pedals in the cockpit, but they didn’t take into account that some use our right foot to brake, so we had to go through a long convoluted process to get them to approve a kit that would allow for me and other right-foot brakers. I did a lot of the testing braking with my left foot, which I didn’t want to do. Now the pedal arrangement has a dead pedal, throttle and brake, but with the throttle and brake moved more to the right.”

“Those small vertical wings on the car (above) are new. There used to be a small ledge there and in wheel-to-sidepod contact a wheel could climb that ledge. Those vertical wings will now prevent a wheel from doing that.”



“The engine is much different...a massive difference. It's a turbo V-6 with direct injection as opposed to a normally aspirated V-8. We definitely have more power. I've only driven the Honda with its single turbo as compared to the twin-turbo engine of the Chevy and the Lotus. Each will have advantages and disadvantages, though the power feels pretty linear and there seems to be both good horsepower and torque.”



“There is that new view of the back of the Indy car, and when you're following another it can be quite different, depending on the paint job. With some cars it accentuates the width of the rear end and those little outriggers behind the wheels. And with others you don't notice it as much.”

MORE ONLINE  roadandtrack.com/ganassi

“It's just been a lot of fun to get involved with the Honda guys again and make the engine as good as it can possibly be. It feels like the new gearbox shifts quicker than the old car's and it allows you to downshift a bit earlier, which is nice.”

“As much as we've had some complaints about the car, on road and street courses it's just plain faster... lighter and with more downforce.” 





IT'S ABOUT 45 MINUTES BEFORE THE start of the Indianapolis 500 and we're standing on the grid, back around row five, the race cars already in place. It's difficult to believe that within the hour Indy cars will be rushing through here at more than 200 mph, because right now the front straight is almost shoulder to shoulder with people.

Crew members gather around the race cars, which are like little islands with humans flowing around them. You might see a movie star. A team owner like Chip Ganassi. Friends you've known after years of following all types of racing. Sponsor groups being ushered along.

Gaze up to the stands, and though you know how packed they are, it's startling. Look toward the first turn and scan back to the final corner... packed with spectators.

How many? The Speedway doesn't announce attendance figures, but there are around 250,000 seats with perhaps as many as 100,000–150,000 fans in the infield. This is the largest one-day, one-location spectator sports event in the U.S.

Behind the Scenes

**The Indy 500
has excitement,
drama—and absolutely
capable people
running the show**

■ STORY & PHOTOS BY JOHN LAMM

The Secretary of Homeland Security, Janet Napolitano, is on hand to see how Speedway security so successfully handles such a large crowd.

Right now it appears to be a huge higgledy-piggledy gathering, but make no mistake, the 500 is one very well-organized event. Even the manner in which those multitudes were guided into the Speedway, whether in their cars or in bus-loads shepherded by motorcycle cops, reminds one of a well-honed military operation.

Race day is, of course, the tip of the arrow, the result of planning that began the previous autumn. Shortly after the first of the year, written plans are created, schedules laid out, preparations begun.

Road & Track got an inside look at how this transpires on race day through the eyes of Dan Edwards, the track racing operations manager. We met the affable retired fire chief of Anderson, Indiana, at the Speedway in 2010 when we did the Lotus 38 story with Dario Franchitti. After we'd commented on what an undertaking



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it must be to stage the 500, he said if we came back race day he'd give us an inside look.

So we did and he did.

Edwards' responsibility is the physical track and its surroundings. He has to worry about everything from making certain the 2.5-mile oval is in perfect condition to ensuring that when the anthem "Back Home in Indiana" ends, those thousands of balloons are released on time.

He has several radios working at once, channels devoted to making certain everything is on schedule—not easy in a place as huge as the Speedway.

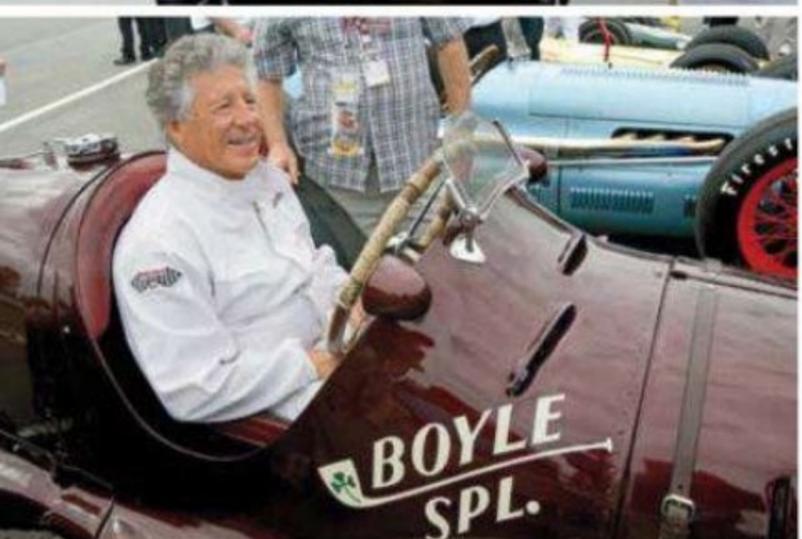
It was a beautiful day, but while we lapped the track in Edwards' Chevy Suburban we asked about rain. Indy cars don't



IMS PHOTO



■ Dan Edwards (left), Indy's racing operations manager, had a multitude of activities to coordinate on race day for the Centennial 500, and he managed them well. Jim Nabors (above) sang "Back Home Again in Indiana" as scheduled, and former race winners Mario Andretti (below left) and Parnelli Jones (below) took to the track in vintage cars, the former in the Boyle Special and the latter driving the Marmon Wasp, winner of the 1911 Indy 500. Four-time Indy winner Rick Mears (right) worked the race as a spotter for Penske. At right, the Holmatro safety crew takes a moment to pray before the big race.



race in the wet and more than once qualifying and the 500 have been plagued by storms blowing in from the west. So when is it dry enough to race on the 2.5-mile oval? We always figured there must be some device—a Moist-O-Meter?—used to measure the wetness of the surface.

Wrong. "You just know," Edwards explains, and merely by the way he says it, you know there are years of experience behind that comment. He can check the effectiveness of the half-dozen jet dryers, note the color of the track...but he knows and makes the go/no-go decision.

Safety requires that there be no flexibility in that decision and there is a set schedule to the entire month of May, but Edwards has to be flexible. Things happen. Like a few vintage Indy cars that did laps, then mistakenly pull into what will soon be the hot pits, dripping oil. Quick-



ly, he orders them out and ensures that the oil is soaked up so the pits are ready. Between Edwards and the well-trained crews it all gets handled quickly. They've done this before and are very good at it. Naturally the crowd is oblivious to these background efforts; the fans are

just having a wonderful time. That's a great thing about Indy. You might arrive at the track at 8 a.m., four hours before the start time, and yet there's so much going on, such energy in the place, that the next thing you know it's time for the green flag to fly.

For the hundreds of thousands of people at the Speedway, it can get surprisingly quiet and still just before the national anthem. The grid is cleared of everyone but essential personnel. Just up the track, the safety crews have parked their vehicles and stand at at-

tention. There's a businesslike, almost gladiatorial look to the Holmatro safety personnel in their orange-and-white fire suits. They have the demeanor of men who take their jobs very seriously...exactly what you'd want just after your race car smacks the wall at Indy.

After the anthem, the safety crew gathers for what appears to be a short prayer.

A cynic might find this almost corny, but it's enough to cause a lump in an Indy race fan's throat.

The race starts and we're in Edwards' Suburban just south of pit lane. To our immediate right is Johnny Rutherford in the Camaro pace car. We have a wonderful seat, the cars rocketing by ahead of us, a big video screen on the stands to

our upper right playing out the race.

Bam. Yellow light. In an instant, Edwards gets out, checks with Rutherford and as soon as it's safe he sends the 3-time 500 winner on-track to pick up the leader. Edwards comes back in the Suburban, intently listening to the radios. Unless there is physical damage to the track, he will stay in the pits. There isn't damage, but he listens carefully to the communications. You get the sense it's like military radio traffic. Nothing superfluous. Get the job done.

While we have these terrific seats, we're almost too close to the action to see it unfold. As the 500 rushes to a finish—just five laps to go—Edwards passes on radio info: Franchitti seems to have it wrapped up.

Then everything happens at once. Why is Dario exiting the pits in front of us? Where is Scott Dixon? Who is that sliding past us, right side wheels askew? Wasn't that Dan Wheldon who just went past? Who won?

Edwards is out of the Chevy again, dealing with Dixon, who ran out of fuel and stopped near us, mad as a hornet. Out to the left, almost-winner J.R. Hildebrand's wrecked car has slid to a stop, the Holmatro team already with him. Wheldon cruises to Victory Lane.

What an ending to the Centennial 500. The result could have been chaotic, but it wasn't. Edwards and the hundreds of people who work the 500 have a system and a plan for the big race. It works beautifully.

Forty-five minutes after the finish, viewing the empty stands and vacant track, it's difficult to believe that Indy cars were just rushing around here at more than 200 mph. 🏁



■ Keeping an eye on the action from the Suburban, Edwards sees Scott Dixon come to a stop, his Dallara out of fuel. Below, J.R. Hildebrand takes the white flag while leading, but he struck the wall in Turn 4 and handed the win to Dan Wheldon, right, who celebrated with a victory lap.



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MOTORSPORT NEWS ■ FEATURES ■ TECH ■ OPINIONS

Le Mans Hybrids

HOW DO YOU TRANSFORM fuel-saving automotive technology from something that appeals to the sandals-and-granola crowd into something all the cool kids can't live without? Race it at Le Mans.

But with an R&D price tag that would make a smaller Formula 1 team hit the panic button, why would Toyota, with its market-dominating Prius in mind, bother to build a hybrid-powered prototype to race for overall honors at this year's 24-hour classic?

And why would Audi, with its class-leading line of fuel-efficient turbodiesel sedans, try to reinvent the proverbial wheel by adding a hybrid system to its Le Mans-winning challenger?

In this case, it's about evolving the flywheel, the capacitor and adding strokes of red to a technology that conjures thoughts of beige.

Toyota, with its brand-new TS030 P1 car, and Audi, with its R18 e-tron Quattro, aren't the first hybrids

■ The hybrid system of the Audi R18 e-tron Quattro is modeled after that of the Porsche 911 GT3 Hybrid, which sends energy to the front wheels for added performance. Regulations, however, prohibit power being sent to the front wheels at speeds below 74 mph, so it will be used most often on the long straights.

to race at Le Mans—that distinction goes to 1998's Panoz Q9 (nicknamed "Sparky" for all the wrong reasons), but these second-generation hybrids are a perfect example of how the technology has moved from novelty act to no-nonsense in just over a decade. The extra 150 hp generated by the Q9's massive 300-volt Ni/MH battery pack and brushless DC motor was negated by their 220-lb. weight—the equivalent of Peyton Manning squatting over the rear axles—and served as a cautionary tale amongst endurance racing teams.

For the Germans, its preferred diet strategy involved shifting away from batteries altogether with the e-tron. And thanks to the pioneering work done by its parent company

Audi's R18 e-tron and Toyota's TS030 prototypes bring electricity to the 24-hour classic



(and soon-to-be P1 rivals) at Porsche, it's not a surprise that Audi chose the same flywheel system that underwent intense development in the 911 GT3 R Hybrid (Trackside, March).

Modeling its layout after the Porsche, Audi placed the Williams F1-developed Flybrid energy storage system in the e-tron's passenger seat and mounted the Bosch-designed electric motors and drive axles at the front of the R18. Altogether, the e-tron system weighs in at a rather svelte 165 lb.

To keep the instant-torque hybrids from thrashing the competition off every corner, the ACO organizers have restricted the use of hybrid power—which activates automatically—to 74 mph and above.

Over 74 mph, it's clearly a

hybrid free-for-all, within reason.

In an effort to prevent constant engagement of the hybrid drive, the ACO has limited energy storage to 500 kJ, which isn't quite enough to last the length of the long straights. Recharging takes place under braking.

With 200 hp fed through the front axles, the e-tron combines to add almost 40 percent more propulsion to what the 510-bhp 3.7-liter single-turbo diesel V-6 sends to the back of the R18.

Take the R18's stump-pulling diesel, add a hybrid drive to amplify its midrange and top-end, and once the green flag waves, Toyota has anything but a fair fight on its hands.

Solving the hybrid puzzle for the Japanese marque has come through a joint effort between Toyota and its massive ex-WRC and F1 base in Germany.

The all-new TS030 chassis, produced in Cologne, is mated to a petrol-powered 3.4-liter V-8 made in Japan specifically for the TS030. Toyota's THS-R (Toyota Hybrid System-Racing) stays true to its production car roots, using a battery to store its energy and a capacitor-based distribution system designed by Nisshinbo.

As we went to press, Toyota had yet to decide whether to use front-axle drive through Aisin



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AW motors, or Denso units at the rear to deliver the same approximate electric punch the e-tron produces. Like so many other facets of the THS-R system, its weight has been kept private.

The TS030's high-revving V-8 should fly on Le Mans' pair of Mulsanne straights, and with hybrid power flowing, could win the top speed battle. But in the plus/minus column, only one of the hybrids

stands a serious chance of claiming victory.

Fuel efficiency? Audi. Low-end grunt? Audi. Midrange? Audi. Top-end pull? Toyota. Hybrid reliability? Thanks to two years of development by Porsche, that too goes to Audi.

Regardless of which manufacturer wins, the marketing benefits are already visible as the men inside the cockpit are already singing the praises of high-perform-



ance hybrids.

"It's quite easy to get used to," said Allan McNish, Audi's two-time Le Mans winner. "It's a marked difference under acceleration. It's smooth. It's not like

an on/off switch. You notice it most when the 500 kJ are gone... you're inside the car yelling 'No!...give me more... I want it back!' It's seriously cool to have."

—Marshall Pruett

■ Audi's R18 e-tron, above, and Toyota's TS030, below, bring hybrid technology to Le Mans. Audi has opted for a flywheel, while Toyota will rely on a capacitor/battery duo.



Sebring: Happy 60th!

Credit Alec Ulmann with seeing the road racing potential in the former Army Air Force training base near the sleepy central Florida town of Sebring.

In March, 1952, he staged the first 12-hour race there (a 6-hour race was held in 1950) and it's been a go ever since. The

first winning car was a Frazer Nash Le Mans Replica and now, 60 years later, an Audi R18 Ultra, the German automaker's 10th victory in the past 13 years.

Originally the track measured 5.2 miles around, but has been through several iterations and raced at

3.7 miles for more than a decade. Still using some of the old runway, Sebring's surface is famous for being rough, particularly Turn 17. Teams like to use the Florida track as a tuneup for Le Mans because if you can endure at Sebring, you can on the French circuit.

One suspects many of the fans don't notice. That's because Sebring is a party track, the 12-hour coinciding with Spring Break. In fact, there's a section called Spring Brake complete with a bikini contest.

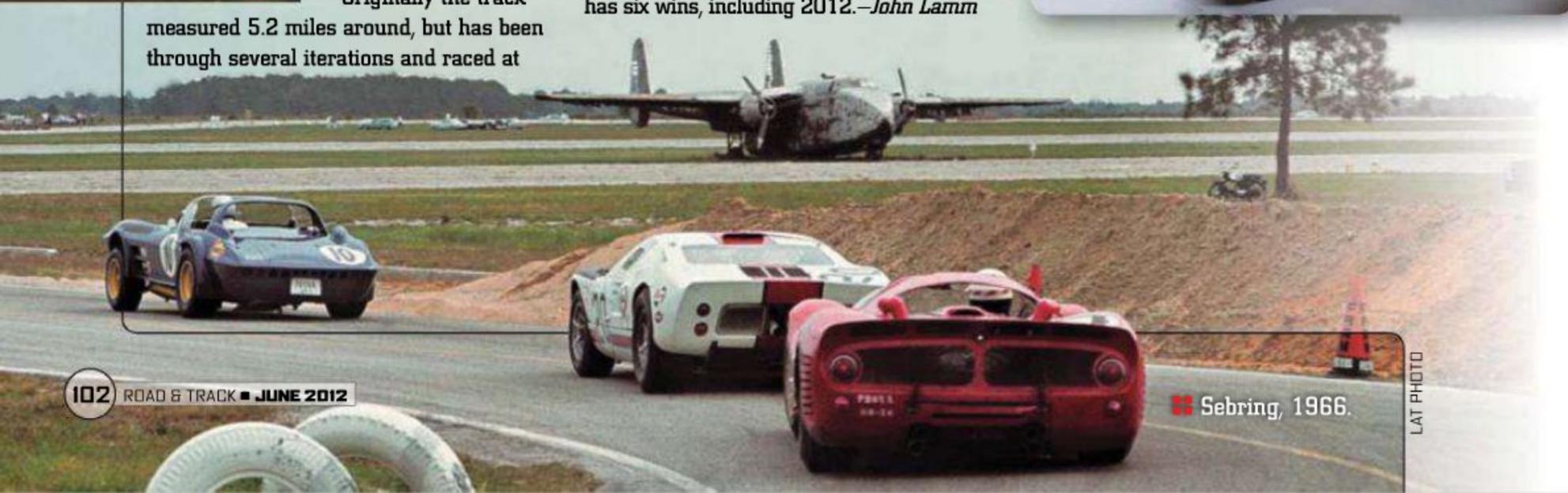
Many of the great drivers have won at Sebring—the race, that is—including Stirling Moss, Phil Hill, Dan Gurney, Jim Hall, Mario Andretti and Hurley Haywood, though the all-time champion is Tom Kristensen, who has six wins, including 2012.—John Lamm

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THE PODIUM

GUEST EDITORIAL

BY BEAUX
BARFIELD

A FORMER RACE CAR DRIVER AND DRIVING INSTRUCTOR, BEAUX BARFIELD WAS LURED AWAY FROM THE ALMS TO BECOME INDYCAR'S RACE DIRECTOR AND PRESIDENT OF COMPETITION.

Let the Racers Race

AS INDYCAR'S NEW RACE DIRECTOR, MY VISION for the series is for it to be officiated in a way that the drivers are promoted as the stars that they are. I think the over-officious manner in which the races have been run in the past several years has really taken away from what the sport can be, so I'm confident that my style of letting the racers race each other will have a positive impact and be a step in the right direction.

My role as the head competition official has a very obvious task, but I think a less obvious part of it is trying to create new concepts and procedures that add excitement to our racing and basically exploit the full potential of what we know IndyCar racing should be. Standing starts are potentially an important piece of that puzzle. I was a part of the team that implemented standing starts in Champ Car, and I would certainly like to see some of the same stuff done in IndyCar.

I think there's a good chance that will happen in a race or two toward the end of the season. My only apprehension is to make sure that the teams get to

a comfortable point, and right now they're overwhelmed with developing new cars and engines and putting all their programs together. I just want to make sure everybody is in a comfortable place before I start dropping stuff like that on them.

But the cars are capable of doing that. The transmission, the driveline, even the way the clutch works, although it's a hand-operated clutch lever on the steering wheel, all of that was designed with the possibility of standing starts in mind.

The real challenge for me this season will be establishing myself and making my expectations very clear of what I call and what I don't call, making that clear to the drivers so that we understand each other. I think that's the biggest challenge of any officiating role. It's just more challenging this year, being my first year with the series.

Since I spent the last five years with the American Le Mans Series, people have this perception of me that I don't have enough oval experience. But actually going back to when I was a driver, I've raced on ovals, I've won races on ovals and

I've officiated a number of oval events in my Champ Car days. So it's not a lack of experience. I certainly appreciate that I've got to shake some cobwebs out, but I don't have any real concern about officiating races on ovals.

One of my biggest concerns when I arrived at IndyCar was what happened with Dan Wheldon's accident at the end of last year. I knew Dan fairly well from his early days, competing in Formula Ford 2000 and such. So for me personally, for a lot of us who are involved in racing, it's difficult. But the feeling I got when I arrived in the IndyCar offices is that it is very important to not forget about the accident—it's something that people seemed to be very conscious of. Yet we have to sort of move forward from it.

I think it's always important in these situations to analyze the data and learn what we can and to improve every aspect of our sport. Our director of safety, Jeff Horton, has spent a lot of time with the drivers and testing new materials whether it be seats, helmets or seatbelts. A lot of attention is being paid to the safety aspects of racing.

There are many people working very hard to create the IndyCar product, and they're all pulling in what I feel is the right direction. I think I'm a relatively small piece of that. But all of the race officiating decisions will start and stop with me.

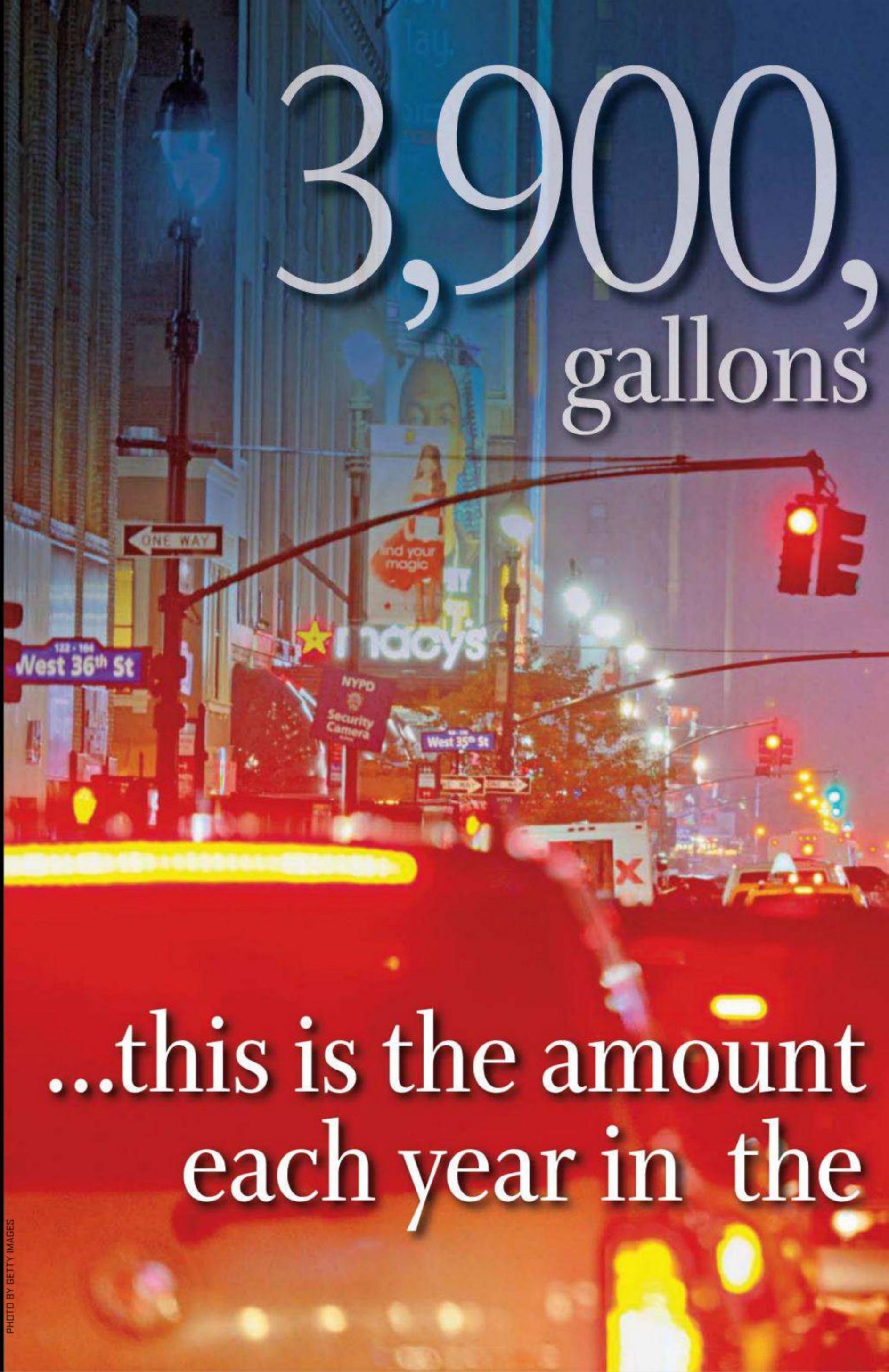
"The challenge for me will be making my expectations very clear of what I call and what I don't call, making that clear to the drivers so that we understand each other."



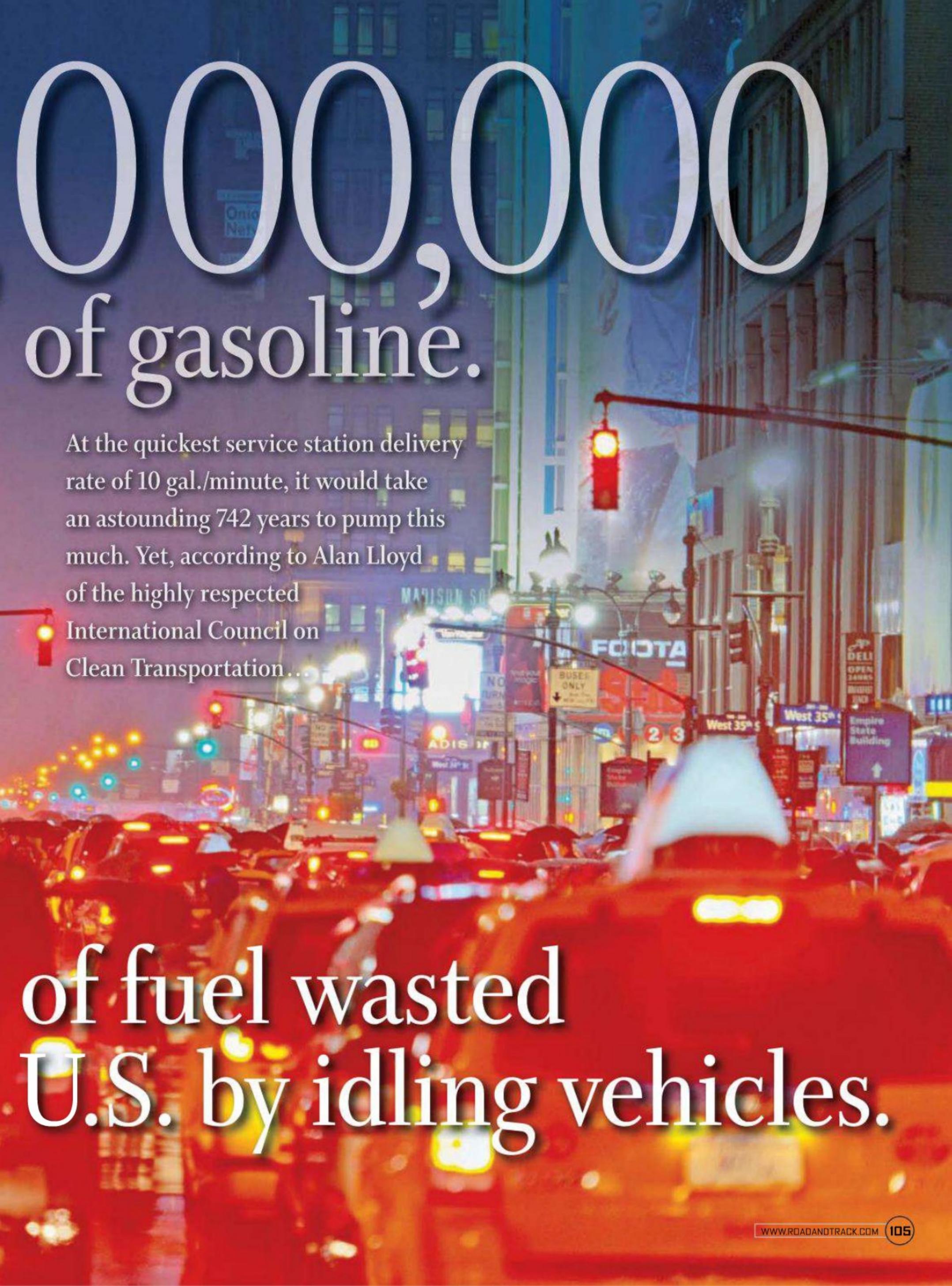
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BY DENNIS SIMANAITIS

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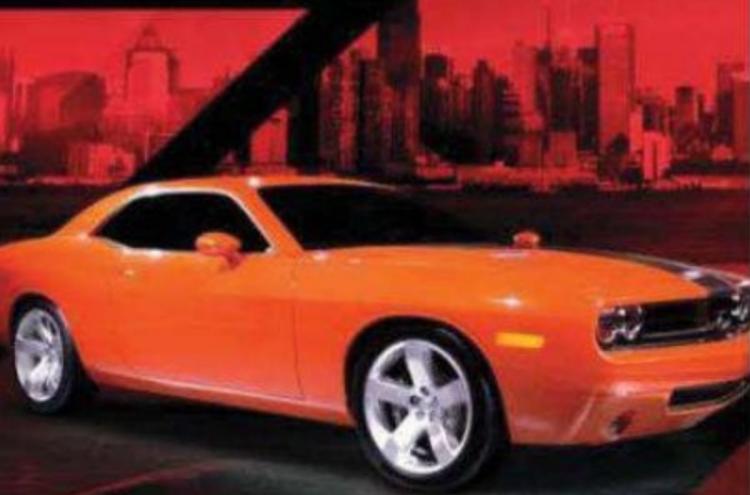
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Start/stop technology can mitigate this waste. Some three dozen car and truck models already available in the U.S. have start/stop systems of one sort or another. By 2015, this is expected to extend to fully 70 percent of the market, with some automakers offering it throughout their lineup

Note, however, not all start/stop systems are created equal. Nor are they found solely in hybrid powertrains. And, at this point, each one we've sampled displays a unique character (as summarized in an accompanying table of 10 cars evaluated).

It's certainly an appropriate time to add this topic to our growing list of Technology Update automotive glossary features. For other recent ones, see "Premium Fuels," April 2012; "From Carriage Trade to Carbon Fiber," December 2011; and "Liquid Fuels? Electricity? Hydrogen?," September 2011; these and others are also at roadandtrack.com.

THE BASICS—AND EVEN SOME HISTORY

We think of automotive self-starting as utterly routine, but of course it wasn't that way at the beginning. A giant of automotive engineering, Charles F. Kettering, and curiously enough, the cash register, played important roles in relieving motorists of the hefty—and sometimes hazardous—work of cranking an

internal combustion engine. His electric starter motor on the 1912 Cadillac adopted the same reasoning that Kettering had originated at National Cash Register Co.—namely, the electric motor needed only to provide an occasional surge of power; it didn't have to be sized for constant load. To this day, automotive starters are optimized for heavily stressed but only infrequent use.

The basic idea of start/stop is simple: When the car comes to an appropriate stop, automatically turn off the engine; then seamlessly restart it when further progress is called for. However, many engineering challenges lurk in these words "appropriate," "automatically" and "seamlessly." It also depends on the type of vehicle, be it conventionally powered or of every gradation from micro to mild to full hybrid.

TRADITIONAL STARTER/BATTERY

Four distinct start/stop configurations are currently in use. The most straightforward is a traditional starter/battery pair; for short, let's call it S/B. The basic hardware is already there; what's needed is augmented control and possible upsizing. One challenge of S/B is achieving relative transparency of operation (not a high priority in its original function). A second is durability in its more frequent use. Also, upsizing can bring problems



Car	Type ¹	Restart Type ²	Stop ³	Restart ³	Remarks
BMW 328i					
automatic	Conv	S/B	C+	C	Some noticeable throbbing
manual	Conv	S/B	C	D	Distinct throbs, stop and restart
Buick LaCrosse	Micro	BAS	A	A	Well nigh transparent in either action
Honda CR-Z					
CVT automatic	Mild	IMA	A	A-	Slight restart nudge
manual	Mild	IMA	A	B+	Full confidence on all restarts?
Infiniti M35 Hybrid	Full	Pre-trans	B+	A	Slight rev overrun on stop
Kia Rio Eco	Conv	BAS	B+	B	Slight vibration, especially on restart
Mercedes-Benz					
CL63 AMG	Conv	S/B	A	A	Autonomous logic lurking beyond on/off
Porsche					
Panamera S Hybrid	Full	Pre-trans	A	A	Stops readily for "sailing"
Toyota Prius C	Full	Planetary	A	A	Slightest of planetary "gravel" on restart

1. Conv = non-hybrid. Micro = start/stop, regenerative braking, slight if any propulsion benefit. Mild = hybrid with modest EV interaction. Full = hybrid with significant EV propulsion. **2.** S/B = traditional starter/battery. BAS = belt alternator starter. IMA = Honda Integrated Motor Assist. Pre-trans = IMA-like Inline configuration, but with clutch between engine and electric motor. Planetary = epicyclic gearbox with two motors, e.g., Toyota Synergy Drive.

3. Stop and restart behaviors graded in terms of smoothness, predictability, confidence. Grades assigned: A seamless, B almost so, C noticeable but acceptable, D distracting.

of packaging and assembly in its particular corner of the engine compartment.

BMW's of the non-hybrid variety—our examples, the 328i in both 6-speed manual and 8-speed automatic form—use the S/B approach for their Auto Start Stop. Though new to the U.S. market, this feature has been part of BMW's European lineup for several years now. (The rationale for this comes anon when regulatory matters are discussed.) Like other systems evaluated, BMW's Auto Start Stop has its own on/off: a separate button adjacent to the car's start-stop ignition control.

Another S/B system is the Mercedes-Benz Eco Start/Stop, our example the potent CL63 AMG. Operation of Eco Start/Stop can also be defeated through the car's COMAND menu, beneath which lurks rather more autonomous logic governing start/stop operation. For example, battery requirements of steering assist and other electricals are monitored; if the engine is needed to maintain functionality, it won't shut down. Also, for safety reasons, if the hood or a door is opened, Eco Start/Stop is not activated.

BAS, AS IN BELT ALTERNATOR STARTER

A second approach to start/stop goes by the name BAS, as in belt alternator starter. BAS start/stop exploits the inherent duality of a motor-generator in a manner similar to that of regenerative braking. (By the way, the related topic of regen deserves a Technology Update of its own—coming soon.) A traditional alternator produces electricity through being belt-driven by the engine's crankshaft. Finessed over to its motor function, a BAS counterpart restarts the engine through this same belt drive. Even with an upsized alternator and drive belt, packaging and assembly are considered straightforward. A higher voltage battery may be employed; a conventional starter is typically retained for cold start.

GM adopted BAS in its 2007 Saturn Vue Green Line microhybrid. A second generation has a larger motor-generator and 115-volt lithium-ion battery pack. This eAssist is on the 2012 Buick LaCrosse in our sample as well as the 2013 Buick Regal and Chevrolet Malibu Eco. It features regen braking as well as start/stop and a modicum of propulsion enhancement.

PLANETARY, AS IN PRIUS

The other two approaches in our sample are hybrid-specific and, indeed, depend on configuration of the hybrid drivetrain. The most familiar of these, as exemplified by Toyota's Synergy Drive, employs two electric motors and a plan-

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etary gearbox, the combination yielding a continuously variable-like transmission of torque. As with BAS, restart capability exploits duality of a motor-generator.

The Prius C in our sample provided experience with this planetary approach. It proved exemplary of Toyota's expertise in hybrids. In particular, its start/stop was unobtrusive, the latter recognizable only through the car's several choices of energy display. As with other planetary systems, restarts had only the slightest of gravelly gear sensations.

INLINE, AKA PRE-TRANSMISSION, NÉE IMA

The fourth start/stop approach is hybrid-specific at this point, though there's nothing intrinsically prohibiting a non-hybrid application. In fact, the idea of incorporating a starter directly into the driveline isn't new. The Dynastart was a starter-generator of an earlier era.

Honda's Integrated Motor Assist was the first of this Inline hybrid configuration. With IMA, the car's motor-generator resides in place of an engine flywheel. It acts as a starter in IMA start/stop mode as well as otherwise adding to hybrid propulsion. Our sample included a pair of Honda CR-Zs, a CVT automatic as well as our Long-Term 6-speed manual.

Other more complex Inline configurations have been termed "P2" or "Pre-transmission" systems. Conceptually, their significant difference from IMA is the incorporation of an added clutch between the engine and motor-generator. (Note this allows full engine disconnect/shutdown—not merely power-off reciprocation—in hybrid electric mode.) All Inline systems operate in similar fashion when performing their start/stop function, their powertrain's integrated motor-generator handling the restart.

Our Inline sample of cars was particularly broad, ranging from the Honda CR-Z pair through an Infiniti M35 Hybrid to the lofty (\$95,000) Porsche Panamera S Hybrid. Allied with its start/stop feature, the Porsche also has a function called "sailing"—at any speed up to 103 mph, accelerator liftoff shuts down the engine for as long as power isn't summoned.

HOW TO ACTIVATE START/STOP

Start/stop activation depends on specific driver inputs as well as operating conditions. The engine must have reached proper temperature; this, to get adequate light-off of its catalytic converter and also to ensure proper lubrication and as effortless a restart as possible.

With a manual-gearbox car, engine shutdown typically comes with braking

to a complete stop, gearbox in neutral and clutch release. The Honda system anticipates this just a tad; its engine shutting down even before a full stop. Both manual-gearbox cars in our sample, the BMW 328i and Honda CR-Z, restarted with the next depression of the clutch and selection of gear.

Cars with automatic transmissions shut down upon braking to a full stop. There's typically a slight delay to account, for instance, for a stop sign or other brief pause. Restart comes with releasing the brake pedal.

HOW DOES IT FEEL?

Driving a start/stop car for the first time can be unnerving. Obviously, confidence of restart is an absolute necessity. Indeed, at one time or another, several of us have inexplicably tricked our Long-Term Honda's restart logic into less than exemplary behavior. With experience, though, comes enhanced confidence. And with the best of the systems evaluated—those earning A grades—operation is well nigh transparent.

Also, curiously, we found no particular grade correlation with system complexity. The Buick's eAssist BAS equaled the Porsche S Hybrid's pre-transmission in smoothness, predictability and confidence. If anything, it's a matter of evolving goodness: The oldest—and most conventional—system, BMW's S/B, was the least impressive.

WHAT ARE START/STOP'S BENEFITS?

Once the catalytic converter is hot and the engine is at operating temperature, start/stop is clearly beneficial to clean air. Its benefits in fuel economy are estimated at around 5 percent, obviously depending profoundly on the amount of idling time. There's enhanced payoff, 10 percent and beyond, for in-motion applications such as Porsche's sailing feature.

Europeans got start/stop first. This was because of differences in regulations, specifically Euro versus EPA Driving Cycles. Cars running the NEDC (New European Driving Cycle) spend fully 25 percent of their time at idle. By contrast, our EPA Highway test has no stops whatsoever; our EPA City test has 11 stops, albeit many of them only brief ones. EPA's Combined mpg figure is a 55/45 weighting of City and Highway, respectively. It's figured that the stops in the City cycle result in a combined City/Hwy idle time of 11 percent. Thus, purely from a regulatory point of view, start/stop technology offers more than twice the payoff in Europe.

There's another matter of test pro-

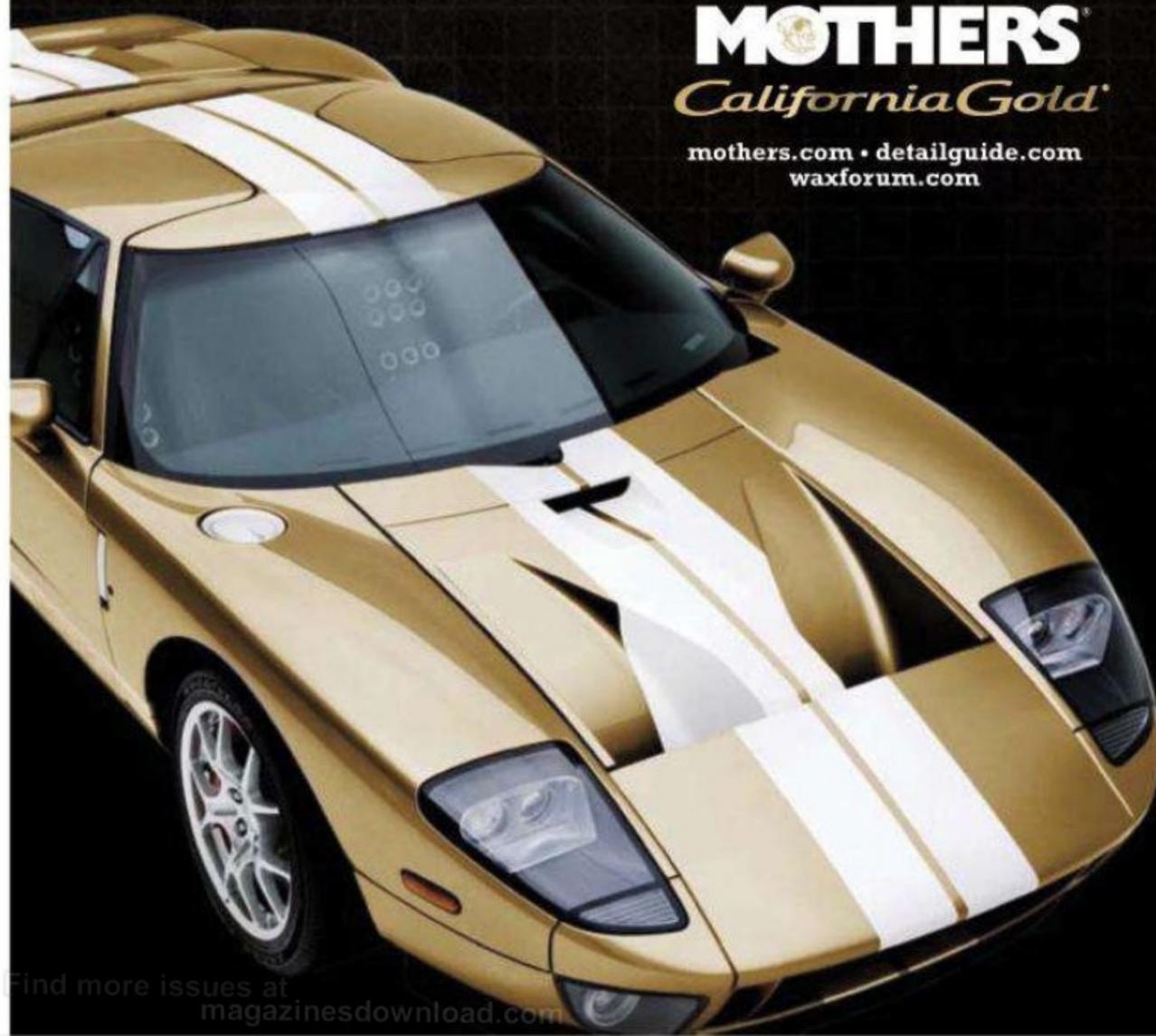


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cedure, namely how the idling is handled with manual-equipped cars. If the test driver fails to release the clutch in neutral during a simulated stop, the systems we evaluated won't be invoked—and there'll be no benefit whatsoever. It seems absurd for drivers to “ride the clutch” in this way, but regulations have been known to breed such unintended consequences.

START/STOP TIDBITS

What about accelerated engine wear? Isn't starting the most difficult time for an engine? Yes, if it's cold and particularly before full lubrication is achieved. However, engineers note, start/stop isn't activated until full warmup.

What about wearing out the starter or battery? The Kettering cash register analogy may be a bit weaker; but Boss Kettering, as he was known, would no doubt have thrived on these engineering challenges. Typically, S/B systems fit beefier hardware; the Bosch Smart Starter Motor, for example. There's also potential for enhanced energy storage: ultracapacitors being one concept, lead-carbon battery technology another. BMW has teamed with Axion Power investigating such a Pb-C alternative to today's AGM (absorbed glass mat) battery. Its current Auto Start Stop continues with the latter technology.

What's to be done with the auxiliaries, for instance, climate control in either heating or cooling mode, when the engine shuts down? As most real-world stops are relatively brief, heating isn't a problem—but air conditioning could be. A particularly neat approach is thermal storage material, essentially a dual-phase substance incorporated into the a/c's evaporator unit. (See “Tech Tidbits,” November 2011, or roadandtrack.com for details.) Other auxiliaries, water pumps, steering power assists and the like, have already gained efficiency through electrification.

As a last tidbit, what about diesel start/stop? Inherently, compression ignition is a difficult combustion to tame, its startups and shut downs inherently raucous. Increasing the frequency of starts/stops and striving to make them all but transparent are challenges, even with today's sophisticated diesels.

On the other hand, fuel taxation in much of the EU benefits the diesel. European drivers—and plenty of others—respond with genuine enthusiasm for compression ignition. Given that engineers around the world are working all out for reduced fuel consumption, these challenges to start/stop technology aren't being ignored. 

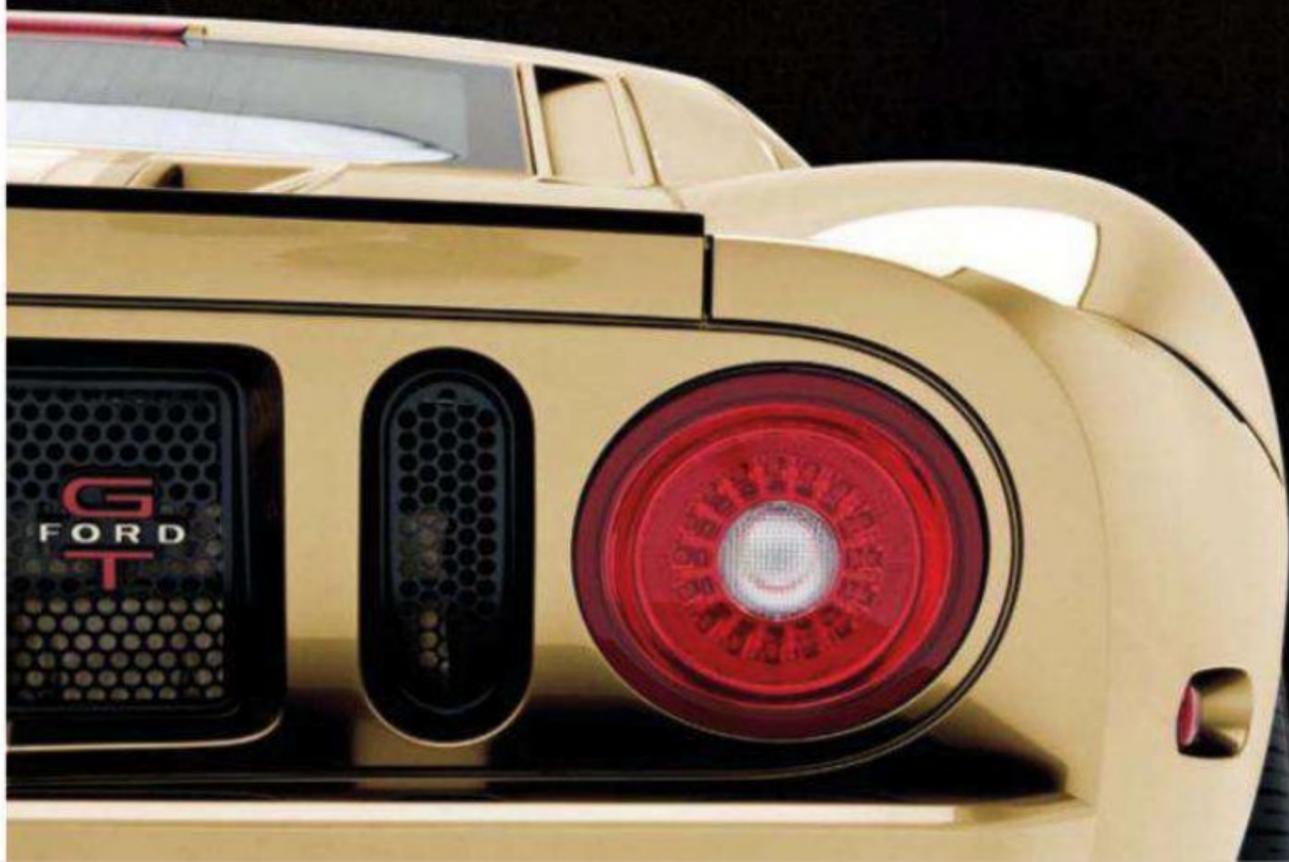


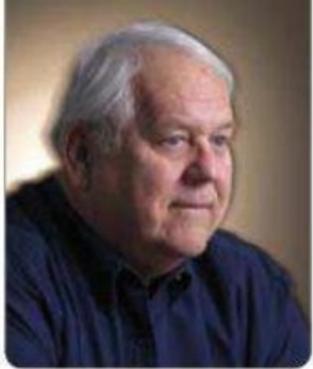
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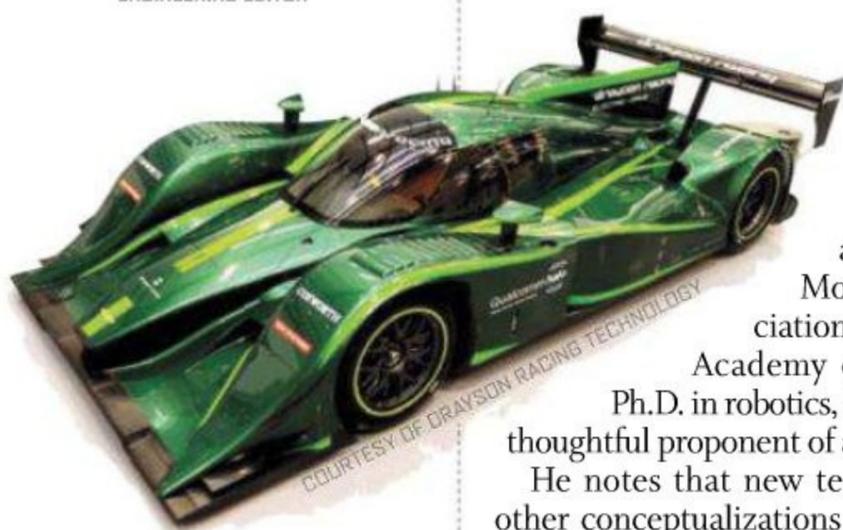


TECH TIDBITS

BY DENNIS SIMANAITIS
ENGINEERING EDITOR

Concepts, Downforce—and a Plug Squabble

THIS YEAR'S SAE HYBRID AND ELECTRIC VEHICLE Symposia offered a wealth of tidbits, everything from a keynote address by Lord Paul Drayson on the evolution of concepts to the subject of battery quick charging, its specifics (and ongoing squabble). A good time—and informative technical exchange—was had by all.



LORD DRAYSON'S EV ENTHUSIASMS:

Lord Paul Drayson is managing partner of Drayson Racing Technologies as well as president of the U.K.'s Motorsport Industry Association. A Fellow of the Royal Academy of Engineering with a Ph.D. in robotics, he's also an articulate and thoughtful proponent of all sorts of green racing.

He notes that new technologies—like many other conceptualizations of mankind—evolve in stages: There's initial hype followed by disillusion, then a shakeout leading to foundation and, ultimately, ubiquity. Humans, he notes, profit from encouragement to move matters from stage to stage.

Right now, with EV acceptance around the world less than stunning, Drayson says we're experiencing the disillusion stage. He concludes, "We need EV racing as a means of changing perception."

The Lola-Drayson B12/69EV is a rolling example of his enthusiasm. Built around a Lola LMP1 chassis, this EV racer has an electric motor for each wheel, the four totaling 850 hp. Innovations include damper regeneration—that is, recouping the energy of shock absorber action—along with the conventional brake variety. Zero-to-60 mph in a claimed 3.0 seconds; 0-100 in 5.1. Its lithium-nanophosphate battery pack may power the car for only 15 minutes—but this is clearly long enough to meet Drayson's goal of setting outright lap records at venues throughout the motor racing world.

He also shared more information on FIA Formula E (see "Are We Ready for EV Racing?" R&T, February 2012). Drayson predicts that an optimized Formula E racer will have low drag, not high downforce: "Why waste energy for the latter?" He foresees canopied cockpits and enclosed wheels as part of this.

Eight events are planned for Formula E's inaugural season in 2013, all in urban venues. Formats are seen as four 15-minute heats with 30 minutes in between. Predicts Drayson, "It'll be an environment where the fruits of winning are massive, but also where failure—glorious failure—is acceptable."

DOWNFORCE—A POINTLESS DESIGN PATH?:

In a recent *Racecar Engineering*, a fine Brit specialist monthly, Paul Weighell offered the following observation: "Aerodynamic downforce, perhaps like Tamara Eccelstone's TV show, is famous for being famous, but serves few needs outside its own small circle."

Before the mid-1960s, Weighell notes, aerodynamic research aimed at reducing drag, something with direct and meaningful payoff in real-world motoring. Then came winged race cars and, in time, today's 24/7 wind tunnels, Computational Fluid Dynamics on supercomputers and aerodynamic nuances that are subtle indeed—and utterly without road-car applications of any sort.

By contrast, compare this with the technological benefits and business opportunities of rapid prototyping, advanced composite fabrication, enhanced energy recapture and other spin-offs arising from racing.

Nor has downforce particularly improved "the show." It may be impressive that cars seemingly defy the laws of physics. But wouldn't it be much more exciting to watch drivers exhibiting superb car control when their mounts aren't stuck to the tarmac?

Lord Paul Drayson's comment about not wasting energy for downforce is well taken.

SAE J1772



CHAdeMO



SAE COMBO



PHOTO COURTESY SAE

CHAdeMO VS. SAE COMBO: The **SAE J1772** connector is the standard plug for EV recharging of the 110- and 220-volt AC variety, the charge time typically measured in hours. Quick charging, e.g., 80-percent refreshment in 30 minutes, usually involves 440 volts DC—and completely different hardware. Also, note, at this point the technicalities of DC quick charging have yet to be standardized.

A Japanese-developed **CHAdeMO** quick-charge connector and its separate onboard plug-in port are already an option with the Nissan Leaf and Mitsubishi i. By the way, CHAdeMO derives from an abbreviation for "charge de move;" it's also a Japanese pun along the lines of "How about some tea?"

The proposed **SAE Combo** plug expands the J1772 connector with added hardware necessary for quick charging. The two plugs are not compatible and members of the relevant SAE committee are currently squabbling over which is preferable. There are trade-offs galore of size and functionality—as well as automaker rivalries.

On the other hand, the quick-charge hardware upstream of the plug is essentially the same, so in one sense it's no big deal which is ultimately adopted. And, as one specialist noted at an earlier symposium, with consumers used to gasoline fill-ups in a tenth the time, "quick charging" in 30 minutes isn't all that quick anyway.

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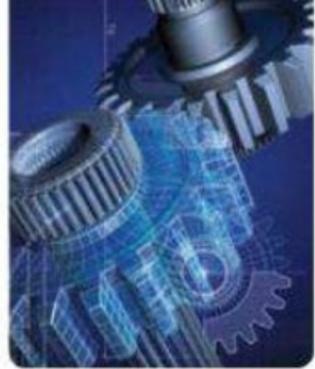
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TECH ADVICE

BY TOM WILSON

Oil Loss, Change Intervals and Cubic Inches

OILING SCION: My dad has a 2008 Scion xB 5-speed manual with just over 40,000 miles on it. He's owned the car since new and has always had routine maintenance performed at the proper intervals. The other day while running errands, the red oil light flickered on and off. Upon checking the dipstick three times and finding it completely dry, I was horrified. Luckily, we were within walking distance of a store that sold oil. We bought three quarts thinking it was more than enough. I was shocked when it read full after all three quarts had gone in. There's no sign of any oil leaks underneath the car. The engine, Toyota's 2.4-liter 2AZ-FE, only takes 4.5 quarts with a new filter. How could it have consumed almost 75 percent of its oil within 4000 miles without anyone noticing?

*Mike Tedesco
Queens, New York*

Oh, quite easily. Your Scion's oil burn rate is less than a quart per 1000 miles, which is rarely visible as smoke. And if you haven't been used to checking the oil—why should you with only 40,000 miles on the clock—then those three quarts could have easily burned away unnoticed.

Now, this level of oil consumption is not good and

something is amiss, but difficult as it is for most people to accept, the economical answer is to simply keep adding oil. Assuming the issue is glazed cylinder walls, a duff piston ring, leaking valve guide or other internal engine fault, determining exactly what the problem is and then fixing it is much more expensive than adding oil every 1300 miles or so. You can expect this response from your Scion/Toyota dealer as the vehicle still functions and repairs are not cost-effective.

We expect the oil consumption to remain relatively steady at this rate and for the engine to give otherwise good service and longevity. However, if the oil consumption increases noticeably, then you can consider a major repair. Typically, automakers won't respond to oil burning until it exceeds one quart per 1000 miles.

OUT OF PRINT: We recently purchased a 2011 Hyundai Sonata Hybrid. We are happy with the car, but have some questions. Is it true they don't make a service manual for the car? We've been sent to Helm, which doesn't have it. We are told it is online, but nobody can provide an address. Even the owner's manual is devoid of simple maintenance tasks like changing the

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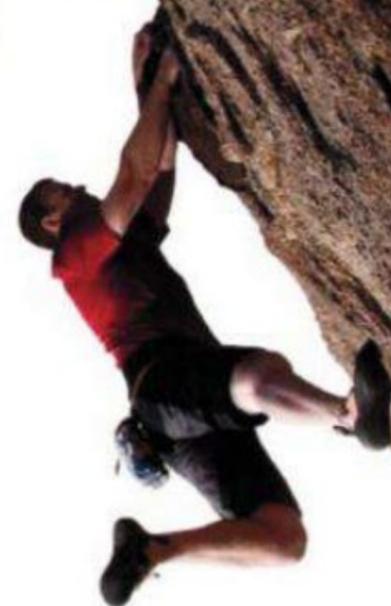
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oil. Speaking of oil changes, we just picked up the car from another round of recalls and were told we need to change the oil every four months or 4000 miles. The car is six months old and has 3500 miles. When asked why so soon, we were told it was because of sludge buildup and we should call Hyundai to confirm. We haven't had much success calling Hyundai. And finally, is it common for hybrids to lose significant mpg when the weather cools? It's not even cold yet and we have lost 7 mpg. We are used to losing 1-2 mpg with our other vehicles, but 20 percent seems like a lot.

*Tim Lenahan
Auburn, New Hampshire*

Go to <http://hmaservice.com/> for the service manual access. As for the 4000-mile oil change interval, it seems Hyundai emphasizes an aggressive oil change interval and takes a dim view of missed oil changes should a warranty issue arise. You should follow the oil change interval in the owner's or shop manual. And technically, Hyundai may believe your cool climate and hybrid powertrain may not provide enough sustained hot oil operation to completely boil off water in the oil (which would build sludge). And not that we like bad news, but cool weather really can kick a hybrid in the batteries, plus call for running the piston engine simply to make hot water for the heater/defroster, hurting the mileage.

WHY NOT WHITWORTH?: I am a subscriber and consider myself old school. Why, when measuring cars, do we use mph, foot pounds, seconds, curb weight in pounds, stopping in feet, horsepower, the quarter mile, etc., yet when it comes to engine sizes we use liters such as 1.6 or 5.0? What happened to the old days of 318, 426, 440 and 454 cubic inches?

*Wayne Hartford
Marlton, New Jersey*

Citing those engine displacements, you must be a Dodge sort of guy, Wayne. As for metric engine measurements, it's only us old enthusiasts that perpetuate the die-hard English units. Detroit automakers went metric on the engineering and manufacturing end of things decades ago, and slowly those measurements have made their way into the enthusiast's argot.

There's no rhyme or reason for any of this, just the messy reality of a world in transition from English to metric standards. But we humans apparently don't easily adapt to change once we're past 30 years of age, and so the enthusiasts who were around back in the day are the ones who remember big-block Chevys as 454s rather than 7.4-liters. Only when the engines are known by their metric measurements from day one do the liters seem to stick.

DOUBLE TIME: Can anyone tell me why cars still have manually adjusted dashboard clocks that do not keep the proper time like our automatically adjusted cell phones? Even cars with built-in navigation systems have the old clocks.

*Drew Allen
Virginia Beach, Virginia*

Great point, and the short version is that many cars are not connected to the internet yet. Often an explanation for such an apparently illogical feature lies unseen in a supporting system. If the manufacturer's marketing department insists its compact sedan have a dashboard clock then the designers need to get a clock on the dash. They keep things inexpensive and, presto, there's your manual clock. Yes, 20 percent of those small sedans might be ordered with the optional navigation system—thus getting an accurate digital clock and the screen to display it on—but that doesn't help the other 80 percent of the cars. So the cars with the optional navigation system get two clocks.

CHAIN GANG: I'm seeing a lot of new cars with chain-driven cams rather than belts. I was under the impression that belts had a lot of benefits over chains such as better control of the cams and quieter running. As someone who grew up with the wonderfully mechanical sound of Alfa Romeo's chain-driven twin-cam four I'm not complaining, but since this is decidedly old technology I'm puzzled as to why manufacturers are going back to it.

*Bruce Brandt
Webster, Texas*

Yes, chains driving camshafts are older than rubber belts, but older doesn't mean inferior. In fact, chains have one major advantage over belts: durability. Try as they might, engineers have yet to make a "rubber band" cam drive that will absolutely live for 150,000 guaranteed miles, much less a quarter million or so.

As customers have come to demand essentially lifetime service-free vehicles, chains have regained favor. They are more expensive than belts, weigh a little more and need some engineering to ensure they don't sing like Caruso. But they're tough as a Waffle House pork chop so they'll be on the job as long as anything else in the engine, and can easily take abuse from variable cam-timing actuators.

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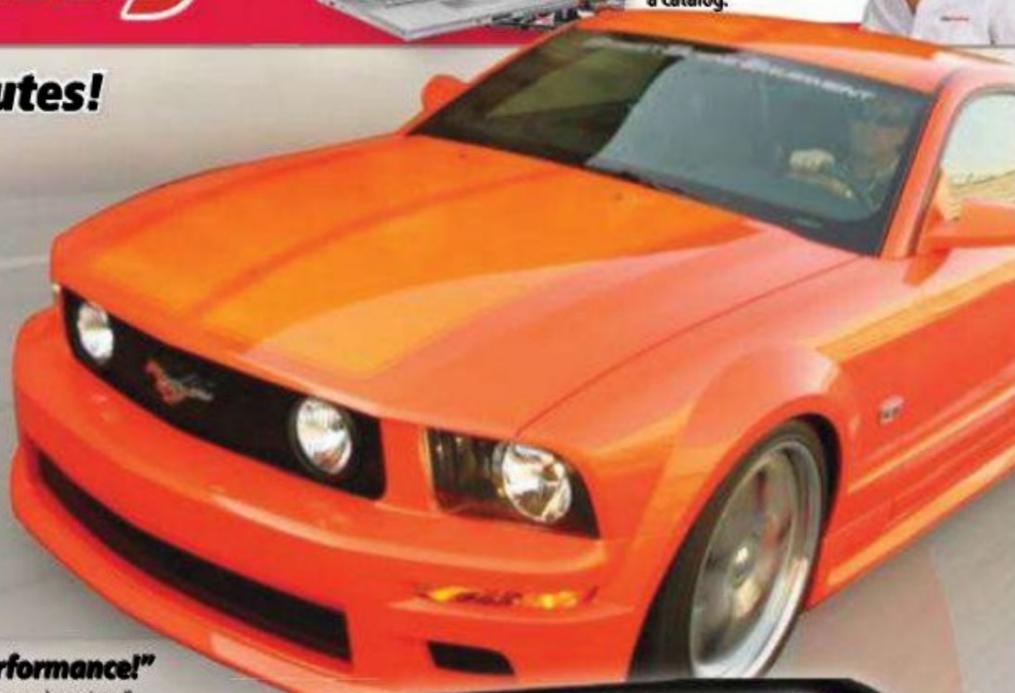
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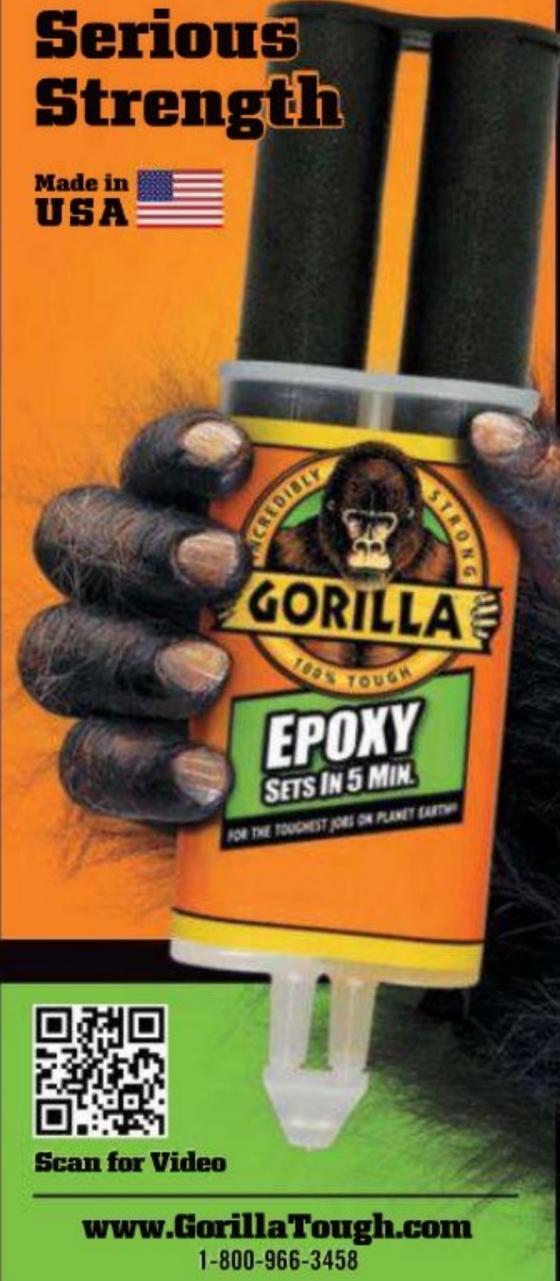


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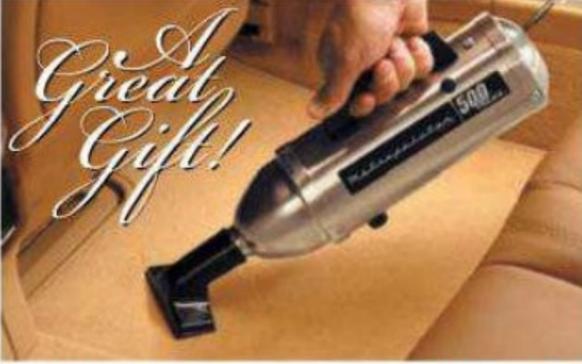
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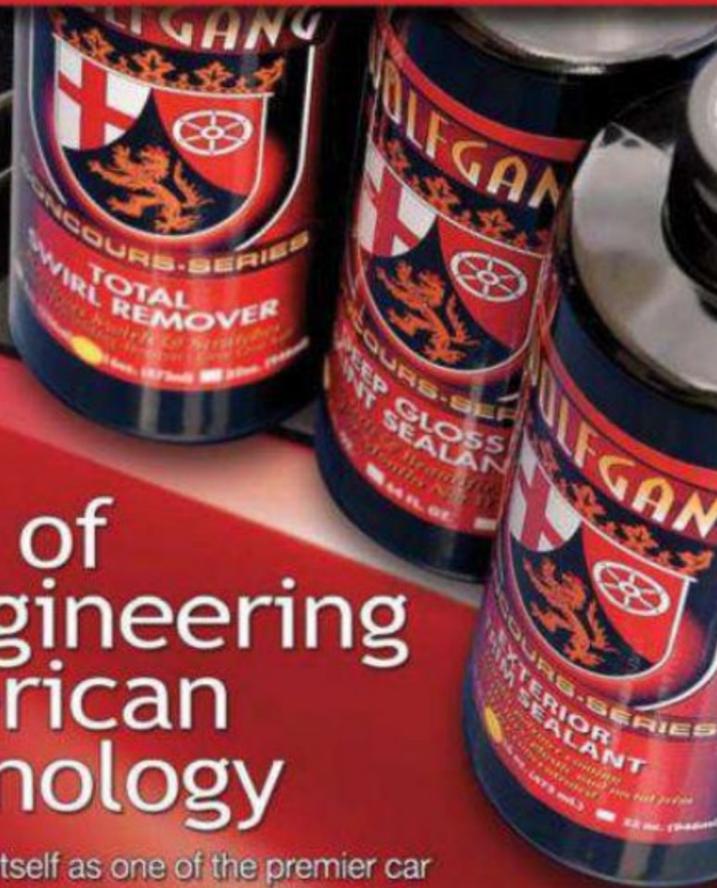
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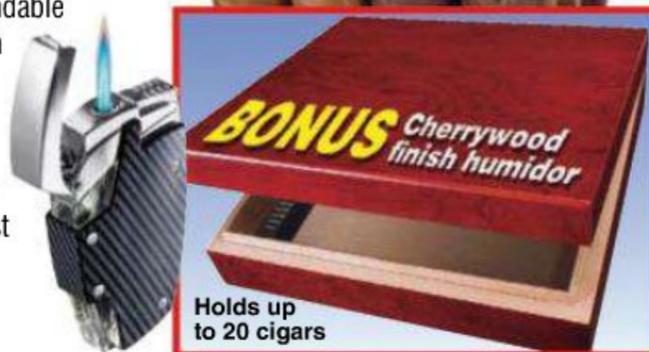
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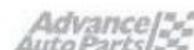
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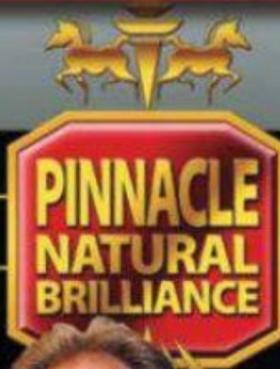


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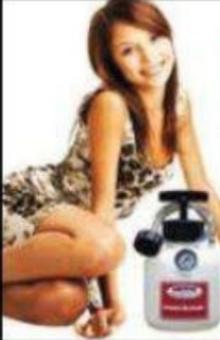
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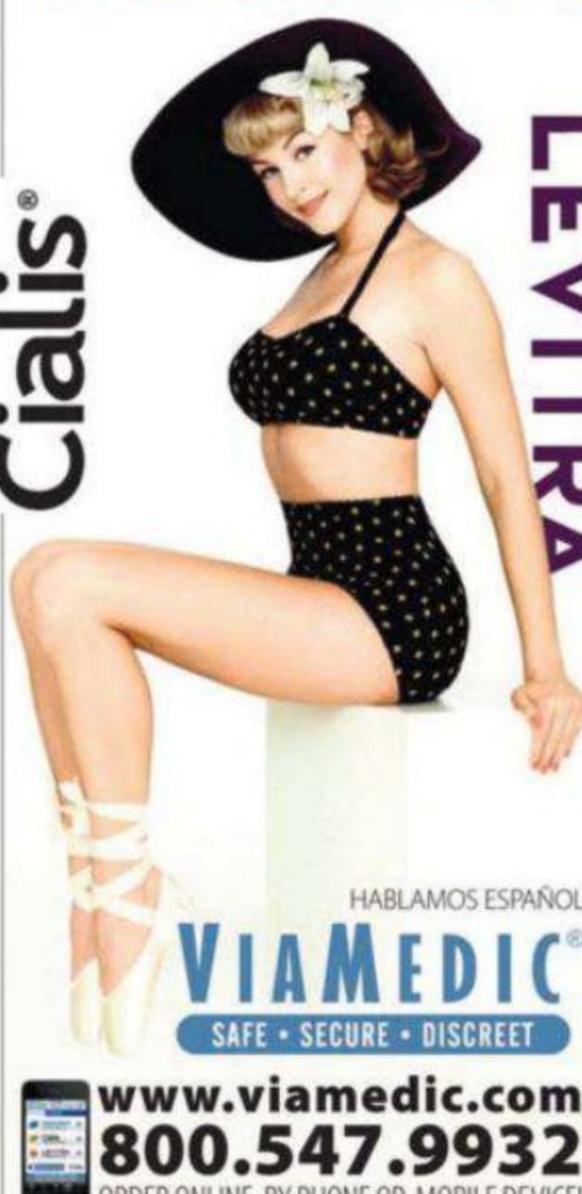
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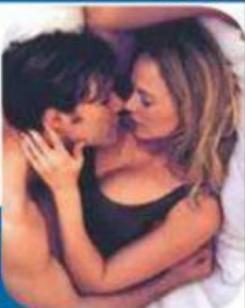
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HARBOR FREIGHT TOOLS - LIMIT 1 Use this coupon to save 20% on any one single item purchased when you shop at a Harbor Freight Tools store. *Cannot be used with any other discount or coupon. Coupon not valid on any of the following: gift cards, Inside Track Club membership, extended service plans, Compressors, Generators, Tool Cabinets, Tool Carts, Welders, Floor Jacks, Campbell Hausfeld products, open box items, Parking Lot Sale items, Blowout Sale items, Day After Thanksgiving Sale items, Tent Sale items, 800 number orders or online orders. Coupon not valid on prior purchases after 30 days from original purchase date with original receipt. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store in order to receive the offer. Valid through 9/1/12. Limit one coupon per customer and one coupon per day.



52246475

SUPER COUPON!

LOT NO. 66418



MULTI-USE TRANSFER PUMP
PITTSBURGH AUTOMOTIVE

SAVE 69%

\$3.99
REG. PRICE \$12.99

HARBOR FREIGHT TOOLS - LIMIT 9 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 9/1/12. Limit one coupon per customer and one coupon per day.



16117048

SUPER COUPON!



7 FT. 4" x 9 FT. 6" ALL PURPOSE WEATHER RESISTANT TARP



Item 877 shown

LOT NO. 877/69137/69249

SAVE 50%
\$3.49
REG. PRICE \$6.99

HARBOR FREIGHT TOOLS - LIMIT 6 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 9/1/12. Limit one coupon per customer and one coupon per day.



55465410

SUPER COUPON!



SAVE 48%

PITTSBURGH AUTOMOTIVE
BRAKE BLEEDER AND VACUUM PUMP KIT

Item 92474 shown

LOT NO. 92474/69328

\$17.99
REG. PRICE \$34.99

HARBOR FREIGHT TOOLS - LIMIT 7 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 9/1/12. Limit one coupon per customer and one coupon per day.



40791532

SUPER COUPON!



MECHANIC'S GLOVES

LARGE LOT NO. 93640

X-LARGE LOT NO. 93641

SAVE 50%

YOUR CHOICE!
\$3.99
REG. PRICE \$7.99

HARBOR FREIGHT TOOLS - LIMIT 8 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 9/1/12. Limit one coupon per customer and one coupon per day.



72921130

SUPER COUPON!

29 PIECE TITANIUM NITRIDE COATED DRILL BIT SET
drillmaster

LOT NO. 5889



SAVE 60%

\$9.99
REG. PRICE \$24.99

HARBOR FREIGHT TOOLS - LIMIT 8 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 9/1/12. Limit one coupon per customer and one coupon per day.



12652150

SUPER COUPON!

LOT NO. 31277

7 PIECE BODY AND FENDER SET
PITTSBURGH AUTOMOTIVE



SAVE 30%

\$24.99
REG. PRICE \$35.99

HARBOR FREIGHT TOOLS - LIMIT 4 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 9/1/12. Limit one coupon per customer and one coupon per day.



93264036

SUPER COUPON!

5 PIECE RATCHETING COMBINATION WRENCH SETS
PITTSBURGH PRO



SAVE 55%

SAE | METRIC
LOT NO. 66087 | LOT NO. 66286

YOUR CHOICE!
\$17.99
REG. PRICE \$39.99

HARBOR FREIGHT TOOLS - LIMIT 5 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 9/1/12. Limit one coupon per customer and one coupon per day.



99867381

SUPER COUPON!

PITTSBURGH AUTOMOTIVE

3 TON HEAVY DUTY JACK STANDS

LOT NO. 38846

SAVE 54%

\$15.99
REG. PRICE \$34.99



HARBOR FREIGHT TOOLS - LIMIT 6 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 9/1/12. Limit one coupon per customer and one coupon per day.



68573857

SUPER COUPON!

US*GENERAL
580 LB. CAPACITY FOUR DRAWER TOOL CART



SAVE \$130

\$99.99
REG. PRICE \$229.99

HARBOR FREIGHT TOOLS - LIMIT 5 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 9/1/12. Limit one coupon per customer and one coupon per day.



83450892

SUPER COUPON!

1/2" PROFESSIONAL AIR IMPACT WRENCH



CENTRAL EARTH QUAKE PNEUMATIC
700 FT. LBS. MAX. TORQUE
LOT NO. 68424/2623

SAVE \$45

\$74.99
REG. PRICE \$119.99

HARBOR FREIGHT TOOLS - LIMIT 5 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 9/1/12. Limit one coupon per customer and one coupon per day.



72167109

SUPER COUPON!

CENTRAL HYDRAULICS

1 TON CAPACITY FOLDABLE SHOP CRANE



LOT NO. 93840

SAVE \$100

\$99.99
REG. PRICE \$199.99

HARBOR FREIGHT TOOLS - LIMIT 4 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 9/1/12. Limit one coupon per customer and one coupon per day.



81999302

380 Stores Nationwide

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or 1-800-423-2567

ROAD TEST SUMMARY

ROAD TEST LEADERBOARD

0-60 MPH	
	sec
1 Bugatti Veyron 16.4 Super Sport	2.5
2 Porsche 911 Turbo S	2.6
3 Lamborghini Aventador LP700-4	2.7
4 Nissan GT-R	3.0
5 Ferrari 458 Italia	3.0

1/4 MI	
	sec @ mph
1 Bugatti Veyron 16.4 Super Sport	9.9 @ 145.8
2 Lamborghini Aventador LP700-4	10.4 @ 136.0
3 Saleen S7 Twin Turbo	10.6 @ 139.8
4 Porsche 911 Turbo S	10.7 @ 128.9
5 Lamborghini Gallardo Superleggera	11.0 @ 128.9

SKIDPAD	
	g
1 Dodge Viper SRT10 ACR	1.12
2 Chevrolet Corvette Z06	1.07
3 Rossion Q1	1.06
4 Lamborghini Aventador LP700-4	1.05
5 Chevrolet Corvette ZR1	1.05

SLALOM	
	mph
1 Chevrolet Corvette Z06	77.2
2 Chevrolet Corvette ZR1	76.2
3 Porsche 911 GT2 RS	75.9
4 Porsche 911 GT3 RS 4.0	75.8
5 Nissan GT-R	75.0

Data apply to the model at the time (issue date) of testing. Legend: For engine types, I is an inline design, F is a flat; V and W describe cylinder configurations; the number following the letter is the number of cylinders. An additional letter, a "t" or an "s" designates turbo- or supercharging; "d" designates diesel; "FC" designates fuel cell; "Elec" designates electric motor; **boldface**=extremes in that particular category, excluding nonproduction cars; **yellow** = newest entries; na=not available, na/U.S.; "CL" Car Life magazine; ¹automatic transmission; ²comparison test; ³price at time of test, some estimated; ⁴estimated; ⁵electronically limited; ⁶DIN bhp; ⁷automated manual transmission; ⁸altitude-affected; ⁹aero-limited; ¹⁰Road Test Update.

INTERPRETING THE NUMBERS: Factors that affect test numbers include air temperature, barometric pressure, condition of track surface, tune of test car. When comparing cars' performances, look for the **Significant differences** in each category, as listed below. This is the amount of difference that is meaningful.

WEIGHT of a car is generally accurate to **within 1 percent**.

ACCELERATION numbers are obtained using drop-clutch starts and lift-throttle shifts.

Significant difference: 0-60 mph, 0.3 sec.; 1/4 mile, 0.5 sec.

TOP SPEED is typically as reported by the manufacturer, but occasionally we measure it on a closed test track.

Significant difference: 5.0 mph.

BRAKING distances are initiated when the pedal is touched, and just enough effort is used to avoid wheel locking; on cars equipped with anti-lock braking systems, the ABS is fully invoked.

Significant difference: 60-0 mph, 10 ft.; 80-0 mph, 15 ft.

HANDLING is quantified two ways: The skidpad measures steady-speed cornering grip around a 200-ft.-diameter circle (run in both directions). The slalom, run through eight cones spaced at 100-ft. intervals, samples both controllability and grip during transient handling.

Significant difference: Skidpad, 0.02g; slalom, 1.0 mph.

Our FUEL MILEAGE is measured largely during urban driving and typically falls between EPA's city and highway estimates.

Significant difference: 0.5 mpg.

MAKE & MODEL	ISSUE	PRICE AS TESTED ³	ENGINE TYPE	HORSEPOWER, SAE	TORQUE, LB-FT	CURB WEIGHT, LB	0-60 MPH, SEC	0-100 MPH, SEC	1/4 MILE, SEC @ MPH	TOP SPEED, MPH ⁴	BRAKING 60-0 MPH, FT	BRAKING 80-0 MPH, FT	SKIDPAD, G	SLALOM, MPH	OUR FUEL MILEAGE, MPG
Acura TL SH-AWD	5-10 ²	\$44,195	V-6	305	273	3860	5.2	13.1	13.7@102.3	130 ⁵	113	198	0.91	68.4	15.8
Aston Martin Rapide ¹	9-10	\$212,445	V-12	470	443	4385	4.7	10.9	13.1@109.5	188	119	214	0.92	69.7	12.0 ⁴
V8 Vantage S ⁷	8-11 ¹⁰	\$157,670	V-8	430	361	3645	4.3	9.8	12.7@113.7	189	118	204	0.97	73.7	15.0 ⁴
V12 Vantage Coupe	1-11 ²	\$193,755	V-12	510	420	3800	4.3	9.3	12.5@116.8	190 ⁵	106	187	0.98	73.7	13.4
Audi A7 3.0 ¹	5-12 ²	\$66,220	V-6s	310	325	4250	4.7	11.9	13.2@105.0	130 ⁵	119	206	0.93	68.0	19.3
A8L ¹	10-11 ²	\$88,375	V-8	372	328	4495	5.0	12.6	13.6@104.0	130 ⁵	112	197	0.93	67.9	18.0
R8 5.2 FSI	1-11 ²	\$170,350	V-10	525	391	3725	3.7	8.4	11.9@118.7	196	112	199	0.97	72.9	13.6
S4 Quattro	8-11 ^{2,10}	\$53,500	V-6s	333	325	3965	4.4	11.0	12.9@108.8	155 ⁵	118	205	0.93	68.4	18.4
TT RS	1-12	\$61,125	I-5t	360	343	3360	4.0	10.6	12.6@109.6	174 ⁵	123	217	0.95	70.7	19.0 ⁴
Bentley Continental GT ¹	7-11 ¹⁰	\$215,675	W-12tt	567	516	5305	4.3	10.4	12.8@111.3	198	117	207	0.89	65.4	13.0 ⁴
Continental Supersports Conv. ¹	11-11	\$298,590	W-12tt	621	590	5515	3.9	10.1	12.5@110.1	202	117	210	0.89	66.6	13.0 ⁴
BMW Z4 sDrive35is ⁷	8-11 ¹⁰	\$64,225	I-6tt	335	332	3555	4.4	10.6	12.9@109.9	155 ⁵	119	208	0.91	67.8	20.0
1 Series M Coupe	9-11 ²	\$50,460	I-6tt	335	332	3405	4.4	10.8	12.9@108.4	155 ⁵	117	204	0.95	73.4	19.9
528i ¹	4-12 ¹⁰	\$58,775	I-4t	240	260	3950	5.9	15.6	14.4@96.3	130 ⁵	122	217	0.88	64.4	24.0 ⁴
650i	4-12 ¹⁰	\$97,825	V-8tt	400	450	4380	5.1	11.4	13.4@107.6	155 ⁵	119	212	0.94	66.8	15.6
750Li ¹	10-11 ²	\$99,125	V-8tt	400	450	4765	5.1	11.7	13.5@106.9	150 ⁵	120	209	0.86	66.4	15.5
Bugatti Veyron 16.4 Super Sport ⁷	11-11	\$2,765,840	W-16qtr	1184	1106	4545	2.5	4.9	9.9@145.8	258 ⁵	124	212	0.99	69.6	9.0 ⁴
Buick Regal GS	12-11 ^{2,10}	\$38,350	I-4t	270	295	3785	6.2	15.6	14.7@99.0	152	119	208	0.90	67.8	23.0 ⁴
Verano ¹	1-12 ¹⁰	\$26,850	I-4	180	171	3400	7.9	21.3	16.0@87.9	118 ⁵	131	233	0.83	66.3	23.0 ⁴
Cadillac CTS-V Sedan	8-11 ^{2,10}	\$69,490	V-8s	556	551	4300	4.1	9.2	12.3@118.4	191	114	198	0.92	70.1	15.2
Chevrolet Camaro SS Conv.	7-11 ²	\$42,180	V-8	426	420	4190	4.8	11.0	13.1@109.3	155 ⁵	116	203	0.89	68.4	16.7
Camaro ZL1	3-12 ²	\$54,995	V-8s	580	556	4080	4.7	10.2	12.9@113.1	180	118	204	0.98	72.9	14.0 ⁴
Corvette	4-12 ^{2,10}	\$63,480	V-8	436	428	3325	4.3	9.3	12.5@116.9	190	126	221	0.82	66.7	18.4
Corvette Convertible	4-12 ^{2,10}	\$70,395	V-8	430	424	3380	4.4	9.8	12.7@114.8	185	125	219	0.84	67.7	20.0
Corvette Grand Sport	4-12 ^{2,10}	\$72,130	V-8	436	428	3430	4.0	9.1	12.3@115.6	190	112	192	0.99	71.4	16.9
Corvette Grand Sport Conv.	4-12 ^{2,10}	\$78,140	V-8	436	428	3440	4.2	9.5	12.5@114.8	185	110	195	0.99	70.7	18.3
Corvette Z06	4-12 ^{2,10}	\$101,760	V-8	505	470	3310	3.6	7.9	11.7@124.1	198	103	176	1.07	72.2	16.5
Corvette ZR1	4-12 ^{2,10}	\$129,945	V-8s	638	604	3405	3.5	7.3	11.5@129.0	205	104	175	1.05	76.2	11.9
Volt ¹	2-11 ²	\$43,485	I-4/Elec	149	273	3825	8.8	28.1	16.8@82.8	101 ⁵	127	231	0.79	62.6	50.0 ⁴
Chrysler 300 SRT8 ¹	12-11	\$57,725	V-8	470	470	4430	4.5	10.6	12.9@111.6	175	120	217	0.82	66.2	14.6
Dodge Challenger SRT8 392	5-11 ²	\$44,380	V-8	470	470	4350	4.6	10.8	13.0@109.8	180	117	198	0.90	68.7	15.0
Charger R/T ¹	4-11	\$39,235	V-8	370	395	4410	5.2	12.7	13.7@104.2	145 ⁵	119	209	0.87	67.8	17.0
Viper SRT10 ACR	4-08 ¹⁰	\$98,110	V-10	600	560	3430	3.4	8.0	11.6@122.6	177 ⁵	109	187	1.12	73.4	na
Ferrari California ⁷	2-10	\$200,822	V-8	453	358	3925	3.5	8.6	11.9@116.9	193	106	188	0.96	69.2	14.0 ⁴
Enzo ⁷	7-03	\$652,830	V-12	650	485	3230	3.3	6.6	11.1@133.0	218	109	188	1.01	73.0	13.3
458 Italia ⁷	12-10 ²	\$280,572	V-8	570	398	3490	3.0	6.7	11.0@128.5	203	112	190	1.00	73.4	13.5
Fiat 500 Sport	10-11 ¹⁰	\$18,350	I-4	101	98	2440	10.2	36.7	17.5@78.0	112	135	237	0.84	68.9	31.0 ⁴
Ford Focus Hatchback ⁷	9-11 ¹⁰	\$25,830	I-4	160	146	3115	8.1	22.2	16.1@86.9	118 ⁵	118	210	0.91	69.2	28.8
GT	12-03	\$150,525	V-8s	500	500	3390 ⁴	3.8	8.8	12.2@121.6	190	117	199	0.99	69.5	15.0 ⁴
Mustang Boss 302 LS	5-11	\$47,990	V-8	444	380	3690	4.1	9.1	12.3@117.2	155 ⁵	112	191	1.02	74.0	16.7
Mustang GT Convertible	7-11 ²	\$42,585	V-8	412	390	3745	4.7	10.8	13.1@110.7	145 ⁵	116	203	0.91	69.1	17.0
Shelby GT500	8-11 ^{2,10}	\$55,330	V-8s	550	510	3870	4.3	8.9	12.4@119.4	155 ⁵	116	198	1.01	69.9	14.4
HKS Nissan GT-R ⁷	10-10 ¹⁰	\$107,000	V-6tt	638	606	3900	3.0	6.8	11.1@128.9	195	122	205	0.97	73.8	na
Honda Accord V6 EX-L Coupe	1-11 ¹⁰	\$32,480	V-6	271	251	3475	6.2	15.7	14.8@96.8	130 ⁵	138	225	0.84	62.9	18.0 ⁴
Civic Si Coupe	10-11 ¹⁰	\$23,175	I-4	201	170	2905	6.7	16.6	15.0@95.3	137 ⁵	134	237	0.88	68.0	23.0 ⁴
Hyundai Equus Signature ¹	10-11 ²	\$58,900	V-8	385	333	4610	6.2	15.0	14.6@98.6	149 ⁵	128	229	0.80	64.2	16.2
Sonata Hybrid ¹	8-11 ¹⁰	\$31,650	I-4/Elec	206	193	3650	8.7	22.8	16.6@86.2	123 ⁵	137	247	0.78	63.6	36.0 ⁴
Sonata SE 2.0T ¹	4-11 ¹⁰	\$25,000	I-4t	274	269	3450	6.1	14.6	14.5@99.6	146 ⁵	131	231	0.83	65.9	23.0 ⁴
Infiniti G25 ¹	4-11 ¹⁰	\$34,225	V-6	218	187	3515	7.7	19.5	15.7@90.2	145 ⁵	124	223	0.87	65.9	21.0 ⁴
G37S Sport	5-10 ²	\$40,085	V-6	328	269	3665	5.1	12.3	13.6@105.6	155 ⁵	117	210	0.90	67.8	16.6
M56 ¹	1-11 ²	\$68,145	V-8	420	417	3930	4.6	11.0	13.1@108.7	155 ⁵	121	214	0.87	66.7	17.9
Jaguar XFR ¹	6-11 ^{2,10}	\$80,475	V-8s	510	461	4425	4.3	9.7	12.6@114.0	155 ⁵	116	204	0.86	67.2	17.1
XJL Supercharged ¹	10-11 ²	\$91,950	V-8s	470	424	4395	4.4	10.3	12.8@111.1	155 ⁵	114	203	0.86	65.9	14.1
XKR-S ¹	3-12	\$132,875	V-8s	542	502	4100	4.2	8.6	12.3@121.0	186 ⁵	117	203	0.91	70.7	13.0
Kia Optima Hybrid ¹	11-11 ¹⁰ </														

MAKE & MODEL	ISSUE	PRICE AS TESTED ³	ENGINE TYPE	HORSEPOWER, SAE	TORQUE, LB-FT	CURB WEIGHT, LB	0-60 MPH, SEC	0-100 MPH, SEC	1/4 MILE, SEC @ MPH	TOP SPEED, MPH ⁴	BRAKING 60-0 MPH, FT	BRAKING 80-0 MPH, FT	SKIDPAD, G	SLALOM, MPH	OUR FUEL MILEAGE, MPG
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Mercedes CL5504Matic ¹	7-11	\$128,315	V-8tt	429	516	4775	4.2	10.3	12.7@111.5	130 ⁵	121	209	0.89	66.6	16.0 ⁴
CLS63 AMG ⁷	9-11 ¹⁰	\$130,290	V-8tt	550	590	4275	3.8	8.3	12.0@122.5	186	116	204	0.93	70.3	16.0 ⁴
E63 AMG ¹	6-10 ¹⁰	\$93,075	V-8	518	465	4285	4.1	9.5	12.5@115.1	155 ⁵	119	207	0.92	68.2	15.0 ⁴
E550 ¹	1-11 ²	\$69,625	V-8	382	391	4150	4.6	11.3	13.1@107.9	130 ⁵	120	212	0.86	65.1	17.4
E550 Coupe ¹	9-09	\$67,225	V-8	382	391	3810	4.7	11.1	13.1@108.9	130 ⁵	137	252	0.84	63.2	15.7
SL63 AMG ⁷	4-10 ^{10,2}	\$143,460	V-8	518	465	4420	4.0	9.5	12.4@115.3	186 ⁵	120	211	0.89	66.6	10.0
SL65 AMG Black Series ¹	3-09	\$304,350	V-12tt	661	738	4215	3.9	7.9	11.8@126.3	199 ⁵	112	192	0.99	70.3	14.2
SLR McLaren ¹	7-05	\$455,750	V-8s	617	575	3860	3.5	7.5	11.5@126.1	207	107	186	0.97	69.6	18.0 ⁴
SLS AMG ⁷	7-10	\$202,150	V-8	563	479	3795	3.6	7.7	11.6@124.3	197 ⁵	112	194	0.96	71.8	10.8
Mini Cooper S ¹	3-12 ^{2,10}	\$29,700	I-4t	181	177	2725	6.0	16.1	14.6@95.7	139 ⁵	119	208	0.90	69.4	28.1
Mini JCW Coupe	3-12 ¹⁰	\$38,850	I-4t	208	192	2785	6.3	15.0	14.6@98.9	149 ⁵	122	210	0.91	71.8	26.0 ⁴
Mini JCW Clubman	1-12 ¹⁰	\$35,350	I-4t	208	192	2815	6.2	15.7	14.8@96.9	147 ⁵	122	215	0.87	69.3	28.0
Mitsubishi Eclipse GT	8-07 ²	\$27,694	V-6	263	260	3570	5.9	14.7	14.5@99.3	148	121	217	0.84	63.9	19.6
Lancer Evolution CSR	6-11 ^{2,10}	\$34,755	I-4t	291	300	3600	4.3	11.5	13.0@106.2	162 ⁵	123	210	0.97	70.0	16.5
Lancer Evolution SE ⁷	3-11 ^{2,10}	\$36,550	I-4t	291	300	3625	4.5	12.0	13.2@104.3	162 ⁵	119	207	0.97	70.2	15.0 ⁴
Lancer Ralliart ⁷	11-08 ²	\$29,915	I-4t	237	253	3540	5.4	15.1	14.1@97.2	130 ⁵	129	227	0.84	66.7	17.3
Nissan GT-R ⁷	3-12 ²	\$95,280	V-6tt	545	463	3890	3.0	7.1	11.2@125.0	193	116	197	0.97	75.0	17.0 ⁴
Juke SV	12-10 ¹⁰	\$21,810	I-4t	188	177	2925	7.1	18.6	15.6@91.4	125 ^{4,5}	133	238	0.84	67.3	25.0 ⁴
Leaf SL-E ¹	2-11 ²	\$35,430	Elec	107	207	3415	9.4	na	17.2@79.0	92 ⁵	130	231	0.81	65.5	118.0 ⁴
Maxima 3.5 SV ¹	9-08	\$34,940	V-6	290	261	3610	6.1	15.4	14.6@97.7	149 ⁵	121	219	0.86	65.4	18.8
Nismo 370Z	9-09 ¹⁰	\$39,540	V-6	350	276	3300	5.0	12.0	13.5@106.6	155 ⁵	123	214	0.93	69.9	19.0 ⁴
370Z Touring	6-11 ^{2,10}	\$41,895	V-6	332	270	3425	4.9	11.9	13.4@106.8	155 ⁵	118	201	0.99	72.0	18.6
Porsche Boxster Spyder	8-11 ^{2,10}	\$67,820	F-6	320	273	3000	4.4	10.4	12.8@109.2	166 ⁵	111	196	1.01	74.2	21.0
Carrera GT	6-04	\$460,400	V-10	605	435	3530 ⁴	3.6	7.0	11.3@131.6	205	124	199	0.99	71.1	11.0 ⁴
Cayenne S ¹	6-11 ¹⁰	\$78,895	V-8	400	369	4555	5.6	14.1	14.1@100.1	160 ⁵	116	200	0.89	66.2	15.0 ⁴
Cayman R	9-11 ²	\$81,685	F-6	330	273	3025	4.4	10.2	12.8@110.5	175	114	200	0.97	73.3	21.7
Panamera S Hybrid ¹	4-12 ¹⁰	\$110,240	V-6s/Elec	380	428	4485	4.9	12.4	13.5@103.9	167	118	208	0.93	70.1	23.0 ⁴
Panamera Turbo S ⁷	12-11 ¹⁰	\$186,845	V-8tt	550	553	4575	3.4	8.1	11.6@120.8	190	118	207	0.99	69.6	16.0 ⁴
911 Carrera GTS ⁷	3-11 ¹⁰	\$113,605	F-6	408	310	3380	3.8	9.0	12.1@115.4	188	109	192	0.95	72.6	21.9
911 Carrera S ⁷	2-12	\$115,290	F-6	400	325	3120 ⁴	3.5	8.4	11.8@118.4	189	111	190	0.99	74.1	20.0 ⁴
911 GT2 RS	10-11 ¹⁰	\$260,980	F-6tt	620	516	3230	3.5	7.1	11.3@130.3	205	111	187	1.02	75.9	17.0 ⁴
911 GT3 RS 4.0	10-11	\$198,280	F-6	494	339	3125	3.6	8.0	11.8@122.2	193	109	190	1.04	75.8	17.0 ⁴
911 Speedster	3-11 ¹⁰	\$204,950	F-6	408	310	3520	3.9	9.2	12.2@114.6	190	111	192	0.97	73.4	19.4
911 Turbo S ⁷	1-11 ²	\$162,460	F-6tt	530	516	3590	2.6	6.3	10.7@128.9	195	107	185	1.02	73.3	15.1
Rolls-Royce Ghost ¹	8-10 ²	\$308,350	V-12tt	563	575	5495	4.7	10.2	12.9@114.3	155 ⁵	119	209	0.85	60.1	16.5
Phantom ¹	8-06 ¹⁰	\$346,650	V-12	453	531	5810	5.9	15.3	14.5@97.4	149 ⁵	123	219	0.77	57.9	11.7
Rosion Q1	1-10	\$108,151	V-6tt	450	390	2675	3.2	7.8	11.6@121.6	185	130	217	1.06	73.0	18.0 ⁴
Saleen S7 Twin Turbo	9-06 ¹⁰	\$602,442	V-8tt	750	700	2900 ⁴	3.3	6.0	10.6@139.8	250	119	210	1.03	69.9	13.0 ⁴
Scion iQ ¹	1-12 ¹⁰	\$19,841	I-4	94	89	2180	10.3	41.5	17.8@78.4	100	131	240	0.80	65.4	37.0 ⁴
Shelby GT350	5-11 ²	\$82,658	V-8s	624	540	3950 ⁴	4.2	9.2	12.4@116.7	155 ⁵	117	207	0.99	69.2	14.0 ⁴
Smart For Two passion coupe ⁷	3-08	\$15,625	I-3	70	68	1825	13.3	na	19.2@70.5	90 ⁵	130	230	0.72	57.6	32.0 ⁴
Spyker C8 Spyder	3-07	\$296,785	V-8	400	354	2985	4.4	10.3	12.7@112.0	160	120	204	0.92	67.1	18.0
Subaru Impreza WRX	11-08 ²	\$28,660	F-4t	265	244	3230	5.1	13.5	13.8@101.0	140 ⁵	124	221	0.87	67.0	22.2
Impreza WRX STI Limited	3-11 ^{2,10}	\$39,870	F-4t	305	290	3455	4.9	13.3	13.4@100.6	155	119	211	0.91	70.9	16.0 ⁴
Legacy 2.5GT Limited	12-11 ^{2,10}	\$34,340	F-4t	265	258	3545	5.6	14.4	14.1@98.8	150 ⁵	125	223	0.84	66.8	23.0 ⁴
Legacy 3.6R Limited ¹	12-09 ¹⁰	\$32,383	F-6	256	247	3555	6.5	16.7	14.9@95.6	149 ⁵	129	232	0.81	63.8	19.2
Tesla Roadster	2-09	\$118,400	Elec	248	276	2750	4.0	11.1	12.7@105.3	121	119	210	0.92	68.6	132/kwh ⁴
Roadster Sport	5-10 ¹⁰	\$159,145	Elec	288	295	2790	3.7	10.9	12.6@104.9	125 ⁵	123	210	0.96	70.3	160/kwh ⁴
Volkswagen Beetle Turbo ⁷	3-12 ^{2,10}	\$29,865	I-4t	200	207	3245	6.4	16.7	14.9@95.4	130 ⁵	136	242	0.85	66.9	26.1
Golf GTI 3-dr ⁷	8-10 ¹⁰	\$31,900	I-4t	200	207	3370	6.1	15.8	14.6@96.9	130 ⁵	143	247	0.86	66.2	25.0 ⁴
Golf R	1-12 ¹⁰	\$36,860	I-4t	256	243	3415	5.7	14.0	14.0@100.1	130 ⁵	130	230	0.89	69.8	20.0 ⁴
Jetta GLI Autobahn	4-12 ¹⁰	\$23,615	I-4t	200	207	3280	6.9	16.8	15.2@95.0	130 ⁵	147	257	0.88	66.5	25.9
Volvo Polestar C30	11-11	na	I-5t	405	510	3430	4.2	10.8	12.8@110.9	155 ⁵	117	198	0.99	72.5	na
S60 T6 AWD ¹	2-11	\$46,200	I-6t	300	325	3950	5.5	13.9	14.1@100.6	130 ⁵	118	210	0.87	69.5	20.2
S80 V8 AWD ¹	6-07	\$56,025	V-8	311	325	4080	5.6	14.3	14.2@99.4	155 ⁵	123	210	0.85	64.6	16.3
V70 ¹	5-08 ¹⁰	\$34,410	I-6	235	236	3530	7.3	18.6	15.6@92.3	130 ⁵	131	230	0.82	63.0	21.5 ⁴

R&T Classics *The following cars are chosen from thousands in our Road Test archives. Some have relevance to stories in this issue, others are here purely to pique your curiosity.*

BMW 2002tii	5-72	\$4988	I-4	120	130	2310	9.8	na	17.3@78.5	110	na	315	0.73	na	20.0
BMW 328i	2-99 ²	\$37,434	I-6	193	206	3170	6.6	18.0	15.1@93.5	128 ⁵	133	239	0.83	63.2	23.5
Mercedes-Benz C280 ¹	2-99 ²	\$38,959	V-6	194	195	3205	7.9	21.4	16.1@88.5	130 ⁵	133	232	0.80	60.8	23.0
Mercedes-Benz C230	1-02	\$26,255	I-4s	192	200	3285	7.6	19.9	15.7@88.9	130 ⁵	132	234	0.78	61.7	20.0
Fiat 500 "Nuova"	5-59	\$1289	I-2	21.5	22	1060	37.2	na	25.0@52.0	66.6	na	na	na	na	40.0 ⁴

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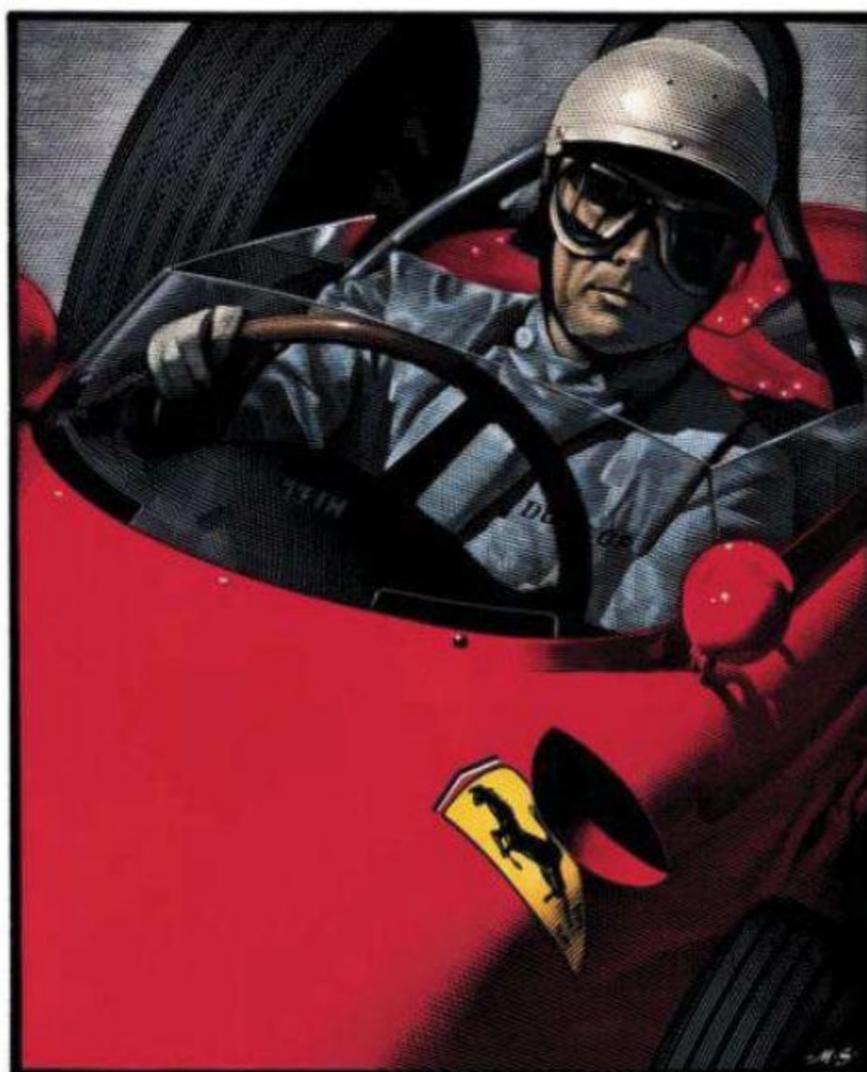
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