

Toyota's 2014 Corolla Delivers Improved Efficiency and Driving Dynamics

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While the all-new 2014 Corolla includes amplified elements of style, design, the engineering effort focused on improving fuel economy and handling to complement the Corolla's legendary reliability.

Drivetrain and Aerodynamics Maximize Efficiency

The new Corolla LE Eco model will offer an estimated EPA highway fuel economy of 42 mpg, making it the most fuel efficient gasoline only compact sedan with an automatic transmission in the segment. The Corolla LE Eco is a new grade that enhances the fuel economy with an efficient CVT, a more efficient 1.8-liter engine with Valvematic technology, aerodynamic underbody covers, color-keyed rear spoiler, and low rolling resistance tires on 15-inch wheels or available 16-inch aerodynamic alloy wheels..

2014 Corolla Fuel Economy

Grade	Trans	2014 MPG City/Hwy/Comb	2013 MPG City/Hwy/Comb
L	6MT	28/37/31	27/34/30
L	4AT	27/36/31	26/34/29
LE	CVTi-S	29/38/32	26/34/29
LE Plus	CVTi-S	29/38/32	NA
LE Premium	CVTi-S	29/38/32	NA
S	CVTi-S	29/37/32	26/34/29
S Plus	CVTi-S	29/37/32	NA
S Premium	CVTi-S	29/37/32	NA
S Plus	6MT	28/37/31	27/34/30
LE Eco	CVTi-S	30/42/35	NA
LE Eco Plus	CVTi-S	30/40/34	NA
LE Eco Premium	CVTi-S	30/40/34	NA

Efforts to reduce wind resistance have helped the new Corolla achieve a drag coefficient of 0.28, which places it near the top of the compact-sedan class. Careful attention has been taken to refine airflow and reduce turbulence over the front and rear edges of the car. The Corolla's underbody features a smoother, flatter smoother design to help reduce turbulent airflow. Both the LE Eco grade and S grade offer strategically placed vehicle under covers located below the bumper fascia, engine, front floor, rear floor, and fuel tank to help manage airflow under the vehicle for improved efficiency.

The 2014 Corolla offers two efficient 1.8-liter, all-aluminum four-cylinder engines. The base 1.8-liter unit with VVT-i is available on the L, LE, and S grades and is rated at 132 horsepower. The Corolla's new LE Eco trim level is equipped with a 1.8-liter engine with Valvematic, a valve train technology which appears for the first time in North America with Corolla. Valvematic offers a broader range of continuously variable valve timing (lift and phasing) to provide optimal intake valve (not on exhaust side) operation relative to engine demands. Valvematic offers more than a five-percent improvement in fuel economy and engine output (140 horsepower).

2014 Corolla Engine Specifications

Engine Type	2ZR-FE	2ZR-FAE
Number of Cylinders/arrangement	4 cylinders, in-line	4 cylinders, in-line
Valve Mechanism	16-valve DOHC with Dual VVT-i	16-valve DOHC with Valvematic
Bore x Stroke mm	80.5 x 88.3	80.5 x 88.3
Displacement c.c.	1798	1798
Compression Ratio	10.0:1	10.6:1
Fuel System	EFI	EFI
Max Output	132 Hp/ 6000 rpm	140 Hp/6100 rpm
Max Torque	128 lb-ft/ 4400rpm	126 lb-ft/4000 rpm

The 2014 Corolla also offers improved fuel economy thanks to its advanced Continuously Variable Transmission. This CVTi-S (i for intelligent, S for shift), which will be available on the LE, S, and LE Eco Corolla models, features several enhancements to improve its efficiency and driving performance with discrete shift points that help create a sensation more similar to a traditional hydraulic automatic transmission.

While the efficiency and reduced weight inherent in a pulley-type CVT would seem an ideal solution for vehicles emphasizing fuel efficiency, the characteristic CVT “rubber band” driving sensation of the engine winding to its power band upon acceleration has earned detractors. With Corolla’s new CVTi-S, Toyota’s engineers improved the drivability of the new Corolla by adapting discrete stepped “gears” or shift points, into the car’s acceleration and deceleration curves. The Corolla’s new CVTi-S even mimics the familiar characteristics of hydraulic automatics creating a sense of positive shift engagement. On the Corolla S trim, up to seven shift-points can also be manually actuated from the shift gate or steering wheel paddle shifters.

As the first pulley-style CVT product offered by Toyota in North America, the engineering effort prioritized making the new CVTi-S’ operation and power application more appealing and familiar to North American drivers. Corolla’s engineers maximized the fuel saving design inherent in a pulley CVT while enhancing its operation to provide a more “direct feel” to pedal inputs through careful analysis of traditional automatic transmission operation. The new CVTi-S will provide a more linear connection between pedal effort and acceleration feel compared to previous CVT designs.

Toyota engineers addressed challenges presented by typical CVT design such as the high level of hydraulic pressure CVT’s require for operation, and the optimization of the pulley ratio range to offer the best performance and fuel economy. Typically, CVT hydraulic-fluid pumps are driven at the same rate as engine speed; as a result, the pump wastes considerable effort, hurting transmission efficiency at higher engine speeds as the pump moves more fluid than necessary to lubricate and sandwich the CVT’s belt. With this new CVTi-S, hydraulic pressure was reduced to an optimal point to protect against belt slippage, while conserving drive effort to limit excess pumping losses. The Corolla’s new CVTi-S is fitted with an oil pump that features a coaxial 2-port design that enables a 25-percent reduction in pump drive torque compared to other pump designs, and results in a greater efficiency with its reduction in parasitic engine loss.

For a belt-driven CVT, the range of speed ratios is determined by the diameters of the input and output pulleys. The greater the disparity in size between these two pulleys, the greater the range of gear ratios, efficiency and performance the transmission can offer. The clearances within the Corolla’s CVTi-S exterior casing and between internal components have been enhanced to better accommodate the most optimally sized pulleys within the compact transmission case. The CVTi-S offers a forward gear ratio range of 0.396 to 2.480, which works well for acceleration, cruising speeds, and fuel-conscious driving with a 4.761 final drive ratio. The new CVTi-S

includes a transmission fluid warmer is used to help get fluid to optimal temperature faster.

The Corolla's new CVTi-S uses a lower viscosity CVT fluid that protects all of the transmission's internal parts while helping reduce parasitic loss to enhance efficiency and performance. The CVTi-S also offers extremely quiet operation from a compact, lightweight case design that adds reinforcing ribs and an optimal shape to help suppress vibration and noise.

ECO and SPORT Drive Modes Add Efficiency and Excitement

Depending on the model, Corolla models equipped with CVTi-S offer the capability of either an ECO (on Corolla LE Eco) or SPORT (Corolla S) driving mode. On the Corolla LE Eco, the ECO driving mode makes accelerator control become non-linear to suppress the vehicle's response to choppy driving and contain acceleration from standing start to help reduce fuel consumption. The accelerator pedal's communication is the same as Normal-mode after 50-percent throttle. In ECO mode, the air conditioning operation is controlled in the interest of efficiency with compressor power reduced, the utilization of recirculation mode, and extra time allowed to attain a desired interior cabin temperature.

The Corolla S with the new CVTi-S offers a SPORT mode that helps deliver a more dynamic driving experience with software tuning that alters shift points, creating transmission behavior during acceleration that enhances the sporty character of the S-grade. SPORT mode is not a track focused mode, but rather a transmission setting that, along with unique electric power steering programming, helps create a sportier driving sensation during normal road and freeway driving. On the Corolla S equipped with CVTi-S, steering wheel mounted paddle shifters allow drivers to make fast, sequential, stepped shifts through "7-speeds" to help enhance the driving experience. The Corolla S console shifter also offers a manual gate (M-position) that also allows drivers to make brisk upshifts or downshifts using the shift lever. The next shift step will automatically be engaged if the engine revolutions become high enough or down shifted if they become low enough. The M mode activity is displayed in the black and white display of the Corolla S combination meter. The Corolla's Sport mode was developed and evaluated on roads within the key global markets to help ensure a more energetic drive across a broad range of conditions.

The base model Corolla L is offered with a four-speed automatic transmission or a six-speed manual transmission. The six-speed manual is also available in the Corolla S.

Rigid Unibody and Tuned Suspension Offer Engaging Handling

The new Corolla offers improved handling and steering due to a rigid unibody that takes advantage of improved suspension tuning to offer a more engaging, better handling, more dynamic car. The Corolla's unibody makes extensive use of high-strength steel to improve the rigidity of the structure, but also keeps vehicle curb weight under 2,900 pounds for all grades, which helps fuel efficiency.

For construction of the new Corolla's unibody, the use of high tensile-strength steel allows for reduced thickness and optimized shape of structural panels while increasing strength to help improve collision performance. Corolla is expected to perform very well in collision safety ratings test. The new Corolla features additional unibody bracing (tunnel brace and rear floor brace) to help increase platform rigidity over the current model.

The new Corolla's suspension uses a Macpherson strut design for the front with a new, more rigid control-arm design. A rear torsion beam arrangement is used for the rear. Both suspension layouts have been designed to take advantage of the additional body rigidity to provide improved handling responses and steering control. While the spring rates on Corolla have been optimized for ride comfort, the S-model equipped with 17-inch wheels includes unique coil, damper, and bushing tuning to help offer a sportier driving characteristic. The rear torsion beam's attachments points are now fastened to the body at a slanted, diagonal angle for its bushings as opposed to the straight attachment orientation of the previous generation vehicle. This diagonal attachment point layout




contributes to improved rear handling, grip, and stability.




The new Corolla is equipped with an electric power steering system that offers enhanced feel and ‘weight” in the hands of drivers, while increasing its sense of directness with little effort. The use of an electric rack and pinion system eliminates an accessory driven hydraulic steering system, which would represent parasitic loss to the engine. The lightweight and compact components of the tilt, telescopic steering structure are designed to help enhance steering rigidity, while reducing vibration. A more structurally rigid steering intermediate shaft help improve the directness of the new Corolla’s steering. The new Corolla’s steering measures 3.19 turns from lock to lock.

The braking system includes a 10.82-inch (275-mm) ventilated front disc, and either a 10.19-inch (259-mm) solid rear disc (available on S-grade) or nine-inch (229-mm) rear drum (all other grades). Like all Toyota models, the 2014 Corolla will feature Toyota’s Star Safety System™ standard, which includes Vehicle Stability Control (VSC), Traction Control (TRAC), Anti-lock Braking System (ABS), Electronic Brake-force Distribution (EBD) and Brake Assist. It also features the standard Smart Stop Technology brake-override system. An electronic tire pressure monitoring system is standard equipment.

Corolla offers a broad range of wheels ranging from 15-inch wheels with covers (L and LE Eco grades), 16-inch steel wheels with covers (LE and S), 16 inch aluminum wheels (LE), a 16-inch aluminum design unique to the Eco grade and 17-inch alloy wheels unique to the S grade. The wheels help emphasize the character of each Corolla model, with the most fuel-economy-focused Corolla LE Eco wearing 15-inch wheels with covers shod in low rolling resistance 195/65R-15 rubber. At the other side of the Corolla spectrum is the sportiest grade of Corolla S that wears impactful available 17-inch alloy wheels covers in more performance oriented 215/45R-17 rubber. The 16-inch wheels used for the LE (both the steel and aluminum) and the 16-inch aluminum aero-wheel for the LE Eco model all use a 205/55R-16 tire.

Gallery of 2014 Corolla Wheels

		 
15-inch wheel cover for steel wheel – L and Eco grade	16-inch wheel cover for steel wheels – LE grade	16-inch Alloy wheel –LE grade

		
16-inch aerodynamic alloy wheel – Eco grade	16-inch wheel cover- Corolla S	17-inch alloy for S grade

The 2014 Corolla will elevate the consumer’s experience for the world’s most popular sedan with modern, expressive styling, a more premium interior experience, improved fuel economy and performance, and a strong menu of available features. Vehicle pricing, final grade content, and option packages will be made available closer to launch timing.