

# FORD RANGER RAPTOR: THE BEAST GETS SMALL

# CAR DRIVER

APR/2018

INTELLIGENCE. INDEPENDENCE. IRREVERENCE.

# BMW M5

## KILL OR BE KILLED

PORSCHE PANAMERA TURBO



MERCEDES-AMG E63 S



CADILLAC CTS-V



## PLUS:

BUICK REGAL TOURX // PORSCHE 911 GT3 // INFINITI QX50 //  
AND THE LAND CRUISER RESTOMOD YOU KNOW YOU NEED

**IT'S ONLY A FAMILY  
CAR WHEN YOUR  
FAMILY'S IN IT.**

**THE ALL-NEW 2018 CHEVROLET TRAVERSE**

**FIND NEW ROADS™**



©2018 Chevrolet Traverse RS in Cajun Red Tintcoat (extra-cost color).

## THE FAMILY SUV TAKES A TRIP TO THE GYM.

*Toning up the all-new 2018 Traverse.*

It wasn't long ago that car enthusiasts simply tolerated the family ride in the garage. But engineers at Chevrolet have been busy making today's vehicles more fun to drive. One of the first results is the 2018 Traverse. It's got all the room you need to handle your family and cargo, while giving you effortless performance and more power without sacrificing efficiency. The new Traverse is nearly 300 pounds lighter than its predecessor and also sports a new 9-speed automatic transmission. Those combine for better fuel efficiency,<sup>1</sup> a smoother ride and better acceleration. You can choose from five different trim levels on Traverse equipped with the standard 3.6L V6 engine, or choose the newly available 2.0L turbo offered exclusively with the RS trim.

## TWO POWERFUL ENGINES. ONE TOUGH CHOICE.

*Choose an engine based on your driving needs.*

The new Traverse offers two engines – a responsive 2.0L turbo on the RS trim or a 3.6L V6 engine that's standard on the other trim levels.

<i>By the numbers:</i>	<b>2.0L Turbo</b>	<b>3.6L V6</b>
HORSEPOWER	<b>257 hp</b>	<b>310 hp</b>
PEAK TORQUE	<b>295 lb.-ft.</b>	<b>266 lb.-ft.</b>
EPA-EST. FUEL ECONOMY	<b>20 MPG city/26 hwy</b>	<b>18 MPG city/27 hwy</b>
TOWING CAPABILITY <sup>2</sup>	N/A	<b>5,000 lbs.</b>



## BRING ON JUST ABOUT ANYTHING.

*Ready for rain, ice, snow or shine.*

When conditions get worse, Traverse can help. You can thank its available Traction Mode Select and switchable all-wheel drive that lets you select the right traction for conditions on the fly. The twin-clutch AWD system on High Country independently controls torque to each rear wheel to help keep your Traverse well planted to the road, even on mixed road surfaces. Variable-assist Electric Power Steering and a new 5-link independent rear suspension deliver confident steering as well as great maneuverability in tight spaces. And when the weather turns bad, newly developed available LED D-Optic™ headlamps<sup>3</sup> combine multiple high-power LEDs with precise, injection-molded lenses for high-performance lighting in challenging conditions.

## MAKE YOUR OWN STATEMENT.

*Pick the attitude that matches your style.*

There are three new trim level options, including the RS with its Black Ice details. For a bolder look, you can also order a Redline Edition that is available with Red-accented Black-painted aluminum wheels. And if it's luxury you want, High Country is fully equipped with Loft Brown premium leather-appointed seating surfaces, sueded microfiber accents, high-polished aluminum 20-inch wheels, ventilated front seats, a huge Dual SkyScape® 2-panel power sunroof and standard advanced all-wheel drive.

CHEVROLET





**GOLD STATUS**

— FEELS LIKE —

**MAKING**

**EVERY SINGLE**

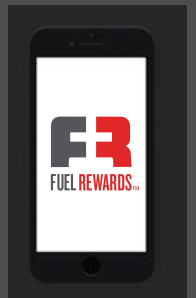
**GREEN LIGHT.**

**AND LOOKS LIKE THIS.**

**SAVE 5¢/GAL OFF EVERY FILL EVERY DAY.**

**DOWNLOAD THE FUEL REWARDS APP TODAY.**

**LEARN MORE AT [FUELREWARDS.COM/GOLD](https://fuelrewards.com/gold)**



RESTRICTIONS APPLY. ACTIVE GOLD STATUS REQUIRED. INTRODUCTORY OFFER VALID FOR 6 MONTHS AFTER ACTIVATION. LIMIT 20 GALLONS AT PARTICIPATING SHELL STATIONS. SEE [FUELREWARDS.COM/GOLD](https://fuelrewards.com/gold) FOR FULL DETAILS.

## Features

034

*Comparison Test*

### POWER DRUNK

BMW M5, Cadillac CTS-V,  
Mercedes-AMG E63 S  
4MATIC, Porsche  
Panamera Turbo.

*by Eric Tingwall*

056

*Road Test*

### BUICK REGAL TOURX ESSENCE

Buick enters the  
off-road-ready-wagon  
competition.

*by Jeff Sabatini*

062

*Feature*

### WHERE HAVE ALL THE WRENCHES GONE?

A shortage of qualified  
technicians has left  
service departments  
scrambling to find  
new talent.

*by Benjamin Preston*

070

*Long-Term Test*

### 2017 CHRYSLER PACIFICA

Animal house.

*by Dave VanderWerp*

### On the Cover

Goodness gracious!

*photography*

*by James Lipman*

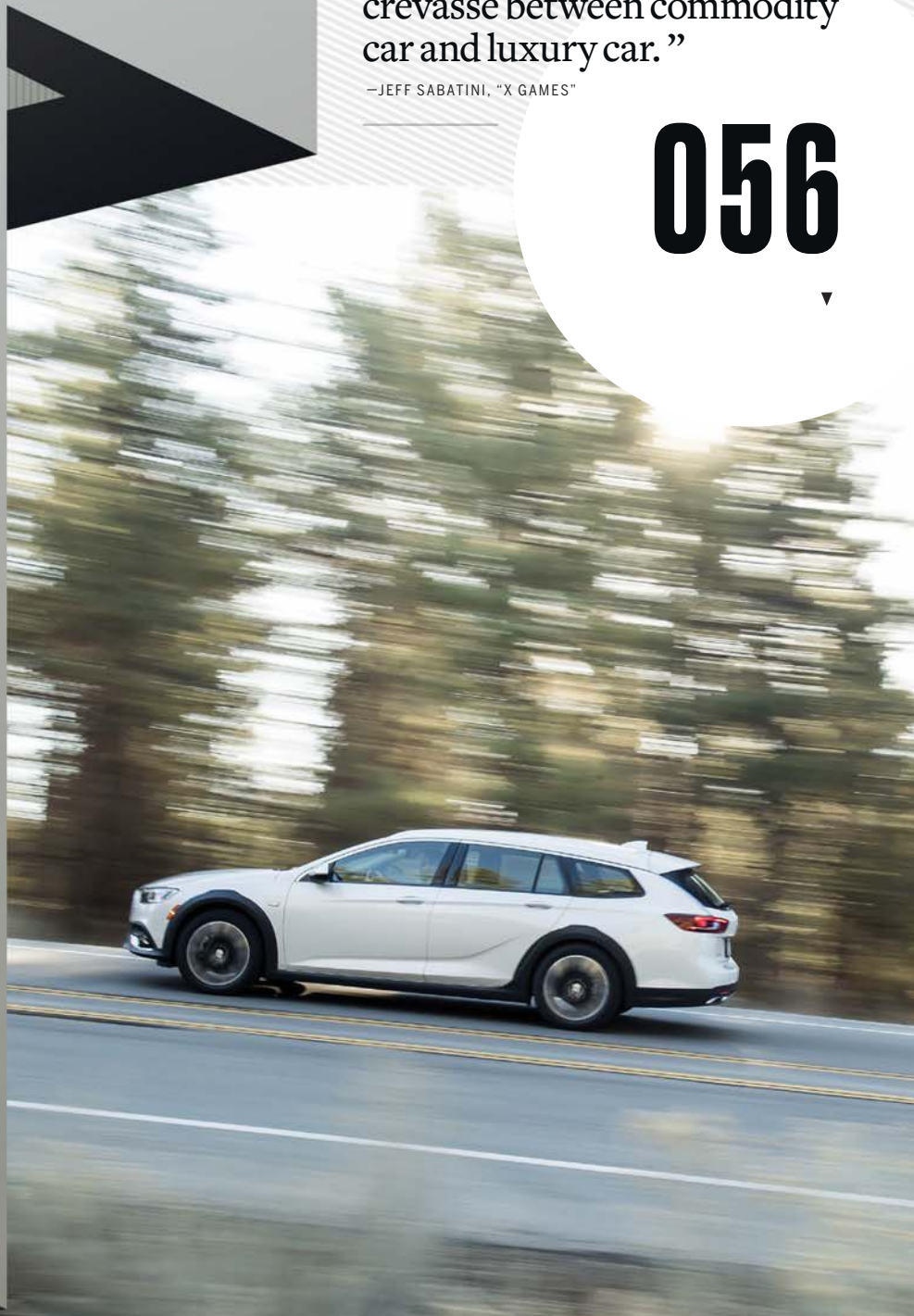
# Car and Driver<sup>®</sup> vol. 63, no. 10

## In this Issue:

“Like other Opels brought here, the Buick Regal TourX attempts to straddle the crevasse between commodity car and luxury car.”

—JEFF SABATINI, “X GAMES”

# 056





## Departments

### Columnists

#### 028 . JOHN PHILLIPS

"... killed mountain goats for stew."

#### 030 . DANIEL PUND

"... I become a manatee."

#### 032 . EZRA DYER

"... you could take that first corner at 155 or 160."

### Upfront

#### 015 . *Reveal of the Month*

#### FORD RANGER RAPTOR

Mini mean.

#### 020 . DESIGNER GENES

Decoding the regulations that govern modern car design.

#### 022 . SWAB THAT SAAB!

Just how disgusting is that used car?

024 . *Tech Department*

#### LEAN ON ME

Controlling body roll is no longer just a job for steel sticks.

#### 026 . A LITTLE CRUSH

Automakers turn to scrappage schemes to boost British sales.

### Drivelines

#### 078 . 2019 INFINITI QX50

Nutty engine in a handsome shell.

#### 082 . 2019 AUDI A7

Advancing its inner beauty.

086 . *Tested*

#### THE FJ COMPANY'S SIGNATURE TOYOTA FJ43 LAND CRUISER

A classic resurrected for the 1 percent.

088 . *Tested*

#### PORSCHE 911 GT3

Revealing the addict in all of us.

090 . *Tested*

#### FORD EXPEDITION MAX

PLATINUM 4X4 . Trucky to the Max!

091 . *Tested*

#### VOLVO XC60 INSCRIPTION

T6 AWD . What Would Arne Jacobsen Drive?

### Etc.

#### 007 . BACKFIRES

Now in our 753rd year.

#### 094 . WHAT I'D DO

#### DIFFERENTLY

Hermann Tilke.

## On the Web

### MERCEDES-BENZ S450

Just in case you wanted a huge sedan with a not-huge engine.  
[CARandDRIVER.com/2018S450](http://CARandDRIVER.com/2018S450)

### HYUNDAI i30 N

This Euro-spec hatch is a Veloster N in sensible clothing.  
[CARandDRIVER.com/2018i30N](http://CARandDRIVER.com/2018i30N)

### TOYOTA CAMRY XSE V-6

The most aggro of the newly aggro Camrys.  
[CARandDRIVER.com/2018CamryV6](http://CARandDRIVER.com/2018CamryV6)

# AZENIS FK510

## BORN FOR THE NÜRBURGRING

One lap of the Nordschleife is all it takes to understand why it's been dubbed the Green Hell. Punishing and unforgiving, it is the ultimate proving grounds. Falken Tire has been a circuit partner since 1999, utilizing information collected from this and many other motorsports activities worldwide to advance ultra high performance tires for the street.



### SUMMER ULTRA HIGH PERFORMANCE

Falken's latest generation ultra high performance summer tire, the Azenis FK510 is designed for drivers of premium vehicles looking for excellent grip and outstanding performance. 4D Nano Design enables Falken engineers to optimize new high-performance compounds at the molecular level, enhancing both wear and wet weather traction.

66 TIRE SIZES | 17" - 21" RIM DIAMETERS

**FALKEN**  
TIRES



See how much you could save on insurance for your truck, motorcycle, RV, boat and more.

**GEICO**<sup>®</sup>

geico.com | 1-800-442-9253 | Local Office

Some discounts, coverages, payment plans and features are not available in all states or all GEICO companies. Motorcycle and ATV coverages are underwritten by GEICO Indemnity Company. Boat and PWC coverages are underwritten by GEICO Marine Insurance Company. GEICO is a registered service mark of Government Employees Insurance Company, Washington, D.C. 20076; a Berkshire Hathaway Inc. subsidiary. © 2017 GEICO



# Backfires:

The joyful noise of the commentariat, rebutted sporadically by Ed.



## THE BESTIES

I have been a subscriber for more decades than either of us probably cares to remember. The January 2018 issue doesn't just deserve to be on your 10Best list; it was, in my opinion, the best ever.

—Tony Gray  
North Wales, PA

I am disappointed. I used to read your mag from cover to cover without jumping back and forth. On page O18, what do I find? A Honda Accord advertisement with a 2018 10Best sign. Spoiler!

—Samo Babnik  
Male Žablje, Slovenia

Please tell your ad people to stop putting 10Best-winner ads before the 10Best articles. It's happened the last couple of years and it ruins the experience of paging through the issue for the first time. I don't want to know about the Honda Accord winning on page O18 when the final winners aren't revealed until pages 102–3 (even though I could have guessed the Accord won). Otherwise, carry on with your excellent publication that I've enjoyed for over 30 years, since I was an eighth grader.

—Todd Fry  
Scottsdale, AZ

Every year, I get a colonoscopy. It's a necessary evil, and I dread it, but it has to happen. The prep is always unpleasant, and no one wants to hear about the process, except maybe the vague details. When the day of the test arrives, it's mostly a nonevent and over before you know it. Imagine my chagrin when I received this year's 10Best issue. PTSD, man. PTSD.

—J. Trudel  
Bridgewater, NJ

**We're the propofol part, right?—Ed.**

I was most confused as to why the Subaru Legacy wasn't included in the 10Best competition. A cheap family sedan with symmetrical



**“WHERE DOES SABATINI GET OFF CALLING THE CAMRY A ‘TRANSPORTATION APPLIANCE’? I APPRECIATE FLAWLESS EXECUTION, RELIABILITY, AND ENGINEERING PERFECTION, WHICH IS TOYOTA.”**



all-wheel drive and a boxer engine sounds great, right? And what about the BRZ/FR-S? Honestly, this year's 10Best was somewhat disappointing. And what the heck is so great about that overly geometrically styled Civic?

—Connor Lamb  
Asheville, NC

**We only include returning winners and new or significantly redesigned cars for 10Best testing. When the Legacy and BRZ/FR-S were new, we included them. The Legacy didn't win when it was new; the BRZ/FR-S were 10Best winners in 2013 but fell off the list in 2014—Ed.**

I don't know how long I've been taking *Car and Driver* but it's been a long, long time, and not only is

this the best 10Best issue, it's my favorite *Car and Driver* I can remember reading. Finally an issue where every car is something I can afford.

—Jay Copeland  
Lee's Summit, MO

**We recommend taking Car and Driver in the same dosage as propofol—Ed.**

## FAMILY AFFAIRS

My second only *Car and Driver* arrived, and I looked with interest at the Week Two Toyota Camry comments [January 2018]. My interest turned to disgust pretty quickly. Where does Sabatini get off calling the Camry a “transportation appliance”? I appreciate flawless execution, reliability, and engineering perfection, which is Toyota. I don't appreciate

self-important critics who waste ink.  
—Greg Hollingsworth  
Calgary, AB

You claim that this is “the Accord’s 753rd appearance on *C/D*’s 10Best list.” As George Burns would have said, “Really, Gracie?” I doubt that either *C/D* or Honda has been around long enough for that many wins.

—Steen Petersen  
Nanaimo, BC

**You must be the toast of the Nanaimo cocktail-party scene—Ed.**

In January’s “Best of the Best Sellers” feature, you say that the Toyota Camry is “largely engineered here,” meaning America. But on page 052, you quote a Toyota official as saying about development of the new Camry: “We didn’t have direct responsibility for the vehicle.” Can you please explain the apparent contradiction?

—Bob Woolley  
Asheville, NC

**The basic engineering comes from Japan, which means that those engineers determine the platform and component set. The U.S.**

**team then does the tuning, production engineering, and design work—Ed.**

I understand your touting the new Honda Accord over the Toyota Camry. I have one question, though. Do you really prefer the Etch A Sketch navigation display in the Accord or are you just reliving your childhood?

—Joseph C. Loibissio  
Charlotte, NC

### EIGHT ON FIVE

You need to lay off the bath salts. It’s not because you didn’t include the Shelby GT350 on the 10Best list, which you should have over the Camaro. No, it’s because you took it off the list after an apples-to-oranges comparison to a European sports sedan rather than said Camaro [“The Battle of the Badass Engines,” January 2018]. Different cars, different missions. It should have been pony car versus pony car. I agree that the RS3 is amazing. I’m waiting for delivery of one even as I type. Is it better than a GT350? In some ways, yes, for example, driving when it’s under 50 degrees

outside or raining and the GT350’s tires are worthless. The RS3 is also faster to 60 mph. But it should have been pony car versus pony car.

—Doug Gentner  
Portland, OR

You went on and on about how wonderful the Audi RS3 is while kicking the Ford Mustang Shelby GT350 to the curb. However, you conveniently failed to compare the exhaust notes between the cars and failed to mention that the GT350’s Voodoo is naturally aspirated. Given the comparable price range between these cars, you again failed to mention by comparison the investment value. In a decade or two, maybe three, that RS3 will be just another rusting car in someone’s yard while the GT350 will be in a museum or on a circuit still doing what it does best, being beastly.

—Joshua Bedford  
Jamaica, NY

I noticed in Ezra Dyer’s review of the Audi RS3 and the Shelby GT350 that he compared them as if they were meant for

## Explained: Size Matters

In “Cheap Chic” and elsewhere in the January 2018 issue, you guys refer to a “B-segment car” and a “C-segment car.” Although I’ve been a subscriber for about 40 years, I’ve never seen those terms. I quickly picked up your *Encyclopedia Vehicula* [December 2017] to look them up, but they’re not there. What’s a “B-segment car”?

—L.J. Sklenar  
Baltimore, MD

Popularized by Europeans, the alphabetized segments classify cars by size. The smallest are the A-segment vehicles (minicars), which are the size of a Fiat 500. Here are examples of each segment:



**A SEGMENT (MINICARS)**  
*Chevrolet Spark, Fiat 500*



**B SEGMENT (SUBCOMPACT)**  
*Ford Fiesta, Kia Rio*



**C SEGMENT (COMPACT)**  
*Honda Civic, Volkswagen Golf*



**D SEGMENT (FAMILY SEDAN)**  
*Chevrolet Malibu, Honda Accord*



**E SEGMENT (MID-SIZE LUXURY)**  
*BMW 5-series, Mercedes-Benz E-class*



**F SEGMENT (FULL-SIZE LUXURY)**  
*Audi A8, Cadillac CT6*

**“DO YOU REALLY PREFER THE ETCH A SKETCH NAVIGATION DISPLAY IN THE ACCORD OR ARE YOU JUST RELIVING YOUR CHILDHOOD?”**





**LONG  
LIVE  
PERFORMANCE**

When you create a New Sportscar eXperience, you don't chase the competition—you chase your dreams. You build a facility that manufactures one thing: performance. You assemble the world's best designers and engineers. You throw in a couple of troublemakers. And you get to work. You start with the driver. You reject benchmarks. You stay true to the feeling. You do it your way. You deliver PRECISION CRAFTED PERFORMANCE. You don't just tell the world what you've created. You find a racetrack. And you show them.

Build your NSX at [nsx.acura.com/build](https://nsx.acura.com/build).

# For the enlightened, tech-savvy, entrepreneurial longboard surfer.

(And anyone else who loves magazines.)



texture®

200+ magazines. One app.

Read more of what you love—Texture gives you unlimited access to the top titles for just about every interest.

Start your free trial at [texture.com/driver](http://texture.com/driver) today.



I don't understand why the GT350, with more horsepower and torque relative to its weight than the Audi, should be the slower car in the quarter-mile.

—Rex O'Steen  
Greenville, SC

**The Audi has two advantages: traction at launch and the quick-shifting dual-clutch gearbox. Those assets give it the edge in elapsed times to 60 and to the quarter. Quarter-mile trap speed is a reliable indicator of weight-to-power ratio, and the GT350 is going slightly faster than the RS3 when it passes the line. That said, it's entirely possible that the RS3's power output is underrated—Ed.**

### DOUBLE UP

What is the best lap time between the "Route Masters" [January 2018]? Seems like this should be published.

—Joe Mussari  
West Chester, PA

**See our annual Lightning Lap coverage. At VIR, the Corvette Grand Sport ran a 2:47.1 in 2016 and the 718 Cayman S ran a 2:58.3 last year—Ed.**

### ROOFIES

I've been protecting the wagon from naysayers since first reading about them in *C/D* as a kid. After seeing the Volvo V90 in the 10Best Cars issue [January 2018],

the same type of person. But they're not. Anyone even considering purchasing a GT350 is not thinking about the RS3, and vice versa. The Audi should have been compared to, say, a Mercedes-AMG CLA45, which starts at \$51,395. Compare the GT350 to the Camaro ZL1 1LE or something. And this applies to the Civic-versus-Camaro battle, too ["Family Values," January 2018]. The point is: Compare like cars. Other than that, great issue.

—Sebastian Larsen  
Vienna, VA

Okay, *C und D's* 10Best is as satisfying a read as it is an appropriately sagacious exercise into gearhead sarcasm, so we are good to go. Just one minor beef: Why not set the GT350 against its direct rival, the butt-ugly but nasty-as-hell Camaro? The Audi is obviously a different kind of platform.

—William M. Martinez, CA

**Oh, live a little, guys—Ed.**

My name is Josh, and I'm only 14 years old. My dad says I might

be one of the last teenagers on the planet who actually want to drive. I love your magazine, but I had a problem with the 10Best issue. One of your comparisons was between the Audi RS3 and the Ford Mustang Shelby GT350. The thing is, the whole comparison was about the engines, but I feel like the only reason the Audi won was because it "has a better car wrapped around it."

How the heck does this even matter if the whole comparison is about the engines?! If the problem with the Shelby was the ride quality and whatnot, then why didn't you compare the Audi with something like a Mercedes? What I am trying to say is, if the battle were actually about which engine is better, the Ford should have won. It's more impressive, makes more power, and makes a nicer noise. Anyway, other than that, I really love your magazine and agree with the other choices in the list.

—Joshua Gillis  
Owings Mills, MD

**Gillis, can you get me Pat Goss's autograph?—Ed.**

▲  
**"WHAT I'M TRYING TO SAY IS, IF THE BATTLE WERE ACTUALLY ABOUT WHICH ENGINE IS BETTER, THE FORD SHOULD HAVE WON."**



## THE WELL-APPOINTED WRIST

Masculine, innovative, cultured and curated—elevate your look with the right combination of materials and styles from the Esquire Men's Jewelry Collection.

**TOP TO BOTTOM:** Ridged Bracelet in Sterling Silver, \$650; Beaded Tiger's Eye Bracelet in Sterling Silver, \$400; Woven Brown Leather and Stainless Steel Bracelet, \$175.

EXCLUSIVELY AT



I pulled out my phone to send my friends a pic of the article, thinking, "Yes! Finally they'll understand!" Then I realized, no, they will never understand. I need new friends.

—Gabriel Ehlers  
Rosemount, MN

## STUNG

Thank you gentle-people for including the Kia Stinger in your most recent 10Best list ["Pilgrims' Progress," January 2018]. On paper, it is an exciting car and, at under \$40K, should be as exciting to drive as it is to look at. It's nice to know that somewhere someone is toiling away making a great car for less than half of what a comparable BMW costs.

—Carson Theriot  
The Woodlands, TX  
**Sorry to break it to you, Theriot, but the Stinger didn't make our 10Best list—Ed.**

I dropped "the other car magazine" after many years. It now looks more like a hybrid between *Cigar Aficionado* and *Condé Nast Traveler*. No more serious automobile evaluations. I am now with *Car*

and *Driver*, but not for long. I am fed up with your writers. They seem like they just graduated from Brighton Language College in England. Too many fancy words. For example, on your 10Best Week Two article regarding the Alfa Romeo Giulia Quadrifoglio by Josh Jacquot: "... tethered securely to the tarmac." I guess he is referring to excellent road-holding attributes. Then, "via rubber, aluminum, and verve"? Sorry, guys, no time to waste in a dictionary. "... steals-your-license Quadrifoglio." I am lost on this one. "Sparkling steering fidelity..." Josh, please. If you drink, pass your pen to your designated writer. "The 505-hp Quadrifoglio simply ignored the pavement irregularities." Oh! You mean the car's computer takes over to escape potholes? Can I retrofit it to my Toyota? What about "the Quad demands a more deliberate grip—both on its steering and on your lunch." Well, dude, what about breakfast and dinner? "Animated steering..."

What the heck, designed by Disney? "A machine that's alive..." Too many Boris Karloff movies, I guess. Comparing a Lexus ES to "bland buttered noodles" is not fair; these are different-class cars, a luxurious sedan versus a sports car. Lexus should cancel any advertising in your magazine. If you continue this trend, change your name to *Car and Poetry*.

—Giusseppe Toro  
San Juan, PR

**Motor Trend is probably more your speed, Toro—Ed.**

## CONCEPTUALIZED

Who wrote the "Concept Cars" article in the January issue? A thousand thanks! Not only were the cars outstanding, the writing evoked memories of the irreverent, tongue-in-cheek prose I first embraced in *C/D* as an 11-year-old in 1967 with a pass-along copy from one of my dad's friends who was into cars. You folks still got it!

—Bill Healey  
Raritan Township, NJ  
**Let's all do our part and not show John Pearley Huffman this letter—Ed.**



## Editor-in-Chief Eddie Alterman

**Deputy Editor** Daniel Pund  
**Creative Director** Darin Johnson  
**Executive Editor** Jared Gall  
**Technical Editor** Eric Tingwall  
**Managing Editor** Mike Fazioli  
**Design Director** Nathan Schroeder  
**Features Editor** Jeff Sabatini  
**Senior Editor** Tony Quiroga  
**Reviews Editor** Josh Jacquot  
**Technical Editor** David Beard  
**Associate Managing Editor** Juli Burke  
**Copy Chief** Carolyn Pavia-Rauchman  
**Road-Test Editor** C. Benn  
**Copy Editor** Beth Nichols  
**Editor, Montana Desk** John Phillips  
**European Editor** Mike Duff  
**Carolina Editor** Ezra Dyer  
**Staff Photographer** Marc Urbano  
**Art Assistant** Austin Irwin  
**Road Warriors** Zeb Sadiq, Maxwell B. Mortimer, Harry Granito, Kunal Haria, Kevin Moreno, Sean Flavin

**Contributing Editors** Clifford Atiyeh, Csaba Csere, Malcolm Gladwell, Fred M.H. Gregory, John Pearley Huffman, Davey G. Johnson, Peter Manso, Bruce McCall, Jens Meiners, P.J. O'Rourke, Steve Siler, Tony Swan, James Tate, Dweezil Zappa

**Deputy Online Editor** Dave VanderWerp  
**Executive Online Editor** Erik Johnson  
**Testing Director** K.C. Colwell  
**Senior Online Editors** Joe Lorio, Mike Sutton, Kevin A. Wilson  
**Online Editors** Alexander Stoklosa, Andrew Wendler  
**Associate Online Editors** Joseph Caoparella, Greg Fink, Tony Markovich  
**Technology and Mobility Editor** Pete Bigelow  
**Environmental Editor** Bengt Halvorson  
**Consumer Editor** David Muller  
**Managing Online Editor** Scott Mosher  
**Buyer's Guide Executive Editor** Kirk Seaman  
**Buyer's Guide Senior Editor** Rich Ceppos  
**Buyer's Guide Managing Editor** Jennifer Misaros  
**Buyer's Guide Assistant Editors** Drew Dorian, Eric Stafford, Annie White  
**Online Copy Chief** Rusty Blackwell  
**Online Copy Editors** Laura Sky Brown, Charles Dyer, Daniel Golson, Paul Livingstone  
**Online Staff Photographer** Michael Simari  
**Online Production Manager** Luke Sellenraad  
**Assistant Online Production Manager** Chris Haponek  
**Buyer's Guide Production Assistant** Cory Wolfe  
**Online Production Designers** Sarah Larson, Jeff Xu  
**Online Production Assistants** Ron Askew, Brad Fick, Michael Nowicki, Daniel Wilson, Justin Wright  
**Social Media** Michael Aaron  
**Photo Assistant** Charley M. Ladd  
**Product Director** Mark Quint  
**Interactive Design Director** Sam Conant

**Editorial Office** 1585 Eisenhower Place  
Ann Arbor, MI 48108

**Printed in the U.S.A.**

**Editorial Contributions** Unsolicited artwork and manuscripts are not accepted, and publisher assumes no responsibility for return or safety of unsolicited artwork, photographs, or manuscripts. Query letters may be addressed to the deputy editor.

## Publisher and Chief Revenue Officer Felix DiFilippo

**National Advertising Sales Director** Cameron Albergo  
**General Manager, Hearst Men's Group** Samantha Irwin

**NEW YORK**  
**East Coast Automotive Director** Joe Pennacchio  
**Assistant** Philippa Malloch  
**CHICAGO**  
**Integrated Sales Director** Rick Bisbee  
**Integrated Midwest Manager** Marc Gordon  
**Assistant** Yvonne Villareal  
**DETROIT**  
**Integrated Sales Director** Mark Fikany  
**Assistant** Toni Starrs  
**LOS ANGELES**  
**Integrated Sales Director** Anne Rethmeyer  
**Integration Associate** Michelle Nelson  
**Assistant** Bryan Goonetilleke  
**SAN FRANCISCO**  
**Smith Media Sales, LLC** William G. Smith  
**DALLAS**  
**PR 4.0 Media** Patty Rudolph

**HEARST DIRECT MEDIA**  
**Senior Manager** Brad Gettelfinger

**MARKETING SOLUTIONS**  
**Executive Director, Integrated Marketing** Dawn Shedgeby  
**Directors, Integrated Marketing** Amanda Luginbill, Eric Bratten  
**Associate Director, Integrated Marketing** Michael Texier  
**Senior Manager, Integrated Marketing** Michael Coopersmith  
**Art Director, Group Marketing** Elena Martorano  
**Marketing Coordinator** Richard Panico  
**Director, Digital Marketing** Kelly Martin  
**Research Manager** Peter Davis

**THE BLEND LINE**  
**Executive Creative Director** Maury Postal  
**Production Director** Tia Devlin  
**Director, Digital Media Strategy** Meagan Magnot  
**Senior Manager, Media Strategy & Planning** Scott Topel  
**Account Manager, Media Strategy/Planning Coordinator** Rebecca Taroun

**ADMINISTRATION**  
**Advertising Services Director** Regina Wall

**PRODUCTION**  
**Production/Operations Director** Chuck Lodato  
**Operations Account Manager** Elizabeth Gascone  
**Premedia Account Manager** Zachary Smith

**CIRCULATION**  
**Executive Director, Consumer Marketing** William Carter

**Published by Hearst Communications, Inc.**  
300 W. 57th Street  
New York, New York 10019

**President & Chief Executive Officer** Steven R. Swartz  
**Chairman** William R. Hearst III  
**Executive Vice Chairman** Frank A. Bennack, Jr.  
**Secretary** Catherine A. Bostron  
**Treasurer** Carlton Charles

**HEARST MAGAZINES DIVISION**  
**President** David Carey  
**President, Marketing & Publishing Director** Michael A. Clinton  
**President, Digital Media** Troy Young  
**Chief Content Officer** Joanna Coles  
**Senior Vice President, Chief Financial Officer** Deb Chichella  
**Publishing Consultants** Gilbert C. Maurer, Mark F. Miller

**INTERNATIONAL EDITIONS**  
Brazil, China, Greece, Spain

**HEARST AUTOS**  
**President** Nick Matarazzo  
**Chief Marketing Officer** Jill Meenaghan

Using Shell V-Power® NITRO+ Premium Gasoline and diesel fuels appropriately in all Car and Driver test vehicles ensures the consistency and integrity of our instrumented testing procedures and numbers, both in the magazine and online.



**CUSTOMER SERVICE** Visit [service.caranddriver.com](http://service.caranddriver.com) or write to Customer Service Department, *Car and Driver*, P.O. Box 37870, Boone, IA 50037 for inquiries/requests, change of mailing and email addresses, subscription orders, payments, etc.

**PERMISSIONS** Material in this publication may not be reproduced in any form without permission.  
**REPRINTS** For information on reprints and e-reprints, please contact Brian Kolb at [Wright's.Reprints](mailto:Wright's.Reprints), 877-652-5295 or [bkolb@wrightsreprints.com](mailto:bkolb@wrightsreprints.com). To order digital back issues, go to your favorite app store. *Car and Driver*® is a registered trademark of Hearst Communications, Inc. Copyright 2018, Hearst Communications, Inc. All rights reserved.



▲  
**"A THOUSAND THANKS! NOT ONLY WERE THE CARS OUTSTANDING, THE WRITING EVOKED MEMORIES OF THE IRREVERENT, TONGUE-IN-CHEEK PROSE I FIRST EMBRACED IN C/D AS AN 11-YEAR-OLD IN 1967."**

We subscribe to *Car and Driver* magazine for our eight-year-old son who is an avid car fan. I was very disappointed to see you describe the Honda Urban EV as "so damn cute" in your January 2018 issue. I certainly hope you do not feel that profanity is necessary to sell your magazine. As I'm sure you would like to court a newer, younger generation for your audience, I respectfully request that you consider what is age appropriate for all sectors of your readership.

—Vicki Hamby  
 Lexington, SC

**We're just glad he didn't see the Tim Allen interview—Ed.**

### MEMORY LANE

John Phillips really outdid himself with this hilarious trek down the kind of memory road that most reasonable people would force themselves to forget [January 2018]. But gosh, who doesn't remember Cedric the Entertainer?

—Bob MacLeod  
 Calgary, AB

**And yet Phillips remembers most of Shecky Greene's one-liners—Ed.**

### AUTOPILOT

Kudos to Daniel Pund for an interesting and humorous column in the January issue. I usually read him as a palate cleanser between my old favorite writer and my new favorite writer, but this month he held his own.

—Peter Masaitis  
 Los Angeles, CA

I've always liked reading stuff by Pund. I'm glad he's got his own column now.

—Mack Easty  
 Austin, TX

Over 10 years ago, I retired and developed what I call MRI (mental retention insanity). A great number of times I would be heading into town to perform a task and then all of a sudden find myself turning down the street that headed to my office where I taught on the university campus. The cause of my detour? MRI. Or I could even shorten that to two other letters, DA, which reflects what I'd then say to myself: "Dumb a \_ \_."

—Art Nielsen  
 Indian Land, SC

**I'd like to solve the puzzle, Pat—Ed.**

### LANGUAGE ARTS

My first time ever writing to a car mag. The use of the F word in the interview by Huffman is trashy and inappropriate ["What I'd Do Differently," January 2018]. Please don't lower your standards.

—Bruce Hoskins  
 Wheaton, IL

Like the great words of Tim Allen: "What the fuck?! This conversation is over."

Just like this Backfire.  
 —Michael Millhouse  
 Appleton, WI

I am shocked at the use of swear words in the January 2018 issue. Have you lost your minds? Did you hire uneducated teenagers to help edit your stories? Get back to being a respectable magazine that doesn't offend its readers.

—Ron Rangel  
 Aloha, OR

I just received the January 2018 issue with an urgent letter to renew. I was paging through the issue and got to the final sentences of the last page where you managed to drop the F bomb. I threw out the rag along with the ripped-up check. Bye.

—Robert Fink  
 Cleveland, WI

### TO AND FROTH

If you are going to write a rant to the editor with the phrase "cancel my subscription," don't. Just call or write the customer-service department. Backfires is a sort of forum, which implies an ongoing vested interest. As a paying

subscriber, I don't want to read anything written by an unsubscribing little bitch.

—Kenny Kastner  
 Modesto, CA

When reading Backfires, I'll sometimes grin or even titter at the humorous retorts. But your January reply to Tim Brown generated an outright guffaw. Other patients in the waiting room looked up, wondering if I'd ingested some illegal narcotic or was just recalling an earlier senior moment.

Thanks, guys. Like Tim said, C/D "f\*\*\*\*\*g \*\*cks."  
 —Eric Jackson  
 Ottawa, ON

Don't you think it's time that the editor replies to Backfire questions legitimately? This is not a junior-high-school newspaper made by students.

—Roy Hooper  
 Ojai, CA

**It's called middle school now—Ed.**

Sam Simoes's comment on your Miata obsession missed the obvious: the payback by C/D to "\_\_\_\_\_ Raceway Laguna Seca" for Mazda's support for testing there. Be honest, guys.

—Ken Brans  
 Alamo, CA

**One thing: We don't test there—Ed.**

My favorite read every month in *Car and Driver* is Backfires. How sad is that?

—Steve Clinton  
 Orange, CA

**I'm a clown, but I'm a sad clown—Ed. ■**

## Letter of the Month:

—  
 Funny, I would've thought that Tim Allen, the subject of January's "What I'd Do Differently," would've answered the article's ultimate question with "Not traffic cocaine in the late '70s."

—Scott Rothermel  
 Grand Ledge, MI



# ESCORT<sup>®</sup> MAX 360c

GAME CHANGING  
CONNECTED  
PROTECTION

**NEW**



360° Directional  
Alert Arrows



Connected Car's Wi-Fi  
Provides Crowd Sourced  
Alerts & Software Updates



ESCORT Live App  
Provides Crowd-  
Sourced Alerts



GPS Intelligence  
Rejects False Alerts



Lightning Fast Response

SAY HELLO TO THE FIRST RADAR DETECTOR DESIGNED FOR THE CONNECTED CAR.

Learn more at [www.escortradar.com/max360c-driver](http://www.escortradar.com/max360c-driver)  
Call 1.800.588.4554 Dept. Number CARDVR to order yours today.



# Upfront

*Reveal of the Month*

## MINI MEAN

FORD SUBJECTS ITS UPCOMING RANGER TO THE RAPTOR REGIMEN. *by Jared Gall*

▣ **THE FORD F-150 RAPTOR** is one of the most entertaining vehicles on the market today, as much giddy fun in its element as a sports car is on a track. But it's also surprisingly well rounded. It is simultaneously a toy, an effective tool for hauling as much as 1200 pounds or towing up to 8000, and, with its spacious cabin and cushy ride, a perfectly comfortable—albeit enormous—vehicle for

Ford's ultimate Ranger is poised to do many Raptor things as well as its big brother does, and one thing even better: fit down tight trails.

daily use. Given the breadth of its skill set, the Raptor is also something of a bargain, starting at just \$51,415.

Now imagine it at a slightly smaller scale. Actually, you don't have to. The Ranger, Ford's dormant mid-size pickup, will relaunch in the U.S. next year, but ahead of the start of sales, Ford introduced the Ranger Raptor in Bangkok, Thailand. A step-for-step downsizing of the F-150 version, the newest Raptor isn't yet confirmed for sale here, but Ford would be foolish not to bring this brute stateside.





**001**  
THE SIDE STEPS ARE UNIQUE TO THE RANGER RAPTOR AND ARE THERE NOT ONLY TO HELP YOU GET INSIDE, BUT TO KEEP DEBRIS KICKED UP BY THE FRONT TIRES FROM SAND-BLASTING THE REAR FENDERS.

**002**  
THIS RAPTOR'S APPROACH ANGLE OF 32.5 DEGREES BESTS THE CHEVY COLORADO ZR2'S BY 2.5. THE FORD ALSO HAS A HALF-DEGREE EDGE IN BREAKOVER AND DEPARTURE ANGLES, AT 24.0 DEGREES EACH.

### ▼ CHASSIS

As with the F-150 Raptor, its Ranger-based sibling is built for high-speed off-road work. That means a long-travel suspension and Fox internal-bypass dampers. The latter pieces ramp up damping force at the extremes of compression and rebound, improving control during acute suspension events. The independent front suspension employs forged-aluminum upper control arms and cast-aluminum lowers. The coil-sprung rear benefits from a Watt's linkage that locates the live axle laterally and features an electronically controlled locking differential. Ford hasn't released suspension-travel figures for the littler Raptor yet, but as on the full-size version, longer control arms push a significant increase in track width, here up 5.9 inches both front and rear over the standard Ranger. Ground clearance is also up 1.8 inches, to 11.1.

### ▼ POWERTRAIN

For the Asia-Pacific markets where it's being launched, the Ranger Raptor will be powered by a sequentially turbocharged diesel 2.0-liter inline-four. We're certain it won't be under the hood of the U.S.-market truck. The 10-speed automatic behind it is the same unit that will serve in the rest of the Ranger lineup on our shores, so we don't expect that to change. While we'd like to see what Ford could do with its twin-turbocharged 2.7-liter V-6 in the mini Raptor, Ford hasn't offered a V-6 in the Ranger since it discontinued American



sales in 2011. As the revived U.S. version is largely based on the same Ranger that's been sold continuously around the world since then, reengineering the platform for a V-6 likely would be a significant undertaking.

All other Rangers sold here will use Ford's turbocharged 2.3-liter four-cylinder, which could very well power the Raptor, too. Something close to the 350 horsepower this engine makes in the Focus RS would allow the smaller truck to match the big Raptor's desert-scorching pace. The brand that put versions of the same V-6 in its \$450,000-plus GT supercar and the most boisterous, badass pickup on the market seems unlikely to have many quibbles regarding cylinder count in, well, anything.

## ▼ STYLING

There's not a lot of fresh thinking apparent in the modifications Ford made to the Ranger's styling, but we're not complaining. The puffed-out fenders and block-letter grille look just as gnarly on the Ranger as they do on the F-150. And here, as on the bigger truck, Ford's designers didn't even try to integrate the headlamps and taillamps into the bulging bodywork. Sinking the lights into fender pockets as if they were chocolate chips in an underbaked cookie exaggerates the truck's width in a way that more gracefully integrated lamps never could. The Ranger even rides on six-spoke wheels that look identical to the F-150 Raptor's. Its 285/70R-17 BFGoodrich rubber is 1.2 inches narrower than its big brother's but, at 33 inches tall, gives this truck bragging rights over Chevrolet's mid-size off-road special, the Colorado ZR2, which rides on mere 31s.

**003**  
WILL THE RANGER RAPTOR OFFER BEAD-LOCK-READY WHEELS LIKE THE F-150 DOES? OUR MONEY IS ON DUH.

**004**  
THE RANGER RAPTOR DOESN'T GET THE AMBER IDENTIFICATION LIGHTS ACROSS ITS GRILLE LIKE ITS BIG BROTHER BECAUSE IT ISN'T WIDE ENOUGH TO NEED THEM [SEE PAGE 020].



## ▼ INTERIOR

From inside, it's easy to see where Ford's design dollars went: outside. This is true of both the F-150 Raptor and the Ranger-based truck. The latter picks up the red centering stripe at the top of the steering wheel, as well as the magnesium shift paddles, from the bigger Raptor. New seats with revised padding and suede inserts are intended to keep occupants comfortable and in place while the driver is doing things that would keep his mother awake at night. Perhaps the blue contrast stitching and "Raptor" embroidery in the seatbacks—just like in the you know what—could convince her that this is all just an aesthetic exercise.

## ▼ HOUSEKEEPING

Officially, Ford isn't going to sell the Ranger Raptor in the U.S. Officially, it's not selling it here, either. Also officially, the spokesminions say Ford is currently focused on launching the regular Ranger, which will go on sale in early 2019. But there's little doubt that Raptor Jr. would kill on our shores. The mid-size-truck class is going strong, with the General Motors twins—the Chevrolet Colorado and the GMC Canyon—combining for more than 145,000 sales in each of the last two years. In its heyday, the Ranger regularly surpassed 200,000 units a year and hit a high of nearly 350,000 in 1999. And while Ford won't quote volumes for the F-150 Raptor, sales have increased every year the truck has been on sale. At the Ranger Raptor's unveiling in Bangkok, Ford's global performance-vehicle chief engineer, Jamal Hameedi, was quoted by Australian website drive.com.au as calling Raptors "a slam dunk" for the U.S. We figure the Ranger Raptor will be here in 2021 or '22. And we're as giddy as anyone.

Mount Up!

# DESIGNER GENES

DECODING THE REGULATIONS THAT GOVERN MODERN CAR DESIGN. *by Clifford Atiyeh*

**CAR DESIGN** is far from a purely aesthetic pursuit. In addition to accommodating all manner of engineering needs, designers must work within tight regulatory constraints. In our hyperregulated modern world, the government dictates nearly every aspect of car design, from the size and color of the exterior lighting elements to how sharp the creases stamped into sheetmetal can be. If a designer is lucky, those rules are the same in the United States and Europe. Often, though, they're not, leading to designs that adhere to the stricter stipulations of the two rulebooks. Because, as Joe Grace, head of concepts and innovation at Fiat Chrysler Automobiles, notes, if a vehicle isn't designed from the outset with both markets in mind, "even changing the plastic pieces can be expensive." We also spoke with Robert Lesnik, director of exterior design for Mercedes-Benz, and Christopher Chapman, senior chief designer for Hyundai Design North America, about the surprising specificity of rules dictating the look of your new car.

## 001. Sheetmetal Edges

Most pedestrians have no clue how much they've affected car design. European regulations attempting to cushion a person's impact with a moving car have led to taller hoods, which provide for more space between the head of a struck pedestrian and any hard engine component. Hyundai's Chapman says that means the design of a car is "set up" at the base of its A-pillar, with shoulderlines rising and greenhouses slimming from there.

There are even regulations regarding the creases in sheetmetal. As Mercedes-Benz's Lesnik explains: "Everything that could hit a theoretical body or head has to be soft." Any sharp exterior line is an illusion made possible by talented designers and precision manufacturing processes. EU law dictates a minimum 0.2-inch radius for all edges on the front and



rear fascias, with a sharper 0.1-inch radius allowed for all other exposed body panels. Even grilles and badges—basically everything above the doorsills—must have blunted edges. But brush bars, protruding tow hooks, and front fenders that expose parts of the front tires, like those on the new Jeep Wrangler, are welcome in America. (In Europe, a different front bumper fills that gap on the Wrangler.)

## 002. Rear Bodywork

Designers also like to pull in the bodywork aft of the rear wheel-well cutouts to show off a little tire tread—the sports-car equivalent of a plunging neckline. But European regulations dictate that fenders must cover the entire tread width as measured from 30 degrees forward of the tire's top center to 50 degrees rearward. Black plastic fins like those you'll find on the Jaguar F-type allow stylists to create that provocative view while still adhering to the letter of the law.

## 003. Taillights

The McLaren P1's arcing taillights can't get much thinner. U.S. law requires a minimum of 7.8 square inches of illuminated surface area per brake light, 1.9 square inches of which must be visible 45 degrees off the car's center and 15 degrees below the taillight's horizontal centerline.

## 004. Turn Signals

U.S. regs allow automakers to use the same element as both taillight and turn signal. In Europe, the turn signals have to be separate and amber in color. Some designers suspect the U.S. will soon follow suit, a development that FCA's Grace tells us he'd champion. And he's already preparing for the change, as the 2019 Ram 1500 sports amber turn signals.

Audi's sequential signals illuminate too small an area when they first fire up, so in the U.S., they're combined with a standard turn signal. Each turn-signal lamp (or bank of LEDs) must cover at least 3.4 square inches.

## 005. Marker Lights

The U.S. requires all vehicles to have marker lights—amber lights mounted to the front fenders or integrated into the sides of headlight housings and red lights on the rear fenders. Europe doesn't mandate markers for any car less than 19.7 feet long but does require redundant turn signals be installed along the sides of the vehicle.

## 006. Auxiliary Lighting

The Ford Raptor and Ram Power Wagon look extra beastly with their semi-truck running lights. U.S. law requires any brute more than 80 inches wide to wear five amber lights, either on the roof or in the grille.



# RARE FORM

## THE FIRST-EVER LS 500. LIVE IN THE NEW.

The LS 500 redefines what a luxury sedan can be. With intense styling like the F SPORT bolstered 28-way power front seats featuring leather trim with an exclusive perforated L-motif design. The LS 500 is also the first-ever twin-turbo Lexus, delivering 416 horsepower<sup>1</sup> with a thrilling 4.6-second 0-60 time.<sup>1,2</sup> And the new Lexus Multistage Hybrid system in the LS 500h delivers seamless acceleration and torque, without requiring a charge. This level of extravagance isn't just rare. It sets a new benchmark.



[lexus.com/LS](https://lexus.com/LS) | [#LexusLS](https://twitter.com/LexusLS)








LS 500 F SPORT shown with options. 1. Ratings achieved using the required premium unleaded gasoline with an octane rating of 91 or higher. If premium fuel is not used, performance will decrease. 2. Performance figures are for comparison only and were obtained with prototype vehicles by professional drivers using special safety equipment and procedures. Do not attempt. ©2018 Lexus

# SWAB THAT SAAB!

JUST HOW DISGUSTING IS THAT USED CAR? by Matt Jancer

**THE SMART USED-CAR BUY** is a vehicle into which the owner has poured his heart and soul. But whether it's heart and soul, tender loving care, or outright neglect, every car receives something else from its owner: hair, skin flakes, fingernail trimmings, and worse. A used car can be like an accidental archaeological dig. A 2015 University of Nottingham study examined 15 daily drivers and found evidence of potential *E. coli*, a bacteria in fecal matter famous for food poisoning, and *Staphylococcus*, of which certain subtypes can cause serious skin infections. Another study conducted in 2016 by a microbiologist at the University of Salford, Manchester, concluded that our cars can be more than 22 times grodier than that smartphone you use to scroll through Instagram in the bathroom.

**SO RANK** For our experiment, swabs from the vehicles were used to inoculate Petri dishes containing three growth media. In order of increasing filth, the swabbed areas ranked as follows:

-   
**5. STEERING WHEEL**
-   
**4. RADIO CONTROLS**
-   
**3. TRUNK**
-   
**2. DRIVER'S SEAT**
-   
**1. DRIVER'S FLOOR MAT**

▼ **Disclaimers:** Yes, we know that not all bacteria are bad. And our sample size is vanishingly small. Car and Driver is not a scientific journal. Just go with it.

To see for ourselves just how vile the average used car is, we asked a pair of microbiologists from the University of North Carolina at Greensboro, Dr. Robert Cannon and Laura Fondario-Grubbs, to bring their sterile swabs and join us at a used-car lot. Not a CarMax or a certified-preowned-car lot, either, but one of those dingy stores erected inside a chain-link cage. In each of our five randomly selected test vehicles, Cannon and Fondario-Grubbs swabbed the driver's seat, steering wheel, radio controls, driver's floor mat, and trunk. At the end of the day, their swabs black with filth, they took the samples back to the UNCG's lab.

The results were not what we'd expected. Most of the cars showed a fair amount of typical harmless bacteria, the kind that covers everyday objects; but tests for the really nasty alarmist stuff, like *E. coli* and *Staph*, came back negative in all five vehicles. Turns out, cars sitting unused in a parking lot are far from giant Petri dishes; they're actually very hostile to germs, Cannon tells us.

"Cars show a microbiome of the persons who drive them," he says. But how long bacteria survive depends on temperature, humidity, and whether they can suck up water and food to reproduce. Humans and the stuff we bring with us into our cars—willingly and otherwise—are a major source of nutrients for these microorganisms. If nobody is using the car, nobody is restocking their food supply, so the bacteria start to die off. Parked in direct sunlight during summer, a car's interior can reach above 170 degrees. On a frigid winter day, it'll be as cold as the snow on its hood. Both extremes are inhospitable to a lot of common bacteria.

That the cars in Nottingham's and Salford's studies were driven daily is critical. Without a human bringing germs and nutrients into the cabin on a regular basis, that microbiome depopulates rapidly. Because it's not the cars that are gross, it's us.

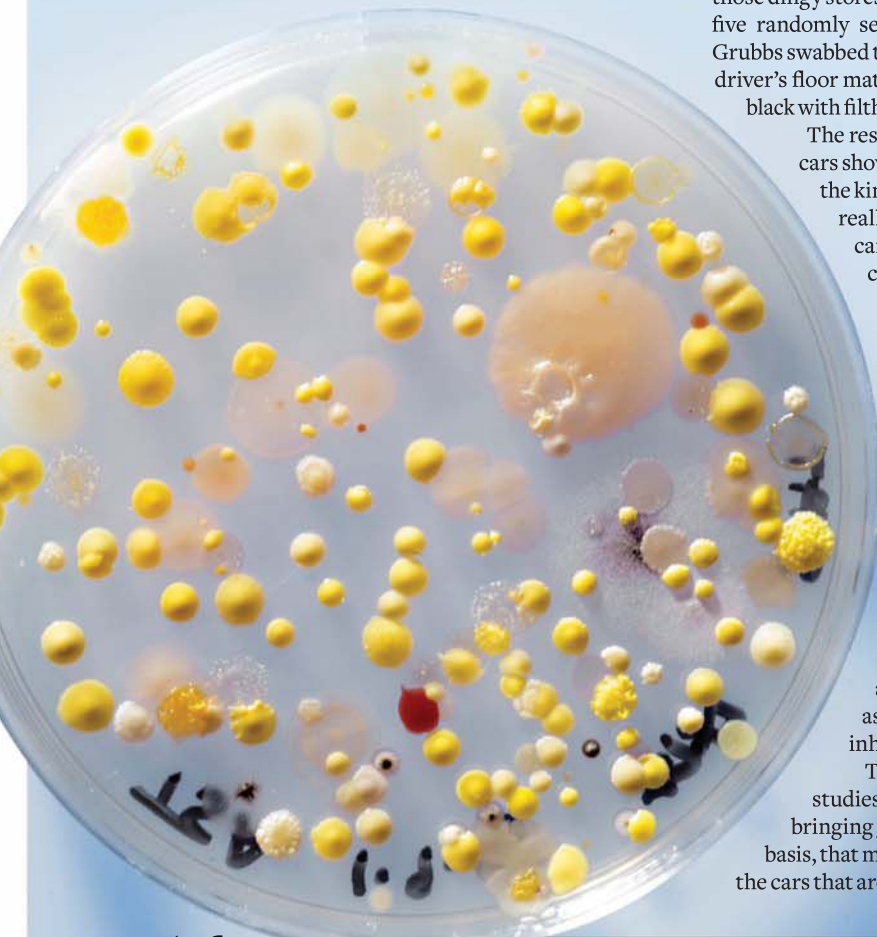


ILLUSTRATION BY MARTIN LAKSMAN



# WHEN ONLY THE BEST WILL DO.

303<sup>®</sup> PROTECTANTS AND CLEANERS ARE PROVEN TO STAND UP AGAINST EXTREME CONDITIONS AND EXTREMELY HIGH STANDARDS - INCLUDING YOURS.

We're as passionate as you are about keeping your ride looking like new, and we know you won't accept anything less than the best. That's the reason 303<sup>®</sup> products undergo rigorous testing to ensure superior performance and outstanding protection. From your dashboard to your tires, 303<sup>®</sup> keeps your car looking newer, longer.

# WE'VE GOT YOUR NUMBER<sup>®</sup>

AVAILABLE AT



Full line of 303<sup>®</sup> Automotive Products now also available at: [303automotive.com](http://303automotive.com)

\*Product selection varies per retailer



# LEAN ON ME

CONTROLLING BODY ROLL IS NO LONGER JUST A JOB FOR STEEL STICKS.  
by Josh Jacquot



**PHYSICS TENDS TO GET ITS WAY.** And when it comes to cars going around corners, physics says this: They should lean. The tires grip, the outside suspension compresses, and the body lists. Reducing that list is what roll-stabilization systems aim to do. During cornering, conventional anti-roll bars—steel rods that act as torsion springs connecting the left and right suspension members—transfer some of the force compressing the outside suspension members to the inside ones, which limits droop and decreases body roll. But because the sides are mechanically linked, a single-wheel bump encountered while traveling straight affects both sides, reducing ride comfort.

Innovations in roll-stabilization systems have tried to balance the competing priorities of flat cornering and optimal ride comfort by redistributing load between the outside and inside tires during cornering, and relaxing the connection between them when the vehicle is traveling straight. Some manufacturers do this by introducing energy into the system, and others use physics against itself. Take that, Newton.

## ACTIVE SYSTEMS

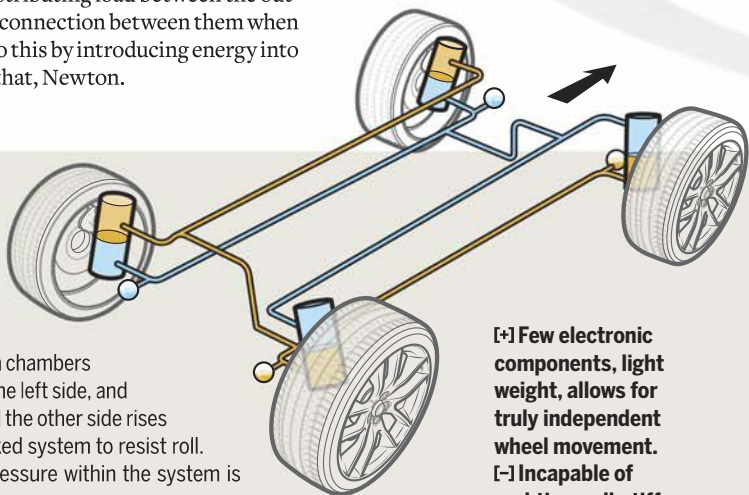
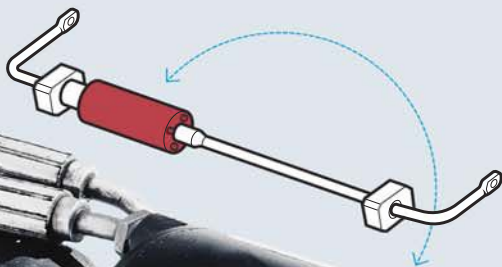
Relying on sensors and a control unit to determine when the car is traveling straight and when it's cornering, active systems use electric or hydraulic means to actively resist roll in turns.

### ▼ Split Anti-Roll Bar with Actuator

The most popular way to actively control body roll is to use conventional anti-roll bars that have been split in two. An electric motor or hydraulic servo between the two halves applies torque to each side individually and as needed. Bentley's system is capable of fully decoupling the bars to enable greater wheel articulation off-road. Applications: Bentley Bentayga; BMW X5, X6, and 5-, 6-, and 7-series; Lexus LC500 and LS500; Mercedes-Benz GLE; Porsche Cayenne and Panamera

[+] Easily packages into existing chassis.

[-] Hydraulic systems come with the complexity of plumbing, pumps, and valves; added mass; limited tunability.



[+] Few electronic components, light weight, allows for truly independent wheel movement. [-] Incapable of real-time roll-stiffness adjustment.

## PASSIVE SYSTEMS

These systems don't introduce any energy into the suspension to mitigate roll.

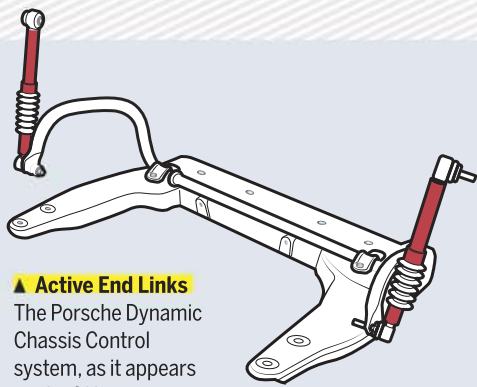
### ► McLaren's Hydraulically Linked Dampers

McLaren's clever roll-control system links the compression chambers of the right-side dampers with the rebound chambers on the left side, and vice versa. As one side of the suspension compresses and the other side rises in a corner, the oil pressure increases within the interlinked system to resist roll.

To change the roll stiffness between chassis modes, pressure within the system is increased or decreased via hydraulic accumulators.

Applications: McLaren P1, Senna, 650S, 675LT, and 720S





**▲ Active End Links**

The Porsche Dynamic Chassis Control system, as it appears on the 911, uses hydraulic end links—actuators, essentially—on the anti-roll bars. The 911's PDCC suppresses body roll by lengthening or shortening the end links during cornering.

*Application: Porsche 911*

**[+] Compact, packages well.**

**[-] Hydraulic complexity.**

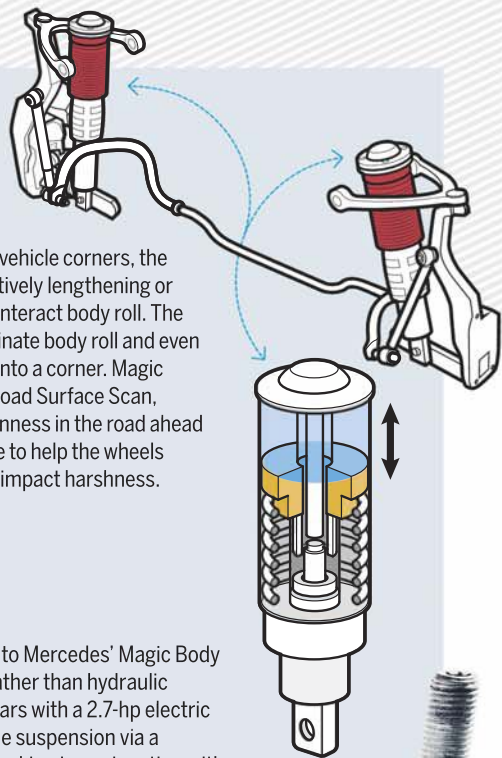
**► Mercedes-Benz's Magic Body Control**

To enable its Magic Body Control, Mercedes fits a hydraulic cylinder to the top of the spring-damper assembly at each wheel. When the vehicle corners, the cylinder extends or retracts—effectively lengthening or shortening the steel spring—to counteract body roll. The curve-inclination function can eliminate body roll and even lean the body another 2.7 degrees into a corner. Magic Body Control includes Mercedes' Road Surface Scan, which uses a camera to spot unevenness in the road ahead and deploys the hydraulic hardware to help the wheels follow the road's contour, reducing impact harshness.

*Application: Mercedes-Benz S-class*

**[+] Multipurpose functionality.**

**[-] Hydraulic complexity.**



**▼ Audi's AI Active Suspension**

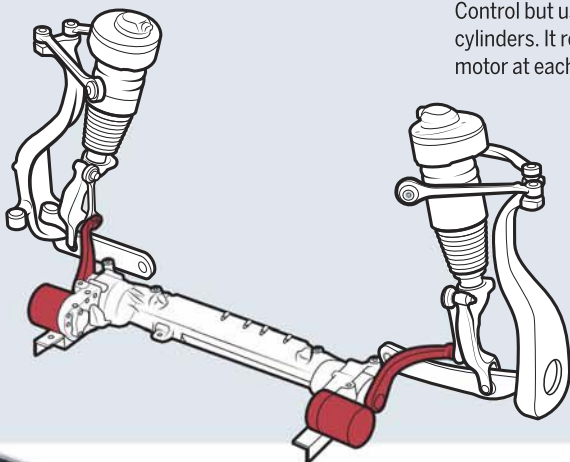
Audi's system is similar in concept to Mercedes' Magic Body Control but uses electric motors rather than hydraulic cylinders. It replaces the anti-roll bars with a 2.7-hp electric motor at each corner coupled to the suspension via a

torsion bar and working in conjunction with the standard air springs. Roll control is only one of the system's functions. Its biggest virtue is its ability to minimize bump intrusion by anticipating surface imperfections and allowing the body to remain level like Mercedes' system. It can also reduce brake- and acceleration-induced pitch motions and raise or lower the body for easier ingress and egress.

*Application: 2019 Audi A8*

**[+] Multipurpose functionality.**

**[-] Multiple heavy components, including redundant springs.**



**Lexus's Roll Posture Control**

Lexus uses its adjustable dampers in addition to conventional anti-roll bars to limit roll. During cornering, the dampers—capable of reacting in 10 to 12 milliseconds over a range of 650 adjustment points—effectively work like a pump, using small vertical wheel motions to jack up the outside suspension while squatting the inside, partially leveling the body.

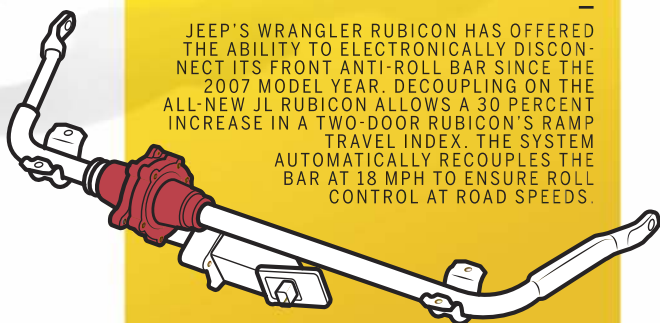
*Applications: Lexus LC500 and LS500 (active bars are optional)*

**[+] Uses existing hardware.**

**[-] Body roll must occur before it can be corrected.**

**TOTALLY DISCONNECTED**

JEEP'S WRANGLER RUBICON HAS OFFERED THE ABILITY TO ELECTRONICALLY DISCONNECT ITS FRONT ANTI-ROLL BAR SINCE THE 2007 MODEL YEAR. DECOUPLING ON THE ALL-NEW JL RUBICON ALLOWS A 30 PERCENT INCREASE IN A TWO-DOOR RUBICON'S RAMP TRAVEL INDEX. THE SYSTEM AUTOMATICALLY RECOUPLES THE BAR AT 18 MPH TO ENSURE ROLL CONTROL AT ROAD SPEEDS.





*Incentivize to Euthanize*

# A LITTLE CRUSH

AUTOMAKERS TURN TO SCRAPPAGE SCHEMES TO BOOST BRITISH SALES. *by Matt Jancer*

REMEMBER “CASH FOR CLUNKERS,” the quasi-green, federal government-backed stimulus of new-car sales in 2009? Well, the idea is back with a twist in Great Britain: scrappage programs sponsored by carmakers themselves. When Vauxhall announced the first privately run scrappage scheme in 2015, few noticed, but the company reintroduced the plan in May last year and set off a flood of copycats. Within months, the U.K. arms of BMW, Fiat Chrysler, Groupe PSA, Mazda, Mercedes-Benz, Renault-Nissan-Mitsubishi, Toyota, and the VW Group all announced programs of their own.

There are variations—the German brands will accept only diesels, for example—but most plans work similarly: Vehicles from any automaker and of a particular age are eligible and earn buyers a discount, usually £2000–£8000 (about \$2750–\$11,000), on a new model. The trade-ins then head to an auto recycler that profits by selling the salvageable parts and recycling the rest.

One motive for these new programs is the European Union directive for end-of-life vehicles. Enacted in 2000 to relieve landfills engorged with auto parts, the directive stipulated an increase by 2015 in the amount of each junked vehicle that must be salvaged for parts, recycled, or incinerated to generate energy. Metal is still the main material recovered and sold on a large scale, but now more challenging materials such as glass, carpeting, and plastic are being recycled, too.

Automakers promote their programs as more than just

WHAT IF SOMEONE TRIES TO SCRAP SOMETHING AWESOME?

Ford, Vauxhall, and Toyota say their contracted recyclers will notify them if certain rare or historic vehicles are turned in. Such cars will be set aside for enthusiast clubs to cannibalize for parts, but the car itself may not be saved. OEMs typically stipulate that vehicles scrapped through their programs be removed from the road permanently.

another way to put cash on the hoods of new cars. Many see them as a means to an environmental end: taking older, dirtier vehicles off the road and replacing them with newer, cleaner ones. “We look at the scrappage scheme as the perfect platform to promote hybrid technology, rather than look to make money from returning older, polluting models to the road,” says a Toyota U.K. spokesperson.

Some scrappage programs were slated to end by now but have been extended due to their popularity. Renault even attributes an increase in sales to its scrappage scheme. Over at Ford, nearly 12,000 Britons bought new vehicles through its program, and Toyota sold almost 4200 cars through its plan by the end of last year. Scrappage discounts could become a fixture of new-car shopping, considering the average car on British roads is 7.7 years old. And by that measure, the U.S. may be even riper for such incentive programs—the average vehicle in our nationwide fleet, based on 2016 data, is 11.6 years old.

# SLIP-ON COMFORT

FROM SKECHERS®

51521NVGY



BREATHABLE

52649CHAR



100%  
KNITTED

529370FWT



EASY  
SLIP-ON  
DESIGN



51521BKW

Easy-going style designed  
for the off-season

**TONY ROMO**

SKECHERS.COM

FEATURING  
**SKECHERS® AIR-COOLED MEMORY FOAM™**  
FOR ALL-DAY COMFORT

## John Phillips // Six miles from my wilderness home, I've discovered a junkyard with as many wrecked cars as my town has wrecked inhabitants. You know why salvage yards are so mesmerizing? Because every single abandoned car, orphaned alloy

wheel, and dechromed Cadillac badge is something I can afford. At what other retail establishment does that ever happen?

I've spent hours scrutinizing this beguiling jubilee of junk, jotting down 24 cars of interest. Everything from a chocolate 1966 Mercedes 250SE to a shipshape 1990 Subaru Justy (my first CVT experience, wow) to a spiffy dirt-tan 1960 Willys Jeep Station Wagon with a bumper sticker shouting "No Zoning! No Set-backs!"—Montana politics in a nutshell. Against the fence rested two early '70s Datsun 240Zs flanking a 2002 Pontiac Aztek, pristine save a windshield traumatized by, I hope, Walter White. Ten steps away moldered a 1960 Cadillac Sedan DeVille upon which someone had scrawled "SAVE!" Then a 1983 AMC Eagle with its factory copper-hued livery offset by coffee-brown accents, the color of carsickness.

Junkyards reliably contain what I term "mystery cases." A sparkling-red 2002 Chevrolet Cavalier, for instance, whose door, trunk, and hood seams have been sealed with bright-yellow "EVIDENCE" stickers. I extract guilty pleasure from examining the cars whose upholstery and airbags are blood-bespattered, along with those sad victims of animal collisions—a repairable 2016 Ram pickup with a tuft of fur driven into its pretzeled radiator, matching deer carcass 50 feet distant. Then I spy a monster crusher capable of pulverizing cars into trapezoids, its maw frozen on the front third of a 1980 Volkswagen Rabbit, looking like an anaconda eating, well, a rabbit. If you anthropomorphize cars, as I do, junkyards are a thousand funerals at once.

The owner of this slice of salvageable



heaven is Gene Honey, who's my age exactly. Gene is a small bear of a guy, coarse gray hair, hands like calloused catchers' mitts. He is perpetually shadowed by Sox, his collie-mix junkyard dog who refuses to guard wrecked cars but will bite you if you touch Gene, even to shake hands. A rude surprise for me, after which Sox unties my shoelaces. A dog with a sense of humor.

Gene and I chat until dark, with Sox refereeing between us on a bench seat unbolted from a minivan. "My blood came to this valley as gold prospectors in the 1870s," Gene tells me. "They trapped martens, also killed mountain goats for stew meat, then channeled water to town from two mountain lakes." As a teen, Gene worked in the local sawmills. "Ten bucks

an hour with benefits," he remembers. "Dangerous as hell, of course, but try to get that wage in the valley today."

The Honey clan was unspeakably upended when brother Dave shot Gene in the head. "It was a .22 rifle he was cleaning, an accident, got me right here in the left temple," he says, fingering the spot. "Doctors said I was dead, no chance. I was in a coma for two weeks, three more holes drilled, bringing the total to four. When I got home, I talked like a chipmunk. Really. But Mom taught first grade, so she was equipped to teach me to read and write again." Today his speech is perfect.

Gene partnered with brother Dave at their repair/salvage/towing shop when it opened in 1986. "A good move, because as a mechanic, Dave was a genius. Unfortunately, he got tangled up with a Filipina lady, real sexy, until they got into an argument. Next morning, I found Dave. He'd shot himself with a .357 Magnum. After that, my life kind of deflated. Business, too. First Dave shoots me, then Dave shoots Dave." The whole town grieved.

Gene's financial salvation nowadays is towing. "Tourists like to abandon rental cars," he says, then laughs. "And not long ago, I got called to the Rocky Knob [a local roadhouse], where black ice had sent a car into the ditch. Time I got there, three more had followed, and in the end, there were eight. I thought, 'Jeez, I oughta go into the Knob, have a beer, wait for a few more.'"

Gene pulls his NAPA cap aslant, then uncovers a 1937 Chevy coupe, unrestored but trendy in its flaky blue patina. "My first car," he says. "Bought it when I was 14 or 15, drove it to high school. There might have been some illegal street racing after." Over the years, hundreds of derelict discards have filtered through Gene's hands, but he has seized only the rare "Yanks" for himself: a '56 Chevy half-ton pickup, a '55 Willys Jeep Utility Wagon with a desert-rat motif, a '39 Chevrolet Carryall Suburban, and a '65 Ford Ranchero.

We talk cars until darkness swallows the yard. When I foolishly reach to shake Gene's hand, Sox shoots scudlike at my palm, knocking it into a Pepsi machine carrying an oversize "OUT OF ORDER" sign. Gene smiles, then frowns. "One last thing," he says, staring at my notepad. "You're not from the IRS, are you?"

"No," I reply. "Why?"

"You look like an accountant."

"I'm gonna take that as a compliment."

"Yup," Gene adds. "I would, too."



THIS

IS THE VAPE  
YOU'VE BEEN  
WAITING FOR

my  
blu

| Click. Vape. Repeat.

©2018 Fontem. NOT FOR SALE TO MINORS. WARNING: This product contains nicotine.  
Nicotine is an addictive chemical. blu®, The blu logo, myblu™, and the myblu logo are trademarks of Fontem Holdings 4 B.V.

myblu.com

# **Daniel Pund // The only one I was concerned about was the tire guy. He looked like Lemmy Kilmister of Motörhead but without the silly hat. My number one goal over the next 24 hours was to stay out of his way. Truth is, staying out of people's way was my job at this**

year's Rolex 24 at Daytona. It was my first time back in 20 years. Two decades ago, I was a bewildered cub reporter, fresh out of journalism school and not earning enough to make a profit. It was my first big assignment, and I remember thinking I needed to keep track of each entry, in each class, for each lap, for 24 hours, often in the dark, with different drivers swapping in and out of each. It would be like keeping track of each bounding ball bearing in a pachinko machine for 24 hours. With the lights off. I developed a twitch.

This time I'd been invited (or at least allowed) to hang out with the crew fielding the No. 33 Mercedes-AMG GT3 car. It runs in the hypercompetitive GTD class along with entries from Acura, Audi, Ferrari, Lamborghini, Lexus, and Porsche. They are all officially part of customer-racing programs, but the factories are very much involved. The 33 car, a racing version of the AMG GT, is campaigned by Team Riley Motorsports for car owner, dealership mogul, driver, Texan, and amiable guy Ben Keating. Two of the other drivers were trim Euro ringers. And the final pilot was a Mercedes factory driver with the spectacular name of Adam Christodoulou. For an hour, my brain was on an endless loop reciting "Christ-ah-DOOOO-LOOOO."

Bill Riley, who runs the team, apparently has no such obsessive-repetitive-thought problem. He sat unmoving on the bench atop the pit box, staring at a bank of screens packed with hieroglyphics. He didn't sleep during the race. Not even the catnaps that the crew grabbed between pit stops. He left the bench only to go to the bathroom (although not to the Porta-John behind pit lane, which, by the 18-hour



mark, was so full that only surface tension kept it from spilling over). "After the race, I become a manatee," he said, lowering his head and bobbing slowly.

The intensity of the tunnel-vision concentration would turn the sharpest brain to tapioca. This year I got to watch the race as the team does: gloriously unaware of the things that do not directly relate to your car, your driver, your tires, etc. Riley was unaware, for example, that the prototypes were blowing tires at an alarming rate. If he cared about how Fernando Alonso was faring in his first big endurance race, Riley didn't show it. (Alonso wasn't faring well.) The only thing that mattered about the faster GTLM and Prototype competitors was that they didn't crash into the 33 car. Over the team radio, the spotters carried

on the world's most mind-numbing, stream-of-consciousness poem, "Prototype on your tail... Corvette GTLM passing on right... Prototype passing on left." It might be sacrilege, but from the crew's perspective, much of the race was boring. There was much more standing around than I had imagined. With about 75 percent of the race run, crew members were spending an increasing amount of time staring holes through whatever was in front of them. Just bushels of potatoes stewing in a broth of the sweet cologne of race fuel, the acrid alarm of hot brakes, and a whiff of concessionaire fry oil.

As mechanic and tire changer Wesley Brown pointed out: "Once we roll the car onto pit lane, our race is over. Then it's a lot of standing around and going zero to 100 mph instantly." He also noted that because of the constant noise in the tent, the crew has developed hand signals to communicate. Example: With your hand just below your belt buckle, point your index finger down. This means "I gotta pee." But when Brown started with the team, the others on the crew told him to make the "bathroom break" sign by creating a circle with the forefinger and thumb of one hand and inserting the index finger of the other hand and twirling it around. The rest of the crew would then laugh at him.

The tire runners kept a more consistent pace, hauling wheels with used rubber to Continental's compound to have new tires mounted and then bringing them back to the pits. It's an entry-level job. At Daytona, the 33 car's tire runner was one Erich Heuschele, whose day job is manager of SRT vehicle dynamics at FCA. He was spending vacation days working for this team, which used to run Vipers. And, no, he didn't say a word about the next Viper.

And the race? Well, after starting 12th in class, the team made steady progress. With a half hour to go, driver Jeroen Bleekemolen was reeling in the lead Lamborghini Huracán. But the 33 needed a splash of fuel to make it to the finish. With 15 minutes left, Bleekemolen pulled into the pits, took 10 seconds of fuel, and roared back out into fourth place. Said Riley over the radio, "Remember, I'll be pissed if we finish fourth and all the dive planes are still on the car." Alas, with his rear tires spent, Bleekemolen ended the race fourth, 2.8 seconds away from a podium finish.

By then, much of the crew was already packing things up. They had to vacate the speedway in four hours.

# Do you hate your detector?

**It was your best friend, now it never shuts up.**

**The good news:** New cars have a safety feature, the blind-spot warning system. Many models use K-band radar to “see” nearby cars.

**The bad news:** Onboard radar turns each of these “seeing” cars into mobile K-band false alarms. A blind-spot system may tag along with you for miles. You’re stuck, not knowing which car to maneuver away from. GPS is no solution. It doesn’t work on mobile falses.



**V1 wins war against false alarms:** New computer code weeds out phony K-band alerts.

## Why you will love V1

**Problem solved:** V1 has an algorithm that recognizes these mobile false alarms and excludes them, yet never blocks a real threat. We’ve named it **Junk-K Fighter**. And it’s now built into all new V1s.

**Detectors that don’t detect:** It’s easy to make a detector without false alarms. Just give up on long-range warnings. Our competitors play that game, we don’t.

### First obligation of V1:

V1 will never miss a threat. Quiet is nice, but missing an ambush is fatal. That’s why we don’t use GPS. GPS knows only location, and if the frequency range of a new threat is the same as that of a blocked alarm, *sorry*, but GPS programming demands silence at that location, even if it’s a trap. V1 will never fail you that way.

**Satisfaction guaranteed:** Try it for 30 days. If it doesn’t satisfy for any reason, send it back for a full refund.

**Call toll-free 1-800-331-3030**

- Valentine One Radar Locator with Laser Detection - \$399
- Carrying Case - \$29     Concealed Display - \$39
- SAVVY® - \$69     V1connection™ - \$49     V1connection™ LE - \$49

Plus Shipping / Ohio residents add sales tax

**30-Day Money-Back Guarantee**

Valentine One is a registered trademark of Valentine Research, Inc.

[www.valentine1.com](http://www.valentine1.com)

**Valentine One**  
RADAR LOCATOR

Valentine Research, Inc.    Ph 513-984-8900  
Department No. YBA        Fx 513-984-8976  
10280 Alliance Road  
Cincinnati, Ohio 45242



# Ezra Dyer // Pebble Beach is coming up. I mean, not right away, but if you want to go, you should start planning now. Because at this point in the year, you might still have time to make a billion dollars, and I think that having a billion dollars would really enhance your Pebble Beach

experience. But if you can't put together a billion by August, I'm here to tell you how to have fun anyway. Just not as much fun as the guy who's staying in his luxury zeppelin tethered above the 18th green. That guy's got it figured out. Nobody really knows who he is, but I heard he invented macaroni and gets royalties anytime anybody uses the letter Q.

Last year at Pebble, I weaseled my way into a few drives where I probably got invited due to a last-minute cancellation by the Pork Rind King of Tallahassee. For instance: off-roading Bentley Bentaygas in a vineyard up in the hills. That was a customer event, as I deduced by about the fifth time one of the other attendees tried to subtly deduce how I was rich enough to get invited. Ditto a Lamborghini Aventador S test drive staged near a tasty mountain road, where I overheard one guy casually declare, "I went out early in the morning, before there was traffic, and you could take that first corner at 155 or 160." (In Pebble Beach, even the humble brags aren't humble.) I blasted that road in a McLaren 570GT and risked my license keeping up with the biggest maniac I saw all weekend, who was driving a Miata RF like a guy who's pretty certain that a cop would go for the McLaren before the Mazda.

While I enjoyed cruising around in a 570GT and acting like a big deal, the beau-



The Pebble Beach Avis lot. Kidding. It's Hertz's lot.



tiful thing about Pebble is that you don't need to be wealthy or own a classic car or be invited to anything to have a great time. Just wander around gawking at cars.

For example, outside the Portola Hotel in Monterey, there's a pedestrian overpass where Lighthouse Avenue emerges from a tunnel, and there is typically a crowd gathered there watching traffic pour out. When is it ever fun to stand around watching traffic? In Monterey during that week, it is. You'd hear a keening shriek echoing out of the tunnel, and everyone would crane to see what brand of wickedness was about to spill forth. Meanwhile, 100 yards away, I saw a white Veyron pull up to the hotel accompanied by a matching EB110. That's a strong car statement when you bring out the EB110 as an accessory.

There's so much going on that you don't know where to look. Lowriders. Rat rods. Oh, hey, a Chiron. In Carmel-by-the-Sea, you'll see Pagani-by-the-Parking-Meter. Outside a restaurant, I geeked out on a BMW M3 Lightweight and got into a conversation with the car's owner, who was equally geeked out that anybody knew or cared why his M3 had tricolor flag graphics. Pebble is about showing off, sure. But it also attracts people who simply love cars. A shuttle driver told me about how he'd recently fixed up a BMW 633CSi that he had acquired for \$50 and a bottle of wine. That's love of the game right there.

Not content with the street view? You should step inside an auction, which is a car show, a party, and a human zoo all rolled into one. You can stroll among interesting machines while rubbing elbows with submarine owners, landed gentry, hustlers, crypto speculators, the guy who invented the pencil sharpener, the woman who divorced that guy, and her new boyfriend, Raoul. If you want to fit in and be taken seriously, I suggest you wear bedazzled acid-washed jeans and get a facelift, whether you need it or not.

At RM Sotheby's auction, I was agog at the cars sitting out back, awaiting their turn on stage. The 2006 Lamborghini Concept S—a roofless one-off Gallardo—was parked near some trees, its interior filling with leaves, drizzle, and whatever else happened to fall from the sky. It sold for \$1.3 million. I watched as a 1989 Ferrari 328GTS went for \$154,000, the auctioneer calmly pitting the two bidders against each other in a fascinating psychological battle. You think of auctioneers as all amped-up "hey, biddabiddabiddaSOLD," but RM Sotheby's guy was a methodical bid-extracting assassin. He was totally willing to let an awkward silence fill the room while someone pondered the wisdom of paying, say, \$140,250 for a 1964 Peel P50. You let the fish run, then you reel it in slow. Later, outside the auction, I heard the guy sitting next to me at the bar talking about how he'd just dropped nearly \$700,000 on a Ferrari Daytona. He seemed quite pleased, as you'd hope you'd be if that were your reality.

And yes, there are the historic races and the Quail and the Concorso Italiano. That's all wonderful, and you can have a grand time without going to any of it. But if you have time on Sunday, you should head over to the golf course. They've got a pretty good car show over there. ■



# The only bed that goes to work when you go to sleep.

## INTRODUCING THE SLEEP NUMBER 360™ SMART BED

Discover the smartest, most adjustable sleep of your life. Responsive Air™ technology senses and effortlessly adjusts for your ideal comfort. Partner Snore™ technology\* lets you sleep in peace.

It's even designed to warm your feet to help you fall asleep faster.

DOES YOUR BED DO THAT?®



Adjust firmness on each side—your Sleep Number® setting



Senses and automatically responds to you



Foot warming—designed to help you fall asleep faster



Gently raise your partner's head to help alleviate mild snoring\*



Control your comfort and see how you've slept with SleepIQ® technology

25-YEAR LIMITED WARRANTY†  
lets you sleep with peace of mind

LASTS TWICE AS LONG  
as an innerspring

9 OUT OF 10 BED OWNERS‡  
say they'd recommend Sleep Number

Call or Click for Your Free Catalog • 1.800.831.1211 (ext. 551561) • [sleepnumberinfo.com](http://sleepnumberinfo.com)

sleep  number.

\*May temporarily relieve common mild snoring in otherwise healthy adults. Partner Snore™ technology is available with Split King and FlexTop® King mattresses on FlexFit™ adjustable bases. †2-Year Limited Warranty on SleepIQ® technology. Warranties available at [sleepnumber.com](http://sleepnumber.com). ‡Results from a 2017 Sleep Number survey of 200 owners asked about their likelihood to recommend Sleep Number to a friend, family member, or colleague. SLEEP NUMBER, SELECT COMFORT, SLEEPIQ, IT and the Double Arrow Design are registered trademarks and SLEEP NUMBER 360 is a trademark of Sleep Number Corporation. ©2018 Sleep Number Corporation

# Power



**MERCEDES-AMG  
E63 S 4MATIC**  
Price: \$134,600  
Power: 603 hp  
Torque: 627 lb-ft  
Weight: 4579 lb  
0-60 mph: 2.9 sec

**BMW M5**  
Price: \$127,295  
Power: 600 hp  
Torque: 553 lb-ft  
Weight: 4288 lb  
0-60 mph: 2.8 sec



**CADILLAC CTS-V**

Price: \$102,935  
Power: 640 hp  
Torque: 630 lb-ft  
Weight: 4168 lb  
0-60 mph: 3.8 sec

**PORSCHE  
PANAMERA TURBO**

Price: \$173,325  
Power: 550 hp  
Torque: 567 lb-ft  
Weight: 4682 lb  
0-60 mph: 3.0 sec

One launches from 5000 rpm,  
one has a Drift mode,  
one hits 200 mph, and one rushes  
to 60 mph in 2.8 seconds.

And one wins.

BY ERIC TINGWALL | PHOTOGRAPHY BY JAMES LIPMAN

# Drunk

# Our test of 600-hp cars nine years ago looked very different from this one.

Fenders bulged. Eight-, 10-, and 12-cylinder engines boomed. Hoods stretched to the horizon—except for that of the Italian, which carried its engine behind the cockpit. Because nine years ago, rounding up four cars with 600 horsepower meant coming face to face with rare and exotic sporting machines. We called them “the pinnacle of the automotive food chain.” They were a Chevrolet Corvette ZR1, a Dodge Viper SRT10, a Lamborghini Murciélago LP640, and a Mercedes-Benz SL65 AMG Black Series. It was 2009, and as the economy cratered and stiff fuel-economy mandates brewed, it was tempting to assume that the halcyon days of horsepower would soon be behind us.

It doesn't appear as if automakers plan to cut us off anytime soon, though. When 600 horsepower seems unexceptional, you know you're living in exceptional times. Packaged as it is for this comparison test—in four-door bodies, produced exclusively by blown V-8s, and paired with automatic transmissions—600 horsepower today looks markedly less exotic than it did back in 2009. But don't be fooled—this much power will always blow your mind.

The BMW M5 is the newest in the set, and while it looks familiar, inside and out, it features two notable format changes: An eight-speed automatic transmission has taken over for the six-speed manual and seven-speed dual-clutch offered in the prior model, and standard all-wheel drive

promises to shrink acceleration times. A rear-wheel-drive mode allows drivers to appreciate how masterfully all-wheel drive wrangles the full might of the 600-hp 4.4-liter V-8, particularly since it's only available once stability control has been fully defeated. M5 pricing starts at \$104,595 and runs \$127,295 as equipped for our test, with the \$4000 Executive package (soft-close doors, four-zone climate control, massaging and heated front seats, plus heated rears, among other equipment) making the M5 as lavish as it is sporting.

Cadillac's 640-hp CTS-V is the outlier, nestling a supercharger in the valley of its V-8, where everyone else stuffs two turbochargers, and delivering torque to only the rear wheels. It's also the value play, as it's

the sole car here that can be bought for five figures. The Caddy's price, however, pushes to \$102,935 with big-ticket options such as Recaro performance seats (\$2300), the performance data and video recorder (\$1600), the Luxury package (\$2500), and an exterior carbon-fiber package (\$6250). The price is kept in check, at least in part, because Cadillac doesn't offer carbon-ceramic brakes, an option that costs between \$8500 and \$8960 on the three other cars assembled.

Mercedes began sending torque to both the front and rear axles of its E63 for the 2014 model year. Naturally then, the big innovation of the new-for-2018 E63 S 4MATIC is . . . rear-wheel drive. As on the M5, the E63's two-wheel-drive mode can't be unlocked until all the electronic safety nets have been cut, at which point the 603-hp Mercedes reverts to old habits, i.e., butchering tires in burnouts and drifts. Our \$134,600 test car includes upgraded front seats (\$1320), forged 20-inch wheels (\$1700), an active exhaust (\$1250), an advanced lighting package (\$1500), and additional insulation in the body and glass (\$1100) as part of its \$29,205 in extras.

Lastly, we have the second generation of Porsche's Panamera Turbo. The Panamera 2.0 arrived for 2017 cured of its scoliosis and looking quite handsome. Porsche's passenger car seats four and swallows cargo via its hatchback. The options list is short on this particular Porsche, but that doesn't make it inexpensive. Its \$25,375 in add-ons are concentrated around performance-enhancing equipment such as the Sport package



	2018 BMW M5	2018 CADILLAC CTS-V	2018 MERCEDES-AMG E63 S 4MATIC	2017 PORSCHE PANAMERA TURBO
<b>PRICE AS TESTED</b>	<b>\$127,295</b>	<b>\$102,935</b>	<b>\$134,600</b>	<b>\$173,325</b>
<b>BASE PRICE</b>	\$104,595	\$88,490	\$105,395	\$147,950
<b>DIMENSIONS</b>				
<b>LENGTH</b>	195.5 in	197.7 in	196.4 in	198.8 in
<b>WIDTH</b>	74.9 in	72.2 in	75.1 in	76.3 in
<b>HEIGHT</b>	58.0 in	57.2 in	56.6 in	56.2 in
<b>WHEELBASE</b>	117.4 in	114.6 in	115.7 in	116.1 in
<b>FRONT TRACK</b>	64.0 in	62.1 in	64.9 in	65.2 in
<b>REAR TRACK</b>	62.8 in	61.2 in	62.8 in	64.4 in
<b>INTERIOR VOLUME</b>	<b>F: 57 cu ft R: 45 cu ft</b>	<b>F: 61 cu ft R: 42 cu ft</b>	<b>F: 52 cu ft R: 46 cu ft</b>	<b>F: 54 cu ft R: 43 cu ft</b>
<b>CARGO VOLUME</b>	<b>19 cu ft</b>	14 cu ft	13 cu ft	17 cu ft
<b>POWERTRAIN</b>				
<b>ENGINE</b>	twin-turbocharged DOHC 32-valve V-8 268 cu in (4395 cc)	supercharged pushrod 16-valve V-8 376 cu in (6162 cc)	twin-turbocharged DOHC 32-valve V-8 243 cu in (3982 cc)	twin-turbocharged DOHC 32-valve V-8 244 cu in (3996 cc)
<b>POWER HP @ RPM</b>	600 @ 6600	<b>640</b> @ 6400	603 @ 6500	550 @ 6000
<b>TORQUE LB-FT @ RPM</b>	553 @ 1800	<b>630</b> @ 3600	627 @ 2500	567 @ 1960
<b>REDLINE/FUEL CUTOFF LB PER HP</b>	7200/7200 rpm 7.1	6500/6700 rpm <b>6.5</b>	7000/7000 rpm 7.6	6800/6900 rpm 8.5
<b>DRIVELINE</b>				
<b>TRANSMISSION</b>	8-speed automatic	8-speed automatic	9-speed automatic	8-speed dual-clutch automatic
<b>DRIVEN WHEELS</b>	rear/all	rear	rear/all	all
<b>GEAR RATIO:1/MPH PER 1000 RPM/ MAX MPH</b>	1 5.00/5.1/37 2 3.20/8.0/58 3 2.14/11.9/86 4 1.72/14.8/107 5 1.31/19.5/140 6 1.00/25.5/163 7 0.82/31.1/163 8 0.64/39.9/163	1 4.56/5.8/39 2 2.97/8.9/60 3 2.08/12.7/85 4 1.69/15.6/105 5 1.27/20.7/139 6 1.00/26.3/176 7 0.85/31.0/200 8 0.65/40.5/190	1 5.35/4.8/34 2 3.24/7.9/55 3 2.25/11.3/79 4 1.64/15.5/109 5 1.21/21.0/147 6 1.00/25.5/179 7 0.86/29.6/186 8 0.72/35.4/186 9 0.60/42.4/180	1 5.97/4.1/28 2 3.24/7.5/52 3 2.08/11.8/81 4 1.42/17.2/119 5 1.05/23.3/161 6 0.84/29.1/190 7 0.68/36.0/185 8 0.53/46.2/180
<b>FINAL-DRIVE RATIO:1</b>	3.15, limited-slip rear differential	2.85, limited-slip differential	3.06, limited-slip rear differential	3.36, limited-slip rear differential
<b>CHASSIS SUSPENSION</b>	<b>F:</b> multilink, coil springs, anti-roll bar <b>R:</b> multilink, coil springs, anti-roll bar	<b>F:</b> struts, coil springs, anti-roll bar <b>R:</b> multilink, coil springs, anti-roll bar	<b>F:</b> multilink, air springs, anti-roll bar <b>R:</b> multilink, air springs, anti-roll bar	<b>F:</b> control arms, air springs, anti-roll bar <b>R:</b> multilink, air springs, anti-roll bar
<b>BRAKES</b>	<b>F:</b> 15.6-inch vented, cross-drilled ceramic disc <b>R:</b> 15.0-inch vented, cross-drilled ceramic disc	<b>F:</b> 15.4-inch vented disc <b>R:</b> 14.4-inch vented disc	<b>F:</b> 15.4-inch vented, cross-drilled ceramic disc <b>R:</b> 14.2-inch vented, cross-drilled ceramic disc	<b>F:</b> 16.5-inch vented, cross-drilled ceramic disc <b>R:</b> 15.4-inch vented, cross-drilled ceramic disc
<b>STABILITY CONTROL</b>	fully defeatable, competition mode, launch control	fully defeatable, traction off, competition mode, launch control	fully defeatable, competition mode, launch control	fully defeatable, competition mode, launch control
<b>TIRES</b>	Michelin Pilot Sport 4S <b>F:</b> 275/35ZR-20 (102Y) <b>R:</b> 285/35ZR-20 (104Y)	Michelin Pilot Super Sport <b>F:</b> 265/35ZR-19 (98Y) <b>R:</b> 295/35ZR-19 (100Y)	Michelin Pilot Sport 4S <b>F:</b> 265/35ZR-20 (99Y) <b>R:</b> 295/30ZR-20 (101Y)	Continental ContiSportContact 5P <b>F:</b> 275/35ZR-21 (103Y) <b>R:</b> 315/30ZR-21 (105Y)

## CAR AND DRIVER TEST RESULTS

	2018 BMW M5	2018 CADILLAC CTS-V	2018 MERCEDES-AMG E63 S 4MATIC	2017 PORSCHE PANAMERA TURBO
<b>ACCELERATION</b>				
<b>0-30 MPH</b>	<b>1.1 sec</b>	1.8 sec	<b>1.1 sec</b>	1.2 sec
<b>0-60 MPH</b>	<b>2.8 sec</b>	3.8 sec	2.9 sec	3.0 sec
<b>0-100 MPH</b>	<b>6.6 sec</b>	8.1 sec	6.7 sec	7.4 sec
<b>0-150 MPH</b>	<b>15.9 sec</b>	20.1 sec	<b>15.9 sec</b>	18.2 sec
<b>1/4-MILE @ MPH</b>	<b>10.9 sec @ 129</b>	12.0 sec @ 121	11.0 sec @ 128	11.3 sec @ 123
<b>ROLLING START,</b>				
<b>5-60 MPH</b>	<b>3.7 sec</b>	4.2 sec	3.8 sec	4.2 sec
<b>TOP GEAR, 30-50 MPH</b>	2.2 sec	<b>2.0 sec</b>	2.3 sec	2.2 sec
<b>TOP GEAR, 50-70 MPH</b>	<b>2.4 sec</b>	<b>2.4 sec</b>	2.5 sec	2.8 sec
<b>TOP SPEED</b>	163 mph (gov ltd)	<b>200 mph</b> (drag ltd, mfr's claim)	186 mph (gov ltd, mfr's claim)	190 mph (drag ltd, mfr's claim)
<b>CHASSIS</b>				
<b>BRAKING, 70-0 MPH</b>	<b>147 ft</b>	148 ft	153 ft	153 ft
<b>ROADHOLDING,</b>				
<b>300-FT-DIA SKIDPAD</b>	0.98 g	<b>1.01 g</b>	<b>1.01 g</b>	1.00 g
<b>610-FT SLALOM</b>	45.2 mph	<b>46.4 mph</b>	44.4 mph	44.8 mph
<b>WEIGHT</b>				
<b>CURB</b>	4288 lb	<b>4168 lb</b>	4579 lb	4682 lb
<b>%FRONT/%REAR</b>	54.7/45.3	52.9/47.1	55.5/44.5	52.9/47.1
<b>FUEL TANK</b>	20.1 gal	19.0 gal	21.1 gal	<b>23.8 gal</b>
<b>RATING</b>	93 octane	93 octane	91 octane	93 octane
<b>EPA COMBINED/CITY/HWY</b>	17/15/21 mpg	17/14/21 mpg	18/15/22 mpg	<b>21/18/25 mpg</b>
<b>C/D 400-MILE TRIP</b>	<b>15 mpg</b>	11 mpg	13 mpg	13 mpg
<b>SOUND LEVEL</b>				
<b>IDLE</b>	47 dBA	50 dBA	47 dBA	<b>44 dBA</b>
<b>FULL THROTTLE</b>	<b>74 dBA</b>	85 dBA	80 dBA	75 dBA
<b>70-MPH CRUISE</b>	66 dBA	67 dBA	66 dBA	<b>64 dBA</b>



with launch control, four-wheel steering, and two-mode exhaust (\$5580); active anti-roll bars (\$5000); and carbon-ceramic brakes (\$8960). As tested, this one costs \$173,325, and yet with a mere 550 horsepower, the Panamera is the noodly-armed kid that threatened to undo our gathering of four 600-hp brutes for this comparison test.

But if you could turn the camera around in that opening image, you'd see that things are so heady in 2018 that our chase car compensates for the Porsche's 50-hp deficit. Armed with 603 horsepower in its own Mercedes-AMG E63 S 4MATIC wagon, our photo team had no excuse for falling off the pace during this test. In fact, we were so smitten by the long-roof's hard-charging performance, innate practicality, and dashing looks that we briefly considered naming it the winner of a comparison it didn't compete in.

We did not extend such consideration

to the Audi RS7, which needed to make an appearance if it was going to defend its 2013 victory over the BMW M6 Gran Coupe and the Mercedes-Benz CLS63 AMG S. Audi introduced an RS7 Performance for 2016 that pushes the twin-turbo 4.0-liter V-8 from 560 horsepower to 605, but the company was in the midst of launching the next-gen A7 [see page 082] and didn't have an RS7 for this test.

Just as we did nine years ago, we concentrated our power in Southern California. Where writhing mountain highways spill into desolate desert, we ran these heavy hitters hard and fast to determine which car actually earns the right to wear its golden brake calipers.

#### 4. PORSCHE PANAMERA TURBO

In the way it corners, the Porsche Panamera Turbo is simultaneously remarkable and disappointing. Active anti-roll bars

It's finally a good-looking car, but the 550-hp Panamera Turbo feels a little light on power and a lot heavy on cost in this group of heavy hitters.

work with the standard air springs and adaptive dampers to hold the body virtually flat in corners and float it over rough pavement. Those attributes combine for handling that is unperturbed by mid-corner bumps, and by remaining so steadfast and fluid, the Porsche largely hides that it's a 4682-pound porker.

Yet on narrow canyon roads that leave little room for error, the Panamera feels every inch as wide as its 76.3-inch beam suggests. As the four-wheel-steering system muddles the intended trajectory, the driver compensates with steering that is uncharacteristically light. Its sense of vagueness lingers even as you accumulate seat time. Relative to the pointy Cadillac and the playful BMW, the Porsche comes off as a little numb, even imprecise.



Drunk on power from driving the competition, one editor repeatedly and earnestly asserted that the Panamera Turbo wants for thrust. He wasn't entirely wrong. With its swollen weight-to-power ratio, the Porsche certainly doesn't pull as hard as the others in passing maneuvers. Its 3.0-second zero-to-60 run is largely a testament to the launch-control scheme that spins the engine to 5000 rpm before firing the Turbo down the barrel.

The latest Porsche infotainment system features a volume roller hidden out of

sight ahead of an electronic shifter, surrounded by hard-to-target haptic "buttons." And there are too many critical controls packed into the convoluted menus lurking within the wide touchscreen. The system pulls your eyes off the road and your attention away from driving, and it makes Cadillac's CUE look downright sensible. Living with it on a daily basis may require use of an effective blood-pressure medication.

But ultimately, this supersedan didn't get fourth place because of its infotain-

**Porsche Panamera Turbo [+]** Corners flatly, rides gracefully. [-] Doesn't steer like a Porsche, hopeless ergonomics, absurdly expensive. [=] Don't call it a four-door 911.





ment system. At \$38,725 more than the next most expensive car in the group (the Mercedes), this Panamera costs a whole heap of money and includes relatively little in the way of equipment. And this is one Porsche that doesn't compensate with superior driving dynamics. If it's a four-seat \$170,000 Porsche you seek, we recommend the 911 Turbo.

### 3. CADILLAC CTS-V

Unable to make use of its full 630 pound-feet of torque in first gear, the Cadillac CTS-V is the unwitting poster child for BMW's and Mercedes' switch to all-wheel drive. Despite being the lightest and most powerful car here, the rear-wheel-drive Caddy churns out the slowest standing-start acceleration times, ceding a full second to the M5's zero-to-60 blitz.

But we'd happily trade straight-line acceleration to move so swiftly through corners. The Michelin Pilot Super Sports cling to mountain asphalt, providing aggressive turn-in bite and dogged grip.

The rear-drive CTS-V suffers in standing-start acceleration tests compared with its all-wheel-drive competitors, but it's the most fun to drive.

Helped by what is perhaps the purest steering in a four-door, this long and narrow dart of a car lands at the apex corner after corner. At the track, the CTS-V's dynamic excellence delivered the best handling numbers, with 1.01 g's of cornering stick and a 46.4-mph run through the slalom.

The eight-speed automatic is neither as crisp nor as quick as the competition's. The LT4 V-8, however, compensates with pushrods, a big supercharger, and even bigger displacement. Its laughable 11-mpg thirst is as charming as the characteristic tremor of a small-block at idle. Under acceleration, the chuff of the blower fills the cabin and drowns out the V-8 snarl.

That the CTS-V borrows the Corvette's engine and apes its blissful handling is a virtue. That Cadillac's interior designers apparently thought they were working on a Chevrolet is not. New for the

**Cadillac CTS-V [+] The way it steers, the way it turns, the way it rides. [-] Can't put the power down, grim interior. [=] The car we want to drive, but not the car we want to own.**









The E63's rear-wheel-drive Drift mode is cool, but know that you can chew through a pricey set ofMichelins in 10 minutes of smoky silliness.

2014 model year, the CTS's cabin already looks twice its age thanks to an overwrought design, unexceptional materials, and tortured ergonomics. The cramped back seat is a pseudosuede prison. The front camera (so you don't crunch the carbon-fiber splitter in parking lots) offers the clarity of a kaleidoscope. Sure, the updated CUE infotainment system is much improved since its debut, but it won't be acceptable until Cadillac replaces the often unresponsive haptic volume control with something that works more reliably. The Cadillac is the car to own if you commute to work on California's Angeles Crest Highway. For the rest of us, though, it fails to live up to the expectations of a six-figure luxury car.

## 2. MERCEDES-AMG E63 S 4MATIC

"The E63 S is proof that the folks in Affalterbach are the rednecks of Europe." That's pretty high praise from executive editor Jared Gall, a man who regularly shoots groundhogs from the comfort of his bathtub. No doubt AMG would prefer we thought of its cars as more sophisticated than mere leather-clad hot rods. But that's not going to happen as long as the

company builds engines as awesome as this 603-hp V-8.

The E63's twin-turbo 4.0-liter bellows and barks until it howls and screams its way to 7000 rpm. Its 627 pound-feet of torque shove this sedan forward in any of the automatic transmission's nine gears. The gearbox, which uses a clutch pack rather than a conventional torque converter, snaps off shifts and slingshots the 4579-pound Merc to 60 mph in 2.9 seconds. All-wheel drive can't neuter an engine this potent, but that didn't stop the





**Mercedes-AMG E63 S 4MATIC [+] Monster engine, opulent cabin, Drift mode. [-] Flinty ride quality, unbalanced handling. [=] A hooligan wearing a three-piece suit.**

Germans from indulging their inner Luke and Bo by including a rear-wheel-drive function called Drift mode.

There's nothing backwoods about the AMG's cabin, which contains enough carbon fiber to build a tandem bicycle. Each piece is meticulously sculpted and finished. The door panels flow gracefully into the dash, and the round climate vents rise out of trim pieces that seem to have the surface tension of water. Our only gripe about the plush cabin: The \$1320 multi-contour seats are misleadingly named, lacking the adequate contouring and padding to encourage us to spend much more than an hour in them.

Over expansion joints and cracks, the AMG's Michelin Pilot Sport 4S tires slap at the road and drive shudders into the cabin. While it matched the CTS-V's 1.01 g's of lateral grip, the E63 S recorded the slowest average speed through the slalom cones. That's the product of a more fickle chassis balance that succumbs to understeer and oversteer more readily than the other cars. On tightly wound mountain roads, the AMG's front-end grip washes out early, and the heavy steering makes the E63 feel more ponderous than it is. AMG's E63 S isn't the one-dimensional bruiser it once was, but it's still not the complete package that the BMW is.





**“The E63 S is proof that the  
folks in Affalterbach  
are the rednecks of Europe.”  
—Jared Gall**





# FINAL RESULTS

Shell  
**V-Power**  
**NITRO+**  
Premium Gasoline  
The Official Fuel of  
CAR AND DRIVER

**MERCEDES-AMG E63 S** 4MATIC  
*Maximum points available*

**PORSCHE PANAMERA TURBO**

**CADILLAC CTS-V**

**BMW M5**

## 1. BMW M5

We were prepared for the F90 M5's 150 to 200 pounds' worth of all-wheel-drive hardware to give the 5-series yet another layer of insulating fat between driver and road. Instead, M engineers trimmed enough poundage elsewhere (note the standard carbon-fiber roof) that this M5 weighs about 100 pounds less than its predecessor.

The twin-turbo 4.4-liter V-8 is strong over the full sweep of the tach, quick to build boost off idle, and buttery smooth at its 7200-rpm redline. It's paired with an eight-speed torque-converter automatic that offers the quick and satisfying action of the best dual-clutch transmissions, without any coarseness. The software guys writing the soundtrack still have work to do, though, as the engine note is blatantly flubbed, most noticeably in the flatulent simulated staccato that accompanies upshifts.

But don't let theatrics taint reality, because there's absolutely nothing artificial about the way the M5 moves. It claims the shortest stop from

We needn't have feared the switch to all-wheel drive and a conventional automatic transmission. The new M5 is a brilliant sports sedan.

RANK	1	2	3	4
<b>VEHICLE</b>				
DRIVER COMFORT	10	8	8	8
ERGONOMICS	10	8	6	6
REAR-SEAT COMFORT	5	3	2	2
REAR-SEAT SPACE*	5	4	4	4
CARGO SPACE*	5	5	3	4
FEATURES/AMENITIES*	10	9	6	5
FIT AND FINISH	10	9	7	9
INTERIOR STYLING	10	8	6	8
EXTERIOR STYLING	10	8	9	8
REBATES/EXTRAS*	5	1	3	0
AS-TESTED PRICE*	20	15	14	20
<b>SUBTOTAL</b>	<b>100</b>	<b>80</b>	<b>79</b>	<b>60</b>
<b>POWERTRAIN</b>				
1/4-MILE ACCELERATION*	20	20	15	18
FLEXIBILITY*	5	3	4	2
FUEL ECONOMY*	10	10	6	8
ENGINE NVH	10	9	8	8
TRANSMISSION	10	9	7	8
<b>SUBTOTAL</b>	<b>55</b>	<b>51</b>	<b>50</b>	<b>44</b>
<b>CHASSIS</b>				
PERFORMANCE*	20	19	19	20
STEERING FEEL	10	8	8	10
BRAKE FEEL	10	9	9	9
HANDLING	10	8	8	10
RIDE	10	9	7	9
<b>SUBTOTAL</b>	<b>60</b>	<b>53</b>	<b>51</b>	<b>58</b>
<b>EXPERIENCE</b>				
FUN TO DRIVE	25	22	21	25
<b>TOTAL</b>	<b>240</b>	<b>206</b>	<b>201</b>	<b>197</b>

\*These objective scores are calculated from the vehicles' dimensions, capacities, rebates and extras, and/or test results.



70 mph at 147 feet. It harasses supercars with its 2.8-second rip to 60 mph. At 10.9 seconds and 129 mph in the quarter-mile, the 4288-pound M5 is only one-tenth of a second slower than the half-a-million-dollar Ford GT.

Wearing the smallest tire stagger in the test, the BMW delivers indefatigable front-end grip. It dives into corners with precision and deftness. The BMW's maximum lateral grip (0.98 g) trails the rest of the group's by a few hundredths—hundredths that you'll never miss when you're exploring the M5's handling nuance on a squiggle of mountain road.

The body control of the BMW isn't cinched as tightly as it is on the Cadillac or the Porsche, and that isn't a bad thing. There's information to be gleaned from the way the body bounds and leans: how much load individual tires are carrying and how

the road camber is changing. This is the analog feedback loop that was notably absent in the sober previous M5. That car at times felt as large and aloof as a 7-series. The new one drives more like a grown-up M3.

The front buckets are seemingly infinitely adjustable and cross-country comfortable, although they sit quite high and all those motors and bladders make the seatback extra thick, which eats into the rear-seat legroom. Rich materials and impeccable build quality abound inside, although it appears that even BMW's own designers are bored with the current long-in-the-tooth design motif. How else do you explain an infotainment system that can be controlled by waving a hand in the air? The luxury never left BMW's M5, though. Now that the playful chassis is back in balance with a more potent engine, the M5 is again the king of the hill. ■

**BMW M5 [+] Proper M-car handling, honeyed powertrain. [-] Tall seating position, ludicrous hand waving, silly fake engine note. [=] A fully alive sports sedan back from the dead.**





# WE BUILD, BUY AND HIRE AMERICAN WE'RE DOING OUR PART

## Accessories Available for

Acura · Alfa Romeo · Aston Martin · Audi · BMW · Buick · Cadillac · Chevrolet · Chrysler · Dodge · Ferrari · Fiat · Ford · Genesis · GMC  
Honda · Hummer · Hyundai · Infiniti · Isuzu · Jaguar · Jeep · Kia · Land Rover · Lexus · Lincoln · Maserati · Mazda · Mercedes-Benz  
Mercury · Mini · Mitsubishi · Nissan · Oldsmobile · Plymouth · Pontiac · Porsche · RAM · Saab · Saturn · Scion · Smart · Subaru · Suzuki  
Tesla · Toyota · Volkswagen · Volvo and more!





# WeatherTech<sup>®</sup>

American Manufacturing *Done Right*<sup>™</sup>

Order Now: 800-441-6287



American Customers  
[WeatherTech.com](http://WeatherTech.com)



Canadian Customers  
[WeatherTech.ca](http://WeatherTech.ca)



European Customers  
[WeatherTech.eu](http://WeatherTech.eu)

**FloorLiner™**

- **Accurately and completely lines the interior carpet**
- **Material provides soft touch top, rigid core strength and bottom surface friction**

*Available in Black, Tan and Grey  
(Cocoa Available for Select Applications)*

**Accessories Available for**

Acura · Alfa Romeo · Aston Martin · Audi · BMW · Buick · Cadillac · Chevrolet · Chrysler · Dodge · Ferrari · Fiat · Ford · Genesis · GMC · Honda · Hummer · Hyundai · Infiniti · Isuzu · Jaguar · Jeep · Kia · Land Rover · Lexus · Lincoln · Maserati · Mazda · Mercedes-Benz · Mercury · Mini · Mitsubishi · Nissan · Oldsmobile · Plymouth · Pontiac · Porsche · RAM · Saab · Saturn · Scion · Smart · Subaru · Suzuki · Tesla · Toyota · Volkswagen · Volvo and more!

**Order Now: 800-441-6287**



American Customers  
[WeatherTech.com](http://WeatherTech.com)



Canadian Customers  
[WeatherTech.ca](http://WeatherTech.ca)



European Customers  
[WeatherTech.eu](http://WeatherTech.eu)

## All-Weather Floor Mats

- Deeply sculpted channels designed to trap water, road salt, mud and sand
- Will not curl, crack or harden regardless of temperature

*Available in Black, Tan and Grey  
(Cocoa Available for Select Applications)*



**WeatherTech**<sup>®</sup>  
American Manufacturing Done Right<sup>™</sup>

# Cargo Liner

- Complete trunk and cargo area protection
- Digitally designed for each application
- Remains flexible under temperature extremes

Available in Black, Tan and Grey  
(Cocoa Available for Select Applications)



## Accessories Available for

Acura · Alfa Romeo · Aston Martin · Audi · BMW · Buick · Cadillac · Chevrolet · Chrysler · Dodge · Ferrari · Fiat · Ford · Genesis · GMC · Honda · Hummer · Hyundai · Infiniti · Isuzu · Jaguar · Jeep · Kia · Land Rover · Lexus · Lincoln · Maserati · Mazda · Mercedes-Benz · Mercury · Mini · Mitsubishi · Nissan · Oldsmobile · Plymouth · Pontiac · Porsche · RAM · Saab · Saturn · Scion · Smart · Subaru · Suzuki · Tesla · Toyota · Volkswagen · Volvo and more!

Order Now: 800-441-6287



American Customers  
[WeatherTech.com](http://WeatherTech.com)



Canadian Customers  
[WeatherTech.ca](http://WeatherTech.ca)



European Customers  
[WeatherTech.eu](http://WeatherTech.eu)

## No-Drill MudFlaps

- Mounts-In-Minutes™
- Installs without tire/wheel removal
- No drilling into the vehicle's fragile metal surface

*Available for trucks and SUVs*



**WeatherTech®**  
American Manufacturing Done Right™

# Side Window Deflectors

*Designed and Engineered in USA -  
Handcrafted in Germany*

- Sleek, low profile design
- Reduces wind noise and allows interior heat to escape

# AlloyCover™

- Lightweight, low-profile tri-fold pickup truck bed cover
- Features specialized latching system for extra security
- Watertight seal prevents elements from entering the truck bed

## Accessories Available for

Acura · Alfa Romeo · Aston Martin · Audi · BMW · Buick · Cadillac · Chevrolet · Chrysler · Dodge · Ferrari · Fiat · Ford · Genesis · GMC · Honda · Hummer · Hyundai · Infiniti · Isuzu · Jaguar · Jeep · Kia · Land Rover · Lexus · Lincoln · Maserati · Mazda · Mercedes-Benz · Mercury · Mini · Mitsubishi · Nissan · Oldsmobile · Plymouth · Pontiac · Porsche · RAM · Saab · Saturn · Scion · Smart · Subaru · Suzuki · Tesla · Toyota · Volkswagen · Volvo and more!

**Order Now: 800-441-6287**



American Customers  
[WeatherTech.com](http://WeatherTech.com)



Canadian Customers  
[WeatherTech.ca](http://WeatherTech.ca)



European Customers  
[WeatherTech.eu](http://WeatherTech.eu)



## CargoTech®

### Cargo Containment System

- Super grippy underside helps keep cargo in place
- Works with WeatherTech® AVM® Cargo Mat, Cargo Liner or existing vehicle carpet or flooring



## BumpStep® XL

- Extra wide design for added protection
- Defends bumper against rear end accidents, dents and scratches

*24" Hitch Mounted Bumper Protection*



**WeatherTech®**  
American Manufacturing Done Right™

# X



## 2018 Buick Regal TourX ▲



# GAMES

**Buick enters the  
off-road-ready-wagon  
competition with  
its new Regal TourX.**

**by Jeff Sabatini**

**photography by James Lipman**



# B

uick last fielded a wagon 22 years ago: the V-8–powered, rear-drive Roadmaster Estate. Such models can usually be identified by the wood-grain vinyl covering most of their 18-foot-long sides and by the octogenarian behind the wheel. When GM quit building them, the land-yacht class of station wagons went extinct—right around the same time Subaru was inventing a new, modern kind of wagon. A suspension lift and some cladding fitted to the mid-size, all-wheel-drive Legacy produced the Outback, which has since evolved to become the long-roof sales champion. No wonder, then, that Buick's comeback bid adheres to a somewhat similar plan.

Like other Buicks of late, the Regal TourX is a rebadged Opel, specifically an Insignia Country Tourer, a mid-sizer that's been encircled by many square centimeters of black plastic and given an ever-so-slightly taller ride height. And like other Opels brought here, it attempts to straddle the crevasse between commodity car and luxury car. GM's 2017 sale of Opel to the PSA Group included a provision for supplying Regals from its Rüsselsheim, Germany, factory, where U.S.-bound TourXs are fitted with a unique powertrain: GM's corporate turbo 2.0-liter four paired with an Aisin-sourced eight-speed automatic. Otherwise, the biggest point of difference for the American model is the oversized tri-shield emblem in its grille.

As a lesson in globalization, the TourX couldn't be more perfect. It does have that red, white, and blue badge and an American-built engine (one that can trace its genesis back more than two decades to a collaboration between Britain's Lotus, Germany's Opel, Sweden's Saab, and, of course, the sometime owner of all the above, GM itself), but the TourX uses a Japanese transmission and is assembled in Germany by a subsidiary of a French company. Is this an automobile we're describing or the opening ceremony of the Olympics?

Looking at the TourX is nearly such a spectacle. GM's designers deserve kudos for penning this anti-crossover; even the overabundance of cladding can't make this Euro-style wagon seem like anything but a car, and a handsome one at that. A single strip of brightwork extends from the A-pillar across the top of the windows and down along the edge of the D-pillar into the tail-

lights, accentuating the long and low look. A deeply drawn character line through the lower doors breaks up the body side and lends a welcome dash of sportiness. Not everything is as it seems, however, as the dual exhaust outlets integrated into the rear bumper are fakes; the actual tailpipes are hidden underneath the car.

The TourX's spec sheet is almost as attractive as its sheetmetal. Standard are 250 horsepower and 295 pound-feet of torque, struts up front and a five-link rear suspension, and an all-wheel-drive system that can vary left-right torque distribution across the rear axle. And the TourX swallows 74 cubic feet of gear with its rear seats folded flat, which is more than Mercedes' E-class wagon can fit. All this comes at a starting price of just \$29,995.

Our test car, a top-of-the-line TourX in Essence trim, was not nearly so inexpensive, though. Its base price is \$35,995, and it is the only way to get leather seats, adaptive cruise control, or advanced safety features such as automatic emergency braking. Even adding Apple CarPlay and Android Auto capability means spending at least \$33,595 for the mid-grade, cloth-upholstered Preferred trim, plus an extra \$1870 to upgrade the touchscreen from seven inches to eight. A fully loaded TourX will top \$42,000.

This still undercuts the starting price of clad-and-lifted would-be wagon competitors, such as Audi's A4 Allroad and Volvo's V60 Cross Country. But those aren't really the Buick's bogeys, and GM knows it. That's why pricing on the TourX lines up neatly with six-cylinder Outback models. Both the Audi and the Volvo shame the Buick's interior, where GM uses materials more on par with Subaru's. Buick can hold its own on the pointy end of mainstream, but it's still not ready to play in the premium part of the spectrum.

That said, there are some thoughtful features inside the TourX, such as switches in the cargo area to automatically fold down the rear seats and tie-downs

For \$30K, the TourX's interior is of decent quality. But some of its cost cutting is harder to justify on a \$40K example like our Essence-trim test car.



GM's designers  
deserve kudos  
for penning  
this anti-cross-  
over; even the  
overabundance  
of cladding  
can't make this  
Euro-style  
wagon seem  
like anything  
but a car.





that slide on a track built into the load floor. Controls for the infotainment and climate systems offer good ergonomics, and the center console is well designed. Save for the middle rear, the seats are comfortable, and Buick's reputation for producing quiet cars survives intact.

Close inspection reveals evidence of cost cutting, from hard plastics on the dashboard to cheap-looking carpet in the load area. Leather that could pass for vinyl covers the seats in between. The analog gauges and infotainment graphics are far from state of the art. It all serves to reinforce the Subaru as a more realistic competitor to the Buick than an Audi or a Volvo.

Taking on a segment leader, especially one with as loyal a following as the Subaru enjoys, is like dropping in on a triple-black-diamond run right after your first snowboarding lesson. Evidence that Buick might need to head back to the lodge's rental counter

The TourX is plenty practical, with more maximum cargo room than its competitors. And only the Subaru Outback beats it for seats-up cargo space.



for an equipment refitting comes in a comparison of ground clearance: The Subaru boasts 8.7 inches, three more than the Buick. Much of the TourX's "lift" is accomplished by fitting taller tires, size 235/50R-18 Continentals rather than the 245/45R-18s that some other Regals sport. Even its marginally longer springs don't improve the TourX's ground clearance over a bone-stock Toyota Camry—both cars sit 5.7 inches off the ground. A brief trip down a U.S. Forest Service two-track had the TourX bouncing into its bump stops, its suspension making groaning noises sufficient to keep us from attempting more serious backcountry forays.

This might matter less if the TourX had a decidedly sportier mien. Our test car weighed just 3747 pounds, but its lightness was betrayed by what we can only deduce is a lack of body stiffness, manifested in vibrations felt through the steering wheel and the seat. That would also explain its chassis tuning, with springs and dampers as soft as fresh powder. Driving the TourX hard on mountain roads proved to be an exercise in delayed gratification: Turn-in is slow, as the suspension needs to compress before the

## 2018 BUICK REGAL TOURX ESSENCE

**PRICE AS TESTED** ..... **\$39,810**  
**BASE** ..... \$35,995

**VEHICLE TYPE:** front-engine, all-wheel-drive, 5-passenger, 4-door hatchback  
**OPTIONS:** Driver Confidence Package I, \$1725; Sights and Sounds package, \$1095; White Frost Tricoat paint, \$995  
**AUDIO SYSTEM:** satellite radio, USB and Bluetooth-audio inputs, Android Auto and Apple CarPlay interfaces, 8 speakers

**ENGINE**  
 turbocharged and intercooled inline-4, aluminum block and head  
**BORE X STROKE** ..... 3.39 x 3.39 in, 86.0 x 86.0 mm  
**DISPLACEMENT** ..... 122 cu in, 1998 cc  
**COMPRESSION RATIO** ..... 9.5:1  
**FUEL DELIVERY SYSTEM:** direct injection  
**TURBOCHARGER** ..... Mitsubishi TD04L6-04H  
**MAXIMUM BOOST PRESSURE** ..... 18.9 psi  
**VALVE GEAR:** double overhead cams, 4 valves per cylinder, variable intake- and exhaust-valve timing  
**REDLINE/FUEL CUTOFF** ..... 6500/6750 rpm  
**POWER** ..... 250 hp @ 5500 rpm  
**TORQUE** ..... 295 lb-ft @ 3000 rpm

**DRIVETRAIN**  
**TRANSMISSION:** 8-speed automatic with manual shifting mode  
**FINAL-DRIVE RATIO** ..... 3.08:1

**ALL-WHEEL-DRIVE SYSTEM:** full-time with a torque-vectoring rear differential

GEAR	RATIO	MPH PER 1000 RPM	MAX SPEED IN GEAR (rpm)
1	5.25	4.9	33 mph (6750)
2	3.03	8.4	57 mph (6750)
3	1.95	13.0	85 mph (6500)
4	1.46	17.4	113 mph (6500)
5	1.22	20.9	136 mph (6500)
6	1.00	25.5	155 mph (6050)
7	0.81	32.3	155 mph (4650)
8	0.67	38.7	145 mph (3750)

**CHASSIS**  
 unit construction with rubber-isolated front and rear subframes  
**BODY MATERIAL:** steel and aluminum stampings

**STEERING**  
 rack-and-pinion with variable electric power assist  
**RATIO** ..... 15.6:1  
**TURNS LOCK-TO-LOCK** ..... 2.7  
**TURNING CIRCLE CURB-TO-CURB** ..... 40.0 ft

**SUSPENSION**  
**F:** ind, strut located by a lower control arm, coil springs, anti-roll bar  
**R:** ind; 2 diagonal links, 2 lateral links, and a toe-control link per side; coil springs; anti-roll bar

**BRAKES**  
**F:** 12.6- x 1.1-in vented disc, 1-piston sliding caliper  
**R:** 11.3- x 0.5-in disc, 1-piston sliding caliper  
**STABILITY CONTROL** ..... partially defeatable, traction off

**WHEELS AND TIRES**  
**WHEEL SIZE** ..... 8.0 x 18 in

**WHEEL CONSTRUCTION** ..... cast aluminum  
**TIRES:** Continental ProContact TX 235/50R-18 97V M+S

**EXTERIOR DIMENSIONS**  
**WHEELBASE** ..... 111.4 in  
**LENGTH** ..... 196.3 in  
**WIDTH** ..... 73.3 in  
**HEIGHT** ..... 58.4 in  
**FRONT TRACK** ..... 62.8 in  
**REAR TRACK** ..... 63.0 in  
**GROUND CLEARANCE** ..... 5.7 in

**INTERIOR DIMENSIONS**  
**PASSENGER VOLUME** ..... F: 54 cu ft R: 47 cu ft  
**CARGO VOLUME BEHIND** ..... F: 74 cu ft R: 33 cu ft

## CAR AND DRIVER TEST RESULTS

ACCELERATION	SECONDS
ZERO TO	
20 MPH	2.2
40 MPH	3.4
50 MPH	4.6
60 MPH	6.4
70 MPH	8.2
80 MPH	10.5
90 MPH	13.2
100 MPH	16.2
110 MPH	20.0
120 MPH	25.1
ROLLING START, 5-60 MPH	7.3
TOP GEAR, 30-50 MPH	3.4
TOP GEAR, 50-70 MPH	4.3

steering builds weight from its vague on-center position. You can just start to feel the Buick's trick twin-clutch rear axle work its torque-vectoring magic before those all-season tires begin howling, warning you to back off lest you reach the low limit of grip—a mere 0.80 g. That beats the Outback, which pulls 0.78 g despite being 7.7 inches taller and packing an extra 117 pounds of weight.

The Buick's braking performance is better, stopping from 70 mph in 175 feet, seven shorter than the Subaru. And the TourX has a clearer advantage under its hood, where GM's inline-four inhales 18.9 psi of turbo boost. That leaves it only six horses shy of Subaru's 3.6-liter flat-six. A 48-pound-foot surfeit of torque allows the TourX to charge to 60 mph in 6.4 seconds, a half second faster than the Outback, hobbled as it is by its CVT.

But the TourX has its own gearbox woes. The eight-speed automatic upshifts as early as it can, often lugging the engine below 2000 rpm in seventh or eighth gear, as if following the commands of some phantom eco mode. But the TourX has no such setting—nor any sport mode, although it surely could use one. At most cruising speeds, the TourX feels as if it has half its horsepower, with anything less than mashing the accelerator producing only a lethargic climb in revs. When the transmission does eventually downshift, it rarely snaps cleanly into the appropriate

**[+] Nice lines, huge cargo hold, low starting price. [-] Recalcitrant transmission, commodity-car interior, neither sporty nor rugged. [=] Even an average wagon is better than another crossover.**

second or third gear without first landing at some intermediate step along the way. The solution is to shift it yourself, which means prodding the gearshift lever fore and aft, as the TourX lacks paddle shifters. Even then, shifts are sedately delivered, leaving the driver plenty of time to ponder why this transmission is in this car. The answer: Buick reps have said that the Aisin eight-speed is just a stopgap measure until it can start using GM's nine-speed unit, perhaps as early as next year. Hope springs eternal.

This could well prove to be a missed opportunity for Buick, which only gets to launch the TourX—with all the accompanying budget and attention—once. Because for all the market success of the Outback, it is not that impressive as a mechanical package. While we welcome any new wagon, this one should have been more of a contender, especially given its good looks and roomy practicality. It seemed perfectly positioned to seduce some Outback intenders looking for more fun and polish, as well as some Allroad/Cross Country shoppers looking to spend less. As it stands, the TourX deserves only a finisher's medal. ■



**1/4-MILE** ..... **14.8 sec @ 95 mph**  
**TOP SPEED** ..... 155 mph (gov ltd, mfr's claim)

**HANDLING**

**ROADHOLDING, 300-FT-DIA SKIDPAD** ..... **0.80 g**  
**UNDERSTEER** ..... moderate

**BRAKING, 70-TO-ZERO MPH**

**SHORTEST STOP** ..... 175 ft  
**LONGEST STOP** ..... 176 ft  
**FADE RATING** ..... none

**WEIGHT**

**CURB** ..... **3747 lb**  
**PER HORSEPOWER** ..... 15.0 lb  
**DISTRIBUTION** ..... **F: 58.2% R: 41.8%**  
**TOWING CAPACITY** ..... 1000 lb

**FUEL**

**CAPACITY** ..... 16.3 gal  
**OCTANE** ..... 93 (recommended)  
**EPA COMBINED/CITY/HWY** ..... 24/21/29 mpg  
**C/D OBSERVED** ..... 22 mpg

**INTERIOR SOUND LEVEL**

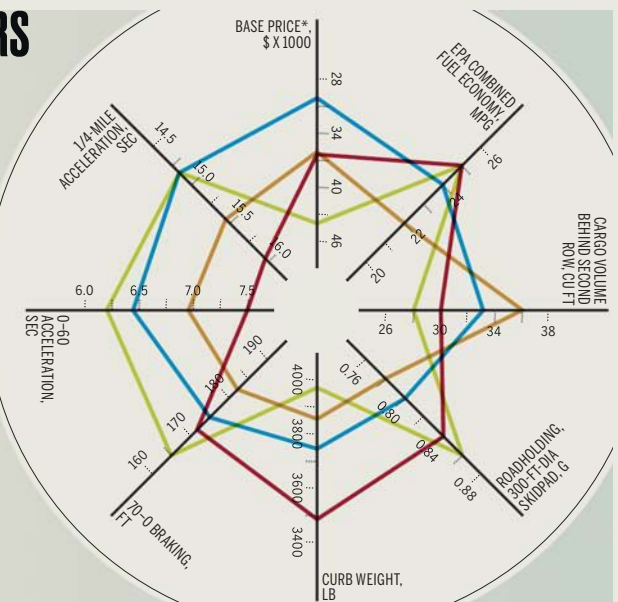
**IDLE** ..... 40 dBA  
**FULL THROTTLE** ..... 69 dBA  
**70-MPH CRUISING** ..... 65 dBA

**COMPETITORS**

The TourX offers an unusually balanced mix of attributes; most of its competitors are not as well rounded.

- **BUICK REGAL TOURX**  
250-HP 2.0-L I-4, 8-SP AUTO
- **SUBARU OUTBACK 3.6R**  
256-HP 3.6-L FLAT-6, CVT
- **VOLKSWAGEN GOLF ALLTRACK**  
170-HP 1.8-L I-4, 6-SP AUTO
- **VOLVO V60 CROSS COUNTRY T5 AWD**  
240-HP 2.0-L I-4, 8-SP AUTO

\*Includes performance-enhancing options.







# A SHORTAGE OF QUALIFIED TECHNICIANS HAS LEFT SERVICE DEPARTMENTS SCRAMBLING TO FIND NEW TALENT.

—  
by Benjamin Preston  
photography by Daniel Byrne

**Even the most high-tech automobile is, at its core, a machine.** And machines break sooner or later, sending most owners into a dealership or independent garage for service. But lately, and no pun intended, there's a wrench in the works: a shortage of qualified mechanics. This comes just as the proliferation of electronic controls for the engine, suspension, steering, brakes, and nearly everything else has made already complicated motor vehicles even more so.

The United States Bureau of Labor Statistics says an average of 76,000 mechanics are needed each year between 2016 and 2026, both to replace those retiring or leaving the industry and to fill some 46,000 projected new openings. Employment in the field dropped by 10 percent during the Great Recession, bottoming out at 587,510 jobs in 2010. It has only recently come close to its 2007 level, with 647,380 mechanics employed in 2016, according to the BLS. Today, Americans are driving a larger vehicle fleet more miles than ever as mechanical and electronic complexity have outpaced improved vehicle reliability. The result is a labor shortage that has increased workloads among existing automotive technicians and is leading to more hassles for customers.

The challenges facing the industry are numerous. Although pay can be competitive after a few years of turning wrenches and reading diagnostic scanners, the job requires a deep commitment to learning the necessary mechanical and digital skills. The tools of the trade are expensive. Plus, enticing today's tech-oriented youth into a profession that requires getting their hands dirty can be difficult.

"We're working around a bit of a culture shift from years ago," says Gary Uyematsu, national technical training manager at BMW of North America. "It used to be that people would work in a lawn-mower-repair or tire shop, but there's not so much of that anymore. Years ago, if you

worked at a gas station, you changed oil and worked with cars. Now, you sell candy and chips.”

BMW’s New Jersey training center is reflective of the changes in the industry. Housed in a sprawling complex in the forested suburbs north of New York City, its long, high-ceilinged gallery is flanked by several pristine classrooms, each with a small seating area at the back of a large service bay. At one end sits a spotless, state-of-the-art paint and body shop, its walls a brilliant white. Instructors work with anywhere from six to 12 students in almost lab-clean classrooms, and they’re generally more focused on computer equipment than greasy mechanical parts.

Stakes are high for BMW and other carmakers, as service departments are big moneymakers for dealerships. According to a recent report from the National Automobile Dealers Association, service and parts brought in about \$110 billion in 2016—nearly 12 percent of dealers’ total revenue. A dearth of qualified technicians imperils dealerships’ satisfaction ratings and revenues, as customers often have difficulty securing appointments and need to endure longer wait times, according to BMW.

To address the tech shortage, schools, manufacturers, and the National Institute for Automotive Service Excellence—an organization responsible for certifying technicians in vehicle diagnosis and repair skills and for accrediting automotive-education programs—have developed partnerships to encourage and help potential technicians to join the industry. The Lincoln Technical Institute—a national vocational school offering programs in automotive technology, HVAC repair, applied health sciences, and other hands-on disciplines—has linked up with Audi, BMW, and Fiat Chrysler. Robert Paganini, president of LTI’s Mahwah, New Jersey, campus, says that the majority of students who participated in its prestigious Audi apprenticeship, which adds an extra two months onto a 13-month program, found jobs within the VW Group after graduation. But participation in a manufacturer-specific program isn’t required for job placement.

“I have more automotive job orders than I can fill,” says Nella Santangelo, director of career services at LTI Mahwah. “There’s a major shortage of technicians, so I don’t have to fight too much for salaries. Opportunities are better now than 25 years ago.”

She admits, however, that salaries tend to start on the low side, about \$10 to \$15 per hour, but can get up to \$30 or \$40 per hour.

According to the BLS, median annual auto-tech pay was \$38,470 in 2016, but how much a tech makes depends on the individual, with top-tier salaries cresting \$64,000 per year. Not bad considering the U.S. Census Bureau puts median household income at \$59,039.

Peter Tahinos, senior vice president of marketing at LTI Mahwah, says that after working for five to 10 years, talented techs could even make six figures. It all depends on the dealership or shop, its location, as well as the sort of vehicles it services: Higher-end cars typically mean better pay for technicians.

Paul LeBlanc, who with his father and brother owns Paul’s Auto Repair, an independent shop in East Hartford, Connecticut, says the pay structure has a lot to do with how techs make money—or don’t. Warranty work, which is prevalent at dealerships, earns a lower hourly rate, and techs are often pushed to finish it quickly. Although LeBlanc has trouble finding

qualified techs for his own shop, his workers are subject to a pay scheme that he says works well for them and encourages studied diagnosis and careful repairs. “The dealerships want those jobs in and out the door as fast as possible,” he says. “You should see some of the stuff I get that’s been serviced at dealerships.”

Educators at LTI and BMW are also trying to get students to look at the automotive-technician field more broadly—as a launchpad to better-paying opportunities down the road. Santangelo gives an example of one LTI student who went to work at the Mercedes-Benz dealership in Manhattan, eventually transferring to a service sales position that paid six figures. “Then again,” says Ken Ramsey, one of BMW’s instructors in New Jersey, “a lot of people get into this because they don’t like sitting at a desk. A lot of guys are shop forever.”

**“There may not be a specific job** or industry that is pulling would-be techs away from the auto industry,” Tahinos says, “but there is so much emphasis by parents and educators pushing kids toward going the traditional college route that many young people are unaware of the opportunities and the career paths available to them in the auto industry or any of the other skilled trades. Many are also unaware of the high-tech nature of today’s vehicles and the fact that being a technician today involves a lot less grease and grime and a lot more computerization and electronics.”

Auto repair, done well, has always been a thinking person’s vocation. Working through problems requires logic and inference and, now more than ever, the ability to troubleshoot difficult-to-diagnose digital malfunctions. Jeremy Stephens, an assistant professor at the Southcentral Kentucky Community & Technical College in Bowling Green, says roughly 80 percent of repairs today are electrical, having to do with sensors and emissions-control systems. But the job still has a tough physical element that turns some people off.

“To be honest, I want to do something else,” says Juan Novo. Now in his late 20s, Novo had only toyed around with a project car and attended trade school before going to work at a dealership in Orlando, Florida. He then enrolled in classes at BMW’s training center. “I don’t want to get my hands dirty; I’m too cute for this,” he says. “But I’m already committed.”

“I love working on cars, but it’s a hard life,” says Ricardo Davila, a tech from a Mini dealership in Rockland, Massachusetts, who also recently participated in classes at the BMW training center. Davila had 20 years of experience at an independent shop before going to work for a Mini store, but he was still a lower-level tech within the hierarchy. “If you’re smart enough to do this, it’s better to do something else,” he says. “It’s not easy, and you have to spend a lot of money on tools.”

At BMW’s training center, a classroom of students looks pretty much like a classroom at any university but with a higher percentage of blue shirts.





# “WE’RE NOT MECHANICS; WE’RE AUTOMOTIVE TECHNICIANS,” SAYS LEBLANC, THE INDEPENDENT SHOP OWNER. “YOU PRACTICALLY NEED TO BE AN I.T. GUY TO WORK ON NEW CARS.”

Indeed, mechanics are usually required to buy their own tools. Go to any automotive repair shop and you’re likely to see a Snap-on truck outside the service bay at least once a week, selling to and settling accounts with technicians. Costs can run well into five figures, although usually stretched over a period of years. LTI has a deal with Matco Tools to give students discounts on a basic starter set, but most new techs can expect to pay a few thousand dollars before they even turn their first wrench professionally.

Students in BMW’s entry-level classes learn basic skills, such as how to read torque wrenches and vernier calipers and how to operate modern wheel-balancing machines, while the upper-level students dig into the more sophisticated computer-diagnostic arena. Acquiring new competency and ASE certifications is an important part of an auto tech’s career development, particularly as cars become more software-driven. Manufacturers such as BMW offer continuing education as a benefit of employment, but some employers require techs to pay for it themselves.

“In the old days, you might flip open a repair manual and look at the wiring diagram—you could fold the whole thing out on four pages,” says Ken VomSaal, a tech at a Maryland BMW dealership, as he works through a stop-start-switch problem on a BMW 7-series set up in one of the classrooms.

Now, wiring diagrams are too large to print on foldouts; they’re all on the diagnostic computer. “Reading wiring diagrams now is like learning another language,” he says.

**Tech-school instructors** and career counselors tend to blame flagging interest in automotive careers on three main factors: first, the job’s age-old grease-monkey stigma; second, high-school counselors pushing four-year university degrees as the ultimate goal for most students; third, millennials’ resistance to the older generation’s efforts to teach them about cars.

“Hollywood hasn’t done us any favors in terms of how people view [us],” BMW’s Uyematsu says. “The auto technician is often depicted as someone who’s not the most highly educated.”

But today’s vehicles contain dozens of interconnected computers, so it’s nearly impossible to repair a vehicle without hooking it up to expensive diagnostic equipment or at the very least a laptop computer. A technician still needs to know how to strip down and reassemble mechanical components without damaging bolt threads, warping flat surfaces, or cracking soft metal, but also how to operate and interpret these many-layered computer applications. This is what has transformed the profession into a highly technical one in which digital skills can translate into successful problem solving. It’s also made cars less accessible to do-it-yourselfers, making the need for skilled technicians all the more acute.

“We’re not mechanics; we’re automotive technicians,” says LeBlanc, the independent shop owner. “You practically need to be an I.T. guy to work on new cars. It’s gotten to the point where it’s more computer-focused than mechanical.”



Tech-program staff see school counselors as a stumbling block to getting more students interested in automotive careers. Terri Tchorzynski, a counselor at the Calhoun Area Career Center in Battle Creek, Michigan, says some advisors just aren’t aware of the opportunities in the automotive service field. Nascent collaborations among schools, manufacturers, and the ASE should help, but it’ll take time.

High-school counselors, for their part, seem to be changing their tune. Tchorzynski says that many in recent years have shifted away from universally pushing four-year-university education. “When I graduated in 1997, the mentality was that to get a good job, you needed a degree,” she says. “But students who do on-the-job training with specific

companies can end up making more than students who spend four years at a university.”

Attracting millennials is proving to be its own challenge. Educators say this first generation to be immersed in digital technology and culture from childhood has a lack of interest in cars and mechanical things, even though they would be likely to excel at the increasingly computerized aspects of the trade.

Santangelo says LTI addresses the problem by emphasizing soft skills—written and verbal communication, critical thinking, personal responsibility and presentation, punctuality—as well as the mechanical skills many in this generation are missing, having never tinkered with their own cars.

But what if the automotive technician’s trade doesn’t catch on with millennials? The myriad diagnostic menus that the advanced students at BMW’s training center have to scroll through to troubleshoot their classroom 7-series inspire an interesting question: Why couldn’t a robot mechanic plug a connector into a port on the side of the car, then prompt a wrench-wielding human to do the dirty work?

“As far as repair shops go, we will still need people to fix brakes and suspensions and do body work,” says Bruce Belzowski, managing director of the Automotive Futures group at the University of Michigan Transportation Research Institute, “but there will probably be fewer people involved in diagnosis. Those who are will need a higher level of computer training.”

Trish Serratore, senior vice president of the ASE, echoes the continuing need for individuals who have strong technical and diagnostic skills. “You can always get dirt, salt, and crossed wires that will give the computer a bad reading,” she says. “Then you’ll need a human to step in.”

For now, though, the industry’s immediate need is for more technicians. To get them, manufacturers and educators are just trying to get the word out to people who like cars and technology.

“I think it’s important for people to know that fixing cars is not your father’s mechanic job anymore—it’s very technical and requires an ability to work with your hands and use your brain,” Serratore says. “We need to let our young people know that this is still a viable career option for them.” ■

# TIRE RACK® .com

## GET YOUR TIRES RIGHT.

Find. Deliver. Install. *Smarter.*®



### Try Our New **TIRE DECISION GUIDE**

**Not sure what tires are right for you?**

Our new and improved Tire Decision Guide eliminates any guesswork on your part. Answer a few easy questions and you'll get our top recommendations based on your preferences, our consumer survey results, our test results and more!



[www.tirerack.com/tdg](http://www.tirerack.com/tdg)

### Ship to a **RECOMMENDED INSTALLER**

If you'd like, we can ship your order to your choice of one of our 7,500+ Independent Recommended Installers.

[www.tirerack.com/installer](http://www.tirerack.com/installer)



# OVER 500 TIRE MODELS FROM 22 MANUFACTURERS



## TIRE REBATES AND SPECIAL OFFERS

Below are a few of the special offers available this month. See them all at [www.tirerack.com/specials](http://www.tirerack.com/specials)  
To find out about special offers in the future, sign up for our emails at [www.tirerack.com/email](http://www.tirerack.com/email)

## BOLT-ON CONVENIENCE

Our Tire & Wheel Packages include:

- Free scratchless mounting and Hunter™ Road Force balancing
- All necessary hardware

[www.tirerack.com/packages](http://www.tirerack.com/packages)





FLOW ONE

NEW

ASANTI

FLOW ONE Race Spec **F1**  
18 19 20

FLOW ONE Race Spec **F2**  
18 19 20

FLOW ONE Race Spec **F2**  
18 19 20

FLOW ONE Race Spec **F3**  
18 19 20

ASANTI Black Label **ABL-16**  
20 22 24



SAVINI  
BLACK DI FORZA

NEW

ASANTI

Savini Black di Forza **BM11**  
19 20 22

Savini Black di Forza **BM12**  
19 20 22

Savini Black di Forza **BM14**  
19 20 21 22

Savini Black di Forza **BM15**  
19 20 22

ASANTI Black Label **ABL-19**  
20 22



Advanti

ENKEI  
PERFORMANCE SERIES

Advanti **DST HY Hybris**  
19 20

Advanti **DST Storm S1**  
15 16

Advanti **DST Storm S1**  
15 16

Enkei Perf. **Vulcan**  
17 18

Enkei Perf. **Y55**  
16

Enkei Perf. **Phantom**  
18 19 20

Enkei Perf. **SS05**  
17 18 20

## See Them on Your Vehicle!



Enter your vehicle at [tirerack.com](http://tirerack.com) to experience one-click access to everything that fits it.

### What About TPMS?

We can assist you in selecting wheels that are compatible with your vehicle's sensors. We also offer an extra set of sensors for all TPMS systems, so your tire and wheel package can arrive with sensors already installed.



ENKEI  
RACING SERIES

ENKEI  
TUNING SERIES

Enkei Racing **RPF1**  
15 16 17 18

Enkei Racing **RPF1**  
15 16 17 18

Enkei Tuning **TFR**  
17 18 19

Enkei Tuning **TS-10**  
17 18

Enkei Tuning **TY-5**  
18 19



ENKEI  
PERFORMANCE SERIES

GRID

Enkei Perf. **Commander**  
17 18 20

Granite Alloy® **GA640**  
16 17 18 20

Granite Alloy® **GA643**  
16 17 18

GRID **GD07**  
17 18 20

GRID **GD08**  
18 20



NEW

NEW

NEW

NEW

NEW

NEW

KMC **XD135 Grenade OR**  
17 18 20

KMC **XD838 Mammoth**  
20 22 24

KMC **XD839 Clamp**  
20 22

Helo **HE904**  
17 18 20

Helo **HE909**  
17 18 20

Method **MR606 Mesh**  
20

Method **MR610 Con6**  
20

BRAKES

dbaUSA

brembo

HAWK

Centric

STOPOTECH  
HIGH PERFORMANCE BRAKE SYSTEMS®

AKBONO

GOODRIDGE



**RALLY RACING**  
17 18 19



**HYPER GT HLT** 18 19

**HYPER XT HLT** 22

**NEW**



## A HUGE SELECTION OF OVER 1,500 DIFFERENT WHEELS



**O.Z.** OZ Ultraleggera HLT 19 20    OZ Formula HLT 17 18 19    **Bremmer** kraft Bremmer Kraft BR09 18    Bremmer Kraft BR16 17 18 19    **ASA** ASA ARI 16 17 18    **NEW** ASA GT14 17 18 19    **NEW** ASA GT14 17 18 19



**Sparco** Sparco Assetto Gara 14 15 16 17 18    Sparco Assetto Gara 16 17 18    Sparco Terra 15 16 17    Sparco Trofeo 5 17 18    **NEW** Sparco Podio 17 18    **NEW** Sparco Podio 17 18    **NEW** Sparco Podio 17 18



**TITANO** Monte TI. MT9 Cibriano 17 18    **MOTEGI** MOTEGI MR136 17 18    MOTEGI MR139 15 16 17    **PLATINUM** Platinum Genesis 16 17 18    **NEW** Platinum Gyro 16 17 18

**McGard**  
**Locking Wheel Nuts/Bolts**  
Function like regular lug nuts/bolts, but require a special key tool (included) for installation and removal.  
**Starting at \$16<sup>95</sup> Call to order.**



**MAMBA** MAMBA M24 18 20    **ULTRA** Ultra Menace 15 16 17 18 20    Ultra Phantasm 17 18 20    **NEW** Ultra Nemesis 17 18 20    **ULTRA** Ultra Xtreme X110 17 18 20    **NEW** WER 501 Legend II 15 16 17    **WORX** WORX 813 Destroyer 18 20



**Long-Term Test:** When the tires get worn and the factory warranty runs out, that's where we come in. *Car and Driver* is your source for the 40,000-mile evaluation.

# 2017 CHRYSLER PACIFICA

**Arrival: Jan/2017**  
**Departure: Dec/2017**

Animal house. *by* Dave VanderWerp

**H**ere's what happens when the fob to a new minivan gets tossed into the key party that is the *Car and Driver* fleet: 28 staffers take turns packing in their slobbering pets, gooey-fingered kids, and various friends and neighbors for a flurry of schlepping and errand running. Just the thought of all the spills, spittle, crumbs, and dander is enough to have us reach reflexively for a disinfecting wipe. As we have learned, the minivan is the vehicle type most likely among the long-term fleet to smell like sweaty feet.

With a new name, comprehensive interior and exterior upgrades, and a host of added features, the new-for-2017 Pacifica is a boon for the sliding-door shuttle at a time when it's up against a tide of swelling crossover demand. This is Chrysler's sixth generation of the superlative kid hauler, which has never been quicker, better-looking, or more fuel efficient, and we promptly awarded it Best Van on our

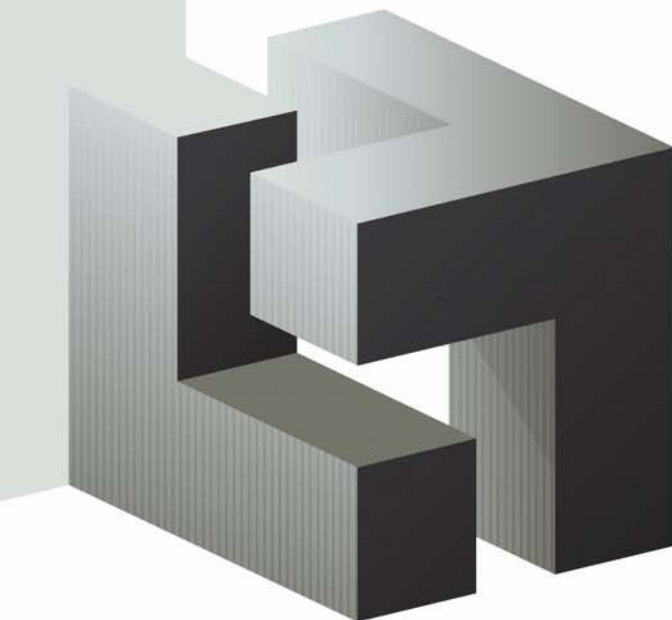
**Rants & Raves**  
"I'd rather drive this than pretty much any three-row crossover."  
—Joseph Capparella

"My passenger kept trying to turn the shift knob rather than the volume knob, which is located just beside it."  
—Erik Johnson

10Best Trucks and SUVs list. Impressively, the new van managed to shed some weight in its redesign while getting substantially stiffer and acing NHTSA and IIHS crash tests. Other than the new plug-in-hybrid variant, there's just one Pacifica powertrain: a 287-hp 3.6-liter V-6 coupled to a nine-speed ZF automatic. Although the V-6 propels the Pacifica to a low-seven-second zero-to-60-mph time and emits a pleasant snarl when being whaled on, there's occasionally an untoward grittiness that comes through at modest engine speed.

We opted for the \$38,890 Touring-L Plus trim, one short of the top Limited model and the cheapest way to get the new dual-touchscreen Uconnect Theater rear-seat entertainment system. To that we added \$4875 in options: 18-inch wheels, a trailer hitch, navigation, and the \$1995 bundle of driver-assist features (it's \$1000 cheaper for 2018) that includes the well-sorted adaptive-cruise-control system that works all the way down to a stop, a 360-degree surround-view camera, and automatic wipers and high-beams. We grumbled as we ticked the box for the \$295 inflatable mini spare, as we have a philosophical issue with carmakers charging for a spare on a family hauler, particularly one not wearing run-flat tires. Our slight modesty meant going without the Limited trim's niceties, such as a panoramic sunroof, a power-folding third row, kick-under-to-open sliding doors, and the built-in vacuum (which—aargh—eliminates the spare-tire option). But really the only feature we missed was the high-intensity-discharge headlamps, as there were numerous complaints among the staff regarding inadequate illumination on rural roads. In IIHS's testing, these halogen units scored "poor," the lowest of its four ratings.

Since the 2005 model year, the Stow 'n Go fold-into-the-floor second-row bucket seats have been the Chrysler minivan's exclusive and headlining feature. In this latest evolution, the seats are far more comfortable than before, and they kneel





**"IT'S CAPABLE OF SEDATING OTHERWISE RESTLESS CHILDREN FOR HOURS ON END. IT'S IN THIS ARENA, AND IN CARGO- AND PASSENGER-SPACE UTILITY, THAT THE PACIFICA SHINES MOST."**

—JOSH JACQUOT, REVIEWS EDITOR



forward to grant access to the third row in a manner that allows a child seat to remain secured in place. Plus, there's a button on the B-pillar that powers each front seat out of the way for even easier stowing and going. When the underfloor bins aren't holding the seats, they provide large additional stash spaces. All that said, these flexible buckets are still notably flatter and firmer than the nonstowable second-row seats in competing vans, and they don't have any fore-and-aft or side-to-side adjustability.

The pack-everything space, configurable seven-passenger seating, hushed and luxurious interior, straight highway tracking, and commanding view ahead—its downward visibility is more than 10 percent better than the Honda Odyssey's by our measurements—make the Pacifica an excellent accumulator of miles. And sure enough, we road-tripped south to Georgia and Florida, west to Wisconsin and Iowa, and even farther west to Nebraska, Wyoming, and Idaho. At its best, our Velvet Red Pearl van covered as many as 500 miles per tank and averaged as high as 29 mpg, even when pushing 80 mph. On our 200-mile highway test loop, which we run at a steady 75 mph, the Chrysler achieved 31 mpg, beating the Toyota and Honda minivans and even topping the 25 MPGe of its plug-in-hybrid sibling.

On the open road, the Pacifica got regular accolades for its rear-seat entertainment; its eight built-in games (including word and math games, the license-plate game, checkers, and solitaire) proved universally mesmerizing to our children, which is saying something in an era where new humans are issued their own sophisticated electronic devices closer and



With its three touchscreens, sensible menu structures, and clear graphics, Chrysler's infotainment game is strong. Also, kid-engaging games. Yay!

closer to a successful exit from the birth canal. And the Pacifica's dual 10.1-inch screens—each given its own designated USB and HDMI ports—are superior to the single-screen setups found in the Honda Odyssey and the Toyota Sienna.

In all, there are six USB ports in the Pacifica, twice that of what the top Odyssey offers. Of course, we had some beefs, too: Why does it require a four-step process to get the DVD audio to play over the vehicle's speakers? And the 3G Wi-Fi was insufficient to accommodate streaming video (Chrysler has added 4G for 2018).

Until we got an electronic nudge from it one morning, we didn't realize that the Uconnect infotainment system was capable of over-the-air updates. Twenty minutes later, the download was complete, although we can't say we noticed any substantial changes. We wish the lack of Android Auto and Apple CarPlay compatibility—a gripe we had with the otherwise excellent system—could be as easily remedied on 2017 models like ours.

On our mountainous, out-west haul, we logged our biggest complaint: the

#### Rants & Raves

"There are clever, useful touches everywhere, from the gloss and grain on the interior surfaces to the crisp gauge cluster and the huge pop-out bin in the center stack."  
—Rich Ceppos

"It's essentially a rolling living room and much better equipped than my own living room, which has no TV and only two power outlets."  
—Annie White

"A rock-star road-tripper."  
—Rusty Blackwell

"There's no sign that this van is poorly constructed. Just the opposite, in fact."  
—Josh Jacquot

## Service Timeline: Stand by your van.

Key: ● - Repairs ● - Damage ● - Maintenance  
● - Normal Wear ● - Oil Additions

**January 12, 2017**  
192 miles: Chrysler Pacifica Touring-L Plus begins its long-term test.

**April 8, 2017**  
● 9909 miles: Dealer performs oil change, tire rotation, and inspections, \$86

**June 19, 2017**  
● 19,656 miles: Dealer inspects but doesn't resolve remote-start HVAC issue; also changes the oil, rotates the tires, inspects the van, and places an order for the cabin air filter that is out of stock, \$167

**July 11, 2017**  
● 24,456 miles: A tire puncture requires a patch at the local tire shop, \$20

**July 18, 2017**  
● 25,677 miles: Dealer installs back-ordered cabin air filter from previous service visit, \$0

**August 23, 2017**  
● 29,410 miles: Dealer performs oil change and inspections; cost includes engine-air-filter replacement, which is overlooked and completed at a later date, \$128

**August 24, 2017**  
● 29,434 miles: Dealer completes the tire rotation that was missed at previous service visit, \$23

**September 8, 2017**  
● 30,776 miles: Uconnect system downloads an over-the-air update.

**November 13, 2017**  
35,348 miles: Bridgestone Blizzak DM-V2 winter tires (\$702) are fitted.

**December 18, 2017**  
● 38,770 miles: Per a recall, the powertrain-control module is reflashed to correct an

JAN/17 FEB/17 MAR/17 APR/17 MAY/17 JUN/17 JUL/17 AUG/17 SEP/17 OCT/17





We think the Pacifica is easily the best-looking minivan on the market. We also think that paying extra (\$295) for a spare tire on a family vehicle is bunk.

nine-speed auto's reluctance to downshift, combined with its lack of manual control. Ascending steep grades became a perpetual death spiral of gear hunting. The transmission's initial reluctance to downshift meant that as we kept adding throttle, the first downshift we'd get was often a two-gear kickdown, at which point the Pacifica would start rapidly gaining speed (after all, it doesn't lack for power). Backing off to prevent exceeding the intended velocity initiates the process all over again. Overall, this ubiquitous transmission shifted more smoothly here than in other applications, but as 40,000 miles approached, it would bobble the occasional low-speed downshift when coasting to a stop.

Although the Odyssey steers with more precision, and we'd prefer a bit more body control out of the Pacifica, the Chrysler minivan shocked most drivers with its penchant for corners. The 18-inch Michelin Premier A/S tires far outperform

their 17- and 20-inch alternatives, helping our Pacifica cling to the skidpad at 0.87 g and stop from 70 mph in 164 feet, figures on par with those of our long-term E46-generation 2001 BMW M3 [March 2003], which was nearly 1000 pounds lighter. How's that for a reminder of the major gains in tire performance in recent years? Not surprisingly, with about two-thirds of their tread worn away at the end of our test, the magic Michelins did even better, pulling 0.89 g. And although the van's stability control can't be completely switched off, we tip our hat to whoever spent time dialing in unobtrusive max-lat runs. This puts the Pacifica at the upper echelon of cornering performance for anything with three rows, just off the 0.91 g posted by the \$126,295 Mercedes-AMG GLS63 4MATIC on summer tires.

The Pacifica's oil changes are dictated by the trip computer, and they seemed to align almost exactly with the 10,000-mile

exhaust-gas-recirculation issue at no cost. Dealer performs oil change, tire rotation, and inspections and replaces the cabin air filter, \$168

for final testing and photography. Dealer lubricates the front doors to remedy a creaking noise that appears during acceleration, \$0

**December 27, 2017**  
**39,405 miles:** All-season tires are refitted

**December 29, 2017**  
**40,181 miles:** Long-term test ends.

NOV/17                      DEC/17                      JAN/18



#### OPERATING COSTS (FOR 40,000 MILES)

MAINTENANCE .....	\$572
NORMAL WEAR .....	\$0
REPAIR .....	\$0
GASOLINE (@ \$2.33 PER GALLON) .....	\$4236

DAMAGE AND DESTRUCTION .....

.....	\$20
<b>SERVICE</b>	
DEALER VISITS (SCHEDULED/UNSCHEDULED) ...	4/1
DAYS OUT OF SERVICE .....	0
UNSCHEDULED OIL ADDITIONS .....	0 qt



maximum recommended interval. Those four stops, which each included a tire rotation and the usual inspections, plus a cabin air filter at 20K and 40K miles, and an engine air filter at 30K miles, ranged from \$86 to \$168, for a total service cost of \$572. Not bad. But stay vigilant, people: Our dealer neglected to replace the engine air filter and also missed a tire rotation until we pointed out both.

Our only unscheduled stop was to fix a creaking noise that manifested when accelerating from rest; it was remedied by lubricating the front door hinges and seals. One small annoyance our dealer couldn't solve: Sometimes after a remote start, the Pacifica's HVAC system would default to its coldest setting rather than the previously set temperature; it turns out that blasting icy air is rather counterproductive to warming the cabin.

As our test was drawing to a close and we were getting ready to celebrate the Pacifica's nearly trouble-free record, we noticed paint bubbling on both outside edges of the hood. Although the repair would be covered under the five-year/unlimited-mileage corrosion warranty, rust appearing in just 12 months is certainly disconcerting. As was the lack of surprise at this by a local body shop.

Still, the Pacifica left us with a good taste, if not a good smell. But its excellence isn't reflected in its residual value. According to ALG, a two-year-old example showing 30,000 miles is worth but 48 percent of the original sticker price,

For all their practicality, Stow 'n Go seats were not always very comfortable as, you know, seats. But Chrysler has made the new versions much cushier.

whereas an equivalent Odyssey retains 68 percent. That works out to a nearly \$10,000 spread, which makes the Pacifica an especially good value in the used market. But you'll probably want to find one that wasn't shared among more than two dozen people.



### Rants & Raves

"Retrieving a water heater was no problem with Stow 'n Go seats: I folded one side of the second and third rows and in it went. And I still had seats for my wife and two kids."  
—Rusty Blackwell

"Can't pair a phone, or enter a destination in the navigation system while the vehicle is moving. This is madness!"  
—Luke Sellenraad

"The touchscreen is quick to respond, clearly organized, and most important, placed within easy reach of the driver. My only real complaint over the three-day weekend was the subpar headlights. They don't generate enough light for rural Michigan at night."  
—Joseph Capparella

"The radio comes on with every restart, even though it was muted before. And the floor covering/carpet-esque material is to dust, lint, and hair what an electromagnet is to iron."  
—Rich Ceppos

## 2017 CHRYSLER PACIFICA TOURING-L PLUS

**\$43,765**

PRICE AS TESTED .....	<b>\$43,765</b>
BASE PRICE .....	<b>\$38,890</b>
<b>VEHICLE TYPE:</b> front-engine, front-wheel-drive, 7-passenger, 4-door van	
<b>ENGINE:</b> DOHC 24-valve V-6, aluminum block and heads, port fuel injection	
<b>DISPLACEMENT</b> .....	220 cu in, 3605 cc
<b>POWER</b> .....	<b>287 hp @ 6400 rpm</b>
<b>TORQUE</b> .....	<b>262 lb-ft @ 4000 rpm</b>
<b>TRANSMISSION</b> .....	9-speed automatic
<b>WHEELBASE</b> .....	121.6 in
<b>LENGTH</b> .....	203.8 in
<b>WIDTH</b> .....	79.6 in
<b>HEIGHT</b> .....	70.0 in
<b>CURB WEIGHT</b> .....	4515 lb

### WARRANTY

3 years/36,000 miles bumper to bumper  
5 years/60,000 miles powertrain  
5 years/unlimited miles corrosion protection  
5 years/60,000 miles roadside assistance

### MODEL-YEAR CHANGES

**2018:** A new base L model (\$28,090) and blacked-out-trim S package join the lineup. Standard equipment now includes blind-spot monitoring, rear parking sensors with cross-traffic alert, Android Auto, and Apple CarPlay.

## CAR AND DRIVER TEST RESULTS

### PERFORMANCE

**ZERO TO 60 MPH:**  
NEW ..... 7.3 sec  
40,000 ..... 7.2 sec

**ZERO TO 100 MPH:**  
NEW ..... 20.4 sec  
40,000 ..... 19.3 sec

**ZERO TO 110 MPH:**  
NEW ..... 25.9 sec  
40,000 ..... 24.4 sec

**ROLLING START, 5-60 MPH:**  
NEW ..... 7.7 sec  
40,000 ..... 7.4 sec

**1/4-MILE:**  
NEW ..... 15.6 sec @ 90 mph  
40,000 ..... 15.6 sec @ 91 mph

**BRAKING, 70-0 MPH:**  
NEW ..... 164 ft  
40,000 ..... 169 ft

**ROADHOLDING, 300-FT-DIA SKIDPAD:**  
NEW ..... 0.87 g\*  
40,000 ..... 0.89 g\*

**TOP SPEED** ..... 110 mph (governor limited)

**EPA FUEL ECONOMY, COMBINED/CITY/HWY** ..... 22/18/28 mpg  
**C/D-OBSERVED FUEL ECONOMY** ..... 22 mpg

**LIFE EXPECTANCIES** (estimated from 40,000-mile test)  
**FRONT TIRES** ..... 55,000 miles  
**FRONT BRAKE PADS** ..... more than 100,000 miles  
**REAR BRAKE PADS** ..... more than 100,000 miles

### WHAT BITS AND PIECES COST

<b>HEADLAMPS (LEFT/RIGHT)</b> .....	\$597/\$582
<b>ENGINE AIR FILTER</b> .....	\$31
<b>OIL FILTER</b> .....	\$12
<b>WHEEL</b> .....	\$365
<b>TIRE</b> .....	\$221
<b>WIPER BLADES (LEFT/RIGHT/REAR)</b> .....	\$30/\$20/\$20
<b>FRONT BRAKE PADS</b> .....	\$182

## FIVE-YEAR DEPRECIATION

Depreciation data from ALG. Based on 15,000 miles per year.



\*Stability-control inhibited.

PROMOTION

# THE DRIVER'S SEAT

Promotions  
Products  
Experience

THE 77<sup>TH</sup> ANNUAL



## FATHER OF THE YEAR AWARDS

### ALL-STAR DAD CONTEST CALL FOR SUBMISSIONS!

Do you know a Dad who is a real "All Star" to his children, his family and his community? If so, nominate him today as the National Father's Day Committee searches for America's #1 "All-Star" Dad.

Every Dad is special. But does your Dad or another Dad you know demonstrate such important attributes as dedication, love, unselfishness, support, and community service on a regular basis?

If so, he could be the Father's Day Committee "All-Star" Dad for 2018.

GO TO  
[ALLSTARDAD.ORG](http://ALLSTARDAD.ORG)  
TODAY AND  
SUBMIT YOUR ESSAY

**Esquire**



30 DAY MONEY BACK GUARANTEE

White dial & gold finish  
\$169



## DANIEL STEIGER ENDURO TOURBILLON STYLE AUTOMATIC

WAS ~~\$769~~ 78% OFF!!!

NOW ONLY

\$169 PLUS S&H

YOU SAVE \$600!!!

### DANIEL STEIGER ENDURO:

A truly beautiful automatic 'tourbillon style' watch with a movement that provides effortless functionality. An attractive adjustable stainless steel band, lavishly plated in 18k yellow gold, securely fastens the intricately crafted body of the watch; featuring an attractive face: detailing a choice of black or white dial; an impressive dual date window, day of week and month sub-dial. To fully appreciate the artistry and craft contained within; simply turn it over and witness the effortless movement work seamlessly away through the skeleton case back. A constant reminder that with precision technology such as this, no batteries are needed and the watch won't need to be wound.

- Automatic Tourbillon Style Movement
- Day, Date & Month Functions
- Intricate Skeleton Case Back
- Magnificent Presentation Case Included

Intricate Skeleton Case Back



Black dial & gold finish  
\$169



TO TAKE 78% OFF INSTANTLY SIMPLY GO TO OUR WEBSITE AND ENTER CODE BEFORE CHECKOUT OR CALL OUR TOLL FREE HOTLINE AND MENTION CODE TO ONE OF OUR SALES TEAM.

ORDER NOW TOLL FREE 24/7 ON

1-800 733 8463

YOUR PROMO CODE:

**CD83EN**

OR ORDER ONLINE

[www.timepiecesusa.com/cd83en](http://www.timepiecesusa.com/cd83en)

Timepieces International Inc, 12800 N.W. South River Drive, Medley, FL 33178



## Fleet Files: Here's how our other long-term vehicles are faring in their 40,000-mile trials:



### 2017 Ford Mustang Shelby GT350

Arrival: May/2017  
Miles: 23,200  
Observed mpg: 18

Last November, to avoid the indignity of salt-stained floor mats, our GT350 made the 2300-mile trek from Ann Arbor to sunny SoCal. We expected it to dominate canyon roads—and does it ever—but track-bred cars are rarely this easy to live with on a daily basis. Magnetorheological dampers take the edge off L.A.'s cracked freeways, and the light clutch and slick shifter are a boon in stop-and-go traffic. So far, we've explored the beaches from La Jolla to Leo Carrillo and up to Pismo, but we are growing tired of having to stop every 250 miles to refuel the 16.0-gallon tank and to check the oil level. Our GT350's V-8 has developed a thirst for synthetic 5W-50, quaffing five quarts in 3000 miles; Ford has warned owners of consumption as high as a quart every 500 miles when subjected to "extended time at high engine speeds, high loads, engine braking, hard cornering maneuvers, and track use." And yet, aside from a few canyon runs, our GT350 has spent all its time on freeways. —*Tony Quiroga*



### 2017 BMW M2

Arrival: Jan/2017  
Miles: 28,879  
Observed mpg: 23

Perhaps the only lazy thing about our hyperactive M2 long-termer is its odometer. But the slow mileage accumulation is only partially due to the M2's limited seating and the onset of winter—or oversteer season, as it's known to opportunists. (Not that it needs a low-friction surface to go sideways; the M2 is an introductory course to yaw management in all conditions.) Blame the lethargic odo on the stiff ride, the M2's logbook filling with complaints about aching backs and sore necks and wishes that we could trade the M2's punishing ride for that of the suppler M240i. Its detractors are not alone: The car itself seems to be whining, as rattles and squeaks proliferate. The ride even alerted this writer to a loose power cord on his radar detector. In no car but the M2 does every bump jiggle the cord so much that it causes a reboot. I guess it's time for a new cord, then, because I'm among the M2's champions, and the last thing I want to do in it is slow down. —*Jared Gall*



### 2016 Mazda CX-9

Arrival: Nov/2016  
Miles: 36,265  
Observed mpg: 22

At its fourth oil change, we noticed our CX-9 is now two model years old. Fruitful years, considering the accolades it's received from us: two 10Best Trucks and SUVs awards to go with a comparison-test victory over the best of the three-row-crossover field. And Mazda has updated the CX-9 in that time. It added G-Vectoring Control software that sharpens turn-in—perhaps a gilding of the lily for the class's already best-driving vehicle. To improve third-row access, Mazda adjusted the second row (now with optional heated outboard seats) to slide farther forward. And that heated steering wheel we've pined for can now be ordered. Absent from the upgrades is Android Auto or Apple CarPlay—both in our CX-9 and new models—despite Mazda's promises that such compatibility is forthcoming. While we continue waiting for official support for our smartphones, we'll be perusing forums, reading up on how some hackers have already enabled it. —*Jeff Sabatini*

2017 PORSCHE  
718 BOXSTER S  
20,102 MILES

2017 FORD F-150  
RAPTOR SUPERCREW  
29,900 MILES



# 1966 Ford GT-40 Mark II 50th Anniversary Die-Cast Tribute



Superior interior  
& exterior detail  
in 1:18 scale

Car boasts official  
race graphics of  
the 1966 GT-40

**Engineered to  
1:18 Scale!**

Measures an  
impressive 9" long



Includes  
removable  
base!

**SEND NO  
MONEY  
NOW!**

Fastest way to order:  
[HamiltonCollection.com/1966Ford](http://HamiltonCollection.com/1966Ford)

Opening doors and trunk, genuine race graphics and opening hood are a few of the fine details of the GT-40!

## Honor Ford's legendary domination with a superior GT-40 die-cast replica!

Fifty years ago, the strikingly modern 1966 Ford GT-40 beat out Ferrari at the prestigious 24-hour Grand Prix d'Endurance at Le Mans. The GT-40 not only took the checkered flag, but swept the race — finishing 1-2-3!

Now celebrate the historic 50th anniversary of this epic victory with the "1:18-Scale 1966 Ford GT-40 MK II #2," a superior die-cast replica showcasing the innovative engineering of the sleek GT-40 endurance racer!

### Precise 1:18-scale die-cast engineering!

Crafted to the highest quality by Shelby Collectibles, this 1:18-scale die cast boasts opening doors that reveal an articulated interior; fine dashboard instrumentation; opening trunk with a detailed engine compartment; chrome-colored accessories; and more.

Rubber Goodyear tires and working steering give this car a smooth ride, plus race-day graphics perfectly mirror the GT-40 two-door coupe that finished first at Le Mans!

**Satisfaction 100% assured.**

Our 365-Day Guarantee assures your satisfaction or your money back. Own this 50th anniversary tribute to the famous 1966 GT-40 that proved Ford had achieved the pinnacle of engineering excellence!

**Demand will be strong;  
Reply today!**

The finely engineered "1:18-Scale 1966 Ford GT-40 MK II #2" die cast can be yours for just three monthly payments of \$33.33\*; with only the first payment due prior to shipment. **Send no money now;** just mail the coupon to reserve in your name today!



MAIL TO: Presented By 09-06536-001-B12

**The Hamilton Collection**  
9204 Center For The Arts Drive, Niles, Illinois 60714-1300

**YES!** Please reserve the "1:18-Scale 1966 Ford GT-40 MK II #2" for me as described in this announcement.

Name \_\_\_\_\_  
(Please print clearly.)

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Email (optional) \_\_\_\_\_

Signature \_\_\_\_\_

**SEND NO MONEY NOW! 09-06536-001-E10301**

\*Add a total of \$21.00 for shipping and service, see [HamiltonCollection.com](http://HamiltonCollection.com). Deliveries to FL and IL will be billed appropriate sales tax. For information on sales tax you may owe to your state, go to [HamiltonCollection.com/use-tax](http://HamiltonCollection.com/use-tax). All orders are subject to product availability and credit approval. Allow 6 to 8 weeks after initial payment for shipment.



# Golf Clap

The Infiniti **QX50** puts groundbreaking technology in an unlikely place. *by Tony Quiroga*

▼ **THERE'S A NEW KIND OF ENGINE** under the hood of Infiniti's redesigned QX50 crossover. It may look like a regular turbocharged 2.0-liter inline-four, but what goes on inside is radically different from anything that's come before it. Here, for the first time in a production vehicle, is an engine that can alter its compression ratio, an accomplishment that has taken Infiniti over 20 years to achieve. Why bother? Because varying the compression ratio promises to maximize efficiency whether you're cruising at part throttle or running toward redline on 23.2 psi of boost.

Infiniti's engine can alter its stroke (how far the piston travels) by 0.05 inch, which changes engine displacement and thus the compression ratio, two things that have been, up till now, fixed. The change modifies the compression ratio from a low of 8.0:1 to a high of 14.0:1. Altering an engine's stroke usually requires a new crankshaft, but Infiniti's solution puts a link between the crank-

shaft and the connecting rods and pivots the joint with a computer-controlled arm.

It's telling that no one has successfully done this before. Adding extra pieces to a highly stressed critical component such as a crankshaft is like slipping Erector Set parts between your vertebrae. As you'd expect, the additional bits are heavy duty and add about 22 pounds of moving parts to the engine. But the design, which reduces the horizontal motion of the

connecting rods throughout the stroke, eliminates the need for the balance shafts used in many inline-fours. Losing the balance shafts also helps offset the weight of the linkage and other hardware. There is, however, an active engine mount to keep any bad vibes from permeating the cabin.

How good is the fuel economy? EPA numbers are 26 mpg combined, 24 mpg city, and 30 mpg highway for an all-wheel-drive model. Front-drive versions extract 1 mpg more in the highway test, a difference that bumps the combined number to 27 mpg.

The good news is that the QX50 achieves better combined fuel economy than all the turbocharged 2.0-liter four-cylinders in its segment. Bad news? It might not merit an end-zone dance. If we compare all-wheel-drive versions, the Infiniti QX50 bests the combined number of the 2.0-liter-powered Audi Q5 and BMW X3 by a mere 1 mpg, according to the EPA. A win is a win, though,

# Drivelines



✓Yes



✓Yes



xNo



✓Yes



**"Dealer Only" Parts!**

✓Yes



✓Yes

- ✓ Reliably Low Prices
  - ✓ Easy To Use Website
  - ✓ Huge Selection
  - ✓ Fast Shipping
- [www.rockauto.com](http://www.rockauto.com)



## 2018 SPRING BENEFIT RAFFLE ENTER TODAY – Win this week!

WIN \$500 IN ANY OF 22 BONUS DRAWINGS

**Grand Prize Drawing – May 24, 2018 @ 2pm**

Grand Prize Winner has a choice of 2018: Mercedes Benz AMG GCL 43 • Porsche Macan S • Alfa Romeo Stelvio Ti Sport AWD • \$50,000 CASH!



Mercedes Benz  
AMG GLC 43



Porsche Macan S



Alfa Romeo Stelvio Ti Sport AWD

**\$100 PER TICKET**  
Only 1500 tickets available  
Enter Early!

Bonus drawings are every Tuesday and Thursday at 2:00pm EST beginning March 6, 2018 through May 17, 2018. To qualify, you must enter by 1pm EST the day of the drawing.

Bonus winners receive \$500!

**Grand Prize Drawing**  
2pm EST May 24, 2018

### Easy to Enter:

- ONLINE: Make a secure ticket purchase at [www.laddinc.org](http://www.laddinc.org)
- CALL TOLL FREE: 1-877-861-5233 Monday through Friday, 8:00am to 5:00pm EST
- BY MAIL: Download an official entry form at [www.laddinc.org](http://www.laddinc.org) and mail to LADD



**ladd**  
Living Arrangements for  
the Developmentally Disabled

All ticket purchases benefit the people served by Living Arrangements for the Developmentally Disabled (LADD). Founded in 1975, LADD is a designated 501(c)3 by the IRS. The Grand Prize drawing is observed by a representative from the auditing firm of Barnes, Dennig & Co., Ltd. Raffle Rules at: [www.laddinc.org/benefit-car-raffle](http://www.laddinc.org/benefit-car-raffle)

Contact us: LADD, Inc. • 3603 Victory Parkway • Cincinnati, OH 45229 Phone: 513.487.3955 • Email: [raffle@laddinc.org](mailto:raffle@laddinc.org)

According to the Internal Revenue Code the amount paid for chances to participate in a raffle does not qualify as a charitable contribution.

• LADDinc  
• @LADD\_Inc

# YOU LITERALLY WON'T HAVE TO LIFT A FINGER



With the press of a button, you can restore your car's original paint. Our online videos will show you how to tackle most repairs in a single afternoon.



Paint pens  
½ oz & 2 oz bottles  
12 oz spray cans  
Ready-to-spray pints,  
quarts and gallons



**AUTOMOTIVETOUCHUP.COM**  
**888-710-5192**



The QX50 will attract more buyers with its good looks than its trick engine. If you have two infotainment screens, you should make them match.

and who doesn't love a good Rube Goldberg machine?

Luxury-minded customers are more likely to care about how the QX50 looks when it's parked in front of their newly built Tuscan- or prairie-style house.

Exterior proportions hew closely to the class norms, but the styling is handsome, especially the D-pillar and body contours. The front looks nicely resolved, too, despite the huge logo and grille.

The interior, however, isn't quite as buttoned up. Material quality is excellent and the quilted leather seats and microsuede trim on top of the door panels and in the center console are elegant touches, but these niceties are only available on the top trim level, Essential. In the center stack, two touchscreens divide the infotainment labor. The upper display is for the map, a map that we should mention appears to have been pulled right out of a 2008 Infiniti. Below that display is another touchscreen that has vehicle settings, destination entry, and audio and Bluetooth phone controls. Will it bother you that the two displays don't share the same fonts? It bothered us. At least the climate controls are traditional buttons that flank the lower screen.

But the cabin is wide and there's a sense of space and airiness that eludes most of the QX50's compact-crossover competitors. In fact, the QX50 is wider than the Lexus RX350, which competes in a larger class. And the sliding rear bench seat (with split-folding seatbacks) boasts more leg-

**[+] Invisible yet novel tech, spacious, refined, quiet, and comfortable. [-] All this to win by 1 mpg? The usual CVT complaints.**

room than the Lexus does. Along with the soft and soothing front seats, the QX50 has more than enough space to comfortably accommodate four six-foot passengers.

Driving the QX50 is analogous to looking at it. It's refined and inoffensive. The transverse-engine layout leads to predictable if uninspiring dynamics. Body motions are tight and the QX50 reliably goes where it's pointed. Point harder, and the front tires give a clear warning that they're running out of grip. Infiniti hasn't given up on its Direct Adaptive Steering steer-by-wire system; it's optional here as well as on the Q50 sedan and Q60 coupe, and the same shortcomings still apply. Steering effort is light and there's a weird artificiality to the way it increases when the front tires are stressed, but it's nevertheless lively off-center and quick.

Pulling away from a stop, we felt a hint of turbo lag. Some of the hesitation may be due to the CVT's sluggish responses and throttle tuning. Despite the occasional hesitation and springiness of the CVT, though, the engine provides real punch. All 280 pound-feet of torque are available from 1600 rpm, and 268 horsepower come in at 5600 rpm. In most driving, there's enough output to keep the CVT from having to spin the engine past 3000 rpm. Should you want to venture into the tachometer's loftier regions, Infiniti

## 2019 INFINITI QX50

**VEHICLE TYPE:** front-engine, front- or all-wheel-drive, 5-passenger, 4-door hatchback  
**BASE PRICE:** \$37,545–\$39,345  
**ENGINE:** turbocharged and intercooled DOHC 16-valve Miller-capable inline-4, aluminum block and head, port and direct fuel injection  
**DISPLACEMENT:** 120–122 cu in, 1971–1997 cc  
**POWER:** 268 hp @ 5600 rpm  
**TORQUE:** 280 lb-ft @ 1600 rpm  
**TRANSMISSION:** continuously variable automatic with manual shifting mode  
**WHEELBASE:** 110.2 in  
**LENGTH:** 184.7 in  
**WIDTH:** 74.9 in  
**HEIGHT:** 66.0 in  
**PASSENGER VOLUME:** 104 cu ft  
**CARGO VOLUME:** 31 cu ft  
**CURB WEIGHT:** 4000–4200 lb  
**PERFORMANCE (C/D EST)**  
**ZERO TO 60 MPH:** 6.3–6.7 sec  
**ZERO TO 100 MPH:** 17.3–17.7 sec  
**1/4-MILE:** 14.8–15.2 sec  
**TOP SPEED:** 140 mph  
**FUEL ECONOMY EPA COMBINED/CITY/HWY:** 26–27/24/30–31 mpg



claims a believable zero-to-60-mph time of 6.3 seconds for the all-wheel-drive version and 6.7 for the front-driver.

In normal use, there's nothing unusual about the QX50's engine, which is remarkable considering what's going on inside. A digital meter labeled Power and Eco sits between the tachometer and speedometer and is the only indication of whether the engine is in low-compression or high-compression mode. We did notice a delightfully rorty, almost Italianate sound as the engine approached its 6000-rpm redline. It's a welcome bit of personality from an otherwise quiet and refined vehicle.

Not many owners are likely to keep their QX50 floored for long, but if they do, they'll notice that the CVT mimics gearshifts to avoid having the engine bawling at a constant speed under acceleration. Grab a paddle shifter and the CVT offers eight pre-set ratios. In addition to a Personal setting, there are three other selectable drive modes: Eco gives the throttle pedal an epidural

and removes all sensitivity; Sport keeps the trans at the ready by holding engine revs elevated; and Standard balances the attributes of Eco and Sport for a normal driving experience.

Pricing starts just below \$40,000 for the base version and can top \$60,000 for a fully loaded QX50. The new QX enters an ever-growing segment and will face tough competition from established players such as the Acura RDX, Audi Q5, BMW X3, Cadillac XT5, Lexus NX300, Mercedes-Benz GLC, and Porsche Macan. And the class is about to add another: Volvo's XC60 [see page 091]. Will QX50 buyers really care that the engine is the first of its kind and a technological triumph? Probably not. What will sell the QX50 is its promise of good fuel economy, luxurious appointments, build quality, interior space, and elegant, inoffensive styling. Provided the engine doesn't pull an Oldsmobile diesel or a Cadillac V8-6-4, the novel solution under the hood will go unnoticed. And that's not the applause these engineers deserve.

#### tech highlight

## VARIABLE-COMPRESSION SUCCESSION

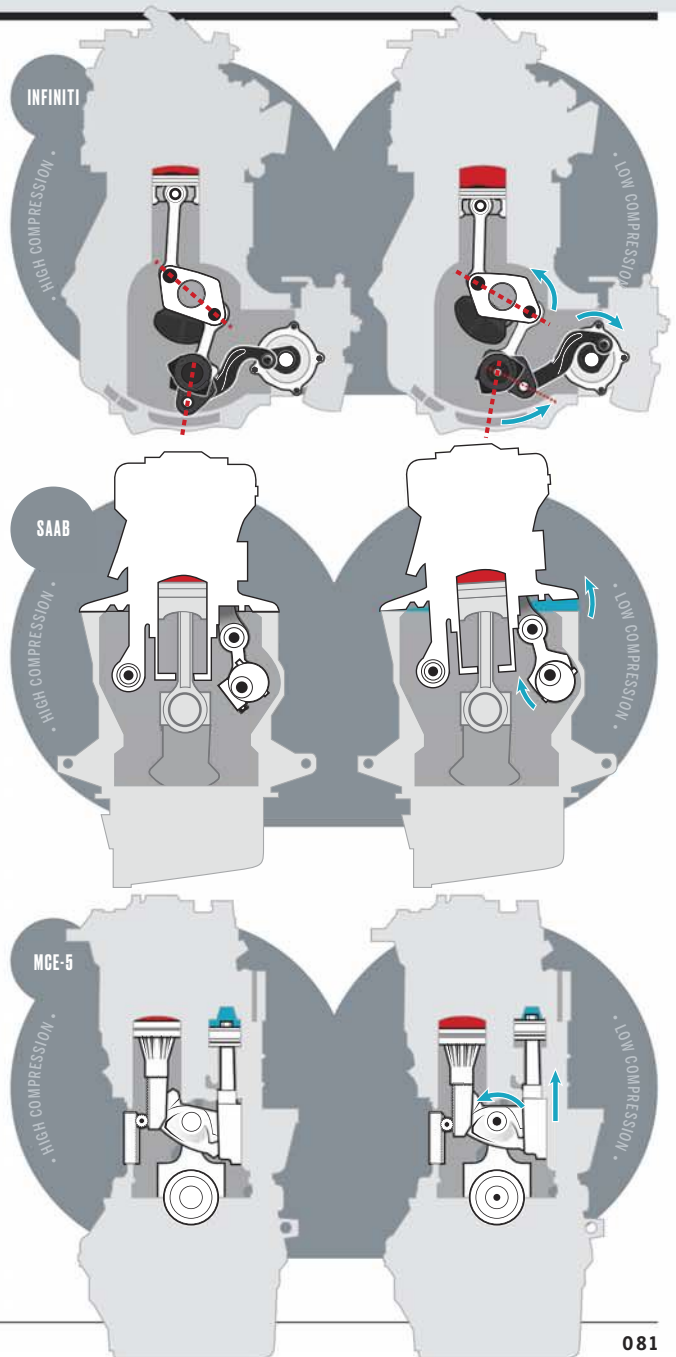
Putting into production an engine with a variable-compression ratio has been an elusive goal since the first patent for one was filed in 1928. Now, after nearly 100 years of failed experiments and near misses by various manufacturers, Infiniti's VC-Turbo engine is here, representing a significant milestone in the development of the internal-combustion engine. Below are two relatively recent dead ends in the quest for the variable-compression rail. —TQ

### 2000 SAAB VARIABLE COMPRESSION

Back at the turn of the 21st century, Saab revealed a supercharged 1.6-liter inline-five engine with a hinged two-piece block. The engine lowered its compression ratio from 14.0:1 to 8.0:1 by pivoting the top of the block, including the cylinders and the head, around a beefy hinge on the intake side. A set of mini connecting rods riding on an eccentric shaft on the exhaust side did the lifting. Since the crankshaft position is fixed, tilting the block's top changed the combustion-chamber volume and thus the compression ratio. Saab claimed 225 horsepower and a fuel-economy bump of 30 percent over an engine with similar output. Development costs and Saab's redheaded-stepchild status within GM meant the capital and interest weren't there to bring the technology to production.

### 2009 MCE-5 VCRI

The French showed off their solution to the variable-compression challenge at the Geneva auto show in 2009. MCE-5 Development's engine can vary compression from 6.0:1 to 15.0:1 through a clever system of gears between the top of the connecting rod and the bottom of the piston. The turbocharged 220-hp 1.5-liter four uses a conventional crankshaft coupled to a connecting rod, but instead of connecting a piston directly to the wrist pin, engineers fitted a roughly oval-shaped, toothed piece that they call the gearwheel. On one side, the gearwheel teeth mesh with a so-called control rack that can be moved up and down via a hydraulic actuator. When the control rack moves, it raises or lowers the opposite end of the gearwheel, which meshes with a rack at the base of the piston. The tilting motion of the gearwheel alters the piston's position relative to the cylinder head, changing the compression ratio. This approach allows each cylinder to vary its compression ratio independently. The French company wanted to have it in cars by 2017, but the engine has yet to make it out of the lab.





# What Lies Beneath

Still a looker, the second-generation Audi **A7** works on its inner beauty. *—by Joe Lorio*

▼ **THE AUDI A7** wasn't the first "four-door coupe," but it is perhaps the most successful. It outsells its BMW and Mercedes-Benz counterparts with a winning combination of luxurious refinement and sporting character wrapped in fetching sheetmetal. For its follow-up, the A7 arguably grows more handsome, and there are even greater changes underneath its freshly pressed skin.

Dimensions closely mimic those of the outgoing car, but the styling employs more crisp lines and sharp angles. The A7 is again a hatchback, and at the trailing edge of the liftgate is a spoiler that deploys at 75 mph. Flanking the hexagonal grille are standard bixenon headlights. European A7s will offer LED low-beams and laser high-beams—neither of which are confirmed for the U.S. The taillights span the width of the car, and the turn signals light up sequentially; lock or unlock the A7, and the front and rear lights perform a little dance.

The A7 shares its MLB Evo platform

**[+] Lusty powertrain, dazzling interior, devilishly handsome. [-] All-touch-screen interface, we don't get the highest-tech toys.**

with the 2019 Audi A8 and the upcoming A6. Highlights include a new engine with a 48-volt hybrid system and a redesigned MMI interface [see "MMI Oh My"]. In the U.S., the sole powerplant is a 340-hp turbocharged 3.0-liter V-6, replacing a supercharged six of the same horsepower and displacement. It's paired with the latest Quattro with Ultra all-wheel-drive system, which can decouple the rear prop shaft and drive only the front wheels to increase fuel economy. Audi's seven-speed dual-clutch transmission replaces the eight-speed conventional automatic used previously.

On the road, the A7 deftly blends polish and performance. The dual-clutch's light-throttle upshifts are all but imperceptible—in part because the engine is so quiet—and its low-speed behavior is smooth enough to pass for a torque-converter automatic. Yet it's also quick to snap off downshifts when requested. Peak torque is 369 pound-feet—up from the previous 325—and it's available over a broad span from 1370 to 4500 rpm. The muscular six effectively motivates the A7; the engine's flexibility and the transmission's responsiveness mean that there's little need to bother with Dynamic mode, which rather flagrantly hangs on to lower gears. You can also choose your own ratio with the wheel-mounted paddles or the shifter's plus-minus gate.

## 2019 AUDI A7

**VEHICLE TYPE:** front-engine, all-wheel-drive, 5-passenger, 4-door hatchback

**BASE PRICE:** \$75,000 (est)

**POWERTRAIN:** turbocharged and intercooled DOHC 24-valve 3.0-liter Miller-capable V-6, 340 hp, 369 lb-ft + AC electric motor, 9 hp; combined system, 340 hp, 369 lb-ft; 0.5-kWh lithium-ion battery pack

**TRANSMISSION:** 7-speed dual-clutch automatic with manual shifting mode

### DIMENSIONS

**WHEELBASE:** 115.2 in

**LENGTH:** 195.6 in

**WIDTH:** 75.1 in

**HEIGHT:** 56.0 in

**CARGO VOLUME:** 19 cu ft

**CURB WEIGHT:** 4100 lb

### PERFORMANCE (C/D EST)

**ZERO TO 60 MPH:** 4.7 sec

**ZERO TO 100 MPH:** 11.8 sec

**1/4-MILE:** 13.3 sec

**TOP SPEED:** 155 mph

### FUEL ECONOMY

**EPA COMBINED/CITY/HWY:** 24/21/30 mpg

(C/D est)

# Drivelines

The standard 48-volt hybrid system doesn't increase the powertrain's output; instead it reduces the V-6's workload. The system recoups up to 16 horsepower via regenerative braking, stores it in the 48-volt battery located under the cargo floor, and feeds it to the engine's crankshaft using a belt-driven alternator-starter. It also enables engine-off coasting, a function that works seamlessly but one that we Yanks won't get. For us, its chief benefit is smoother and more frequent operation of the auto stop-start feature.

U.S. A7s will offer a choice between standard steel springs and an adaptive suspension with air springs, as on the cars we drove. Audi claims its Drive Select system now offers a greater spread among its various modes, and Comfort definitely provides the best ride quality, yet with well-controlled body motions. In Auto and Dynamic modes, the 255/40R-20 tires fitted to our test car acknowledged pavement imperfections with a solid thwack. Dynamic adds some heft to the otherwise overly light steering but doesn't offer any notable improvement in handling—not that it really needs improving. As revealed on a series of S-bends and switchbacks, the A7's chassis carves corners with the confidence of Lindsey Vonn at Lake Louise. The cars we drove, however, had the benefit of rear-wheel steering, which won't make it stateside.

Audi's Level 3 automation capability is another feature not coming to the U.S.—at least not yet. We did not experience it, but we did try the adaptive cruise control with stop-and-go function. It allows for use of cruise control in city traffic, although if the car is stopped for more than a few seconds, the driver needs to prod the accelerator or flick the cruise-control stalk to get going again.

The more conspicuous tech is inside the cabin, where the new MMI system ditches the pop-up display and rotary controller in favor of two touchscreens. Audi's configurable 12.3-inch Virtual Cockpit instrument cluster remains as an option. The interior materials and design execution are excellent. On our example,

leather covered the dash and door tops, with fake suede on the ceiling and door panels. One small gripe about the materials: The brushed-metal trim in the Euro-spec cars can annoyingly reflect the sun's rays into your eyes, but it's not decided yet if that trim will be standard here. There is fractionally more rear-seat legroom, which is now generous, although headroom in the back remains marginal.

This redesign maintains the A7's good looks while bolstering its tech quotient and burnishing its drivability. Even with some of its new features off-limits, the A7 again presents the best argument for the German confection that is the four-door coupe.

**Top:** You won't believe us, but the new A7's dashboard looks surprisingly like the Ford GT's. **Above:** Rear seats are still not for the long of torso.



screen queen

## MMI OH MY

The A7 (along with the new A8) marks the first true overhaul of Audi's MMI interface. The new system scrapes the rotary controller and its surrounding function buttons. Instead, there are two touchscreens, a 10.1-inch upper unit and an 8.6-inch lower one, both of which confirm inputs with haptic feedback. The upper is used primarily for the audio system, camera view, and map display (although the map can also appear in the configurable instrument screen) and to alter the car's settings. All climate-control functions move to the lower screen, with fan speed and temperature adjustable by tapping or swiping. The lower screen also permits finger-drawing inputs for Google or navigation searches—whole words, not just letter by letter. In addition, the lower screen can show programmed shortcuts across the top (four at a time, on up to eight pages, for 32 total); the shortcuts can be radio presets, navigation destinations, or phone contacts. Only the volume knob and the buttons that call up the driver-assist menu and the exterior camera view survive the touchscreen takeover. The exterior camera may be the most trick new feature, though, offering a 3-D view of the car that can display any side of the vehicle. And among the various 2-D views is one that can provide an overhead look at the front or rear wheels to show you when you're about to curb a rim. —JL



# HARBOR FREIGHT

QUALITY TOOLS AT RIDICULOUSLY LOW PRICES

850 Stores Nationwide • HarborFreight.com

**PITTSBURGH** **1" SELLING JACKS** IN AMERICA

**RAPID PUMP® 3 TON LOW PROFILE HEAVY DUTY STEEL FLOOR JACK**

Customer Rating ★★★★★

Now \$1999

COMPARE TO HUSKY \$14998 MODEL: H000120

SAVE \$69

Weights 73 lbs. ITEM 61253 62326/61282 shown

63477861

LIMIT 5 - Coupon valid through 7/19/18\*

**CHICAGO** **ELECTRIC POWER TOOLS**

**10" SLIDING COMPOUND MITER SAW** • Powerful 15 amp motor

Customer Rating ★★★★★

Now \$11799

COMPARE TO KOBALT \$199 MODEL: SM2507LW

SAVE \$114

ITEM 61972/61971 shown Blade sold separately.

63498375

LIMIT 4 - Coupon valid through 7/19/18\*

**FREE** WITH ANY PURCHASE

**PITTSBURGH**

**4" MAGNETIC PARTS HOLDER**

• Non-Marring Base • Stainless Steel

COMPARE TO TITAN \$599 MODEL: 11194

Hardware sold separately.

ITEM 62535/90566 shown

63517692

**20% OFF** ANY SINGLE ITEM\*

LIMIT 1 coupon per customer per day. Save 20% on any 1 item purchased. \*Cannot be used with other discount, coupon or any of the following items or brands: Inside Track Club membership, Extended Service Plan, gift card, any item from 3 day Parking Lot Sale Item, compressors, floor jacks, safes, saw mills, storage cabinets, chests or carts, trailers, wrenches, welders, Admiral, Amco, Bauer, Cobra, Craftsman, Dayton, Eastwood, Fisher, Hercules, Iron, Jupiter, Lancer, Paulsen, Predator, Tangent, Viking, Vulcan, Zurich. Not valid on prior purchases. Non-transferable. Original coupon must be presented. Valid through 7/19/18.

**U.S. GENERAL**

**30", 5 DRAWER TOOL CARTS**

• 8100 cu. in. of storage • 700 lb. capacity • Weighs 139 lbs.

Customer Rating ★★★★★

Now \$1699

COMPARE TO \$1150 SNAP-ON MODEL: KRSC33AF80

SAVE \$980

FANTASTIC NEW COLORS

ITEM 64031 64032/64030 64033 shown ITEM 64060 64061 64059 shown

63427285

LIMIT 5 - Coupon valid through 7/19/18\*

**HERCULES** **BEATS DEWALT**

**20 VOLT LITHIUM CORDLESS 1/2" COMPACT DRILL/DRIVER KIT**

• 576 in. lbs. of torque • 2.5 amp hour battery • Weighs 3.6 lbs.

Customer Rating ★★★★★

Now \$999

COMPARE TO DEWALT \$17999 MODEL: DCD780C2

SAVE \$80

ITEM 63381

63528880

LIMIT 5 - Coupon valid through 7/19/18\*

**PITTSBURGH** **AUTOMOTIVE**

**1 TON CAPACITY FOLDABLE SHOP CRANE**

• Boom extends from 36-1/4" to 50-1/4" • Crane height adjusts from 82" to 94"

Customer Rating ★★★★★

Now \$999

COMPARE TO \$117999

SAVE \$80

ITEM 69512/61858/69445 shown

63537351

LIMIT 4 - Coupon valid through 7/19/18\*

**COVERPRO**

**10 FT. x 10 FT. PORTABLE SHED**

Customer Rating ★★★★★

Now \$13999

COMPARE TO SHELTER LOGIC \$23689 MODEL: 70333

SAVE \$96

ITEM 63297

63444603

LIMIT 3 - Coupon valid through 7/19/18\*

**BADLAND** **Battle Tested**

**2500 LB. ELECTRIC WINCH WITH WIRELESS REMOTE CONTROL**

• Weighs 14.3 lbs. • 11-1/8" L x 4-1/2" H

Customer Rating ★★★★★

Now \$4999

COMPARE TO SUPERWINCH \$17999 MODEL: 1125220

SAVE \$130

Voted Best Winches

ITEM 61840 61297/63476 61258 shown

63546627

LIMIT 5 - Coupon valid through 7/19/18\*

**HARDY**

**MECHANIC'S GLOVES**

Customer Rating ★★★★★

Now \$399

COMPARE TO MECHANIX \$1499 MODEL: S075800

SAVE 73%

ITEM 62434, 62426, 62433, 62432, 62429, 62428 shown

63548587

LIMIT 7 - Coupon valid through 7/19/18\*

**CENTECH**

**2/10/50 AMP, 12 VOLT BATTERY CHARGER/ENGINE STARTER**

Customer Rating ★★★★★

Now \$2999

COMPARE TO SCHUMACHER ELECTRIC \$6999 MODEL: SE-1290

SAVE 57%

ITEM 60581 60653 shown

63552249

LIMIT 5 - Coupon valid through 7/19/18\*

**luminar** **OUTDOOR**

**24 FT., 18 BULB, 12 SOCKET OUTDOOR STRING LIGHTS**

Customer Rating ★★★★★

Now \$1999

COMPARE TO PORTFOLIO \$3998 MODEL: SL128K

SAVE 50%

ITEM 63483

63552692

LIMIT 6 - Coupon valid through 7/19/18\*

**PITTSBURGH** **AUTOMOTIVE**

**PNEUMATIC ADJUSTABLE ROLLER SEAT**

• 300 lb. capacity

Customer Rating ★★★★★

Now \$1999

COMPARE TO DURALAST \$6499 MODEL: TR6201C

SAVE 69%

ITEM 61160/61896 63456/46319 shown

63553837

LIMIT 5 - Coupon valid through 7/19/18\*

**PORTLAND**

**7 AMP ELECTRIC POLE SAW 9.5" BAR**

Customer Rating ★★★★★

Now \$5999

COMPARE TO WORX \$9998 MODEL: W6909

SAVE \$39

ITEM 68862 63190 62896 shown

63560070

LIMIT 4 - Coupon valid through 7/19/18\*

**HaulMaster**

**1000 lb. capacity 18" x 12" MOVER'S DOLLY**

Customer Rating ★★★★★

Now \$799

COMPARE TO BUFFALO TOOLS \$1643 MODEL: H0FDOLLY

SAVE 51%

ITEM 61899/63095/63096 63098/63097/93888 shown

63568640

LIMIT 7 - Coupon valid through 7/19/18\*

**Apache** **Model 2800**

**ULTRA-LIGHT, CRUSH PROOF WEATHER-RESISTANT LOCKABLE CASE**

Customer Rating ★★★★★

Now \$2299

COMPARE TO PELICAN \$7456 MODEL: SL1400

SAVE 69%

ITEM 63926

63571073

LIMIT 5 - Coupon valid through 7/19/18\*

**PREDATOR**

**6.5 HP (212 CC) OHV HORIZONTAL SHAFT GAS ENGINE**

Customer Rating ★★★★★

Now \$9999

COMPARE TO HONDA \$32999 MODEL: GX200UT042Z

SAVE \$230

ITEM 60363/69730 69727 shown CALIFORNIA ONLY

63579860

LIMIT 4 - Coupon valid through 7/19/18\*

**TWO TIER COLLAPSIBLE EASY-STEP LADDER**

• 225 lb. capacity

Customer Rating ★★★★★

Now \$1999

COMPARE TO WERNER \$3388 MODEL: S22A-1

SAVE 40%

ITEM 67514

63583820

LIMIT 6 - Coupon valid through 7/19/18\*

**FULL-MOTION TV WALL MOUNT**

• Fits most 37" to 80"

Customer Rating ★★★★★

Now \$3999

COMPARE TO ROCKETFISH \$14999 MODEL: RF-HITVMM170C

SAVE \$110

ITEM 64037 63155 shown

63584895

LIMIT 5 - Coupon valid through 7/19/18\*

**CENTRAL PNEUMATIC**

**20 OZ. GRAVITY FEED SPRAY GUN**

Customer Rating ★★★★★

Now \$999

COMPARE TO KOBALT \$4998 MODEL: SGV-AIR8812

SAVE 80%

ITEM 67181/62300/47016 shown

63585791

LIMIT 7 - Coupon valid through 7/19/18\*

**PITTSBURGH** **SCISSOR SUPER COUPON**

**LIFETIME WARRANTY** **130 PIECE TOOL KIT WITH CASE**

Customer Rating **★★★★★**

SAE AND METRIC

**NOW \$299**

COMPARE TO **\$6639** **SAVE 54%**

ITEM 63248/64080 68998/64263 68991 shown

63586170

LIMIT 5 - Coupon valid through 7/19/18\*

**YUKON** **SCISSOR SUPER COUPON**

**46" MOBILE WORKBENCH WITH SOLID WOOD TOP**

Customer Rating **★★★★★**

**NOW \$2399**

ITEM 64023 64012 shown **NEW**

• 15,704 cu. in. of storage  
• 1200 lb. capacity

COMPARE TO **\$26999** **SAVE \$30**

63586762

LIMIT 4 - Coupon valid through 7/19/18\*

**PREDATOR** **SCISSOR SUPER COUPON**

**4000 MAX. STARTING/3200 RUNNING WATTS**

Customer Rating **★★★★★**

**6.5 HP (212 CC) GAS GENERATOR**

• GFCI outlets

**NOW \$2899**

COMPARE TO **\$1999** **SAVE \$1709**

ITEM 69676/69729/63080/63079 shown

ITEM 63090/63089, CALIFORNIA ONLY

63588117

LIMIT 3 - Coupon valid through 7/19/18\*

**EARTHQUAKE XT** **SCISSOR SUPER COUPON**

**1/2" COMPOSITE PRO EXTREME TORQUE AIR IMPACT WRENCH**

Customer Rating **★★★★★**

**NOW \$1299**

ITEM 62891

• Weights 4.4 lbs.

COMPARE TO **\$52495** **SAVE \$394**

ITEM 62891

63591703

LIMIT 5 - Coupon valid through 7/19/18\*

**HERCULES BEATS DEWALT** **SCISSOR SUPER COUPON**

Customer Rating **★★★★★**

**NEW** **4-1/2", 7 AMP ANGLE GRINDER**

**NOW \$3499**

COMPARE TO **\$59** **SAVE 40%**

ITEM 63052 62556 shown

63596364

LIMIT 4 - Coupon valid through 7/19/18\*

**PITTSBURGH** **SCISSOR SUPER COUPON**

**3 TON HEAVY DUTY STEEL JACK STANDS**

Customer Rating **★★★★★**

**NOW \$1799**

COMPARE TO **\$3499** **SAVE 48%**

ITEM 62392/69597/38846/61196 shown

63607183

LIMIT 5 - Coupon valid through 7/19/18\*

**PITTSBURGH** **SCISSOR SUPER COUPON**

**LOW-PROFILE CREEPER**

Customer Rating **★★★★★**

**300 lb. capacity**

**NOW \$1999**

COMPARE TO **\$3999** **SAVE 50%**

ITEM 63371/63424/63372 shown

63611200

LIMIT 6 - Coupon valid through 7/19/18\*

**CENTRAL PNEUMATIC** **SCISSOR SUPER COUPON**

Customer Rating **★★★★★**

**3/8" x 50 FT. RETRACTABLE AIR HOSE REEL**

**NOW \$5999**

COMPARE TO **\$99** **SAVE \$39**

ITEM 62625/62344/33697 shown

63621497

LIMIT 2 - Coupon valid through 7/19/18\*

**CENTRAL MACHINERY** **SCISSOR SUPER COUPON**

**20 TON SHOP PRESS**

Customer Rating **★★★★★**

• Pair of arbor plates included

**NOW \$14999**

COMPARE TO **\$22249** **SAVE \$72**

ITEM 32879 60603 shown

63629144

LIMIT 5 - Coupon valid through 7/19/18\*

**PITTSBURGH** **SCISSOR SUPER COUPON**

**TORQUE WRENCHES**

Customer Rating **★★★★★**

**LIFETIME WARRANTY**

• Accuracy within ±4%

**NOW \$999**

COMPARE TO **\$8497** **SAVE 88%**

ITEM 63647568

LIMIT 7 - Coupon valid through 7/19/18\*

**PORTLAND** **SCISSOR SUPER COUPON**

**1750 PSI ELECTRIC PRESSURE WASHER**

Customer Rating **★★★★★**

• 1.3 GPM  
• Adjustable spray nozzle

**NOW \$7999**

COMPARE TO **\$17933** **SAVE \$99**

ITEM 63255/63254 shown

63648765

LIMIT 4 - Coupon valid through 7/19/18\*

**WARRIOR** **SCISSOR SUPER COUPON**

**29 PIECE TITANIUM DRILL BIT SET**

Customer Rating **★★★★★**

**NOW \$999**

COMPARE TO **\$60** **SAVE 83%**

ITEM 62261 61637 shown

63656684

LIMIT 6 - Coupon valid through 7/19/18\*

**CHICAGO** **SCISSOR SUPER COUPON**

**RECIPROCATING SAW WITH ROTATING HANDLE**

Customer Rating **★★★★★**

**NOW \$1999**

COMPARE TO **\$4998** **SAVE 60%**

ITEM 61884/65570 62370 shown

Blade sold separately.

63663684

LIMIT 5 - Coupon valid through 7/19/18\*

**PITTSBURGH AUTOMOTIVE** **SCISSOR SUPER COUPON**

**VEHICLE POSITIONING DOLLY**

Customer Rating **★★★★★**

• 1250 lb. capacity

**NOW \$6999**

COMPARE TO **\$269** **SAVE \$199**

ITEM 62234/61917 shown

63664585

LIMIT 4 - Coupon valid through 7/19/18\*

**PITTSBURGH** **SCISSOR SUPER COUPON**

**12" RATCHET BAR CLAMP/SPREADER**

Customer Rating **★★★★★**

**LIFETIME WARRANTY**

**NOW \$299**

COMPARE TO **\$1998** **SAVE 85%**

ITEM 62123/63017 69222 shown

63676782

LIMIT 8 - Coupon valid through 7/19/18\*

**FISCHER** **SCISSOR SUPER COUPON**

**HEAVY DUTY MULTI-VEHICLE 750 LB. HIGH LIFT JACK**

Customer Rating **★★★★★**

**NOW \$1999**

COMPARE TO **\$42575** **SAVE \$245**

ITEM 63298

63685062

LIMIT 5 - Coupon valid through 7/19/18\*

**HaulMaster** **SCISSOR SUPER COUPON**

**500 LB. CAPACITY STEEL CARGO CARRIER**

Customer Rating **★★★★★**

**NOW \$3999**

COMPARE TO **\$7999** **SAVE 50%**

ITEM 69623 66983 shown

63691713

LIMIT 4 - Coupon valid through 7/19/18\*

**PITTSBURGH** **SCISSOR SUPER COUPON**

**32 PIECE SCREWDRIVER SET**

Customer Rating **★★★★★**

**LIFETIME WARRANTY**

**NOW \$599**

COMPARE TO **\$1778** **SAVE 66%**

ITEM 90764/61259 shown

63693707

LIMIT 6 - Coupon valid through 7/19/18\*

**drillmaster** **SCISSOR SUPER COUPON**

**7" VARIABLE SPEED POLISHER/SANDER**

Customer Rating **★★★★★**

**NOW \$2999**

COMPARE TO **\$3999** **SAVE 25%**

ITEM 69474 62861/60626 shown

63697464

LIMIT 4 - Coupon valid through 7/19/18\*

**VULCAN** **SCISSOR SUPER COUPON**

**OMNIPRO™ 220 MULTIPROCESS WELDER WITH 120/240 VOLT INPUT**

Customer Rating **★★★★★**

**NOW \$19999**

COMPARE TO **\$249** **SAVE \$449**

ITEM 63621

63703242

LIMIT 4 - Coupon valid through 7/19/18\*

850 Stores Nationwide • HarborFreight.com

\*Original coupon only. No use on prior purchases after 30 days from original purchase or without original receipt. Valid through 7/19/18.

All Harbor Freight Tools, the "Compare to" price means that the specified comparison, which is an item with the same or similar function, was advertised for sale at or above the "Compare to" price by another national retailer in the U.S. within the past 90 days. Prices advertised by others may vary by location. No other meaning of "Compare to" should be implied. For more information, go to HarborFreight.com or see store associate.



TESTED

# Time Is Money

Confronting reality with the FJ Company's **Signature FJ43**, a classic Toyota Land Cruiser resurrected for the 1 percent. *—by Mike Sutton*

▼ **KEEPING UP WITH** the increasingly powerful and computer-assisted automobile is serious work. It can dazzle our senses one minute and numb them the next. We're not complaining; we just sometimes need to unwind with a hot soak in frivolity. Such as driving a custom 1981 Toyota Land Cruiser that costs as much as a new Lamborghini Huracán.

You read that correctly: The restored and lightly modernized FJ43 rig on these pages—the top-spec Signature model from the Miami, Florida-based FJ Company—stickers for \$210,900 with a handful of options. A rational purchase it is not. But iconic vehicles can captivate their fan base to the point of obsession, and the classic FJ Land Cruiser—most notably those built from 1954 to 1984—is nothing less than an off-road folk hero.

Starting this year, the FJ Company intends to sell up to 24 Signature trucks, of which our Matte Dune Beige model is an early prototype. The build quality and details are meticulously rendered [see “Spit Shining a Fossil”], and its boxy old-school charm is off the charts. While \$200K does buy you a 21st-century powertrain and a host of other updates versus less expensive versions, make no mistake: This is an authentic steel-bodied FJ Land Cruiser that, despite its enhancements, still drives with the woolly disconnectedness of an ox cart.

The Signature is underpinned by custom live axles front and rear, turned by 4.10:1 gears. It rides on 17-inch steel wheels wrapped with meaty 285/70R-17 BFGoodrich Mud-Terrain T/A KM2 tires. Beefy Old Man Emu leaf springs and new-age Fox dampers are good for 2.5 inches of suspension lift above stock and the compliance of a bridge girder; loading up the FJ with a half-dozen adults—the four in back squeezed into two longitudinally oriented fold-up benches—greatly improves this off-roader's normally jarring ride.

Safety equipment includes six seatbelts and four-wheel disc brakes from a current Toyota 4Runner (13.3-inchers in front, 12.3-inchers in back), which are adequately powerful but feel wooden at the pedal. Our prototype lacks ABS, but production models will certainly have it. A carefully modulated panic stop from 70 mph takes 209 feet as the off-road rubber squirms and howls on the edge of lockup.

## THE FJ COMPANY'S SIGNATURE TOYOTA FJ43 LAND CRUISER

**VEHICLE TYPE:** front-engine, rear/4-wheel-drive, 6-passenger, 3-door convertible  
**PRICE AS TESTED:** \$210,900  
**BASE PRICE:** \$200,000  
**ENGINE:** DOHC 24-valve V-6, aluminum block and heads, port fuel injection  
**DISPLACEMENT:** 241 cu in, 3956 cc  
**POWER:** 231 hp @ 5200 rpm  
**TORQUE:** 266 lb-ft @ 3800 rpm  
**TRANSMISSION:** 5-speed manual  
**DIMENSIONS**  
**WHEELBASE:** 95.7 in  
**LENGTH:** 165.9 in  
**WIDTH:** 65.6 in  
**HEIGHT:** 81.5 in  
**CURB WEIGHT:** 4726 lb

## C/D TEST RESULTS

**ZERO TO 60 MPH:** 8.5 sec  
**ZERO TO 90 MPH:** 25.2 sec  
**ROLLING START, 5-60 MPH:** 8.9 sec  
**1/4-MILE:** 16.5 sec @ 81 mph  
**TOP SPEED:** 106 mph (mfr's claim)  
**BRAKING, 70-0 MPH:** 209 ft  
**FUEL ECONOMY C/D OBSERVED:** 12 mpg

We never tested an FJ back in the day, but the FJ Company says the Signature's updated hydraulically assisted recirculating-ball steering is far more precise than the original system. Which is a bit scary considering that the huge, thin-rimmed tiller still has the feel and exactitude of a farm tractor's and takes a lazy 4.1 turns to spin from lock to lock. Standing 81.5 inches tall with 57.3 percent of its porky 4726 pounds resting on its back wheels adds to this FJ43's waywardness.

Signature models eschew the Land Cruiser's original inline-six engine for a newer 4.0-liter V-6 with variable intake-valve timing, which produces 231 horse-



Shell  
**V-Power**  
**NITRO+**  
Premium Gasoline  
The Official Fuel of  
CAR AND DRIVER

# Drivelines



You have to appreciate this FJ's consistency. Never have we experienced a vehicle that both looks and drives this much like a duck-hunting blind.

power and 266 pound-feet of torque. Clutch takeup on the five-speed is progressive, but the custom shift lever moves with long, deliberate throws and chunky engagement.

The low-revving 4.0 is more than a match for the FJ's ancient steel ladder chassis. Hard launches are greeted with a squawk of the rear tires and a 92-decibel din at full throttle (we avoided a more brutal four-wheel-drive start, as well as the skidpad, out of mechanical sympathy). Working through the gears, we saw 60 mph arrive in a decent 8.5 seconds and the quarter-mile pass in 16.5 at 81 mph, making the Signature as quick as a modern subcompact. While it's possible to brush 100 mph with a tailwind, the violent airflow around the covered-wagon body is a reminder that old FJs are best enjoyed at a leisurely pace. Employed as a daily driver, it saw just 12 mpg overall.

Our frigid, midwinter loan precluded us from rolling up the front section and the rear side panels of the standard canvas softtop (a hardtop is \$5000 extra). The cold also exposed the tent's many gaps as well as the ineffectiveness of the noisy Vintage Air HVAC system. At least the supportive front Recaro thrones and the rear jump seats are heated. Additional modernizations include blinding LED headlights, an Apple iPad Mini with a JL Audio system in the center console, and a backup camera that displays in the rearview mirror.

While the ARB locking differentials (\$3500), roll cage (\$2000), and heavy-duty Warn winch mounted on a custom front bumper (\$3500) are notable options, we doubt that a truck this nice will ever see serious trail work. That may be a shame for some of the FJ faithful, yet the Signature fulfills its mission as a grand totem of adventuring by simply tooling around town. Sure, it's expensive, but you can hardly put a price on time travel.



**[+] Vintage cool factor, beautifully crafted, modern engine and tech.**  
**[-] Vintage 4x4 road manners, eye-watering price, ill suited for cold weather.**

*cruisin'*

## SPIT SHINING A FOSSIL

Founded in 2010, the FJ Company mainly restores classic 40-series Land Cruisers, with turnkey FJ40 and FJ43 models starting at \$85,000. Donor vehicles generally come from the U.S. and Latin America, the latter region fertile enough for the FJ Company to base its 75,000-square-foot production facility in Bogotá, Colombia. That country also was the first home of our test truck, a single-owner example that fit the requirements for rebirth: minimal rust and the original chassis. Once at the shop, each rig is methodically disassembled and every piece is either refurbished or replaced to OEM quality or better. Various customizations contribute to what is roughly a 3500-labor-hour process, which can take up to a year to complete. Before delivery, every FJ gets a quality check at one of the company's locations—either in Miami, Florida; Aspen, Colorado; or Dallas, Texas—and all three sites can perform repairs under the included one-year warranty. The company's technicians will even do house calls, as was the case when our FJ's leaking non-spec radiator needed to be replaced with a production unit midtest. —MS





TESTED

# Track Marks

Porsche's revised **GT3** reveals the addict in all of us. *\_by Tony Quiroga*

**HOW YOU FEEL** in the brief pause between switching off the engine and opening the door tells you nearly everything about a car. In most good ones, there's a warm afterglow of emotions and contemplation reminiscent of the finest psychotropics. Shutting off a Porsche 911 GT3's flat-six leaves you suspended in silence, a brief respite before the stale adrenaline and paranoia hit. Was that a police car behind me? No way of knowing since the GT3's spoiler hides anything in your rear view. Did I just get away with putting on a canyon-road clinic at 1.11 g's, howling through the tunnels and passing everything I encountered? Someone must have called the cops. Quick, close the garage door!

And then the thoughts of the new addict arrive: When can I do that again? How can I buy one of these things? Sell the house? What's this MacBook Air worth? What if I moved to the desert and lived on ramen? Can I still go to medical school? I should slip a subtle request for a raise into something I write.

My name is Tony, and I'm addicted to the GT3. It's been 30 minutes since my last drive.

You see, friends, it all happened after 225 miles in a GT3. A man's will melts when faced with a naturally aspirated 500-hp 4.0-liter flat-six that burns its way to 9000 rpm. The new-for-2018 GT3's engine features wider crankshaft bearings to beef up the bottom end and new heads with roller finger followers for a lighter and zingier valvetrain. In higher gears, where the stretch from 8000 to 9000 rpm grows to more than a fraction of a second, the churn of its six pistons exactly mimics the characteristic buzz-saw sound of an Airbus A320's turbofan engines at takeoff. In the GT3, you're immersed in 99 decibels' worth of thrust with every run to redline. This six sucks down premium—enough to trigger a \$1000 gas-guzzler charge—while flooding your brain with dopamine. The GT3 can stop from 70 mph in 146 feet. I can stop anytime.

In our dual-clutch-automatic test car, the launch-control system bangs off consistent 3.0-second runs to 60 mph. The mighty six revs to 6600 rpm before

launching. Release the brake, feel the clutch engage, and the Michelin Pilot Sport Cup 2 rear tires, size 305/30ZR-20, hook up. Poof, you're in the next county. Stay in it and the quarter arrives in 11.1 seconds at 127 mph. The track-ready GT3's times and \$145,650 price fall neatly between those of the more street-focused \$121,750 450-hp Carrera GTS and the 540-hp all-wheel-drive Turbo that starts at \$162,850. As tested, this perfectly optioned GT3 with heated seats (\$700), a 23.7-gallon fuel tank (\$140), auto-dimming mirrors (\$700), and white metallic flake in the paint (\$720) came to \$147,910.

To an addict, the price doesn't seem unreasonable. It's just a matter of reprioritizing your life to get the money together. After all, it's a relative bargain. The GT3's high usually requires stepping up to the really expensive stuff from Italy, the prancing horses and charging bulls. But those cars can't touch this 911's ability to balance everyday usability, speed, and steal-your-face handling goodness. Also, everyone assumes you have a problem if you drive an Italian exotic. Provided you're not too public with your displays of speed, the GT3's familiar 911 shape helps keep your little issue hidden to the casual observer. If you really want to appear to be a functioning member of society, go for the GT3 Touring option that loses the giant spoiler.

Porsche took the GT3 back after a week. It's promised me a manual version in a few weeks. I'm totally fine. I always grind my teeth like this.

## 2018 PORSCHE 911 GT3

**VEHICLE TYPE:** rear-engine, rear-wheel-drive, 2-passenger, 2-door coupe  
**PRICE AS TESTED:** \$147,910  
**BASE PRICE:** \$145,650  
**ENGINE:** DOHC 24-valve flat-6, aluminum block and heads, direct fuel injection  
**DISPLACEMENT:** 244 cu in, 3996 cc  
**POWER:** 500 hp @ 8250 rpm  
**TORQUE:** 339 lb-ft @ 6000 rpm  
**TRANSMISSION:** 7-speed dual-clutch automatic with manual shifting mode  
**DIMENSIONS**  
**WHEELBASE:** 96.7 in  
**LENGTH:** 179.6 in  
**WIDTH:** 72.9 in  
**HEIGHT:** 50.0 in  
**PASSENGER VOLUME:** 47 cu ft  
**CARGO VOLUME:** 14 cu ft  
**CURB WEIGHT:** 3318 lb

## C/D TEST RESULTS

**ZERO TO 60 MPH:** 3.0 sec  
**ZERO TO 100 MPH:** 6.9 sec  
**ZERO TO 150 MPH:** 16.3 sec  
**ROLLING START, 5-60 MPH:** 3.9 sec  
**1/4-MILE:** 11.1 sec @ 127 mph  
**TOP SPEED:** 197 mph (drag limited, mfr's claim)  
**BRAKING, 70-0 MPH:** 146 ft  
**ROADHOLDING, 300-FT-DIA SKIDPAD:** 1.11 g  
**FUEL ECONOMY**  
**EPA COMBINED/CITY/HWY:** 17/15/20 mpg  
**C/D OBSERVED:** 17 mpg

**[+] All of the highs, none of the life-altering consequences.**  
**[-] The manual is even more fun, the Touring pack is more grown-up.**

# Drivelines



The Official Fuel of CAR AND DRIVER





**CAR AND DRIVER**

**1080HD MINIOPRO DASH CAM**

# PROTECT YOUR SIDE OF THE STORY

The Car and Driver MiniPro Dash Cam—easy-to-install and featuring the latest technology, it's now easier than ever to Protect Your Side of the Story.

-   
 G-SENSOR
-   
 NIGHT VISION
-   
 WIFI-ENABLED
-   
 GPS TRACKING
-   
 GESTURE CONTROLS



SEE OUR FULL LINE OF DASH CAMS AT [BESTBUY.COM](http://BESTBUY.COM)

# POWERHOUSE 18

## CIGAR COMBO **SAVE OVER 80%**



- 18 Hand-Rolled Premium Cigars
- Cherrywood-finish Humidor (Holds 20)
- A Guillotine Cigar Cutter

**ORDER NOW!**  
Limited Supply

Compare similar \$161.90

# \$29.95

Call **1-800-652-2909** or visit [thompsonspecials.com](http://thompsonspecials.com)

©2018 Thompson Cigar Co.



Promo Code **TA879** • OFFER GOOD FOR 30 DAYS Add \$5.95 for Shipping - #926986. One per customer. Florida residents ADD 7% sales tax, not available to minors and good only in the USA. Per the FDA's minimum age requirement for tobacco purchases, your age will be verified based on the current legislation in your billing and shipping address location.

**Esquire**

GROOMING



THE ULTIMATE MEN'S GROOMING COLLECTION

AVAILABLE AT ULTA AND ULTA.COM





TESTED

# Maxed Out

Ford's **Expedition** is reskinned in aluminum.  
\_by John Pearley Huffman

▼  
**AT RAILROAD CROSSINGS**, freight trains stop for it out of professional courtesy. It's called Max because if it were any larger, it wouldn't fit through the Panama Canal. Though its body is made from aluminum, it's a Platinum because Ford is ironic. And it has 10 forward gears like an old Schwinn Varsity. Everything about the 2018 Expedition Max Platinum 4x4 tested here emphasizes the SUV's size. The switch to aluminum reduces mass (a bit), but as with the F-150, Ford doesn't want anyone thinking the Expedition is wimpy. As if anyone ever could. This isn't just a full-size SUV, it's a 6047-pound psychological-distortion event.

The Max is the Suburban to the regular Expedition's Tahoe—the 131.6-inch wheelbase and 221.9-inch overall length outstretch the not-a-Max's by 9.1 and 11.9 inches, respectively. Its additional length doesn't change the commodious lounging area for the seven passengers, but the rear doors are longer for better access to the third row, and there are an additional 15 cubic feet of storage space. Chevy's Suburban goes 130.0 inches on the wheelbase and 224.3 inches overall.

Most of the Expedition's new body is shared with its opulent brother, the Lincoln Navigator. And the suspension design and steel ladder frame have only slightly evolved since an independent rear suspension was adopted for the 2003 model year. The sole engine in the new Expedition is the twin-turbocharged 3.5-liter V-6, which is rated at 375 horsepower on regular fuel in lower trims and at 400 premium-swirl-

**[+] Turbo lug without turbo lag, brilliant transmission, room for ballroom dancing. [-] Conservative interior design, bulldozer handling, and shouldn't it weigh less?**

equipped with the Heavy Duty Trailer Tow package, its 9000-pound tow rating is more than a match for the bow rider's heft.

Inside, the rotary shifter is mounted flat on the center console—taking up nearly as much space as a conventional shifter would. So what's the point? Compared with the Navigator's, the ExMaxPlat's interior is conservative, with more conventional controls and a smaller infotainment display screen. There's a rough-hewn feel to some plastic pieces that are more work-truckish than luxury liner. And while the seats are covered in acres of inconsistent-quality leather, at least the seating surfaces are well shaped. It's all old-school, last-century design while its Lincoln brother has nudged itself into the 21st century.

There's nothing thrilling about this big beast's driving dynamics. The Max's ride is on par with that of the GM alternatives, but the ute's steering is keeping secrets, its 285/45R-22 Hankook Dynapro HT tires aren't that tenacious, and it doesn't carve corners as much as hack at them with a fire ax. And with an as-tested price over \$84,000, it's some \$13,500 beyond the starting cost of the better-driving but admittedly smaller Mercedes-Benz GLS450.

Aesthetically and conceptually, the Expedition Max is boldly American. It's a throwback truck coming ever more attractive crossovers. But if you need what it does, it does those things well.

## 2018 FORD EXPEDITION MAX PLATINUM 4X4

**VEHICLE TYPE:** front-engine, rear/all-4-wheel-drive, 7-passenger, 4-door hatchback  
**PRICE AS TESTED:** \$84,085  
**BASE PRICE:** \$79,740  
**ENGINE:** twin-turbocharged and intercooled DOHC 24-valve V-6, aluminum block and heads, port and direct fuel injection  
**DISPLACEMENT:** 213 cu in, 3496 cc  
**POWER:** 400 hp @ 5000 rpm  
**TORQUE:** 480 lb-ft @ 3250 rpm  
**TRANSMISSION:** 10-speed automatic with manual shifting mode  
**DIMENSIONS**  
**WHEELBASE:** 131.6 in  
**LENGTH:** 221.9 in  
**WIDTH:** 79.9 in  
**HEIGHT:** 76.2 in  
**CARGO VOLUME:** 36 cu ft  
**CURB WEIGHT:** 6047 lb

## C/D TEST RESULTS

**ZERO TO 60 MPH:** 5.9 sec  
**ZERO TO 100 MPH:** 16.5 sec  
**ZERO TO 110 MPH:** 20.5 sec  
**ROLLING START, 5-60 MPH:** 6.8 sec  
**1/4-MILE:** 14.6 sec @ 94 mph  
**TOP SPEED:** 115 mph (governor limited)  
**BRAKING, 70-0 MPH:** 192 ft  
**ROADHOLDING, 300-FT-DIA SKIDPAD:** 0.78 g  
**FUEL ECONOMY**  
**EPA COMBINED/CITY/HWY:** 18/16/21 mpg  
**C/D OBSERVED:** 14 mpg

Shell  
**V-Power**  
**NITRO+**  
Premium Gasoline  
The Official Fuel of  
CAR AND DRIVER

# What Would Arne Jacobsen Drive?

Volvo's new **XC60** moves competently, but that's not why you'll want it. *—by K.C. Colwell*

▼ **THE REDESIGNED** Volvo XC60 T6 scoots to 60 mph in 6.1 seconds and hangs on to a cloverleaf at a very carlike 0.87 g, but it's not built for those feats. A less expensive, base-engine BMW X3 will easily keep up while a similarly priced Porsche Macan S will embarrass the Volvo on a winding two-lane. Buying an XC60 for its performance is like purchasing a Rolex for the way it keeps time. No, you get the XC60 to salvage the right part of your brain: You buy it for its quiet, comfortable, and all-around stunning interior.

Inside, it seems as though Volvo spared no expense. From the tiny Swedish flag on the front passenger's seat to the pale-gray open-pore wood trim, the stitched dash, and the vertical orientation of its 12.3-inch infotainment display (all of which come standard on our top-tier Inscription-trim test car), this cabin soothes and rewards. The generosity extends to the nicely trimmed cargo area; behind the split-folding second row are 30 cubic feet of cargo space, which is big for the class.

That Volvo can produce a six-figure-worthy interior in a \$63,290 compact SUV and still have the money to keep the lights on is a modern mystery. Our theory is that Volvo's switch to a single engine block across its entire lineup saved enough development dollars to heavily pad the interior coffers. It's a strategy not without compromise, however.

The engine, of course, is a 2.0-liter inline-four. In T6 guise, it wears both a turbocharger and a supercharger to produce 316 horsepower and 295 pound-feet of torque. A sporting engine this is not, and it lacks the eccentric character of the inline-fives and -sixes that once formed the uniquely Norse personality of the brand. Run it to the forced shift at 6300 rpm and there is little to inspire, both in the sounds it makes and the feelings it elicits. All-wheel drive is standard, and the eight-speed transaxle shifts with competence across the rev range, but as there are

## 2018 VOLVO XC60 INSCRIPTION T6 AWD

**VEHICLE TYPE:** front-engine, all-wheel-drive, 5-passenger, 4-door hatchback  
**PRICE AS TESTED:** \$63,290  
**BASE PRICE:** \$49,695  
**ENGINE:** supercharged, turbocharged, and intercooled DOHC 16-valve inline-4; aluminum block and head; direct fuel injection  
**DISPLACEMENT:** 120 cu in, 1969 cc  
**POWER:** 316 hp @ 5700 rpm  
**TORQUE:** 295 lb-ft @ 2200 rpm  
**TRANSMISSION:** 8-speed automatic with manual shifting mode  
**DIMENSIONS**  
**WHEELBASE:** 112.8 in  
**LENGTH:** 184.6 in  
**WIDTH:** 74.9 in  
**HEIGHT:** 65.3 in  
**PASSENGER VOLUME:** 100 cu ft  
**CARGO VOLUME:** 30 cu ft  
**CURB WEIGHT:** 4322 lb

## C/D TEST RESULTS

**ZERO TO 60 MPH:** 6.1 sec  
**ZERO TO 100 MPH:** 15.7 sec  
**ZERO TO 130 MPH:** 32.6 sec  
**ROLLING START, 5-60 MPH:** 6.8 sec  
**1/4-MILE:** 14.6 sec @ 97 mph  
**TOP SPEED:** 131 mph (governor limited)  
**BRAKING, 70-0 MPH:** 170 ft  
**ROADHOLDING, 300-FT-DIA SKIDPAD:** 0.87 g\*  
**FUEL ECONOMY**  
**EPA COMBINED/CITY/HWY:** 23/21/27 mpg  
**C/D OBSERVED:** 19 mpg

\*Stability-control inhibited.

Shell  
**V-Power**  
**NITRO+**  
 Premium Gasoline  
 The Official Fuel of  
 CAR AND DRIVER



no paddles, manual shifts must be executed using the gear selector. Steering and brake feel are unremarkable, even if their feedback is perfectly matched to the XC60's relaxed mission. If you have to hustle, the \$1800 air springs and adaptive dampers do a more than adequate job of keeping body motions in check. And despite 20-inch wheels (standard on Inscription T6 models), the ride is smooth.

Most of the day-to-day controls are accessible through the central touchscreen, but on a cold morning, it's slow to respond until the cabin warms. Also, screen icons for specific tasks, such as deactivating the aggressive stop-start system, aren't easily discoverable amid the menus. Dedicated buttons for important ancillary functions would improve the situation. Fortunately, the three-stage heated seats and heated steering wheel automatically fire up when it's cold outside.

Our car was fitted with \$13,595 in options, but the only must-have is the \$3000 Luxury Seat package. Sliding into the XC60's 12-way adjustable thrones reminds us of our first sprawl in an Arne Jacobsen lounge chair, which is to say we were perfectly supported—a feeling that is worth every penny. ■

**[+] Fantastic seats, stunning interior, a tiny Swedish flag.**  
**[-] Engine lacks character, many are quicker, many are sprightlier.**

# Getting Rid Of Belly Fat: A Nutritional Guide

Researchers have announced a radical technique that not only fights potentially deadly belly fat, but can also lead to slimmer waists and, perhaps, improved health.

The only catch? The establishment wants to spend 5 years – and \$65 million – testing this technology.

But one doctor thinks that the technology is so effective, it is immoral to make people wait.

So he's offering a version of the technique...now.

"The science has already been tested, and it's effective," says Dr. Rand McClain, Chief Medical Officer at Live Cell Research. "I can't make people wait 5 years for something that could be helping them today."

McClain is referring to a field of health research that is said to activate a "master switch" inside your body's cells.

This switch controls when your cells store fat, and when they convert the fat into energy. Control the "master switch," the theory goes, and you also control fat.

To researchers, this is far more than just an appearance issue. It could be even more important to Americans who mistakenly believe that small amounts of exercise can radically change their bodies.

According to Dr. Todd Miller, professor in the Department of Exercise Science at George Washington University, "People don't understand that it is very difficult to



exercise enough to lose weight. If that is why you are doing it, you are going to fail."

So a way to battle belly fat could be the breakthrough the health community has been waiting for. McClain believes the technique works best for people over 30, particularly those who may be experiencing fatigue, weaker bodies and even "foggy" thinking.

Best of all, McClain announced that he is making his method available – and affordable – to virtually all Americans.

With demand already high for his stunning technique, McClain created an Online presentation detailing how the health breakthrough works.

You can watch the presentation here at [www.NoFat92.com](http://www.NoFat92.com)

In this video, Rand is telling it like it is...we need more doctors like this! People should be advised to watch the entire video report before committing to such an unconventional method.

Watch the video at [www.NoFat92.com](http://www.NoFat92.com)



# 16 ft Fishing Boat

Goes 17 mph and Packs In a Car!



## The Roll-Up Sea Eagle® FishSkiff™ 16

Patent Pending



### UnRoll and Go...Rollup and Stow

- \* 16' long x 54" wide \* Weighs just 105 lbs.
- \* Inflates in minutes \* Packs to 60" x 24" x 18"
- \* Holds 2 people or up to 1765 lbs.
- \* 6 hp Capacity \* Motors up to 17 mph
- \* Also paddles or takes an electric motor

**1-800-944-7496**

for a **FREE** Catalog M-F, 9-5 EST  
Or for more info visit:

**SEA EAGLE.com**

19 N. Columbia St., Dept CA048B, Port Jefferson, NY 11777

**JDM** astar

GLOBAL PROVIDER FOR AUTOMOTIVE LED LIGHTING

**WWW.JDMASTAR.COM**

USE PROMO

**JDMCD18**

**15%**  
DISCOUNT



ORDERING OR INQUIRIES  
TEL: **626 330-0711**

## Dramatic chip repairs are this easy!

BEFORE AFTER



...And no paint blobs!

Go to our website to see how our new Squirt 'n Squeegee kit can quickly repair 100's of chips



"The Cure for Road Rash"

Rated #1 by The Wall Street Journal

**DR. COLORCHIP**  
AUTOMOTIVE PAINT CHIP REPAIR SYSTEM

**ORDER YOUR KIT TODAY!**

4 paint chip repair kit sizes: \$39.95 - \$64.95  
**DRCOLORCHIP.COM • 866.372.2548**

# RAGGTOPP

Manufacturer Approved

## CONVERTIBLE TOP CARE PRODUCTS

Exterior and Interior Protection  
for Fabric, Vinyl and Leather

\$5 Off Your Next  
Order of \$50 or more  
Use Coupon Code: CandD



Tested and Endorsed by

**HARTZ**

Original Equipment  
Manufacturer of  
Fabric and Vinyl  
Convertible Topping

**(800) 377-4700**

**www.Wolfsteins.com**

# BRAKEWORLD

GUARANTEED BEST PRICE • LARGEST SELECTION  
GUARANTEED FITMENT • ADVICE YOU CAN TRUST

## ULTRA HIGH QUALITY ROTORS



- Massive Stopping Power
- Cooler Brakes
- Longer Rotor Life



## PERFORMANCE BRAKE PADS

- NO BLACK DUST
- Super Quiet & Clean
- Shorter Stopping Distance
- Longer Pad Life
- Advanced Ceramic & Kevlar Pads



## STAINLESS STEEL BRAKE LINES



## PROTECTED NANO COATED ROTORS

AVAILABLE IN:

- Chrome • Black
- Red • Gold
- Blue



SHOP ONLINE 24/7 **WWW.BRAKEWORLD.COM**

TOLLFREE: **866.272.5396** **WHOLESALE PRICES!!**

# MICROBEAD CAR COVERS

MicrobeadCarCovers.com 888-627-1129

Practically custom-fit outdoor/indoor car cover, bag, wind straps & lock kit

Only \$99.95



Select-Fit™

Practically custom-fit indoor/show car cover, bag, wind straps & lock kit

Now \$139.95



Select-Fleece™

Standard \$89.95  
Wide \$154.95  
**PREVENT FLAT TIRE SPOTS**



As featured in Hemmings



★★★★★

- Dodge Ram pickup truck customer



Patent-pending design seals out sunlight with Velcro closures  
OC Sun Shade \$24.95

Free 2-Day Shipping (CONTL USA) CODE: **CD2DAY**

Text your Year, Make & Model  
to **617-657-4212** for current promotions

MicrobeadCarCovers.com **888-627-1129**

MARKET PLACE  
.....For advertising information call 212-649-4204, 9am-5pm EST

# What I'd Do Differently

## Hermann Tilke, 63

The German designer of 75-plus race-tracks tells us about racing his mother's VW, criticism from Bernie Ecclestone, and what F1 drivers complain about.

► interview by MIKE DUFF



### **C/D:** Are you another frustrated racing driver?

**HT:** When I was 19, I started racing my mother's car—she didn't know. It was a Volkswagen Scirocco. I carried on racing during my study at RWTH Aachen University. I did the European championship in touring cars, first with an Opel Kadett GT/E, then with a Toyota Celica. My job wouldn't give me free time, so I left and founded my own company—our first office was in our kitchen—to have more time for racing.

### **■ How did you get into track design?**

□ I was still a civil engineer, and I knew people at the Nürburgring. I asked if I could do something for them, and eventually they gave me small jobs—pedestrian bridges. My first real track was the Race of

Champions track at the Nürburgring in 1989. Bernie Ecclestone saw it and asked who had done it, which led to bigger projects.

### **■ How did you get on with him?**

□ Very well. He is very direct. The first meeting, when I showed him the proposal for the AI-Ring in Austria, he looked at the drawings and said, "This is shit." Nice to meet you, Bernie! But then we discussed it and found we could work together.

### **■ How difficult is it to make a track that works for different motorsport disciplines?**

□ Very hard. Usually the investor wants a track that can do everything—motorcycles, racing cars, experience days—and it is not easy to bring this together. A good motorcycle track is not necessarily a good track for Formula 1, because

of overtaking, but also because you need to design safety features differently. It's not a problem if an F1 car crashes into a barrier at 40 or 50 mph. The car is demolished, the driver gets out and says, "Where's my next car?" But not motorcycles; they can't hit a barrier at that speed.

### **■ How do you respond to criticism about your tracks being very similar "Tilkedromes"?**

□ There is always a reason for what we do, and the budget is always one of the limiting factors. We have created more than 75 tracks, and there are limitations beyond the greatest possible layout. I've had people say, "Why can't you make the straight 100 meters longer?" Because we don't own the land!

### **■ It's also been said that your tracks don't penalize drivers enough if they make mistakes...**

□ With a pure Formula 1 track, like the Baku street circuit, you can make it with less runoff. But if you do the same at a permanent track, then the private driver who wants to drive it will be scared about demolishing his car. Then there are the young drivers, 16-year-olds starting out in single-seaters. Do we want them to carry the risk?

### **■ Why not use gravel traps instead of asphalt runoff areas?**

□ Asphalt is safer, for cars at least. You can shorten runoff by a third compared to gravel: When a car spins, it stops very quickly. But if they go into gravel at high speed, they can skip over it. You don't slow down when you're flying. But there's another reason: If you have a private track day and somebody goes into gravel in their Porsche or AMG, then they are likely going to be paying for new parts. Seven thousand euros is an expensive spin.

### **■ What do Formula 1 drivers complain about?**

□ Details—why is the curb here, why is it not long enough? We try to make a track difficult, but we have the best drivers in the world, and in Formula 1, the best technology. There are three elements to the racing—the car, the driver, and the track—and two of those are close to being perfect. If you gave F1 cars to amateurs, you would have more exciting races! It's

funny, during the first Formula 1 weekend at a track, the opinions of the drivers normally change from the first practice to the race. In Istanbul, drivers were complaining [that Turn 8] is high speed with lots of downforce, so cars were grounding out. Schumacher was the one who said: "You guys have the wrong setup. If you have it right, then the corner is good."

### **■ What would you have changed about your life or your career?**

□ I don't know, I don't think about it. We try to criticize ourselves at the end of every project, but in general, nothing really. There are some things in my personal life, but not my work.

### **■ Would you be tempted to design an oval?**

□ Of course. I love the idea of a track where you can see everything all the time.

### **■ Should a circuit be like a gladiatorial arena?**

□ Yes, but so that talented drivers can win, not from the point of view of risk. I never agree with people who say it's not interesting because it's not dangerous. When they say it was better in the past when the cars and tracks were dangerous, I always say there was some incredibly boring racing in the past as well! ■

### **CUSTOMER SERVICE**

Visit [service.caranddriver.com](http://service.caranddriver.com) or write to Customer Service Department, *Car and Driver*, P.O. Box 37870, Boone, IA 50037 for inquiries, requests, changes of mailing and email addresses, subscription orders, payments, etc.

**CAR AND DRIVER**® (ISSN 0008-6002) VOL. 63, NO. 10, April 2018, is published monthly, 12 times per year, by **Hearst Communications, Inc.**, 300 West 57th Street, New York, NY 10019, U.S.A. Steven R. Swartz, President & Chief Executive Officer; William R. Hearst III, Chairman; Frank A. Bennack, Jr., Executive Vice Chairman; Catherine A. Bostrom, Secretary, Hearst Magazines Division; David Carey, President; John A. Rohnan, Jr., Senior Vice President, Finance. © 2018 by **Hearst Communications, Inc.** All rights reserved. Trademarks: **Car and Driver** is a registered trademark of **Hearst Communications, Inc.** Periodicals postage paid at New York, NY, and additional mailing offices. Canada Post International Publications mail product (Canadian distribution) sales agreement no. 40012499. Editorial and Advertising Offices: 1585 Eisenhower Place, Ann Arbor, MI 48108. **SUBSCRIPTION PRICES** United States and possessions: \$13.00 for one year; Canada, add \$10.00; all other countries, add \$24.00. **SUBSCRIPTION SERVICES** *Car and Driver* will, upon receipt of a complete subscription order, undertake fulfillment of that order so as to provide the first copy for delivery by the Postal Service or alternate carrier within 4–6 weeks. **MAILING LISTS** From time to time, we make our subscriber list available to companies who sell goods and services by mail that we believe would interest our readers. If you would rather not receive such offers by postal mail, please send your current mailing label or an exact copy to Mail Preference Service, P.O. Box 37870, Boone, IA 50037. You can also visit preferences.hearstmags.com to manage your preferences and opt out of receiving marketing offers by e-mail. *Car and Driver* assumes no responsibility for unsolicited material. None will be returned unless accompanied by a self-addressed stamped envelope. Permissions: Material in this publication may not be reproduced in any form without permission. Back Issues: Back issues are available for purchase in digital format only from our app store of choice. **POSTMASTER** Send all U.S.A. to C.D.S. (Dept. 5073, 5, 2). **NON-POSTAL AND MILITARY FACILITIES** Send address corrections to *Car and Driver*, P.O. Box 37870, Boone, IA 50037. **Printed in the U.S.A.**

# WeatherTech®



**FloorLiner™**  
*Laser Measured*



See our full line of Automotive Accessories at [WeatherTech.com](http://WeatherTech.com)



**Cargo Liner**



**Pet Barrier**



**RackSack®**

## Accessories Available for

Acura · Alfa Romeo · Aston Martin · Audi · BMW · Buick · Cadillac · Chevrolet · Chrysler · Dodge · Ferrari · Fiat · Ford · Genesis · GMC · Honda · Hummer · Hyundai · Infiniti · Isuzu · Jaguar · Jeep · Kia · Land Rover · Lexus · Lincoln · Maserati · Mazda · Mercedes-Benz · Mercury · Mini · Mitsubishi · Nissan · Oldsmobile · Plymouth · Pontiac · Porsche · RAM · Saab · Saturn · Scion · Smart · Subaru · Suzuki · Tesla · Toyota · Volkswagen · Volvo and more!

**Order Now: 800-441-6287**



American Customers  
[WeatherTech.com](http://WeatherTech.com)



Canadian Customers  
[WeatherTech.ca](http://WeatherTech.ca)



European Customers  
[WeatherTech.eu](http://WeatherTech.eu)

THE ALL-NEW  
**QX50**

# YOUR DRIVE. EMPOWERED.

The all-new 2019 INFINITI QX50 was designed with one thing in mind: you. Every inch, every feature and every innovation has been carefully designed to inspire, enhance and fulfill your inherent potential. From the world's first production Variable Compression Turbo engine and empowering ProPILOT Assist\* technology to a driver-centric design, you are the center of QX50's universe.



**INFINITI**  
EMPOWER THE DRIVE™



\*ProPILOT Assist is an available feature. It cannot prevent collisions. Always monitor traffic conditions and keep both hands on the steering wheel. See Owner's Manual for safety information. ©2018 INFINITI.





NOT JUST A RETHINK. A RE-EVERYTHING.



Reimagine, revamp, reexamine, retool, reconsider, recalibrate, readjust, realign, rearrange, reevaluate, reassess, rededicate and refocus. Now, we are reborn. We are Mazda Team Joest. We intend to rewrite records. And help lead Mazda into a future of limitless potential.

DRIVING MATTERS®

