2004 Honda Accord Coupe : Model Overview

INTRODUCTION
The seventh-generation Honda Accord moves the Accord lineup to new levels of style, sophistication and performance. Both the Accord Sedan and Coupe have been designed and engineered for high intermediate class standards in the areas of performance, ride and handling, and comfort in sporty, driver-oriented packages.

MARKETING POSITION
Accord’s development team targeted not only traditional competitors, but also upscale European cars in terms of design, engineering and “emotional appeal” in an effort to move Accord to advanced levels of sophistication and performance. Underscoring this direction is a sporty V6-powered Accord Coupe with 6-speed manual transmission.

The Accord model line represents the finest selection of Accord sedans and coupes ever produced. The Accords are intended to excel in key areas of performance, handling, and interior and exterior design, while providing value and durability, quality and reliability (DQR) that have made the Accord brand a popular choice of North American consumers the past 25 years.

Top Competitive Models

<table>
<thead>
<tr>
<th>Coupe V6 (Primary)</th>
<th>Coupe V6(Secondary)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toyota Solara V6</td>
<td>BMW 3 Series</td>
</tr>
<tr>
<td>Pontiac Grand Prix 2D</td>
<td>Oldsmobile Alero</td>
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<tr>
<td>Mercury Cougar</td>
<td></td>
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<tr>
<td>Plymouth Sebring</td>
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<table>
<thead>
<tr>
<th>Coupe L4(Primary)</th>
<th>Coupe L4(Secondary)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toyota Solara L4</td>
<td>Volkswagen Jetta</td>
</tr>
<tr>
<td>Mercury Cougar</td>
<td>Oldsmobile Alero</td>
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<tr>
<td>Toyota Celica</td>
<td>Pontiac Grand Prix</td>
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<tr>
<td>Plymouth Sebring</td>
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KEY DEMOGRAPHICS

<table>
<thead>
<tr>
<th>Gender:</th>
<th>70% Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Age</td>
<td>40 Years Old</td>
</tr>
<tr>
<td>Status:</td>
<td>70% Married</td>
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<tr>
<td>Education:</td>
<td>55% College +</td>
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<td>HH Income:</td>
<td>$85,000</td>
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<tr>
<td>HH w/ Kids:</td>
<td>25%</td>
</tr>
<tr>
<td>Occupation:</td>
<td>Professional 40%</td>
</tr>
<tr>
<td>Purchase Reasons:</td>
<td>DQR / Reputation Fun-to-Drive Exterior Styling</td>
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</table>
2004 Honda Accord Coupe: Body

BODY
When designers began work on the current generation Accord, they were looking to produce a more dynamic overall package, one with a more muscular and agile look. They chose a cheetah as their design theme, with a sleek overall body, aggressive front and muscular flanks. Their goal was to make the Accord more of an “emotional” choice for buyers with more dramatic and aggressive styling.

ACCORD COUPE STYLING
The Accord Coupe designers set out to develop a sport-oriented Accord, making a bold styling statement and further differentiating the Coupe from the Sedan. Rakish, youthful and energetic, and bearing a family resemblance to the S2000, the Accord Coupe shares some of the Sedan’s styling cues, but none of its sheet metal. Everything is unique. A high beltline, sweeping door lines and rear fenders intensify the Sedan’s theme of muscularity and vitality and convey a sensation of speed.

The exterior dimensions of the current generation Accord Coupe are nearly identical to the model it replaces (the wheelbase is the same at 2670 mm, length is 4766 mm, and width is up 26 mm to 1811 mm). Extra attention to aerodynamics resulted in a lower 0.29 drag coefficient, making it among the most slippery 5-passenger coupes available.

UNIBODY OVERVIEW
Similar to other mass-produced cars, the Accord uses a unibody design that combines the principal body panels and platforms as one welded-up assembly. The “body frame” concept is ideally suited for passenger car applications.

PRINCIPAL UNIBODY BENEFITS
- Light weight for excellent performance, responsive handling, high fuel efficiency and low emissions
- Excellent safety due to distribution of collision forces
- Incredible stiffness and rigidity for improved handling
- Excellent space utilization for maximum interior room
- Reduced use of natural resources for greater environmental responsibility

BODY RIGIDITY
The Honda Accord unibody is 27 percent stiffer in torsional rigidity than the previous generation model while maintaining the same excellent bending rigidity of the previous generation. Torsional rigidity is defined as the ability of the body to withstand twisting forces, such as when it travels over uneven surfaces or under hard cornering.

Bending rigidity is defined as the ability to withstand bending forces such as a choppy or undulating section of roadway. Using new dynamic body rigidity measuring techniques, specific areas of the body were targeted for further strengthening to eliminate localized vibrations.

These advances are important for a variety of reasons. First, a stiff unibody lowers interior noise. Because the Accord unibody flexes less, it has less tendency to produce “drumming” noises as it moves down the highway, encounters bumps or rounds curves. A stiff body structure also allows engineers to closely tune the suspension to provide optimal ride and handling qualities.

Honda carefully benchmarked the competition – the best of the intermediate car segment as well as more expensive car segments – when engineering the 2003 Accord. For chassis rigidity, Honda engineers benchmarked the BMW 3-Series, the Audi A4 and A6, and even the Mercedes-Benz S Class. In torsional rigidity, the new Accord achieved its target of surpassing
BMW, Audi and Mercedes-Benz, and is second only to the Mercedes-Benz S Class in bending rigidity.

DOORS AND DOOR SASHES
The Accord's doors and door sash structure (the formed metal structure around the door glass) played an important role in the development of the body. Engineers wanted to reduce weight as well as improve appearance and stiffness, so a manufacturing process was developed to help accomplish their goals.

Honda engineers used multi-laser blanking combined with a roll-formed outer sash to create the doors in the Accord. This process uses steel sheets of varied thickness that are first laser-welded together to form a single sheet of material. This is then stamped to create the finished part. A roll formed outer sash is then attached to create a uniquely constructed door. With the metal thickness varied throughout the part depending on the loads it needs to carry, the door structure has all the strength it needs – without carrying excess weight. The result is not only a precise door in terms of dimensional quality, but also an incredibly rigid door and sash structure – 25 percent more rigid than in the previous generation Accord – as well as 5 percent lighter.

AERODYNAMICS OVERVIEW
Body styling serves an engineering purpose, too, in the pursuit of the Accord Sedan's 0.30 Cd aerodynamic rating. This is an impressive step forward relative to the previous Sedan's Cd of 0.33.

The Accord Coupe has seen similar gains in aerodynamic efficiency, improving from 0.32 to a remarkable 0.29. The coupe's shape provides superior stability and even reduces wind turbulence outside the car so less noise is transmitted inside the car. As an added benefit, the Accord body styling also reduces the collection of dirt on portions of the body.

There are several examples of how managing airflow helps give the Accord the lowest wind noise level of any Honda passenger car ever built. Windshield wipers have been recessed, the wiper arms reshaped and the side mirrors redesigned. Other measures contributing to reduce wind noise levels include dramatically reducing the width of body seams, fairing the A-pillars into the front fenders, mounting glass flush with the surrounding body panels, and using double seals around all doors.

A-PILLAR DESIGN
The Accord dramatically smooths the airflow from the windshield to the side glass by using a three-dimensional side glass shape and a redesigned A-pillar. The result is a reduction in the "peeling vortex" created by the air moving from the windshield to the side glass, which both lowers mid- and high-frequency wind noise and helps improve side glass visibility in rainy conditions.

SIDE MIRROR DESIGN
Honda engineers also studied the airflow through the channel between the mirror and the A-pillar to refine the Accord’s side mirrors. By changing the design of the channel to an expanding V-shaped passage, the passing airstream actually decelerates as it moves across the glass. In addition, the mirror was redesigned with more of an airfoil shape. These improvements to the mirror especially help reduce high-frequency wind noise.

FRONT AND REAR SUBFRAMES
To maximize gains derived from its stronger body, both the front and rear subframes of the Accord have structural enhancements that improve ride and handling characteristics, while reducing noise and vibration.

The front subframe has hydroformed elements that substantially increase both strength and rigidity. Hydro-forming is the state-of-the-art creation of complex shapes from high-strength steel. To make Accord’s major subframe components, hydraulic water pressure forces the
steel into rigid dies (molds) under tremendous pressure. The result is a precisely made part that is stronger where necessary and precisely the right size and shape. The subframe is attached to the Accord’s body using special rubber floating mounts that minimize the amount of both road and engine noise and vibration transferred to the passenger compartment.

The rear subframe of the Accord uses rubber floating mounts, reducing road noise.

**NVH INSULATING MATERIALS**
The selection of insulating materials plays a critical part in eliminating interior noise. But the use of thick, heavy insulators can reduce interior space and add weight to a vehicle, reducing performance, handling and fuel economy. Engineers adopted a number of creative solutions, each one custom-designed for a particular area of the car.

Sound Reduction Strategies:
- Acoustic roof lining between the headliner and the roof sheetmetal is made up of layered materials including fiberglass, an adhesive layer and urethane
- Double door seals reduce intrusion of wind and road noise
- Lightweight melt-sheets used throughout the floor areas and inside the trunk
- Acoustic front fender bulkhead reduces sound made by water, front suspension, tires and road noise
- Formed urethane floor insulator in conjunction with mass-back carpet reduces road noise, vibration and harshness
- Urethane rear-wheel-housing insulator reduces road and water noise
- Hood insulator reduces engine noise
- Flush-mounted glass
- Improved aerodynamics
- Re-designed side-mirror
- New windshield wiper position and design

**SOPHISTICATED CRAFTSMANSHIP**
Moving the benchmark forward in the intermediate segment requires a high level of craftsmanship. Although the Accord already enjoys one of the finest quality reputations and highest residual values (trade-in value) in the segment, the Sedan and Coupe are designed to “up the ante” with further improvements to quality.

**Key Points:**
- Gaps have been reduced between doors and body panels (from 5.0 to 3.5 mm for the front door to fender, 5.5 to 4.0 mm for front to rear door, and 4.0 to 3.5 mm for the rear door to rear fender)
- “Zero gaps” (less than 1 mm) between bumpers and fender panels
- A near flush centre pillar (B-pillar) reduces noise through extraordinary component and assembly tolerances

**DOOR HANDLES AND LATCHES**
Honda engineers studied the door opening and closing feel and sound of top European sedans while working on the Accord’s door pulls and latches. The result is a vehicle that feels like a more expensive European car when grasping the door pull and opening or closing the door.

Pulling the handle releases the door with a smooth and quality feeling. The door opens quietly and smoothly. Closing the door produces a soft, quiet and refined sound.

Part of the credit for this extraordinary feel goes to the new door sash structures. The stiffer structure better resists the high-frequency vibration that often accompanies door closing, thereby reducing noise. There is also a new door lock mechanism, which drastically reduces lock operation noise. A new door “checker” (or door stop) and a new low-friction centre hinge also improve the door function. The result is a firm, smooth, high-quality operation.
MOONROOF
The Accord’s glass moonroof (on EX-L and EX V6 models) features a molding that is bonded to the glass. This allows for a virtually flush fit with the surrounding roof, improving appearance and reducing wind noise. The Coupe’s sunroof opening has been increased from 246 to 270 mm over the previous generation. The motor and drive mechanism have been improved for reduced operating noise. Air passing across an open moonroof can create an unpleasant situation called “wind throb” in the car’s cabin. A specially designed pop-up deflector in the new Accord moonroof controls wind-flow and results in a 10 dB reduction in “wind throb” noise in city driving at typical speeds.

MULTIPLEX WIRING SYSTEM
The Accord has numerous electronic functions (e.g. keyless entry system, auto-off headlights, traction control system) each requiring the management of electronic signals.

In a multiplex system, one wire can carry many commands simultaneously, reducing the size, weight and complexity of wiring harnesses. A uniquely “coded” signal is sent through the wire for each desired function. For instance, a single wire might carry operating commands for all four of the Sedan’s power windows. Each of these functions would be coded separately so that only the desired window would react when the button was pressed, despite the fact that every device on the circuit received the same message.

The multiplex wiring system in Accord actually consists of two networks and significantly streamlines electrical operations by reducing the size and number of wiring harnesses, lowering vehicle weight, reducing component costs, and improving durability and reliability. The Body Control LAN, or B-CAN uses a communication protocol transmitting data at 33.33 Kbps and is used to control body functions including power windows, relay modules, a “Multiple Integrated Control Unit” and turn signal assembly switch.

The Accord’s multiplex system is designed to be the most technologically sophisticated as well as the lightest and most cost efficient in the intermediate category.

MATERIAL TECHNOLOGIES
Inside and out, the Accord represents a focused effort on Honda’s part to reduce vehicle mass, while using high-quality and environmentally friendly materials. The results include better performance, reduced use of natural resources, improved fuel economy and lower emissions. With these gains, Honda aimed for the Accord to be best-in-class on all environmental levels.

Materials such as lead and polyvinyl chloride (PVC) have been dramatically reduced in the current generation Accord, replaced by thermoplastic resin components such as those used in the fuel tank. Lowering the presence of these materials in the vehicle helps the environment and improves the recyclability of the vehicle’s key components at the end of their useful service life.

TRUNK LID DESIGN
The Accord Coupe has a keyless trunk lock, which allows the trunk to be opened either with the wireless remote control or interior release. The keyless trunk lid improves both security and styling.

2004 Honda Accord Coupe : Chassis

INTRODUCTION
To develop the Accord chassis, Honda engineers took on the challenge of providing both dynamic performance and ride comfort. Balancing world-class levels of ride quality, cornering prowess, steering and braking response into one versatile intermediate-size package was no easy task. Establishing the parameters entailed benchmarking an international field of vehicles with the goal of providing a new, more exciting driving experience for Accord owners. Meeting those parameters called for enhancing some areas of the already popular Accord chassis, and
a new take on others.

The Accord retains the basic double-wishbone suspension design that has long made it a favourite. As before, the rear hardware employs an additional multi-link configuration that adds a supplemental lateral link for improved toe control.

The front sub-frame, refinements to the front suspension geometry and refinements to the rear sub-frame stiffness and suspension geometry provide a more sophisticated overall character, enhancing body control under acceleration/deceleration, high and low cornering loads and in transient maneuvers. Despite its greatly expanded dynamic envelope, these changes also yield significant improvements in both ride quality and overall isolation.

**ACCORD CHASSIS HIGHLIGHTS**

**Linear Steering**
- Rack-and-pinion power steering system incorporates an orifice-type steering damper for improved high-speed feel
- A steering kickback reduction valve improves steering feel, particularly during cornering
- Improved suspension geometry and body rigidity helps sharpen steering response

**Braking**
- Large front disc brake rotor diameters (all 4-cylinder models and V6 Coupe with manual transmission)
- Electronic Brake Distribution (EBD) on all Accord models with 4-wheel disc brakes (EX-L 4-cylinder as well as all V6 models)
- ABS is standard on all Accord models
- A Traction Control System for V6 models integrates full-range Electronic Throttle Control (ETC), reducing wheelspin and improves vehicle dynamics at all speeds
- A lightweight, high-efficiency master cylinder
- A 10-inch brake booster replaces previous 8- and 9-inch tandem setup
- Pedal feel improved – more positive action
- Pedal stroke distance reduced

**Ride, Handling and Stability**
- A powertrain mount system provides optimum NVH benefits along with ride and handling enhancements
- Revised front suspension geometry slightly lowers the roll axis and improves anti-dive/squat characteristics
- Stiffened rear sub-frame with revised geometry raises the roll axis and increases anti-lift characteristics
- Better roll/pitch control
- Large wheels and tires on most models
- Large, high-compliance bushings in front lower control arms reduce impact shocks

**ENHANCED GEOMETRY**

Improving the Accord’s dynamic capabilities entailed significant revisions to the suspension geometry. These modifications were intended to impart a more sophisticated overall character, enhancing body control under acceleration/deceleration, high and low cornering loads and in transient maneuvers as well as improving stability for cornering.

This comprehensive recalibration process involved changing control arm lengths and locating points on both ends of the car. Up front, this resulted in a lowering of the roll centre height and a lengthening of the virtual roll arm length. In the rear, roll centre height was raised and the virtual roll arm was lengthened. The rear toe curve was also modified.

Collectively these changes have transformed the Accord’s driving dynamics. With quickened steering response and with roll and weight jacking curtailed during spirited cornering, the car
feels much more planted and balanced. The revised suspension geometry paid similar dividends in reducing the Accord’s pitch tendencies. By increasing the front anti-dive/anti-squat and rear anti-lift angles, these undesirable weight transfer motions were reduced by 25 percent under braking and by 29 percent under acceleration.

**DOUBLE-WISHBONE FRONT SUSPENSION**
A key contributor to the Accord’s ride and handling balance is its front double-wishbone suspension. This latest expression of Honda’s suspension technology is an evolution from the previous Accord. The system is comprised of a large lower arm that pivots from the front subframe, with a smaller upper arm that’s positioned above the wheel and tire and wraps around the spring/damper unit to pivot on the mounts in the unibody structure.

The front suspension geometry has been reworked to impart a more sophisticated overall character, enhancing body control under acceleration/deceleration, high and low cornering loads and in transient maneuvers as well as improving stability in cornering.

**5-LINK DOUBLE-WISHBONE REAR SUSPENSION**
The Accord’s subframe-mounted 5-link double wishbone rear suspension is designed to provide precise camber and toe control, exceptional ride compliance and good space efficiency. The system consists of a series of tubular steel links that precisely position the upright that carries each rear wheel through its full suspension motion. The upper and lower links control camber when cornering, so that the tire contact patch remains flat (the optimum position for maximum adhesion) throughout the wheel’s range of movement. The lateral links compensate for the inherent toe deviation of independent rear suspensions, which tends to steer the car as it corners (roll-steer). As a result, the Accord tracks accurately around curves with no noticeable roll-steer effect.

**HIGH CAPACITY FRONT COMPLIANCE BUSHINGS**
Large compliance bushings fitted to the Accord’s front lower control arms help improve overall comfort by allowing significantly more fore and aft movement in the front suspension. On small bumps, pavement seams and patches, the performance of these new bushings is a critical component of overall ride quality and road isolation.

**RACK AND PINION STEERING WITH IMPROVED STABILITY AND REDUCED KICKBACK**
The Accord’s well-weighted and highly responsive power rack-and-pinion steering system provides an exceptionally linear and consistent feel regardless of pavement conditions. The Accord’s power assist is steering-torque sensitive; hydraulic boost is applied to the system in direct proportion to the amount of force (torque) created between the tire and the road as the wheel is steered. As the force increases, the system increases the amount of power assist accordingly. Regardless of speed, an increase in effort is countered by an increase in boost (for example, if the wheels encounter a rough surface with a greater coefficient of friction).

To provide the Accord’s steering with a high level of useful feedback without excessive harshness, the system incorporates two features. The first is a steering damper that smoothes the level of assist provided by the power steering pump, with the benefit of improved steering stability at higher speeds and an improved “feel” throughout all speeds.

A kickback reduction valve also has been added to reduce harsh feedback felt through the steering wheel over rough or uneven surfaces, especially during cornering. With conventional steering systems, steering kickback increases in intensity as lateral g-forces and steering torque increase. The Accord’s system substantially reduces the rate of kickback increase.

**UPGRADED BRAKING SYSTEMS**
Stopping power has been enhanced across the Accord lineup. In addition to multiple hardware refinements that enhance stability and help trim braking distances, both the Sedan and Coupe now boast best-in-class pedal feel and stroke. ABS has been made standard equipment on all Accords.

Other key changes include a single, high-efficiency 10-inch booster in place of the 8-inch/9-
inch tandem unit used previously; a lighter, more efficient master cylinder; and a new front disc package with increased rotor sizes. On 4-cylinder Accords, the diameter dimension rises from 259 to 282 mm, equal to that found on automatic transmission V6 models. That spec jumps from 282 to 300 mm on the V6 Coupe equipped with the 6-speed manual transmission.

Precision optimization of mechanical and hydraulic pressure ratios in the new system yields major improvements to the pedal feel and stroke under both low- and high-effort stopping situations. Brake stroke on the Accord has been reduced by 11 percent compared to the previous generation.

**ELECTRONIC BRAKE DISTRIBUTION (EBD)**
The EBD system used with 4-wheel disc brakes (EX-L 4-cylinder as well as all V6 models) complements the function of the ABS by adjusting braking force front-to-rear depending on passenger (or cargo) positioning to deliver enhanced stability and stopping performance. When brake force is applied, the ABS computer's EBD function estimates the proper distribution of braking pressure based on the difference between the front wheel and rear wheel speeds.

Hydraulic pressure to the rear wheel brakes is adjusted via the oil pressure controlling actuator. With a heavy payload under hard braking, the maximum amount of braking force is applied to the rear wheels.

**V6 TRACTION CONTROL SYSTEM (TCS)**
A state-of-the-art traction control system is standard equipment on all V6 Accords. Computer controlled and driver-selectable, this TCS improves the Accord’s handling, stability and traction at all speeds and with all types of low-grip road conditions. Unlike the previous system that only interfaced with the Accord’s ABS circuitry at speeds under 40 km/h, this generation TCS also incorporates full-range throttle control that prevents undesirable wheel-spin regardless of vehicle velocity and extends active braking control up to 85 km/h.

**INCREASED TIRE SIZES**
To take full advantage of their improved dynamic capabilities, all Accords are now fitted with more performance-oriented all-season tires that enhance ride and handling characteristics. These upgrades appear on both 4-cylinder and V6 models.

The most dramatic change is found on the EX V6 Coupe, which is equipped with four 215/50R17 tires when fitted with the 6-speed manual transmission.

<table>
<thead>
<tr>
<th>Accord Coupe Tire Sizes</th>
<th>Accord Coupe Tire Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Current Generation</td>
</tr>
<tr>
<td>LX-G 4-cylinder</td>
<td>P205/65R15</td>
</tr>
<tr>
<td>EX-L 4-cylinder</td>
<td>P205/60R16</td>
</tr>
<tr>
<td>EX V6</td>
<td>P205/60R16</td>
</tr>
<tr>
<td>EX V6 6MT</td>
<td>P215/50R17</td>
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**2004 Honda Accord Coupe : Interior**

**INTRODUCTION**
For the current generation Accord, Honda designers wanted to bring new levels of style and sophistication to the interior, and to incorporate “emotion” into the Accord’s interior.

Designers worked extensively to reach their design goals. They sought to blend driver-oriented features with information-oriented technologies and they used many subtle cues to
transform the Accord’s interior from that of its predecessor.

The proportions and relationships are new, with a higher beltline and more prominent dashboard lending a feeling of substance and solidity. Dramatically more supportive seating with tilt and telescoping steering provide a fresh driving position aimed at making Accord the fun-to-drive standout in its class. There’s also more useful space and more storage throughout the cabin.

The technology is apparent as soon as you enter the vehicle, embodied in the instrument faces, which are illuminated by LEDs and present a dark appearance when the car is at rest. Audio systems were upgraded. EX-L and EX V6 models have separate temperature controls for left- and right-side front seat occupants. To open up more storage space, the functions of the audio head unit and climate control unit (HVAC) were consolidated into a single, easy-to-use display.

The Accord interior also exhibits Honda’s trademark attention to function and utility and the thoughtful features that have come to separate Honda from its competitors.

**INTERIOR DIMENSIONS**
While interior volume is virtually identical to the old car, the next generation Accord has more useful space in many key areas. Front and rear headroom have been increased, and there is now greater clearance between the passenger’s head and outer roof rails. The driver has more knee room, while the front seat passenger has more foot room.

<table>
<thead>
<tr>
<th>Accord Coupe Interior Dimensions</th>
<th>Current Generation</th>
<th>Previous Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headroom, front/rear, mm (in.)</td>
<td>1011 / 917 (40.4 / 38.5)</td>
<td>966 / 928 (40.0 / 37.6)</td>
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<tr>
<td>Legroom, front/rear, mm (in.)</td>
<td>1089 / 815 (42.6 / 36.8)</td>
<td>1083 / 823 (42.1 / 37.9)</td>
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<tr>
<td>Shoulder Room, front/rear, mm (in.)</td>
<td>1424 / 1408 (56.9 / 56.1)</td>
<td>1423 / 1408 (56.9 / 56.1)</td>
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<tr>
<td>Hip room, front/rear, mm (in.)</td>
<td>1376 / 1172 (54.6 / 53.4)</td>
<td>1324 / 1171 (54.9 / 54.1)</td>
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<tr>
<td>Interior Volume</td>
<td>2942 L (117 cu. ft.)</td>
<td>2941 L (116 cu. ft.)</td>
</tr>
<tr>
<td>Passenger Volume</td>
<td>2608 L (103 cu. ft.)</td>
<td>2888 L (102 cu. ft.)</td>
</tr>
<tr>
<td>Trunk Volume</td>
<td>371 L (14 cu. ft.)</td>
<td>385 L (14 cu. ft.)</td>
</tr>
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**ACCOMMODATING DRIVING POSITION**
The current generation Accord’s driving position was totally revised in pursuit of enhanced comfort and control. During development of the car, a three-continent research project revealed key driving position dimensions that work well for a wide range of drivers. This data was used to develop a more adjustable driving position for the Accord, which is more comfortable and adaptable than ever before.

Relative to the previous Accord, the steering wheel has been tilted towards the driver by 4 degrees and raised 20 mm. The steering column is now aligned ideally with the driver’s body, instead of being slightly offset laterally. In addition, the steering wheel telescopes 40 mm, while retaining its previous tilt feature. By releasing a single steering column-mounted lever, the driver can position the steering wheel as desired.

**SEATING FEATURES AND TECHNOLOGY**
Besides reducing driver fatigue on long trips, the Accord’s front bucket seats improve the driving posture and better stabilize the body to create a more secure feeling when cornering, accelerating or braking. The cushion design and material were designed to reduce vibration. EX-L and EX V6 models have a new Shukra-type adjustable lumbar support mechanism that
fits the body more comfortably, without the noticeable edges found with some conventional plate-type adjustable lumbar support systems.

**IMPROVED MANUAL SEAT HEIGHT ADJUSTMENT MECHANISM**
Front bucket seats in LX-G models have a lever-operated, ratchet-type seat height adjustment. Compared to knob-type height adjusters, the system requires less effort and more precise positioning. The seat's vertical travel is 40 mm.

**ACCORD COUPE INTERIOR PACKAGING**
With unique buyers and unique mission, the interior of the Accord Coupe builds on the concepts developed in the four-door Sedan. The instrument binnacle is high to create a stronger feeling of personal space, while the driving position is low for a sportier feel.

**ACCORD COUPE FRONT BUCKET SEATS**
In keeping with the Accord Coupe’s more sporting nature, the front seats have a specially modified bolster shape to provide more even more support during cornering. The open front headrests are also unique to the Coupe. To improve access into the rear seats compared to the previous-generation Accord Coupe, the current model has a revised forward tilt mechanism. In the past, the amount of forward tilt of the backrest for passenger entry was determined by the recline setting of the seatback. This system provides the full amount of forward tilt, regardless of the angle of backrest recline.

**FLAT CARPET**
To improve the sense of craftsmanship of the floor surface, the Accord utilizes a formed urethane insulator to allow the carpet surface to be perfectly flat. Thicker than the cushion in the previous generation Accord, the molding integrates the front seat mounting rails for a more finished appearance and helps improve sound deadening and the airflow efficiency of the heater.

**LED INSTRUMENTATION**
Supporting the Accord’s driver-oriented nature are large LED instruments that are easy to read and rich in appearance. These types of LED meters have never been used before in a car in this price range, and are typically found in vehicles with a higher Manufacturers Suggested Retail Price.

Standard analog instrumentation includes a large format speedometer, 0-8500 rpm tachometer, fuel and coolant temperature gauges. EX-L and EX V6 models have an outside temperature indicator as part of the odometer/tripmeter digital display.

**INTERIOR LIGHTING**
Enhancements to interior illumination provide added visibility in the current generation EX interior. The console is illuminated at all time by an overhead light that bathes the console in a subtle glow. The power window switches in all four doors are also internally illuminated.

Accord’s instrument system uses progressive illumination to establish a "dialog" with the driver. When the door is opened, the instrument brightness clicks on at 10 percent – a "welcome" for the driver. When the key is put in the ignition, the illumination ramps up to 100 percent in one second. When the ignition is turned on, the illuminated instrument needles and annunciator lights come on, indicating all systems are go.

After the drive, the process reverses itself. When the ignition is turned off, the instrument lights dim to 10 percent brightness over the course of one second. When the key is taken out of the ignition, the lights dim to zero in one second. The entire process is purposely subtle, but illustrates the level of detailed engineering built into the Accord’s interior.

**AVAILABLE DUAL-ZONE CLIMATE CONTROL**
Standard in leather-equipped 4-cylinder EX-L models and all EX V6 models is a dual-zone climate control system. Easy-to-use rotary temperature knobs are positioned within
easy reach of each front seat occupant. The selected temperature for each side appears in the central audio/climate control display.

**ONE-TOUCH MAX A/C**
In Accords with manual climate control systems (all DX, LX-G and LX V6 versions) a one-touch "MAX A/C" button makes it easy to cool the interior quickly, without having to manually select "A/C" and recirculate.

**EXPANDED INTERIOR STORAGE**
A sliding armrest, which adjusts fore and aft to suit different sized drivers and front seat passengers, highlights the expanded list of interior storage choices. Even when extended forward its full 80 mm, the armrest still provides enough clearance for the cupholder to accommodate a large-size beverage cup. Inside, the console has coin storage and includes hooks for a cell phone cord to prevent it from being caught when the lid is closed. With the integration of audio and climate controls into a single unit, additional storage has been created. Up to 12 CDs can be stored in the lidded compartment immediately below the audio/HVAC unit. Even the size of the overhead sunglass holder has been increased over the previous generation.

**INTEGRATED SWITCH CONTROLS**
For enhanced styling and functionality, the cruise control switches and audio controls (EX-L, LX V6 and EX V6 models) are an integral part of the steering wheel design instead of the previous style attached to the side of the wheel.

Special care was taken to insure that all switches used throughout the Accord cabin have a uniform quality and tactile feel. Switches on the instrument panel and door panels have complimentary force levels and strokes.

**ENHANCED KEYLESS ENTRY SYSTEM**
The remote keyless entry system offers features more commonly found on more expensive vehicles. Functions formerly relegated to a remote entry key fob have been expanded and are also integrated into the head of the Accord’s high security "wave" ignition key itself. **All the windows can be opened remotely, along with the usual door lock/unlock functions.** With an FM superheterodyne signal, the remote has improved resistance to interference from strong electrical fields such as pager bases or aviation communications.

The remote is also simple to use. A single push of the "unlock" button unlocks the driver’s door. A second push unlocks all the doors. Push the unlock button down again for more than one second continuously, and all the power windows begin to lower, an added feature that is particularly useful for hot, sunny days. Release the button, and the windows stop. Similar functions can be accomplished with the ignition key inserted in the door lock. Like previous models, turn the key to the unlock position once and the driver’s door unlocks. Return it to the normal position and then back to the unlock position and all the doors unlock. In addition, hold the key in the unlock position for more than one second and the windows start to open, until you return the key to the normal position.

The key can also close the windows while in the driver’s door lock. A single turn to the locked position will again lock all the doors. A return to the normal position followed by a turn to the lock position closes the windows. Any time the key is returned to the normal position, the windows stop.

**CARGO UTILITY**
Both the Accord Sedan and Coupe have approximately the same trunk space as the models they replace. Close attention to the shape of the trunk and its access allow both cars to handle the same size and quantity of cargo items as their predecessors. A lower lift-over design for the Coupe eases loading and unloading.
UPGRADED AUDIO SYSTEMS
The Accord features three different audio systems to suit differing buyers and price points. DX and LX-G models have AM/FM/CD head units with 120 watts of power. The DX model has four speakers while LX-G, EX-L, LX V6 and EX V6 models have six speakers. Compared to the previous Accord, the front speakers are upgraded with Neodymium speaker magnets and polypropylene cones, and the tweeters have been improved for frequency response.

Five-point parametric equalization helps tune each system’s frequency response to the unique acoustic properties of the Accord’s interior to deliver fuller, more accurate sound quality. Relative to the previous generation Accord, the current system advances sound quality on all fronts, most notably in the high and mid frequencies.

EX-L, LX V6 and EX V6 models adds an in-dash 6 CD changer to the AM/FM system in place of the single CD unit, along with Neodymium magnet/polypropylene cone 6 x 9” rear speakers for reduced distortion with superior accuracy and increased bass power and clarity.

For superior sound performance, the Accord V6 Coupe with 6-speed manual transmission is equipped with a special Premium Audio System. This system features an AM/FM/6-disc, in-dash CD changer with a high-power amplifier that delivers 180 watts. Twin-Neodymium speakers with polypropylene cone woofers and soft dome tweeters are used up front, with twin 6 x 9” Twin-Neodymium polypropylene cones in back.

All the Accord systems feature 2-band compression that improves the sound quality at low volume settings. Since some audio system frequencies are masked by vehicle noise, this digital sound compression boosts select frequencies and reduces others. The result is clearer, more balanced audio at low listening levels.

2004 Honda Accord Coupe : Powertrain

2.4-LITRE 4-CYLINDER
Power
- Displacement increase from 2.3-litres to 2.4-litres vs. previous generation 4-cylinder
- 160 horsepower (+10 horsepower / 7% increase vs. previous generation 4-cylinder)
- 161 lb.-ft. of torque (+9 lb.-ft. / 6% torque increase vs. previous generation 4-cylinder)
- VTEC system incorporates Variable Valve Timing and lift Electronic Control (VTEC) with Variable Timing Control (VTC) for continuous variable phasing of the intake camshaft
- Internal balance shaft for additional smoothness
- Improvement in fuel economy based on estimated figures

Emissions
- High-efficiency rear-facing exhaust manifold/pipe structure reduces the distance to the catalytic converter for more effective operation
- Addition of a Linear Air Fuel ratio sensor to all variations assures air/fuel control
- Increased VTEC swirl ratio
- Internal Exhaust Gas Recirculation (EGR) effect (new i-VTC technology)
- Air Assist Injector reduces Hydrocarbon levels on cold starts

Noise, Vibration and Harshness
- Rigid block and pan assembly
- Dual balance shafts
- Silent cam chain drive

3.0-LITRE V6
Power
- 240 horsepower (+40 horsepower / 20% increase vs. previous generation V6)
- 209 lb.-ft. of torque (+16 lb.-ft. / 7% torque increase vs. previous generation V6)
- Compression ratio increases to 10.0:1 from 9.4:1 vs. previous generation V6
- 3-rocker VTEC system
- Electronic Throttle Control (ETC) system
- High-inertia intake manifold design
- Regular unleaded gasoline
- High-flow/low-restriction exhaust system cuts back pressure by 30%

Emissions
- (all models meet the new LEV II LEV, Tier 2 – Bin 5 standards)
- Close-coupled catalysts for fast light-off
- Addition of a Linear Air Fuel ratio sensor assures precise air/fuel control

Noise, Vibration and Harshness
- An engine mounting system also benefits ride and handling
- Rigid engine block

TRANSMISSIONS
5-Speed Automatic Transmission for 4-Cylinder Engines
- Replaces previous generation 4-speed automatic
- Lightweight, compact design
- Enhanced performance and shift feel
- Direct electronic control and control-logic circuitry
- High-efficiency, ultra-thin torque converter
- Optimized gear ratios
- Second-generation Active Lockup torque converter contributes to improved fuel economy
- Grade Logic circuitry

A 5-Speed Automatic Transmission with V6 Engine
- Replaces previous generation 4-speed automatic
- Lightweight, compact and high torque design
- Wide ratio range optimizes total performance and fuel economy
- Integration with the Electronic Throttle Control (ETC) system provides enhanced shift quality
- ATF temperature sensor allows temperature compensation for even smoother shifts
- Low one-way clutch
- Grade Logic circuitry

A 5-Speed Manual Transmission with 4-Cylinder Engines
- Lighter and more compact than the previous generation gearbox
- Smooth, quiet operation
- Light shift feel with short throws
- Multi-cone synchronizers on first through fourth gears
- Low-effort clutch with short pedal stroke
- Optimized gear ratios

A 6-Speed Manual Transmission for V6 Coupe
- Compact, lightweight design
- Precise, short-throw shifting action
- Dual mass flywheel
- Self-adjusting clutch
- Close-ratio gears enhance performance
- Multi-cone synchronizers on 1st through 4th gears
- Synchronizer applied to reverse gear

### 4-CYLINDER ENGINE OVERVIEW
Representing the state-of-the-art combination of performance, economy and ultra-clean operation, the Accord’s standard 2.4-litre i-VTEC engine is a showcase of Honda’s latest technologies. Building on the solid foundation of the original VTEC design, this latest 16-valve i-VTEC engine transforms the character of the 4-cylinder Accord, providing unprecedented levels of acceleration and fuel efficiency with minimal tailpipe emissions.

This strong running engine equals or betters the old engine’s peak torque figure over an impressive 3000-rpm range. **Even though it develops significantly more horsepower (+7%) and torque (+6%), this engine also meets stringent LEV II LEV Tier 2 – bin 5 emission standards.**

This compact and lightweight 4-cylinder engine comes well prepared to serve as the powerplant of choice for roughly 70 percent of Accord buyers. Fitted with internal balance shafts for additional smoothness and cast-in iron cylinder liners to enhance durability, it is designed from the start to deliver years of trouble-free operation. **Except for inspections and fluid changes, the first scheduled maintenance is not required until 168,000 kilometers.**

<table>
<thead>
<tr>
<th>Engine Comparison: Current Generation vs. Previous Generation</th>
<th>Current Generation</th>
<th>Previous Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine</td>
<td>In-Line 4 DOHC i-VTEC</td>
<td>In-Line 4 SOHC VTEC</td>
</tr>
<tr>
<td>Displacement</td>
<td>2354cc</td>
<td>2254cc</td>
</tr>
<tr>
<td>Compression Ratio</td>
<td>9.7:1</td>
<td>9.3:1</td>
</tr>
<tr>
<td>Fuel Type</td>
<td>Regular Unleaded</td>
<td>Regular Unleaded</td>
</tr>
<tr>
<td>HP</td>
<td>160 hp @ 5500 rpm</td>
<td>150 hp @ 5700 rpm</td>
</tr>
<tr>
<td>Torque</td>
<td>161 lb.-ft. @ 4500 rpm</td>
<td>152 lb.-ft. @ 4900 rpm</td>
</tr>
<tr>
<td>Transmission</td>
<td>5MT/ 5AT</td>
<td>5MT/ 4AT</td>
</tr>
<tr>
<td>City/Highway L/100 km</td>
<td>9.8 / 7.1 (AT)</td>
<td>10.2 / 7.1 (AT)</td>
</tr>
<tr>
<td>Emissions Certification</td>
<td>LEV II LEV</td>
<td>LEV I LEV</td>
</tr>
</tbody>
</table>

### KEY 4-CYLINDER ENGINE TECHNOLOGIES
The 2.4-litre Accord engine incorporates a host of advanced technologies, highlighted by the adoption of Honda’s latest i-VTEC (“intelligent”) valve-control system. Developed from technology initially seen in the world of Formula One racing, Honda’s original VTEC (Variable valve Timing and lift Electronic Control) system changed the valve lift, timing and duration to suit the engine’s running condition.

With continuous phase adjustment of the intake camshaft, i-VTEC adds VTC (Variable Timing Control) to the mix. This latest enhancement, first used on the Acura RSX and also found on
the new Honda CR-V and Civic SiR, provides further improvements to power and torque figures while optimizing overall operating efficiency and minimizing tailpipe emissions.

With its greater output, the i-VTEC engine provides the new Accord with better total performance under all types of driving conditions and terrain.

**With all-aluminum construction and a 16-valve DOHC design, the 2.4-litre Accord develops 160 horsepower at 5500 rpm and 161 lb.-ft. of torque at 4500 rpm.** The combination of VTEC technology with the VTC provides the engine with even stronger low- and mid-range power as well as a robust high end.

The “intelligent” variation on the basic theme retains the original VTEC hardware that permits the optimization of valve lift and duration as the engine transitions from low-speed to high-speed operation, while adding the ability to continuously vary phasing of the intake cam based on both rpm and load factors. The net result is optimized idle stability, emissions, torque and power.

To further improve its operating efficiency, the engine has been rotated 180 degrees from the previous generation Accord 4-cylinder. This change permits the catalytic converter to be mounted closer to the exhaust manifold (now on the rear side of the engine), which promotes quicker light-off and thereby helps further reduce cold-start emissions.

**CYLINDER HEAD AND VALVETRAIN**
The i-VTEC engine is crowned by a compact, lightweight cylinder head made of pressure-cast aluminum alloy. Its 4-valve-per-cylinder design has double overhead camshafts activated by a silent chain drive to ensure extremely precise control of the cam phasing. The cam drive is maintenance-free throughout the life of the engine. The combustion chamber is designed with a relatively large “squish” area that promotes faster flame propagation on the ignition stroke. This results in more complete burning of the air-fuel mix and subsequently, lower levels of Carbon Monoxide and Hydrocarbon emissions.

**4-CYLINDER i-VTEC**
Ushering in an era of performance technology, Honda’s original VTEC (Variable Valve Timing and Lift Electronic Control) was elevated to a new plateau with the introduction of i-VTEC. This “intelligent” form of the highly effective VTEC package adds a new element to the mix in the form of VTC (Variable Timing Control), which provides for continuously variable phasing of the intake camshaft.

The formidable pairing of VTEC and VTC results in several major improvements to drivability, including more horsepower and torque at lower rpm levels, enhanced fuel economy and significantly lower emissions.

The VTEC system on the new 2.4-litre DOHC 4-cylinder employs two rocker arms with friction-reducing roller followers for each pair of intake valves, along with an intake cam that has separate lobes configured to optimize both low- and high-speed operation. Depending on engine load and rpm, an electronic controller determines which cam profile will be used and exactly how each intake will operate.

At low revs, where low lift and shorter duration provide optimal operation, the timing of the two intakes is staggered and the lift asymmetrically skewed in favour of the primary valve. This helps to create a swirl effect within the combustion chamber that increases the efficiency of the burn process.

At higher rpm, a hydraulically actuated spool valve causes a locking pin to engage the secondary rocker arm with the primary one, transitioning the secondary valve into a high-lift/long-duration mode that improves output on the top end.

VTC allows the timing of the intake camshaft to be continuously varied throughout the engine’s entire rpm range. Along with helping boost power, VTC also provides a more stable
idle (allowing idle speed to be reduced) and reduced pumping losses by effectively creating an internal Exhaust Gas Recirculation (EGR) effect at low and mid engine speeds.

The result is increased fuel economy and lowered NOx emissions. Operation of the VTC is electronically controlled and is determined by input from sensors that monitor rpm, timing, throttle opening, cam position and exhaust gases.

Depending on the above-listed conditions, VTC can vary the phasing of the intake cam (change its position relative to the crankshaft) by +/- 25 degrees. VTC activation is accomplished hydraulically via a spool valve that sends high-pressure oil to passages in the cam’s drive sprocket.

At idle, the timing is almost fully retarded to minimize valve overlap. In normal highway driving, the intake camshaft is advanced to provide overlap for EGR effect. With the throttle wide open, valve timing starts in an advanced position at lower rpm and continuously changes to a retarded position when redline is approached. This allows optimum cylinder scavenging and pumping efficiency and provides outstanding power and torque throughout the rpm range.

**ENGINE BLOCK, CRANKSHAFT AND OIL PAN**
The 2.4-litre engine uses a two-piece, die-cast aluminum block and bearing cap design that helps maximize strength and rigidity while minimizing noise and vibration. The compact upper element features cast-in iron cylinder liners for outstanding durability while the lower element consists of a single-casting crankshaft carrier fitted with ferrous-carbon bearing-cap inserts that add to its overall structural rigidity. Each journal on the forged-steel crankshaft is micropolished to help reduce internal friction and improve durability.

**FUEL INJECTION**
The Accord V6 is fitted with the latest iteration of Honda’s sophisticated Programmed Multi-Port Fuel-Injection (PGM-FI) system. It’s controlled by a 32-bit microprocessor that uses a comprehensive array of sensors to monitor throttle position, intake manifold pressure, coolant temperature, intake air temperature, atmospheric pressure and the oxygen content of the exhaust gases, as well as the relative positions of the camshafts and crankshaft. Based on the input it receives, the PGM-FI signals an efficient multi-orifice injector for each cylinder to introduce the proper amount of atomized fuel at the precisely timed instant to ensure ideal combustion. Internal feedback circuitry allows the PGM-FI to custom match its real-time operation to accommodate the specific air-fuel conditions that exist in each individual cylinder.

**INTERNAL BALANCE SHAFTS**
To improve smoothness throughout the rpm range and help lower noise levels, the Accord 4-cylinder is fitted with an internal balancer unit. Consisting of a pair of chain-driven counter-rotating shafts located in the oil pan, the balancing system helps quell the inherent second-order harmonic vibrations that normally impact in-line 4-cylinder engines.

**SERPENTINE DRIVE BELT**
The Accord 4-cylinder uses a single, serpentine belt to operate all of the engine’s accessory drives. In addition to saving space compared to the dual-belt system used on the previous four, this maintenance-free component features an integral auto tensioner.

**EXHAUST SYSTEM**
A high-efficiency exhaust system and a high-density catalytic converter helps the 4-cylinder engine meet stringent Tier 2 – Bin 5 LEV II LEV emissions certifications. Both of these components function more effectively as the result of the engine having been rotated 180 degrees in the bay.

Exhaust gases pass through a low heat-mass/dual-wall stainless steel manifold as they now exit the “downstream” side of the engine via a double-walled pipe, that also helps limit heat loss.

The combination of higher relative temperatures and a more direct path to the catalytic
INTELLIGENT ECU
The ECU on the i-VTEC engine is now fitted with an on-board data recorder that constantly monitors operation of both the automatic transmission and fuel-injection circuitry.

The system is unique in that it tracks operating parameters before and after a fault occurs, which makes troubleshooting much simpler. The data stream can be downloaded into a diagnostic analyzer at the dealer, where the cause can be identified and proper corrective action taken.

EXHAUST SYSTEM WITH COMPACT SILENCER
The exhaust system of the i-VTEC powered Accord is designed to deliver both functional and cosmetic benefits. Several elements contribute to a reduction in total system weight.

These include shortening the engine-to-tailpipe distance (as the result of rotating the engine 180 degrees), eliminating a tailpipe connector flange and adopting a new design for the resonator.

Lighter and more compact than the previously fitted unit, the silencer uses a “pipe turn” internal configuration that helps attenuate exhaust noise levels by 5-7 dB. The narrower cross section also permits the bumper fascia to be lowered by 25 mm, thereby providing a cleaner appearance to the rear of the car.

V6 ENGINE OVERVIEW
The Accord’s 24-valve V6 engine shares several basic design elements with its predecessor, including a 60-degree/3.0-litre configuration. But a host of technological advances makes it significantly more powerful, more fuel efficient and with lower emissions.

The V6 engine is nearly 9 kg lighter and 25 mm shorter than the previous generation V6. A 3-rocker VTEC system replaces the two-rocker version used in the previous engine. It develops 20 percent more horsepower and 7 percent more torque, using regular unleaded gasoline.

Honda engineers designed the V6 engine to require only minimal care throughout its lifetime by incorporating components like platinum-tipped spark plugs and a space-saving, self-tensioning serpentine accessory drive belt. Except for periodic inspections and normal fluid replacements, the V6 engine requires no scheduled maintenance until the 168,000-km mark. **Even oil changes are scheduled for every 6,000 km.**

<table>
<thead>
<tr>
<th>V6 Engine Comparison</th>
<th>2004 Accord</th>
<th>Previous Generation Accord</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine</td>
<td>60º V6SOHC VTEC</td>
<td>60º V6SOHC VTEC</td>
</tr>
<tr>
<td>Displacement</td>
<td>2997cc</td>
<td>2997cc</td>
</tr>
<tr>
<td>Compression Ratio</td>
<td>10.0:1</td>
<td>9.4:1</td>
</tr>
<tr>
<td>Fuel Type</td>
<td>Regular</td>
<td>Regular</td>
</tr>
<tr>
<td>HP</td>
<td>240 hp @ 6250 rpm</td>
<td>200 hp @ 5500 rpm</td>
</tr>
<tr>
<td>Torque</td>
<td>211 lb.-ft.@ 5000 rpm</td>
<td>195 lb.-ft.@ 4700 rpm</td>
</tr>
<tr>
<td>Transmission</td>
<td>5AT</td>
<td>4AT</td>
</tr>
<tr>
<td>Expected City/Highway L/100 km</td>
<td>11.2 / 7.8</td>
<td>11.6 / 7.8</td>
</tr>
</tbody>
</table>
KEY V6 ENGINE TECHNOLOGIES
Several key changes to the induction system, exhaust system, and valvetrain combine with a significant increase in the compression ratio to generate major output gains in the current generation Accord V6. Primary contributors on the intake side include a high-inertia manifold, a large and electronically controlled throttle body and precise measurement and control capabilities for both air and fuel. These features account for about one-third of the additional 40 horsepower the current V6 engine pumps out.

On the downstream side, high capacity components throughout the entire exhaust system increase the flow rate by 30 percent and are responsible for another third of the overall power increase. The remaining output gains result from improvements in combustion efficiencies derived from larger intake valves, the 3-rocker VTEC system (replacing a two-rocker design), and a bump in compression ratio from 9.4:1 to 10.0:1.

Several factors work together to help the V6-powered Accord achieve improved fuel economy. A more precise electronic knock control system permits the boost in compression ratio.

The wider gear ratio range of the 5-speed automatic transmission boosts operating efficiency and also reduces internal friction. Improved aerodynamics also contributes to improving fuel economy.

Numerous innovative features contribute to the V6 engine’s low emissions status, including an advanced fuel injection management system, and unique “unified” exhaust manifold and cylinder head design with close-coupled catalytic converters. This sophisticated system features an ultra-precise linear airflow sensor in addition to a conventional Oxygen sensor in the secondary under-floor converter. The engine also incorporates an electronic EGR system that helps minimize NOx emissions.

CYLINDER HEADS WITH INTEGRAL EXHAUST MANIFOLDS
One of the most innovative aspects of the Accord V6 is the design of its cylinder heads. Made of pressure-cast, low-porosity aluminum, these lightweight components have tuned exhaust manifolds as integral parts of the casting, a unique feature that improves overall packaging and permits optimal positioning of the primary close coupled catalytic converters.

While the V6 maintains the basic SOHC design, 4-valves-per-cylinder and VTEC, configurations, refinements significantly boost operating efficiencies. As before, each camshaft is inserted into the head from the front of the engine – an approach that saves weight and complexity by eliminating the need for bolt-on cam caps. And the crankshaft still drives each cam via a fiberglass-reinforced toothed timing belt. However, the diameter of the intake valves has been increased to improve breathing and the ports have been reconfigured to more ideally match the flow characteristics of the new, high-inertia intake manifold.

Finally, the VTEC (Variable valve Timing and lift Electronic Control) system has been changed from a 2-rocker to a 3-rocker design for improved throttle response at low rpm and increased top-end power.

3-ROCKER VTEC SYSTEM
Honda used expertise gained from its successful racing programs to develop the innovative VTEC system more than a decade ago. Since then, various forms of VTEC have become familiar features on many of Honda’s engines. VTEC makes it possible to vary the relative timing and lift of the intake valves to optimize overall performance, netting good low-end torque as well as improved high-end horsepower.
Basic operation of the 3-rocker VTEC setup used on the 2003 Accord’s V6 is similar to that of the 2-rocker version used on the DOHC 4-Cylinder, where rocker arms fitted with low-friction roller followers actuate the intake valves.

The heart of the VTEC system is a unique camshaft and rocker arm system. For each cylinder’s set of two intake valves, there are three rocker arms and three corresponding lobes on the camshaft. The two outboard lobes each have a profile maximizing cylinder swirl to suit low- to mid-rpm operation. The third or centre cam lobe has a dramatically different profile designed for longer duration and higher lift. This lobe profile is designed to optimize breathing and horsepower production at high engine speeds.

At low engine rpm, the outboard lobes operate the valves. During high-speed operation the VTEC computer sends a signal to a spool valve, which in turn delivers engine oil pressure to small pistons in the rocker arms. Oil pressure causes the pistons to move, locking all three rocker arms together. Once locked, the rocker arms are forced to follow the centre cam lobe, increasing top-end performance. The crossover from low lift to high lift occurs in 0.1 seconds and is virtually undetectable to the driver.

ENGINE BLOCK
At the core of the Accord’s lightweight V6 is an exceptionally strong, rigid aluminum-alloy block that employs cast-iron cylinder liners to enhance durability. Die-cast and heat-treated, the block has a high natural resonant frequency and an optimal 60-degree V-angle, features that contribute to the engine’s inherently smooth, quiet operation as well as to its relatively compact size. A short deck height also improves its overall packaging efficiency.

CRANKSHAFT, CONNECTING RODS AND PISTONS
Internal components of the Accord V6 deliver an outstanding combination of efficiency and durability. The central element is an extremely rigid forged steel crankshaft with microfinished journals that minimize friction and improve durability. Compression ratio of the lightweight cast-aluminum pistons was increased to 10.0:1, up from 9.4:1 in the previous engine.

The precision-contoured piston crowns have a unique charge-centralizing design that maximizes volumetric efficiency and a large squish area that facilitates more complete combustion and leads to decreased emissions. The pistons are fitted with full-floating wrist pins to help eliminate the “slapping” noise that can occur on cold starts.

The crank and pistons are linked by compact connecting rods that employ a special weight-saving, direct-thread fastener in place of the conventional nut-and-bolt configuration typically used on other engines.

ELECTRONIC THROTTLE CONTROL
Another factor that contributes to the world-class performance of the Accord’s V6 engine is an electronic throttle control (ETC) system. This system controls the throttle during transmission shifts for improved smoothness. It also allows for throttle control to be incorporated in the traction control system and integrates the cruise control function into the ETC. This computer controlled drive-by-wire (DBW) package is a feature that will be incorporated into other future Honda powerplants. Key system components include an accelerator position sensor, electronically controlled throttle body, DBW driver unit, and the main electronic control unit (ECU).

HIGH INERTIA INTAKE MANIFOLD
Air passing through the ETC enters through a high-inertia intake manifold with a runner design that’s specifically matched to optimize output characteristics. It features a unique plenum configuration that effectively transitions incoming air from a negative to a positive waveform. This helps create a natural supercharging effect and is designed to complement the new intake port design.
DIRECT IGNITION AND KNOCK CONTROL
Ideally balancing performance, economy and low emissions demands precise control of the spark timing as well as an effective ignition system to ensure optimum burning of the air-fuel mixture under all operating conditions. To help accomplish this goal, a sensor determines the onset of engine “knocking” and modifies spark timing before improper detonation causes damage. The system allows the engine to run with a greater amount of spark advance and a higher compression ratio than the previous V6, increasing efficiency. A compact, high-energy ignition coil positioned directly atop each respective plug bore in the cylinder head activates each spark plug in the new engine.

HIGH-FLOW EXHAUST SYSTEM WITH CLOSE-COUPLED CATALYZERS
The high efficiency exhaust system incorporates several key elements that work in concert with the engine’s uniquely designed cylinder heads to help boost performance, reduce tailpipe emissions and trim weight.

Major system components include two close-coupled primary catalytic converters, a secondary underfloor catalytic converter, a centrally positioned, high-flow resonator and dual rear silencers. Integrating the exhaust manifold into the head casting allowed the primary catalytic converters to be mounted directly to the exhaust orifice. This location ensures an extremely rapid light-off for the high-efficiency 900-cell per square inch converters, which directly contributes to the engine’s exceptionally low emissions.

A high-flow hydroformed 2-into-1 collector pipe that transfers exhaust gasses to the secondary 350-cell converter also reduces exhaust backpressure.

In addition, the silencer further reduces backpressure. The net result is a 30-percent drop in backpressure compared to the previous Accord V6. These improvements account for 15 of the extra 40 horsepower the current V6 develops.

Eliminating a flange on the rear portion of the exhaust pipe and adopting a more compact design for the rear silencers also trimmed weight from the system. Because these smaller silencers are easier to package, the rear of the new Accord has a more refined appearance.

ACCORD V6 WITH MANUAL TRANSMISSION / SPORT SOUND
The V6 engine in the Accord Coupe fitted with the 6-speed manual transmission features exclusive revisions to the air intake system and a modified single-chamber resonator. This provides the Accord Coupe with a more aggressive intake (“sport”) sound during acceleration, yet retains the sophisticated character of other Accord models under normal cruising conditions.

ENGINE MOUNT SYSTEM
The Accord has an engine mount system, used with both the 4-cylinder and V6 engines. The system combines the strengths of an inertia axis system with those of a centre-of-gravity engine mount system to achieve both excellent NVH and ride and handling.

The system starts by supporting the engine on two large mounts placed below the centre of gravity of the powertrain. Combined with the subframe mounts, the engine mounts provide a “double isolation,” or double rubber isolating elements between the engine and the passenger compartment, for excellent engine noise attenuation. The front of these two centre of gravity mounts is hydraulic and electronically controlled (except on the 4-cylinder with manual transmission which uses a hydraulic mount).

The hydraulic characteristics switch between two settings – one to optimize vibration performance at idle and one to optimize powertrain damping performance at higher speeds and over rough roads. The rear-most mount is a hydraulic mount for damping of the powertrain over rough roads. A dual mode engine side hydraulic mount is placed high on the engine connecting to the frame rail to best control powertrain motion during handling manoeuvres. An upper transmission mount is added high on the transmission, connecting to
the frame rail, again to control powertrain motion during handling maneuvers, and serves to provide symmetry in motion control. Finally, two rubber lower transmission mounts complete the setup.

The end result is a system providing excellent noise and vibration attenuation, superior powertrain damping over rough roads, and positive powertrain lateral motion control for excellent handling response. In addition, the mount system was engineered to compliment the subframe “sliding mode” during a front collision event, effectively increasing available crush length by 100 mm.

5-SPEED MANUAL TRANSMISSION FOR 4-CYLINDER ENGINES
The manual transmission paired with the Accord 2.4-litre 4-cylinder engine is a lightweight, compact 5-speed, housed in a rigid die-cast aluminum case. Multi-cone synchronizers used on first through fourth gears contribute to a smoother, more fluid shift feel, while helping reduce throw distances by 50 mm. A repositioned shift lever further facilitates quick, direct gear changes.

The clutch assembly is an equally compact design that features low-torsion springs in the pressure plate to keep pedal effort low and eliminate judder while ensuring a smooth, progressive engagement.

5-SPEED AUTOMATIC TRANSMISSION FOR 4-CYLINDER ENGINES
The 5-speed automatic transmission is lightweight and compact and designed to provide best-in-class performance and fuel economy. It also reduces shift shock and improves shift smoothness, thanks to a linear solenoid with direct control.

The transmission also features an updated grade logic control system. By using sensors that monitor throttle position, vehicle speed and acceleration/deceleration and then comparing these inputs with a map stored in the transmission’s computer, the system is able to determine when the vehicle is on an incline and adjust the shift schedule for improved climbing power or downhill engine braking.

5-SPEED AUTOMATIC TRANSMISSION FOR V6 ENGINES
The 5-speed automatic transmission used in V6 Accord models is different from the one in 4-cylinder models, but similar to the one used in the Acura 3.2 TL. This wide ratio transmission’s lower gears provide quick acceleration while the tall top gear ratios result in low cruising rpm levels for reduced noise and lower fuel consumption. One difference from the TL transmission is the addition of the Electronic Throttle Control (ETC) system to further enhance shift smoothness by momentarily closing the throttle (reducing torque) at shift points.

Because the transmission shares idler and third-gear clutches, the transmission provides five ratios in a unit approximately the same size of a conventional 4-speed automatic transmission. The transmission also incorporates a first gear one-way clutch for smoother shifts, plus a heat exchanger that controls and moderates transmission operating temperatures for both durability and improved shifting smoothness.

Linear solenoids provide precise, real-time control of the clutch on/off pressure. This superior clutch-engagement accuracy allows the grade logic control to operate smoothly under all conditions. For added refinement, a bearing supports the idler shaft.

To manage overall powertrain operation, the Powertrain Control Module (PCM) provides precise management of the transmission-engine interaction. For instance, by limiting engine output torque and/or transmission clutch pressure, hard driveline shocks are limited. The system also prevents the engine from exceeding 5000 rpm when the transmission is in neutral or park. It also has an upgraded grade logic control system similar to the one in the 5-speed automatic transmission for 4-cylinder engines.
6-SPEED MANUAL TRANSMISSION FOR V6 COUPE
To maximize its appeal to enthusiasts, the V6 Accord Coupe is available with a close-ratio 6-speed manual transmission closely related to the unit in the Acura 3.2CL Type S, producing a performance-oriented Accord. A low (higher numerically) first gear improves acceleration off the line while a tall overdrive sixth gear provides for good fuel economy under freeway cruising conditions.

Prime weight-minimizing elements in this 6-speed include a high-pressure-cast aluminum alloy casing and a compact gearset made of high-strength steel. Brass multi-cone synchronizers on first through fourth gears, and a single-cone synchro on the reverse gear, help improve shift feel and smoothness while a relatively large gear-mesh contact area decreases internal noise.

The ideally positioned shift lever features short, precise throws and incorporates a positive lockout mechanism that prevents a driver from accidentally shifting into reverse when the car is moving forward. Matching transmission to engine speed is a self-adjusting hydraulic clutch that’s fitted with a vibration-minimizing dual-mass flywheel.

2004 Honda Accord Coupe : Safety

SAFETY OVERVIEW
An all-out engineering effort was made to ensure that the Accord would rank at the top of the intermediate class in the safety crash tests conducted by the U.S. government’s National Highway Traffic Safety Administration (NHTSA) and the private Insurance Institute for Highway Safety (IIHS). These tests include frontal (both NCAP and certification tests), IIHS offset frontal, side impact (NCAP and certification), IIHS offset frontal, side impact (NCAP and certification) and rear end impact.

Among the most rigorous tests is the IIHS 64-km/h (40-mph) offset frontal, where the entire impact energy is focused on the left-front corner of the vehicle.

To make the unibody both stronger and lighter, 48 percent of the Accord’s structure uses “high-strength” steel. This material, along with carefully designed load paths within the body structure, helps maintain the integrity of the passenger compartment during a collision.

FRONT SUBFRAME
In a severe frontal collision, the Accord’s steel subframe (that carries the engine/transmission unit and lower front suspension arms) can move rearward in a controlled manner (an additional 100 mm more than the previous generation Accord) to further absorb impact energy.

REPAIR COSTS
As Honda developed the Accord Sedan and Coupe, it benchmarked intermediate competitors such as the Toyota Camry, Nissan Altima, Volkswagen Passat and others, not only for passenger crash safety, but also for repair costs associated with low-speed collisions.

Based on the IIHS test standards, the Accord is expected to have the lowest repair costs for low-speed impacts of any car in the intermediate class. These bumper impact tests include both flat and angled 8-km/h (5-mph) front barrier tests, as well as flat barrier and pole 8-km/h (5-mph) rear bumper impact tests.

ANTI-LOCK BRAKING SYSTEM (ABS)
The Accord’s standard ABS system employs 4-wheel speed sensors and three control channels. The speed sensor at each wheel sends signals to the ABS control unit, which in turn independently modulates the brake fluid pressure to each front wheel and the rear wheels in tandem. This system enhances the driver’s ability to maintain steering control during hard stops on all types of surfaces. The ABS function is particularly effective on split-friction surfaces in which the wheels on one side of the vehicle have significantly less traction than those on the other side.
FRONT SEAT SIDE AIRBAGS WITH PASSENGER-SIDE POSITION SENSOR
The Accord’s front passenger seat is equipped with an innovative system designed to prevent injury to a small child or small-statured adult by preventing side air bag deployment if they lean into the side air bag deployment path. Seven sensors in the passenger seatback determine the height and position of the occupant to assist the system in determining if it is safe to deploy the side air bag. If the passenger is in the deployment path of the side air bag, the system will prevent the side air bag from inflating. When the passenger returns to an upright seating position, the side air bag will reactivate so it can deploy and protect the passenger in a side impact.

ANTI-THEFT FEATURES
The Accord is protected by a variety of anti-theft features. All models feature the "wave" key for door, ignition and trunk locks. This type of lock is much more resistant to "picking" than conventional designs. Door and hood locks and their operating cables are now more thoroughly protected to prevent a “Slim Jim” or other jimmying device from being used to force entry. The engine immobilizer system used on previous generation Accords to shut down the engine’s electronic control unit (ECU) has been further enhanced with the addition of a rolling code.