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Chrysler Canada: The all-new 2013 Dodge Dart Redefines Performance

World-class aerodynamics, state-of-the-art technology and an agile, responsive driving experience compliments of Alfa Romeo-based architecture

- More than 600 hours of development time in Chrysler Group's wind tunnel combined with segment-leading technology, such as active grille shutters and extensive use of underbody belly panels, helped Dodge Dart achieve its world-class aerodynamic performance
- Proven, modular Alfa Romeo Giulietta architecture lengthened 305 mm (12 inches) and widened roughly 25 mm (inch) on each side for North American market; delivers fun-to-drive experience with more interior roominess than some mid-size sedans
- The Dart body has one of the highest high-strength steel contents in the industry, 68 per cent, which results in a solid, rigid structure
- Liberal applications of sound-deadening materials contribute to Dodge Dart's whisper-quiet interior

April 27, 2012, Windsor, Ontario - Dodge engineers used the latest technological advances combined with a passion for excellence when developing the all-new 2013 Dodge Dart, and the result is a high-performing, sleek, aerodynamic sedan that is both fuel efficient, fun to drive and whisper quiet on the inside.

The all-new 2013 Dodge Dart was developed and engineered to exceed customer expectations for satisfaction, quality and reliability. Dodge engineers looked at every detail during development by tracking more than 5,000 customer functional objectives for the car on a weekly basis. The functional objectives were determined from consumer clinics that took place at the start of the design and development of the Dart. Engineers spent time with consumers who owned a compact car and tracked things that truly matter to them.

"The 2013 Dodge Dart was engineered to compete with the best vehicles in the compact car segment," said Matt Liddane, Vehicle Line Executive – Chrysler Group LLC. "We listened to our customers and developed an outstanding compact sedan that delivers where it matters most – it's fuel-efficient, extremely quiet, has all the latest high-tech features, is unsurpassed in the class with 10 air bags and it's an absolute blast to drive. We can't wait for our customers to experience it."

Alfa Romeo Roots

FIAT Group architecture – compliments of the award-winning Alfa Romeo Giulietta – is the basis for the underpinnings of the new 2013 Dodge Dart. The Giulietta is renowned for satisfying the most demanding customers in terms of exceptional driving dynamics and agility, and that DNA carries over to the new Dodge Dart. Dodge engineers lengthened the platform 305 cm (12 inches) as they expanded it from a hatch to a sedan and widened it roughly 51 mm (2 inches) – almost 25 mm (1 inch) on each side –to create a spacious compact sedan with the interior roominess of a mid-size car.

The Giulietta's proven modular architecture means many models can be built using the same basic underpinnings. The result is better quality and reliability, as well as lower costs, less development time and tooling. The Compact U.S. Wide (CUS-wide) architecture Dart is built on is comprised of common, modular and interchangeable components and allows for modularity of the wheelbase, front track, rear track, front overhang, length and width across vehicle lines.

The 2013 Dodge Dart's body structure has a high-strength steel content of 68 per cent, one of the highest in the industry. Hot stamped-, high-strength- and ultra-high-strength steel are used to construct a strong, lightweight, solid vehicle architecture.

The Dart excels not only in traditional performance metrics, but also as an ecologically smart, fuel-efficient vehicle.

World-class Aerodynamics

The all-new 2013 Dodge Dart hits the mark with world-class aerodynamic performance compliments of a modern, sculpted exterior design and innovative technology not typically seen in the compact sedan segment.

The Dart spent more than 600 hours of development time in the Chrysler Group's state-of-the-art aero acoustic wind tunnel. As a result, designers optimized the car's front end for smooth airflow above, below and around the car without compromising styling or engine cooling requirements. Examples include the notch angle at the rear of the car, the shape of the rear taillamp applique and rear corners, all of which combine to improve aero performance without hurting the design aesthetics. In addition, work in the wind tunnel helped designers aero shape the mirrors for a significant improvement in aerodynamic performance.

The all-new Dodge Dart is the first Dodge vehicle to employ an active grille shutter system, which automatically closes the airflow through the lower intake when cooling is least needed, reducing drag roughly 3 to 5 per cent when compared with a vehicle without an active grille shutter system.

When the active grille shutters are closed, airflow is redirected around the front of the vehicle and down the sides, rather than through the vehicle, enhancing aero performance. Engine coolant temperature and vehicle speed determine whether the shutter is open or closed. For example, the shutter will close at highway speeds when less engine cooling is required and aerodynamic drag is most significant; the system will open when the car is hot city driving, traveling up a hill or pulling a trailer.

The 2013 Dodge Dart includes segment-exclusive underbody panels that run virtually stem to stern on the Dart's underbody and are more typically found on luxury vehicles. The belly panels are constructed of Mould-in-colour (MIC) black composite and essentially cover 90 per cent of the underbody. In addition to the aerodynamic benefits, the panels also serve to stop road noise from entering the passenger cabin.

The extensive use of underbody treatments, including a stylized lower radiator close out panel that is positioned below the front fascia, front and rear tire spats, an engine belly pan, two mid-floor belly pans, a centre diffuser and outboard diffusers, collectively reduce aerodynamic drag by 7 per cent.

Fun-to-drive Dynamics

The Dart's chassis was engineered to deliver sporty European handling dynamics and steering precision with ride and comfort characteristics tuned for North American roads.

The front and rear suspensions on the Dodge Dart are built using bushings and geometry tuned to achieve excellent handling with maximum comfort.

The exceptional balance of fun-to-drive dynamics, emergency handling, ride comfort and a quiet cabin is accomplished through the suspension bushing tuning and the exceptional body structure, including the front aluminum cradle, rear upper/under body structure reinforcement and superior suspension attachment stiffness.

The 2013 Dodge Dart features the proven MacPherson strut front suspension, which is renowned for its packaging efficiency and light weight. Dodge engineers specifically tuned the front suspension geometry to minimize camber loss, resulting in more responsive steering and handling characteristics and a smooth ride with little to no road noise – all qualities drivers will appreciate.

Dodge engineers used aluminum alloys for the knuckles and brake calipers and high-strength steels for the suspension linkages. They also optimized structural components to minimize unsprung weight (the weight of parts that are not carried on the springs, such as wheels, axles, and brakes), which results in more responsive vehicle handling, ride quality and reduced road noise.

The stiffness and low weight of the front suspension helps reduce typical rolling noise, keeping the road noise where it belongs – on the road and out of the Dart's passenger cabin.

The 2013 Dodge Dart's suspension features a flat-bottomed geometry in which the floor plan is nicely integrated,

which actively contributes to the Dart's exceptional aerodynamic performance.
Many key front-suspension components improve ride quality, durability and safety.

- Ride quality is improved, in part, thanks to the use of:
 - o Split dome anti-sway bar blocks that optimize the exchange of forces between the suspension and body, filtering out vibrations
 - o Telescopic hydraulic shock absorbers with high lateral stiffness
 - o Solid half-shafts throughout the range that help reduce weight and vibration
 - o Side load coil springs that optimize the thrust axis and help transfer loads on the shock absorber to improve comfort
 - o High-strength springs
- Durability and perceived vehicle quality are improved in part by:
 - o Spring isolators interposed between the springs and their support bases to eliminate running noise
 - o One-piece cast-iron lower control arms to enhance durability
- A third load path, which provides additional safety benefits for drivers and passengers, is created with attachments on the cast-aluminum, flat cross member that are strong enough to absorb loads in the event of an impact. The flat cross member enhances vehicle rigidity.

The Dart's front suspension cradle is constructed of high-pressure, die-cast aluminum, which is 6.3 kilograms (14-pounds) lighter than more conventional front cradle applications. The cradle also is stiff, helping stop the transmission of noise, vibration and harshness (NVH) into the passenger compartment, contributing to the Dart's exceptionally quiet interior.

A bi-link independent rear suspension on the all-new 2013 Dodge Dart enables European handling capability for those drivers who love to lean into corners and the smooth ride North American drivers covet.

Lightweight, hollow aluminum longitudinal arms enable the Dart's exceptional handling capability. Engineers dampened and isolated the ride harshness by employing premium urethane jounce bumpers, which provide smooth, progressive engagement over sharp bumps. The rubber upper and lower spring seat isolators and shock absorber bushings and tuned rubber bushings at the inboard and outboard ends of the suspension provide additional isolation.

Many key components of the rear suspension improve vehicle handling, reduce road noise and improve durability.

- Handling performance is improved, in part, thanks to the use of:
 - o An aluminum cross member with an optimized weight/stiffness ratio improves the reaction to lateral loads
 - o A stabilizer bar with torsional stiffness delivers sporty handling
 - o Bushings with stiffness characteristics are designed to maximize handling
 - Road and running noise is reduced through the use of:
 - o Spring isolators between the springs and their support bases
 - o Bushings with low dynamic stiffening ratios minimize the noise levels transmitted from the road
 - Vehicle durability is improved with the use of:
 - o Steel springs with high fatigue durability allow for weight containment
 - o Chrome guide rods enable very long durability even under extreme use conditions
 - Telescopic hydraulic shock absorbers that connect to the lower link are engineered for minimal bulk
- The rear suspension cradle is crafted in the same manner as the front, with a high-pressure die-cast aluminum structure. It is optimized to provide minimal weight, which enables fuel-efficiency, and for stiffness, which reduces the transmission of NVH into the passenger compartment.

The Dart's all-season tires provide exceptional grip and balanced performance and contribute to the vehicle's excellent ride comfort. The standard 16-inch and available 17-inch tires were picked with an emphasis on fuel efficiency. Dart R/T's standard 18-inch tire puts a priority on steering and handling.

Power Steering System

With a 15:1 steering ratio, the 2013 Dodge Dart is one of the fastest-steering vehicles in the compact car segment. The Dart's steering system is designed and engineered for the best performance for the driver in sporty driving conditions, as well as excellent handling and reduced effort during parking maneuvers.

The all-new Dart employs standard Electric Power Steering (EPS). All of the power assist is provided via an electric motor system rather than a traditional hydraulic system. Because the system is fully electronic, the driver experiences optimal steering effort at all vehicle speeds, and there is less noise and better fuel efficiency since there is no parasitic loss from a power steering pump.

The boost, or assist, is variable and speed sensitive, responding to sensors monitoring steering torque, steering wheel speed and angle and vehicle speed. The steering system is fully integrated with the vehicle's Electronic Stability Control (ESC) system and helps to compensate in split-traction, torque steer and pull-drift (crowned road) situations.

The 2013 Dodge Dart features next-generation electric dual-pinion steering, which delivers sporty handling by managing significant loads at all steering wheel operating speeds, power assist curves modulated according to driving conditions and up to a 3 per cent improvement in fuel efficiency when compared with a conventional hydraulic system.

The Dart steering column is designed for telescopic adjustment of up to 40 mm and up to 4 degrees of angular adjustment. The Dodge Dart has an estimated turning circle of 11.3 metres (38.1 feet).

Brakes

The 2013 Dodge Dart includes four-wheel disc antilock brakes (ABS) with traction control standard on all models.

The Dodge Dart features a four-channel anti-lock braking system that monitors the speed of each wheel individually. The four-channel system allows individual wheel braking for superior control and provides backup braking in the unlikely event that one of the two braking circuits would fail. The ABS software uses a steering wheel angle sensor that allows the system to differentiate between straight-line braking and braking in a turn resulting in better straight line braking with minimal yaw.

The Traction Control System (TCS), which is integrated with ABS, is an all-speed, four-channel system. TCS helps maximize driver control in all conditions by combining both engine torque and brake control to regulate wheel spin at all driving speeds. When the system senses impending wheel slip during acceleration, it signals the throttle control to reduce drive wheel torque. Under extreme situations, such as going from pavement to ice during acceleration, the system will selectively apply the brakes to maintain control. An ESC button on the centre stack allows the driver to partially turn off the system.

The all-new Dodge Dart also features electronic brake-force distribution, which helps the driver optimize stopping distances and maintain control under all vehicle loading conditions by regulating braking pressure front-to-rear.

Vented 305 x 28 mm front rotors help dissipate braking-related heat and improve braking performance compared with non-vented brake rotors. Solid 264 x 10 mm rear disc brakes improve braking performance with better pedal feel and reduced stopping distance. They are also quieter and lighter than drum rotors.

Whisper-quiet interior

The Dodge Dart's interior cabin is engineered to be exceptionally quiet. This is accomplished through the honing of exterior shapes and the use of sealing and acoustic sound-deadening materials and applications.

The all-new Dart was engineered using multiple techniques to optimize and improve exterior shapes and to make for a smooth, quiet ride. From front to rear, those techniques include:

- Laser-braised roof ditch eliminates noise-inducing cavities and resonance along the roof line
- A segment-exclusive seal from the backlight to the decklid stops turbulence in the area resulting in a quieter ride for rear seat occupants. The seal also eliminates the chance for air leakage into the trunk compartment and protects the trunk from water seepage
- The grille grates are optimized to minimize air "swoosh"
- Wiper blades are positioned below the hood line, which ensures near silent operation
- A hood seal closes off the hood-to-fascia gap, minimizing air turbulence
- 3.0 mm acoustic laminate windshield glass delivers a 2.5 to 3.0 decibel reduction in noise when compared with standard laminate glass

- Door uppers were designed and engineered so nothing invades air flow around the vehicle, which can be a common source of wind noise
- Mirrors were refined and optimized during hundreds of hours of wind tunnel analysis to improve both aero and sound performance
- A triple door seal system for all doors keeps wind and noise from seeping into the passenger compartment

The 2013 Dodge Dart also is the first Dodge vehicle to use a hybrid system of rocker foam and acoustic baffles. The acoustic baffles are paint-oven expandable and are placed in cavities in the Dart's body structure to reduce road noise. Twenty-four acoustic baffles are applied in the B-pillars, dog-leg, sail/C-pillars, rails and A-pillar. Similar to the acoustic baffles, expandable tape is applied in three-to-four locations in the window frames of all four doors, which stops air leakage in the door header, weld flanges and holes.

Engineers also applied 100 per cent fully sealed acoustic perimeter water deflectors in all four doors, which is a key enabler to reducing the amount of air and related noise that sneaks into the passenger compartment. The rubberized shield has only one orifice while most have multiple holes.

Baked on mastic in the floor pan of the new Dodge Dart reduces road noise and vibration and adds to the vehicle's smooth, quiet ride.

Engine covers and a glove-fit instrument panel pad on the passenger compartment side reduce powertrain noise.

All of the treatments result in less air entering into the passenger cabin, giving drivers and passengers world-class levels of interior-cabin quietness in the all-new 2013 Dodge Dart.

Segment-leading heating, ventilation and cooling (HVAC)

The all-new 2013 Dodge Dart offers best-in-class heating and cooling performance delivering exceptional heat up, cool down and defrost, as well as quiet performance.

To achieve the segment-leading performance, engineers used Computational Fluid Dynamics to deliver just the right amount of air flow through the ductwork. A variable displacement condenser continually matches the requested cooling load, which keeps the system stable and helps it operate quietly and efficiently. The central unit doors of the system are electronic; there are no cables, so drivers and passengers experience a more consistent feel when the system is on.

The air outlets are adjusted with rack-and-pinion vein adjusters, which make them both feel pleasant to the touch and give a consistent feel when they're repositioned in a different direction. Outboard air outlet bezels in the Dodge Dart come in three finishes: black, satin chrome or black chrome. Models equipped with automatic temperature control also include a humidity sensor, which creates an automatic de-fog capability.

Customer-focused Vehicle Development

The all-new 2013 Dodge Dart was developed and engineered to exceed expectations for customer satisfaction, quality and reliability. Engineers used Design for Six Sigma (DFSS) to ensure the voice of the customer was captured during the vehicle development process. DFSS folds in voice of the customer data along with lessons learned to ensure every vehicle is of the highest quality possible.

Before the Dart was even designed, customer focus teams were established to understand the voice of the customer. Critical areas and key systems were used to designate projects. The all-new 2013 Dodge Dart had more than 100 DFSS projects during its development phases. Dodge engineers looked at every detail during development by tracking more than 5,000 customer functional objectives for the car on a weekly basis. The customer functional objectives were determined from consumer clinics held at the start of the Dart's design and development.

The 2013 Dodge Dart was engineered with a new definition of performance in mind. The Dart excels not only in traditional performance metrics, but also as an ecologically smart, fuel-efficient vehicle.

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