

STING BACK

Seventh-generation Chevrolet
Corvette is every bit spectacular

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The challenge was daunting, the charge great: Develop a seventh-generation Chevrolet Corvette that would not merely exceed expectations of the faithful, but could reaffirm it as the greatest performance car for the dollar on the planet. And while that's going on, make sure the Vette's halo shines bright enough to prove this "new" General Motors competes globally with technology, ingenuity and passion not seen for generations.

Go faster *and* use less gas. Be more comfortable *and* potent on the track. Run with Porsches, Ferraris and Aston Martins—for thousands less. Do it in a car whose technology is *ne plus ultra*, with All-American Badass attitude.

While that might not be the stated mission of the 2014 Chevrolet Corvette you see here, it is the implied mission statement. Here is *the* car worthy of being christened Stingray for the first time in more than 25 years.

We can't get away from GM-supplied numbers that would make any sentient performance fan salivate: It pulls 1.0 g on track, hits 60 mph in less than 4.0 seconds *and* delivers up to 30 mpg on the highway. Thank goodness for Chevrolet's continuing racing efforts because, yes, this Stingray brims with technology, much of it adapted from the C6.R road race car.

Here's the kicker, that push-you-over-the-top insight that may prompt a Porscheophile or *Tifosi* to look toward Motown for that next big ride: If you can afford today's Corvette, you'll be able to afford this one, too.

For all the changes—two parts carry over: a roof panel *latch* and a cabin air filter—this Stingray is every bit a Corvette, with a long hood, short deck, and wide and low stance, with a decidedly Italianate flair.



FAST, COMFORTABLE AND ECONOMICAL

Corvette chief engineer Tadge Juechter's mission was formidable: This Corvette had to perform better than any Vette that came before it, including the current car, already among the world's best. It had to be more comfortable than the car it replaces, long a sore point (literally and figuratively) for Corvette critics. And it had to help GM meet ever-tightening fuel-economy regulations, or at least do as little harm to the Corporate Average Fuel Economy score as possible.

No, Juechter could not get by with a mere makeover of the sixth-generation car, a car that's been in production since the 2005 model year and is itself based heavily on the fifth-gen Corvette introduced as a '97. A makeover—an easy, less costly and tempting solution—would not prove to the world that Chevrolet and GM have returned to the business of building exceptional, breathtaking cars. While an overused term, this C7 Corvette had to be revolutionary, so much so that Ed Welburn, GM design chief, christened it Stingray, a



Competition seats (upper left) include cutouts for racing belts. Track mode (upper right) changes the center display to a race-car layout. Everything in the Stingray's cockpit is aimed at the driver.



name not used since 1976.

Once given the green light, Juechter and his crew tore up the Corvette's chassis, exterior, interior and, while at it, the assembly plant, too. The Corvette factory in Bowling Green, Ky.—closed to the public since September 2012—got itself a \$131 million makeover, including a new body shop to weld the aluminum spaceframe:

- Yes, aluminum. If the C7 Corvette is a technological wundercar, it starts with its bones. The frame is lighter and stiffer. All 2014 Corvettes get an aluminum frame: Today's base and Grand Sport Corvette use a steel frame.

- A new V8 has the same displacement as today's base 6.2-liter engine, but it cranks out more power while sipping fuel at cruising speeds via direct fuel injection, variable valve timing and cylinder-cutoff technologies. It mates to a rev-matching seven-speed manual or six-speed automatic transmission.

- Hood and rear vents adapted from the C6.R race car deliver more front downforce and keep the transaxle cooler.

- Every display in the cockpit is aimed at the driver's needs. Information displays on two 8-inch monitors. Track enthusiasts can opt for a large bolster seat designed to hold them in place as well as any purpose-built racing seat.

"We set out to redefine modern performance," Juechter says. "We scanned the world for technology. But we didn't make changes just to be different. It had to enhance the driving experience."

Today's Grand Sport model combines the base powertrain with a Z06's wider body and is the most popular Corvette on the market. The 2014 Stingray brings that wide-body look to the base model. Lord—and Juechter—only knows what kind of gloriously sinister shape will come from future high-performance Corvette models.

Juechter reiterates this new Stingray's performance figures will impress, including its stopping power, with smaller tires than on the C6, it will stop from 60 to 0 mph as well as today's Z06. When fitted with the Z51 performance package, the Stingray will top the supercharged ZR1. Oh, my.

STYLING OF A STINGRAY

GM conducted a global design competition from within its ranks to craft the C7's rakish look. Juechter says the team considered more than 300 design proposals.

Much of the new Stingray's final shape is traced to a 2009 Stingray concept that played a role in two of the *Transformers* movies. It's a so-called technical design, with several subtle surface features easy to miss at first but which become apparent on closer study:

- A flat surface along the front fender's edge marks a transition from fenders to hood.

- Four character lines flow from its nose to the hood's rear edge. They are not parallel, and this helps define the hood's raised center section.

- This Stingray has rear quarter windows, a feature

not seen on a Corvette since the 1962 model. The change was needed to make room for air vents above its rear wheels.

- High-intensity discharge headlamps light the way, framed by LED daytime driving lights.

- And in one of the biggest breaks from Corvette history, there are not four perfectly round taillights, until now seen on every Vette since 1961. Rather, the Stingray's taillights are a hexagonal shape (not Camaro square as some had predicted) and use indirect LED lighting for a futuristic look. The taillight housings also incorporate exhausts for the rear cooling ducts.

That change was deliberate, program manager Harlan Charles says. He explains the Corvette needs to attract a new generation, one that has grown up playing video games and going to events like road rallies.

"We knew we couldn't use the Stingray name unless the new car truly lived up to the legacy," Welburn says, and indeed it does.

DRIVER-FOCUSED COCKPIT

Nowhere is the Corvette's overhaul more evident than in the cockpit, now as driver-centric as ever.

Juechter sent his interior designers out for hot laps on the GM proving grounds test track. "We wanted them to understand the high-stress working environment when hustling the car and what's really important to the driver," Juechter says.

That track time led to an instrument panel in which every control but one—a passenger temperature control mounted at the bottom edge of the right dashboard vent—aims toward the driver. There's a steel-reinforced grab handle for the passenger, mounted on the center console. And the team beefed up the center tunnel trim because drivers use it to brace their right leg during hard cornering, while adding more padding to the door armrest for more comfort on long cruises.

The Stingray's gauge cluster uses an 8-inch video monitor behind a smaller, 14-inch steering wheel. Gauges for speed, fuel and water temp flank the video screen. The display can change based on the drive mode selected: An info-rich screen appears when in touring; a large tachometer for sport mode; a race-car-inspired layout with tach band and lap timers for track mode. A full-color head-up display is an option.

A second monitor—bright enough to be viewed in direct sunlight—dominates the center stack. The driver can use hand-swipe gestures on this monitor to control the GM MyLink infotainment system. The screen also folds down to reveal a storage space with a USB connector. There are knobs for controlling the radio and ventilation, and seat heating/cooling buttons.

Seats have long been a sore point for Corvette critics, so the Stingray aims to put all those complaints to rest, offering a choice: There is a moderately bolstered touring seat and a highly bolstered competition seat.

The Stingray's seats use magnesium frames for higher rigidity with less weight and are trimmed in carbon fiber. The sport seats include cutouts to make it easier to mount wide racing belts in the car.



The entire interior is wrapped in luxury materials. There's hand-stitched leather on the dashboard. The seats can be covered in Nappa leather. Carbon-fiber trim is an option.

HIGH-PERFORMANCE GAS SIPPER

There's a new V8 engine underhood, the first from the fifth generation of GM's small-block engine family.

The 450-hp, 450-lb-ft LT1 engine combines direct fuel injection, continuously variable valve timing and—for the first time in a Corvette—cylinder deactivation that turns the 6.2-liter V8 into a gas-sipping 3.1-liter V4 during cruising speeds. The LT1 delivers as much low-end torque as the 7.0-liter V8 in today's Z06, and the Z51 package adds a dry-sump engine-oiling system, brake-cooling ducts and a taller rear spoiler.

Buyers will also have a choice of transmissions:

■ A Tremec seven-speed manual with active rev matching for upshifts and downshifts. This is an evolution of the six-speed manual in the C6. The rev-matching system uses a Hall Effect sensor mounted on the transaxle to sense the start of gear changes and command the engine computer to bump up engine revs for

a smoother shift. It can be turned off with a steering-wheel switch for heel-and-toeing.

Fourth gear in the Tremec is a direct 1:1 drive, and the top three gears are overdrive, bolstering the Stingray's fuel-economy numbers.

The manual drivetrain also gets a dual-mass fly-wheel and a dual-disc clutch for smoother shifting. The Z51 performance package adds a close-ratio gearset to the gearbox:

■ GM's Hydra-Matic 6L80 six-speed automatic includes steering-wheel-mounted paddle shifters, such as those found in far more exotic rides from Italy and England. A low-inertia torque converter helps make gear changes smoother. And the transmission's shift points and the shift feel change based on the setting of the Drive Mode Selector. There's no dual-clutch or eight-speed automatic—at least not yet—despite speculation both technologies would be available.

Juechter says he hasn't found a dual-clutch able to handle the Stingray's torque and still fit into the available space in the transaxle.

Also, having a torque-converter automatic helps smooth the cylinder-deactivation system. And with

The Stingray badge takes its inspiration from the 1959 Sting Ray concept and the 2009 Corvette Centennial concept.

For more on Corvettes past and present, go to www.autoweek.com/corvette

the engine's wide torque band, the additional cost of an eight-speed automatic wasn't necessary to meet performance targets.

ONE CAR, MANY MOODS

The most important control in the cockpit is the center-console mounted Drive Mode Selector. With it, the driver can set up the Stingray for one of five choices: weather, eco, tour, sport or track. Each mode can change up to a dozen performance characteristics, including throttle response, steering feel, shift points, active exhaust and engagement of the optional electronic limited-slip differential.

Weather mode, for example, dials back a bit on the Stingray's performance to cope with driving in snow or heavy rain. The eco setting maximizes the time the Corvette's engine runs in fuel-saving V4 mode. Tour is the car's default mode, tuned for daily driving, while sport tightens things up a bit for a spirited run on twisty roads.

A button in the center of the mode selector can dial back the stability control system for competitive driving. It also activates the Performance Traction Management settings when in sport and track modes.

FRAMED UP

At the heart of the Stingray's performance capabilities is the frame. At first glance, it closely resembles the frames used on the C5 and C6 Corvettes. But the changes go beyond the switch from steel to aluminum.

The C5 and C6 frames used hydroformed side rails—single pieces of steel tubing running the full length of the frame, bent into shape via internal hydraulic pressure. It makes a solid foundation.

The C7 advances that technology, tailoring side rails with five sections. Each rail's center section is hydroformed from aluminum tubing. Attached to the front and rear of the center rails are large aluminum casting attachment points for the front and rear suspensions. At the end of each casting are sections of extruded high-strength aluminum, in a figure-eight shape, forming the front and rear crush zones for the car. Compared to the C6's steel frame, the C7 aluminum frame weighs 99 pounds less and is 57 percent stiffer.

The C7 continues to use a structural center tunnel as its backbone, but it's been reshaped and braced in the corners for increased stiffness. The base Stingray is a coupe with a removable roof panel but the frame is designed for a convertible model, expected in model year 2015.

Today, GM buys the aluminum frame used on the Z06 and ZR1 from supplier Dana Corp. But the C7's frame will be assembled in Bowling Green, laser-welded in a high-tech body shop.

The effort to cut weight from the C7 extends to hollow-cast front and rear aluminum cradles, replacing solid-core units. Switching to hollow cast makes each cradle about 25 percent lighter.

The Stingray keeps the short-/long-arm suspension and rear transaxle design from the C6. But each sus-

pension part has been reworked. Steering knuckles, bearings and links are stiffer. More weight was cut via hollow lower control arms and switching the rear toe links from steel to aluminum.

On the outside, the hood and removable roof panel are lightweight carbon fiber, while the rest of the Stingray's body panels are an even lighter-weight sheet-molded compound. The underbody panels are made with carbon-nano composites.

All those lightweight panels, along with a 1-inch longer wheelbase, give the Stingray ideal 50/50 weight distribution. The goal: Make the driver more connected with the road, chassis engineer Mike Bailey says.

A big part of that driving feel comes from Stingray's steering. Juechter says the C7's steering system is five times stiffer than that found in the C6. It includes an electric power-steering unit, a stiffer steering column and steering gear mounted to the front cradle.

RACE-PROVEN TECHNOLOGY

There's a lot of race car in this seventh-generation street-going Stingray. Aerodynamics software from the Pratt & Miller Corvette race team shaped the C7's body, including new hood vents boosting front downforce and the rear quarter-panel ducts channeling air to coolers for the automatic transmission and electronic limited-slip differential.

Front-end lift at high speeds has long been a gremlin with Corvettes, a result of its sloping front-end design. Adapting the hood vent from the C6.R race car, front lift is reduced, channeling one-third of the airflow over the top of the car, Juechter says, while air from the ducts above the rear tires exits through vents at the outer edges of the taillights and rear fascia—a natural low-pressure point on the car.

The driver-side duct provides cooling for the automatic transmission or the manual transmission with the Z51 performance package, while the passenger-side duct provides cooling for the Z51's electronic limited-slip differential.

The ducts also keep the cabin cooler. With separate cooling circuits for the rear components, engineers eliminated cooling lines from the radiator running down the center tunnel.

Hauling the Stingray to a stop are Brembo brakes with four-piston fixed calipers. Brakes on the base car measure 12.6 inches in front and 13.3 inches in back, providing 35 percent more swept area than the C6. The Z51 adds dual-cast ventilated rotors measuring 13.6 inches in front and 13.3 inches in back.

The base Stingray is fitted with 18-inch wheels up front and 19-inch wheels in back, while the Z51 rolls with 19-inch forged wheels in front and 20-inch units in back. All 2014 Corvettes get tires from Michelin, which won a shootout with Goodyear.

That's the C7 Corvette. We haven't driven it yet. But the looks and the specs tell us the 2014 Corvette is deserving of the name Stingray.

We can't wait. 🏁