

AUTO SPIES



2008 Mercedes-Benz C-Class

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INTRODUCTION

The fourth-generation Mercedes-Benz C-Class sedan is making its debut with greater emphasis on agility, safety and comfort as well as an even sportier flair. For increased comfort, the 2008 C-Class four-door is also about 3.7 inches longer and 1.7 inches wider than its highly successful predecessor, with a 1.8-inch wheelbase increase.

A first look at the new-generation C-Class reveals an edgy interplay of taut styling lines and broad, serene surfaces that typifies the latest Mercedes design idiom. For the first time on a Mercedes-Benz sedan, the iconic three-pointed star in the center of the front grille (usually reserved for its coupes, convertibles and sport utilities) identifies the AMG-inspired C-Class Sport models.

Revised suspension and steering help make the new C-Class noticeably more agile, along with a slick-shifting redesigned six-speed manual transmission for the C300 Sport model.

Digital Prototyping Refines the Car and Speeds the Process

An industry first, technical development of the new C-Class included the use of a digital prototype, allowing the first road-worthy prototypes to accelerate through a 15-million-mile road test program in record time. Mercedes engineers used this 2100-gigabyte digital prototype to refine crash safety, chassis behavior, aerodynamics, ride comfort and even climate control during early virtual testing.

In fact the new C-Class was crash tested 5,500 times on the world's largest IT network before a real prototype was ever built! For perspective, crash simulation models involved 26,000 elements in 1989, now incorporate more than 1.9 million elements for greater accuracy and realism.

V6 Power With a Sport or Luxury Personality

In the U.S. market, the new C-Class will be launched with three V6-powered models – the C350 Sport, the C300 Luxury and the C300 Sport. In addition, the C300 Sport and Luxury models will be available with the increasingly popular 4MATIC four-wheel-drive system. New standard equipment includes a power sunroof, eight-way power front seats with lumbar support, two-zone automatic climate control, 17-inch wheels, Bluetooth connectivity and a central controller with a display screen.

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The Sport Models

In addition to the grille-mounted star, the new C-Class Sport models can be identified by AMG body-styling – deeper front and rear aprons as well as under-door rocker panels – and twin-spoke 17-inch wheels of staggered width or optional 18-inch wheels. In addition, the car features sport shocks and springs that provide a crisper ride as well as more than a half-inch lower ride height. Inside, Sport models come with three-spoke steering wheels and a combination of either aluminum (C300 Sport) or black birdseye maple trim (C350 Sport) (instead of the four-spoke wheel and burl walnut trim on Luxury models). An instrument cluster with a titanium-colored background and rubber-studded aluminum pedals further differentiate the sport models from the luxury variant.

The C-Class Buyer

The C-Class Sport models are aimed at younger buyers and driving-enthusiasts. With their stronger visual differentiation and distinct performance enhancements, the Sport models focus on sporty driving dynamics and stylish design. In turn, the Luxury versions are intended for the traditional luxury car customer, communicating class-leading comfort, quality and value with contemporary styling.

The Competition

The entry luxury segment has grown to 637,429 vehicles in 2006, representing the largest portion of the total luxury market. This is the most competitive segment for Mercedes-Benz USA in terms of both volume and in the number of competitors.

Globally, the C-Class competes with the Audi A4 and BMW 3 Series, and in the U.S. market, other primary competitors include the Lexus IS, Infiniti G, Acura TL and Cadillac CTS.

A Key Part of the Mercedes-Benz DNA

The Mercedes-Benz C-Class, including its 1984-1993 predecessor, the 190-Class, defined the auto industry's entry-level luxury sedan segment. The 190 debuted the company's (and the world's) first multi-link rear suspension, now used on all of its passenger cars and many of its competitors.



This patented five-link rear suspension offers ideal rear wheel location and alignment under any driving situation by isolating cornering, braking and driving forces. Equally important in everyday use, the multi-link rear suspension is compact, allowing for impressive trunk space.

Building on the success of the 190, Mercedes-Benz introduced the first C-Class in the fall of 1993. Offering refinements to the 190's engineering, the C-Class featured advances in design and aerodynamics as well as a new value pricing strategy for Mercedes. The C-Class also proved as winner on the racing circuit, sweeping the 1995 DTM Series with the Driver, Team and Constructor's Championships.

Also in that same year the first official AMG model made its debut in a C-Class – the C36 AMG. The C-Class helped fuel a steady sales resurgence for the company in America.

The third-generation C-Class was launched for the 2001 model year, and 4MATIC C-Class models made their debut for 2003. Over the next six years, the C-Class line continued to play a key role in the company's product offensive, which resulted in 13 straight years of record sales for Mercedes-Benz USA.



EXTERIOR DESIGN

Taut Lines and Rounded Surfaces

The design of the new-generation 2008 C-Class sedan evokes effortless sportiness and confident style. Above all, the interplay between its taut lines and broad, rounded surfaces makes for a clean, yet expressive look. The front end of the new car is key – inspired by the head of an arrow, suggesting forward movement, athleticism and performance. Its grille is mounted flush with the hood and front fenders, visually solidifying the space between the headlights and lending a muscular presence.

Sport Models Get The Iconic Grille-Mounted Star

For the first time on a Mercedes-Benz sedan, C-Class Sport models are easily identified by the three-pointed star in the center of the grille. Usually reserved for its coupes, convertibles and sport utilities, the large, grille-mounted star makes a dramatic visual statement about the DNA of the new Sport models, while C-Class Luxury models reveal a more traditional face with the iconic star atop the hood.

Shoulder Lines With Character Lines

Both the Sport and Luxury models wear gracefully integrated front bumpers accented by an aerodynamic lip (discreet on Luxury models and more aggressive on the Sport) with recessed fog lights positioned well outside a wide lower air intake opening. Underscoring the high-tech character of the new sedan, projector beam headlights are mounted under clear lenses in translucent cylinders reminiscent of high-quality camera lenses.

The latest Mercedes-Benz design language is most apparent when viewing the new C-Class from the side. Again, its elegant style is characterized by the interplay of striking lines and large contoured surfaces. A wide, muscular shoulder line visually supports the side windows, roof pillars and roof, forming one sweeping line from the front all the way to the rear and elegantly stretching the body.



Complementing the shoulder line, a character line emerges organically from the front fender and rises toward the rear, forming a boundary between the convex and concave door surfaces – emphasizing light and shadow. For all its elegance, the design of the new C-Class emphasizes its sporty character with wider track, prominent fender lines and large wheel wells. The shoulder curve and C-pillar join to form a line that flows to the rear, and the character line below it flows into the trunk lid, visually shortening the rear overhang and helping to create a stylish, sporty rear end.



INTERIOR

More Space, More Comfort

Very simply, more space means more comfort. With a body that's 3.9 inches longer and 1.7 inches wider than the previous model, the new car boasts a noticeably roomier cabin. There's nearly a half inch more front and rear hip room, while front shoulder room has increased by more than 1½ inches.

In addition to more hip room, rear passengers have 1½ inches more elbow room and nearly an inch more room at the shoulder. Most important, rear passengers get nearly a half inch more leg room and a third of an inch more knee room.

Mercedes engineers also attached great importance to comfort entering and leaving the vehicle, so the front door opening is larger, and the front edges of the B-pillars are straight. The new shape of the rear seat cushions also make it easier to get in and out.

More Cargo, Too

The new C-Class has more luggage room, too, and the trunk lid opens nearly two inches farther than its predecessor. According to the VDA measuring method, the trunk capacity is now 16.8 cubic feet – 0.7 cubic feet more than the previous model.

What Looks Good, Feels Good

The upper dashboard is finished in a dark color to minimize glare, while the lower section around the glove box, center console and knee protection wears the dominant interior color. Air vents and controls blend into the upper dash, as does the new instrument panel.

In large part, the high-quality appearance of the interior is the result of a special production process that leaves a seamless surface with no lines or joints. Robots spray a foamed surface skin onto the dash backing; this soft polyurethane skin is pleasant to the touch and can be thicker or thinner as needed. The glove box and flip-up cover for the display are finished the same way, giving the dash a uniform, high-quality appearance.



To minimize resonance and vibration, an aluminum cross member supports the dashboard, and the glove box, front passenger air bag and center console are attached to the cross member. Four pounds lighter than a comparable steel one, this cross member is bolted to the A-pillars, giving them added strength in the process. The large 391-cubic-inch climate-controlled glove box comes with a power socket and a plug for an MP3 player to the car's audio system.

Blending into the lines of the dash and the tunnel console, the center console holds panels for the audio system and two-zone climate control, along with a row of switches for other equipment such as heated seats. The shift lever and central controller are located on the tunnel console as well as an arm rest that's contoured to serve as a helpful hand rest when operating the new electronic controller.

A High-Performance Instrument Cluster

The new instrument cluster features three analog gauges that show engine speed, road speed, fuel level and coolant temperature. A 4.5-inch display in the center of the speedometer is linked to a 12-button multi-function steering wheel that can call up a variety of helpful information such as odometer, range, oil level, distance, time traveled and average speed and mpg. It can also display phone and audio system information – radio station, CD track or MP3 playlist. If the car is equipped with the optional navigation system, this display will also show next-turn directions or phone book numbers.

Electronic Controller Replaces Scores of Buttons

Similar to the popular system launched on the S-Class sedan and CL coupe, an electronic controller on the lower console works like a computer mouse to provide easy, quick operation of many functions that used to require scores of separate buttons and switches. By turning and pressing the aluminum controller, menus and sub-menus on the center-console display are displayed and selected for the audio system as well as the optional navigation system and integrated phone. The controller is also linked to the rocker switches on the multifunction steering wheel.



Audio Systems

Standard equipment in the new C-Class is a 100-watt Audio 20 system. In addition to its eight speakers, the Audio 20 includes a single CD slot, telephone keypad, a MP3 plug in the glove box and a Bluetooth interface.

Optionally available is a 450-watt harman/kardon LOGIC7 Dolby Digital/DTS 5.1 discrete multichannel surround sound system, delivering a true studio sound experience. The LOGIC7 system comes with 12 speakers, including two surround-sound speakers and a sub-woofer.

The new C-Class includes a MusicRegister feature as part of the Multimedia package, which enables CD "ripping" (saving) to a four-gigabyte hard drive that can store up to 1,000 tracks from a CD. A Gracenote database automatically identifies each track with its title, artist, album name and other information. The audio system can also play tracks stored on a DVD or PC memory card.

COMAND Navigation

A five-inch color display nestled under a flip-up cover at the top of the center console is standard equipment on the new C-Class. However, when the car is equipped with the optional COMAND navigation system, a power-operated seven-inch display screen slides out and up when the flip-up cover is raised. The navigation system uses a hard drive with map data covering all of North America. In addition to the high-resolution map display at the top of the center console, next-turn navigation instructions can also be shown in the instrument cluster central display.

Integrated Phones

Bluetooth enabled phones connect wirelessly to the standard hands-free system, which facilitates safe cell phone use while driving.



ENGINES

Four-Valve Engine Technology

The new-generation C300 and C350 sedans are powered by a high-tech Mercedes-Benz V6 that's characterized by four valves per cylinder and variable valve timing. In the 1990s, Mercedes-Benz engine technology used three valves per cylinder, in which a single exhaust valve kept exhaust temperature high and emissions low. However, the current engine family incorporates new ways to minimize emissions, allowing the use of higher-flow four-valve architecture.

The new C350 features a 268-horsepower 3.5-liter V6 with 258 pound-feet of torque, and the C300 comes with a 3.0-liter V6 that produces 228 horsepower and 221 pound-feet of torque. In both engine variants, maximum torque is available from 2,700 rpm all the way up to 5,000 rpm. In fact, at just 1,500 rpm, the V6 develops 87 percent of its maximum torque.

Variable Valve Timing

Variable intake and exhaust valve timing requires separate camshafts for the intake and exhaust valves, so the C-Class V6 powerplants use double-overhead camshaft technology. Valve timing is automatically adjusted within a range of 40 degrees using electro-hydraulic vane-type adjusters.

At part throttle, the valve timing adjuster keeps the exhaust valves open as the intake valves are opening, using this valve overlap for internal exhaust gas recirculation, reducing exhaust emissions and improving fuel economy. However, approaching full throttle, the camshaft adjustment optimizes valve timing for maximum power.

To minimize disturbing air flow through the ports, valve stems are only six millimeters or about ¼ inch in diameter (most valves have 8 or 10 mm stems), and the valves are angled at 28.5 degrees to optimize the combustion chamber shape.



Two-Stage Intake Manifold Fattens the Torque Curve

While variable valve timing gets a lot of credit for the engine’s unusually broad torque curve, a two-stage intake manifold made of a lightweight magnesium alloy plays a key role as well. At relatively low engine speeds, a set of flaps in the manifold close off short intake passages, forcing intake air to take a much longer route into the engine and creating pressure waves that help the intake process and improve torque at lower engine speeds. Above about 3,500 rpm, the flaps open electronically, and intake air flows the shortest distance to the combustion chambers, helping to generate maximum horsepower, especially at higher speeds.

Tumble Flaps Improve Fuel Efficiency

The C-Class V6 is equipped with tumble flaps in the intake passages near the combustion chamber. The tumble flaps pivot open under part load, improving combustion by creating additional turbulence around the intake valve and in the combustion chamber. During higher engine loads such as full throttle, the tumble flaps are completely recessed in the wall of the intake manifold. Better combustion helps improve engine torque, but the primary purpose of the tumble flaps is to further increase fuel economy, and tests show that the tumble flaps indeed boost fuel mileage by about two percent.

Assembling the New Engine from Start to Finish

First, a forged crankshaft with four main bearings is placed into an aluminum engine block that features wide main-bearing saddles and transverse bearing supports that minimize vibration. A balance shaft is then installed in the block between the two cylinder banks, about where the camshaft is located on a pushrod-type V6 or V8 engine. The balance shaft is driven from the crankshaft by a long double chain that loops around one camshaft in each cylinder head and engages the underside of the balance shaft sprocket. This means the balance shaft counter-rotates at crankshaft speed, and its “lobes” cancel out the vibration created by the inherent imbalance of the 90-degree V6.



When the cylinder block is cast, molten aluminum is poured around iron cylinder sleeves, melting the outer surface of the iron sleeve and bonding it to the aluminum block. Aluminum pistons are pinned onto forged steel connecting rods that are about 20 percent lighter than on comparable engines. The pistons slide into the cylinders, and the connecting rods are clamped around the crankshaft journals. The two cylinder heads are bolted onto the block, and twin camshafts are installed in each cylinder head. The intake camshafts are driven by a double chain, and gears on the intake cams drive the exhaust cams.

Even Downstream Emission Controls are Elegant

To keep exhaust air as hot as possible leading to the catalysts, double-wall stainless-steel piping is used throughout the exhaust system. Two catalytic converters – one on each bank of the V6 engine – promote additional downstream conversion of pollutants into carbon dioxide and water vapor with the help of secondary air injection. Two oxygen sensors for each catalyst monitor and help manage the entire emissions-reducing process.

Each car is also equipped with five mufflers – two up front, one in the center and two in the rear. Although the new C-Class has a true dual exhaust system, the center muffler is common to both pipes as a means to smooth the exhaust pulsations in both sides and reduce exhaust noise.

Flex-Fuel a Reality

All new-generation C300 models equipped with an automatic transmission are set up to run on either premium gasoline or any mixture of ethanol alcohol up to E85, which is 85 percent ethanol. Since alcohol is less dense than gasoline, a special in-line fuel sensor monitors the type of fuel flowing from the tank to the engine, and the fuel system automatically adjusts the fuel-air mixture accordingly.

The flex-fuel system allows the new C-Class to take advantage of a growing number of E85 stations and still use conventional gasoline when E85 isn't easily available. Alcohol fuels burn more cleanly than gasoline, resulting in even lower exhaust emissions.



TRANSMISSIONS

A New Six-Speed Manual

Mercedes-Benz is offering a newly designed six-speed manual transmission for the C300 Sport model. For strength and durability, the new NSG 510 transmission features wider gears and additional bearings as well as a new version of the slick-shifting single-rod internal linkage. This transmission brings a strong sporty component to the C300, offering maximum control with short gear lever throws for quick shifting. Gear ratios for the new six-speed are 5.10, 2.78, 1.75, 1.25, 1.00 and an overdrive 6th gear with a ratio of 0.81 as well as a 4.63 reverse gear. This relatively wide spread of gear ratios provides quick off-the-line acceleration, great response when merging in traffic and quiet, fuel-efficient highway cruising.

The Seven-Speed Automatic

Most of the new-generation C-Class models come with the exclusive Mercedes-Benz seven-speed automatic transmission as standard equipment (C300 Luxury, C350 Sport). When compared to other automatic transmissions, the seven-speed provides better acceleration and fuel economy as well as smoother gearshifts. Seven gear ratios allows for a wider spread of ratios between first gear and top gear and, at the same time, smaller increases in engine speed as the car accelerates through the gears. This gives the electronic control unit more flexibility in terms of maximizing fuel economy and making the transmission's reaction time extremely fast.

Skip a Gear When You Need To

Unlike most transmissions, the seven-speed transmission will skip up to three gear ratios if necessary when it downshifts, shifting directly from seventh to fifth, for example, or even sixth to second. This helps the transmission choose the right gear ratio for quick acceleration, with smooth, almost imperceptible shifts in the process.



Lock It Up for Better Fuel Mileage

The Mercedes-Benz seven-speed uses a refined, proven hydrodynamic torque converter with a special lock-up clutch inside the converter for maximum fuel efficiency.

Submerged in transmission oil and using special long-life friction materials, the lockup clutch eliminates the usual torque converter “slippage,” providing the direct connection and fuel efficiency of a manual transmission when the lockup clutch is engaged. Unlike many other vehicles, the Mercedes-Benz lock-up clutch engages in all seven gears.

Touch Shift – Just Like It Says

Touch Shift allows the driver to manually select all forward speeds by pushing the gear lever slightly left or right to downshift or upshift while in the “Drive” selector position. In other words, it’s not necessary to move the lever to another gate to make manual gear changes, and an in-dash gear indicator shows the selected gear. Though all forward speeds can be selected, computer control prevents downshifts that would cause the engine to over-rev. Once the driver has used Touch Shift to manually select a gear, holding the lever to the right returns it to fully automatic Drive mode, and the in-dash gear indicator will then display “D.”

Doing It Automatically

When not shifting manually, Mercedes automatic transmissions not only adapt to changes in road grade (delaying upshifts on ascents for climbing power and hastening downshifts on descents for engine braking), but also to an individual’s driving style. The transmission computer adjusts shifting logic for leisurely driving with smooth upshifts for the best fuel efficiency.

By comparing road speed changes and load (throttle opening), the transmission computer can discern uphill and downhill grades and adjust shifting as a result. It avoids back-and-forth shifts between two gears on a long incline, and delays upshifts on descents (for engine braking), as a driver is likely to do with a manual transmission. A driver who requires frequent highway merging will find the transmission holds each gear longer for quicker acceleration.

A button on the center console allows the driver to select a Sport or Comfort shift mode. The Comfort setting is used for normal driving, which involves smooth, soft shifts and relatively low-speed shift points. When



the Sport mode is selected, shift points occur at higher engine speeds, and shifts are faster and crisper.



4MATIC FOUR-WHEEL-DRIVE

A Trend in the Luxury Car Market

As modern all-wheel-drive systems become even more refined, they are becoming increasingly popular, especially in the luxury car market. With negligible weight and fuel-efficiency tradeoffs, full-time four-wheel-drive systems provide year-round traction and stability benefits on both wet and dry roads. Overall, Mercedes-Benz has sold more than 1.2 million 4MATIC cars and sport utilities, and in Europe, the all-wheel-drive segment of the high luxury market has increased 50 percent over the past three years.

Full-Time 4WD System Features Four-Wheel Traction Control

The full-time four-wheel-drive system used in Mercedes-Benz 4MATIC cars and all sport utilities features a center differential that can vary front-to-rear torque distribution for great on-road handling, not to mention stellar traction. In addition, the system includes innovative four-wheel electronic traction control that keeps the vehicle going even if only one wheel has traction.

4MATIC Cars Get Rear-Biased Torque Distribution

Under normal conditions, Mercedes sport utility vehicles distribute torque nearly equally between the front and rear wheels. However, the 4MATIC-equipped C-Class and S-Class sedans come with a planetary gear set within the center differential that begins with 45-55 percent front-to-rear torque distribution. To skilled drivers, this rear-bias all-wheel-drive system feels much like rear-wheel-drive cars, in which subtle throttle-steering effects can enhance handling, especially in spirited driving.

The Latest 4MATIC System

The latest version of the Mercedes-Benz 4MATIC four-wheel-drive system is optionally available on the new-generation C300 Sport and the C300 Luxury model. After making its debut on the new-generation S-Class sedan, the new 4MATIC system features a totally redesigned full-time all-wheel-drive system that's integrated into the seven-speed automatic transmission.



The new system fits right into the standard body and utilizes the existing front suspension – gone are the special suspension parts and wider transmission tunnel that were necessary on earlier 4MATIC systems. The extra gears and shafts that drive the front wheels now weigh only 145 pounds more than the rear-wheel-drive model. Beginning from the right side of the transmission tail section, a driveshaft powers a front final drive and differential unit just to the right of the engine oil pan. The axle shaft for the left front wheel passes through a tube that's encapsulated in the engine oil pan.

Improved Fuel Efficiency

Fuel efficiency has been improved, due to a number of innovative measures that minimize the energy needed to turn the extra all-wheel-drive shafts and gears. In particular, only two gears now power the front driveshaft (instead of the previous three), and the direction of rotation is cleverly corrected in the front final drive without additional gears.

Recessing the universal joint for the front driveshaft into the transmission output gear also saved space, helping to fit the entire drive system into the standard body shell.

Even Better Traction with Multi-Plate Diff Clutch

The new C-Class 4MATIC also comes with a multi-plate clutch tucked into the center differential that provides the extra traction benefits of a limited-slip diff while complementing the four-wheel traction-control system. Sometimes called a “breakaway” clutch, the multi-plate unit helps provide power equally to the front and rear wheels when driving straight ahead, but still allows the front wheels to rotate faster in turns. In a sense, the clutch is a proactive traction aid, while the four-wheel traction control reacts after wheel slippage is sensed.

A Full Century of 4WD Experience

Mercedes-Benz has been building four-wheel-drive commercial vehicles since 1907 – a full 100 years of experience with all-wheel drive. The 4MATIC all-wheel-drive system made its world debut at the Frankfurt Motor Show in 1985, and Mercedes-Benz launched 4MATIC-equipped passenger cars in the U.S.



market for the 1989 model year. The full-time 4MATIC system made its debut on the 1998 E-Class sedan and wagon as well as on the M-Class sport utility.



CHASSIS

An Ultra-High-Strength Steel Unit Body

High-strength steel minimizes weight while providing the greatest possible structural strength, and the 2008 C-Class sedan sets an industry record for the amount of high-strength steel used in its unit body design – about 70 percent, including about 20 percent ultra-high-strength steel alloys in its body structure. Engineers called out that the engine now sits lower and more reward in the chassis, contributing to improve dynamics and F/R weight balance.

For the first time in any Mercedes, the new C-Class makes use of the new “RobScan” joining process, the latest in laser welding technology. RobScan enables high work speed combined with narrow welding seams, and about 640 RobScan welding seams are used in the door, side wall and rear body areas.

Aluminum and Plastic Where It Counts

Other lightweight materials are used where they offer the most advantages. For example, the doors, front safety structure, front fenders and rear parcel shelf are made of aluminum, while the spare tire well is formed of plastic.

Lastly, the use of high-strength adhesives contributes to the strength of the body shell by creating a strong bond between the steel flanges and supplementing conventional processes such as laser/spot welding. More than 196 feet of bonded seams help to increase load resistance and the transfer of forces, especially in safety related areas. Overall, the body weighs more than 17 pounds less than its predecessor, yet the torsional rigidity of the new car is increased by 13 percent, providing even better crash protection, sharper handling and lower road vibration.



Lightweight, Energy-Absorbing Front Suspension

The 2008 C-Class front suspension combines two separate lower links with a coil spring strut, along with a twin-tube gas shock and a stabilizer bar. Rather than one large control arm like a conventional MacPherson strut, the two forged-aluminum lower links of low mass help provide better impact absorption in the case of a frontal impact. Low mass also contributes to more precisely-tuned wheel control and damping. In addition, sensitivity to wheel imbalance or brake fluctuations is minimized.

The top of the strut is connected to the body by a triple-path head bearing, in which coil spring forces are transmitted directly to the body, but damping forces (via the shock absorber piston rod) go through a rubber bushing that turns with the bearing during steering. The third path, forces exceeding suspension travel, involves a buffer stop directly to the body.

The front suspension links are mounted to a new sub-frame of high-strength steel that also carries the engine and transmission as well as the aluminum rack-and-pinion steering unit, which is mounted in front of the wheel center.

Multi-Link Rear Suspension

The proven five-link independent rear suspension (pioneered by Mercedes-Benz in 1984 for the 190E and used in all subsequent M-B passenger cars) has been updated for the newest C-Class. Mercedes engineers have redesigned its parts to minimize unsprung weight and optimize strength.

Furthermore, suspension engineers revised all the elastokinematics – the designed-in wheel deflection under extreme load – to ensure optimum response to vibration and enhance the sedan's predictability while driven hard. A newly designed rear sub-frame, also of high-strength steel, holds the rear final drive and suspension links.



Advanced Agility Package in the Works

Available next year, a special suspension package will feature electronically controlled shock absorbers that go beyond the ADS adaptive damping systems found in some other Mercedes-Benz models. When the driver activates the Sport mode through the Sport/Comfort switch, the system will automatically adjust the car's handling characteristics across a wide range of conditions, providing sport-suspension response with greater ride comfort.

In the Sport mode, ride height is reduced more than a half inch (15 mm), and throttle response is noticeably faster. The package also includes quicker steering (a 13.5:1 steering ratio instead of 14.5) as well as stiffer springs and stabilizer bars

Extra Braking Power in Reserve

As on every Mercedes-Benz passenger vehicle, the new C-Class features four-wheel disc brakes with a standard electronic four-channel anti-lock braking system (ABS), itself a Mercedes-Benz innovation first produced in 1978.

However, the new C-Class has an ample reserve of braking power. This is partly due to brake disc dimensions, which are 11.6 inches up front (12.7 inches on the C350) and 11.8 inches at the rear, as well as aluminum front brake calipers with 2.36-inch pistons. The rear disks have nodular cast iron calipers with 1.57-inch pistons. Finally, a new aluminum tandem brake booster uses two eight-inch diaphragms to provide increased braking power.

Standard 17-Inch Wheels and Tires

The C300 Luxury model rides on new five-spoke, 7.5 x 17-inch alloy wheels that wear 225 / 45 HR 17 tires. The C300 Sport comes with staggered seven-spoke wheels – 7.5 wide in front and 8.5 inches at the back – while the C350 Sport can be identified by six-spoke wheels, also the staggered width. Sport models get 225 / 45 HR 17 tires up front and wider 245 / 40 HR 17 tires in the rear.

Sport sedans (except 4MATIC models) can be fitted with optional 18-inch wheels that are eight inches wide up front and 8.5 inches in the rear. The optional wheels run on summer-tread tires – 225 / 40 R 18 in front and 255 / 35 R 18 at the rear.



SAFETY

The renowned safety of Mercedes-Benz automobiles has been based on real-life experience for decades. Careful analysis of actual traffic conditions and accident histories help steer new technical developments. In addition to meeting government standards, the technical safety aspects of the new C-Class also reflect in-house Mercedes-Benz accident research. The C-Class is designed for the greatest possible impact safety, based on Mercedes' own stringent passenger car guidelines which date all the way back to 1951, when the company patented its energy-absorbing car body with front and rear crumple zones.

Seat Belts, Tensioners and Belt Force Limiters

All five seating positions in the new-generation C-Class are fitted with three-point inertia-reel seat belts and electronically controlled belt tensioners. In a collision, the tensioners take up seat belt slack at lightning speed, anchoring occupants to their seats. As a result, they decelerate with the vehicle earlier, so forces are reduced. Then, as crash forces build, belt force limiters on the outer four seats relax the restraining action of the belt slightly, reducing the risk of chest and shoulder injuries. In the two front seats, adaptive belt force limiters allow belt forces to relax more, to take full advantage of the “ride-down” protection of the two front air bags.

Two-Stage Front Air Bags

Two-stage front air bags for driver and passenger deploy based on the severity of impact. If sensors detect a minor front-end impact, only one chamber of the gas generator is deployed, so the bag is not filled as fully or as quickly as it is in a severe front impact. In a more severe collision, the second chamber is deployed 5 to 15 milliseconds later.

A sensor mat in the front passenger seat determines if someone is in the seat and classifies their weight, which helps determine how fast to deploy the front passenger air bag. If the seat is not occupied, the sensor will deactivate the front air bag, side air bag and the seatbelt tensioner (a measure designed to reduce accident repair costs). Signals from the seat belt latches help determine how many other passengers are in the car, and where they are sitting.

AUTO SPIES





Active Front Head Restraints

In the event of a rear collision that exceeds the system's deployment threshold, active front head restraints move forward more than 1¾ inches (44 mm) and upward by about an inch (24 mm), helping to support the head and reduce the likelihood of whiplash injuries.

Side Air Bags and Curtain Air Bags, Too

Another Mercedes-Benz innovation is standard-equipment side curtain air bags. Akin to an air mattress, nine air chambers in each side curtain air bag span the full distance of the side windows from front roof pillar to rear roof pillar. In the event of a side crash, they deploy between the occupants and the door, helping primarily to reduce forces acting on the neck and head.

To help protect against chest injury, side air bags for each front seat occupant are integrated into the seatbacks. While the curtain air bags reduce head and neck injuries, the side air bags help protect the chest, resulting in one bag complementing the other.

Structural Side Impact Protection

In the floor of the new C-Class, reinforced rocker panels transfer impact forces to two strong side members in each foot well, under the front seats and to a full-width crossmember under the rear seat. The transmission and driveshaft tunnel reinforcements also improve the transfer of forces between the front seats.

At medium height, the doors themselves are stiffened with several lateral reinforcements and extremely strong door hinges. An extruded aluminum crossmember under the dashboard provides lateral structure as well as the seat frames and backrests themselves. Finally, the C-Class roof minimizes intrusion, thanks to A-, B- and C-pillars with three-shell construction – or concentric posts – through their full height. The roof frame itself is also made of this three-shell construction. All this front and side impact protection is repeated in the rear, even in an offset rear-end impact at high speed.



Five Elements of Safety

Safety encompasses far more than surviving impact. As an overall concept, good vehicle safety integrates the prevention of accidents via quick response to driver input, electronic assistance (ABS, ESP Stability Program, Brake Assist), soft and progressive impact absorption, controlling the body movement of passengers due to impact, and quick emergency response to passengers in severe impacts. The 2008 C-Class fulfills each of these five elements in this increasing scale of safety concerns:

1. Actively Avoiding Impact

The best type of crash is one a driver can avoid altogether. To that end, the new C-Class uses outstanding suspension and brake design to yield outstanding agility in emergency maneuvers. Also, through a variety of sensors, a triangle in the middle of the instrument panel warns the driver when the car has reached the limits of adhesion and handling.

2. Electronic Assistance to Avoid Impact

Should emergency driver input cause a potential skid or spin, three forms of dynamic driving assistance – ABS anti-lock braking, ESP stability control and Brake Assist – help restore control of the vehicle and perform the maneuver asked by the driver.

3. Impact Absorption

If an impact is unavoidable, the vehicle should protect its occupants, and – Mercedes-Benz believes – protect occupants of another vehicle by absorbing impact energy in a progressive manner. The first instant of impact should start the deformation process, and in a fraction of a second, resistance should increase, ending the event with the passenger cell structure intact to best provide passenger protection. If impact energy is viewed on a graph, impact absorption appears as a curved line, showing that the vehicle’s front and rear crumple zones “catch” the impact as softly as possible within the space provided. Also, the C-Class front suspension helps absorb frontal impact energy by using two separate, low-mass lower control arms and a steering rack mounted to a predictably-deformable sub-frame.



Deformation is engineered into several stages as well. Low-speed impact energy is absorbed by foam elements in the bumpers, protecting metal panels aft of the bumpers. Higher impact energy is absorbed by a front module and two crash boxes that use high-strength, dual-phase steel. These crash boxes not only protect the passengers and the safety cell of the vehicle, they also help minimize the cost of minor crash repair. With even higher impact energy, the C-Class' side members in the front structure begin absorbing impact, distributing load to four different zones:

- a** - the front module's crossmember, which transfers the impact forces of an offset crash to the side not directly involved
- b** - the side members that extend far to the front
- c** - the strong sectional panels above the wheel wells
- d** - the front wheels themselves, which then contact special impact-absorbing structures ahead of the rocker panels, loading the body's side structure and helping to spread forces over a wide area.

4. Controlling Passenger Movement

Occurring simultaneously with the vehicle's crumple zones absorbing energy, the C-Class restraint systems for each occupant keep passengers from moving out of position. Properly-latched seat belts, seat belt pretensioners and belt force limiters go a long way to achieving this in the C-Class, while a complement of two front, side, and two full-interior-length side curtain air bags help prevent injury to head, neck and arms.

5. Emergency Response

Passenger safety is not over once the collision stops. In the case of a severe collision, emergency response is vital. To address this last portion of the safety picture, 2008 C-Class sedans can be equipped with Mercedes-Benz' innovative Tele Aid system. Tele Aid is activated immediately when any one of the air bags or belt tensioners deploy, generating a direct call on a crash-secure cellular line and redundant antennae. The response specialist at the other end has instant access to vehicle location, so that if emergency response is indeed needed, it can be summoned immediately, with exact location, plus full information on the car model and color for quick recognition by emergency services.



Repair-Friendly Crash Boxes Help Reduce Cost

Five polypropylene impact absorbers are located in front of the bending crossmember of the bumpers. At low speeds, the flexible bumpers are deformed but then return to their original shape. At higher speeds, easily replaceable deformation elements called “crash boxes” (incorporated into the frame on the front and rear crossmembers) absorb sufficient energy in a minor impact to ensure that the side members behind them are not deformed. In special repair crash tests, it has been demonstrated that because the front-end structure becomes progressively stiffer toward the rear, damage to the vehicle body at an impact speed of up to about 9 mph remains confined to the immediate points of impact.

ABS Anti-Lock Brakes

Another Mercedes-Benz safety first, ABS prevents dangerous wheel lockup during heavy braking and works on wet or icy surfaces as well as on dry ones. When the driver hits the brake pedal in an emergency situation, ABS uses wheel-speed sensors to sense impending lockup, then automatically releases the brakes in split-second pulses so that the vehicle can retain its directional stability and can still be steered.



Brake Assist

Pioneered by Mercedes-Benz, Brake Assist can potentially shorten stopping distances during emergency braking. Brake Assist features a sensor on the brake pedal linkage which allows the computer to recognize unusually fast pedal application speed that identifies an emergency braking situation. The system then applies full braking force by actuating a special valve on the brake booster unit.

While Brake Assist operates independently of the ABS anti-lock brakes, it does rely on ABS to prevent wheel lockup during full brake force application.

ASR Traction Control

ASR is an abbreviation that originally stood for a German term meaning “anti-slip regulation.” ASR traction control uses the wheel speed sensors, which are as good at identifying wheel slippage as they are at recognizing wheel lockup. Processing this valuable information in a split-second, traction control can apply the brakes to any slipping drive wheel, improving traction as a result.

Adaptive Braking

The new C-Class incorporates an adaptive braking system that includes a brake proportioning feature with sensors to measure deceleration and cornering forces as well as rear suspension movement. Based on this data, the system can modulate the percentage of brake force on each wheel to maximize its contribution to the overall braking effort.

This system includes brake-drying and hill-start assist features. Whenever the wipers are turned on, the brake pads will automatically (and imperceptibly) touch the brake discs occasionally to clear them of water, which helps ensure consistent braking in wet weather. Hill-start prevents the car from rolling backwards when stopped on a steep hill by briefly keeping brake pressure applied until the driver touches the gas pedal.



ESP Electronic Stability Control

The first-ever passenger vehicle with a stability control system was 1996 Mercedes-Benz S600 coupe, and like all current Mercedes models, the new-generation 2008 C-Class features Electronic Stability Program (ESP) as standard equipment.

Even the “ESP” abbreviation helps explain the system’s benefit – in essence, ESP works invisibly, seemingly intuitively, to help keep the car going exactly where the driver points it, under driving circumstances that might otherwise lead to loss of control and a possible accident without the system.

Using electronic sensors and computer logic, the system measures if the car is going in the direction it is being steered. If there’s a difference between what the driver is “asking” (primarily through the steering wheel) and what the vehicle is doing, the system corrects with split-second speed by applying one of the left or right-side brakes, even before the driver may sense any changes.

ESP uses the angle of the steering wheel and the speed of the four wheels to calculate the path being steered, and it gets electronic signals about lateral acceleration and vehicle “yaw” rate to measure what the car is actually doing. Yaw rate describes the speed at which a vehicle rotates around its vertical center axis, and it can be demonstrated by rotating a small model car on a toothpick stuck down through its roof.

ESP measures any tendency toward understeer (when a car is slow to respond to steering changes, causing it to “plow”) or oversteer (when the rear wheels try to swing around, causing the car to “fishtail”). Whenever it senses understeer in a turn, ESP increases brake pressure to the inside rear wheel. With an oversteer tendency, it increases brake pressure to the outside front wheel.

ESP is effective during acceleration, braking and coasting. The system enhances driver control and helps maintain directional stability in turns as well as when driving straight-ahead, including on uneven surfaces and over patchy snow, ice or gravel.



CONCLUSION

It's clear that the fourth-generation C-Class will eclipse the success of its predecessors and further strengthen its role as a core product within the revered Mercedes-Benz family. With the new four-door's renewed emphasis on agility, safety and comfort, in tandem with a liberal dose of useful technology, the C-Class should prove more popular than ever.

As the consummate example of a two-pronged marketing strategy, the C-Class Sport and Luxury models complement each other while broadening the appeal of the new car. With its visual differentiation and AMG-inspired performance personality, the Sport models are likely to turn heads among car enthusiasts and bring new, younger buyers to the brand. At the same time, Luxury models address the traditional needs of luxury car buyers and seem certain to keep Mercedes loyalists loyal.

Social change is changing the auto industry, and consumers are looking for more socially responsible alternatives for their personal transportation. To many, a C-Class four-door is the new right-size, and the flex-fuel capability of the C300 models supports the nation's latest environmental initiative. If consumers show enough interest, a clean diesel powerplant is certainly within the realm of C-Class possibilities for the U.S. market.

As Mercedes-Benz USA sets all-time sales records each year, the challenge becomes greater, and the proverbial bar is raised for others to follow. However, with the new-generation C-Class, the company is well positioned for the future.



2008 Mercedes-Benz C-Class

Standard Equipment:

3.0-liter, 228 hp V6 Engine (C300)

3.5-liter, 268 hp V6 Engine (C350)

Six-speed Manual Transmission (C300 Sport only)

Seven-Speed Automatic Transmission (C300 Luxury and C350 models)

17-inch Alloy Wheels with All-Season Tires

Four-Wheel Disc Brakes

ABS Anti-Lock Brakes

ESP Stability Control

Brake Assist

Integrated Fog Lights

Adaptive Front Air Bags

Curtain Air Bags

Side Air Bags

Three-Point Inertia-Reel Seat Belts

Electronic Belt Tensioners

Belt Force Limiters

Active Front Head Restraints

Power Sunroof

Eight-Way Power Front Seats with Lumbar Support

Power Windows

Central Door Locks

Eight-Speaker Audio 20 Radio/CD/MP3 Sound System

Two-Zone Automatic Climate Control

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12-Button Multi-Function Steering Wheel

Electronic Controller

Bluetooth Connectivity

Sport Models: Additional Standard Equipment

Sport Suspension

Sport Grille

AMG Cladding (side skirts, front and rear aprons)

AMG Trunk Lid Spoiler (C350 only)

P1 Option Package (Standard on C350 model)

Satellite Radio

Heated Front Seats

Auto-dimming Mirrors

Garage Door Opener

Rain Sensor



P2 Option Package

Includes equipment from P1 Package

Bi-Xenon headlamps with corner-illuminating fog lights and heated headlamp washers

Split Folding Rear Seat

Rear Sunshade

Multimedia Package

COMAND Navigation

Six-Disc in-dash CD/DVD Changer

Harman kardon LOGIC7 Surround Sound

Voice Control

PCMCIA slot

Other Options (Available Separately)

4MATIC All-Wheel Drive (C300 Sport and Luxury models only.)

Leather Upholstery

Metallic Paint

Panorama Sunroof

Six-Disc CD Changer

Tele Aid

18-inch AMG Wheels (RWD Sport Sedans only)

Seven Speed Automatic Transmission (C300 Sport RWD only)