

FCA US Breaking Out the Strong Stuff, Gets Lit for 2017

Safety & Technology Overview and Glossary

- Higher-strength steel usage up 53 percent at FCA US since model-year 2012
- Advanced High-Strength Steel content highest in all-new 2017 Chrysler Pacifica body structure
- LED headlamp technology debuts on 2017 Jeep Wrangler, delivering 90 percent more high-beam output versus halogen
- 2017 lineup boasts more than 75 driver-assist, occupant-restraint and connectivity features that benefit safety and security

September 1, 2016, Auburn Hills, Mich. - As FCA US LLC expands and freshens its vehicle lineup, so goes the Company's use of higher-strength steels – a key contributor to improved crashworthiness.

Model-year 2017 also marks the debut of light-emitting diode (LED) headlamps in the FCA US lineup. The technology delivers greater light output, which helps allow drivers to see more – and potentially see it sooner.

"Our commitment to improving safety is unwavering," says Mike Dahl, Head of Vehicle Safety and Regulatory Compliance. "We are continually exploring the use of new materials and components that will boost the performance of our vehicles, for the benefit of our customers."

Compared with body structures of the vehicles they replaced, higher-strength steel content has increased more than 53 percent in the all-new, mainstream-segment vehicles introduced by FCA US since model-year 2012. These materials contribute to improved crashworthiness as well as weight reduction, which helps improve fuel efficiency.

Among the vehicles launched most recently, two have earned Top Safety Pick+ ratings from the Insurance Institute for Highway Safety (IIHS): Fiat 500X small crossover and the Chrysler 200 mid-size sedan. Higher-strength steel content levels in their body structures total 74 percent and 66 percent, respectively.

"It should also be noted this increased integration extends to the higher-end materials, such as Advanced High-Strength Steel (AHSS)," Dahl says.

AHSS accounts for 38 percent of the all-new 2017 Chrysler Pacifica's body structure – the highest such concentration in any FCA US vehicle. The 500X boasts the next-highest AHSS level at 28.3 percent.

Similar usage jumps have occurred with hot-stamped steel, which accounts for 14 percent of the Jeep Renegade's body structure.

According to the Steel Market Development Institute (SMDI):

- High-Strength Steel (HSS) is a medium-strength steel used in various body-structure components; it is up to 100 percent stronger than conventional or "mild" steel
- AHSS is a higher-strength steel used in parts such as beams, sills, cross-members and other energy-absorbing components; it is up to 300 percent stronger than mild steel
- Hot-stamped steel is press-hardened for use in parts with complex shapes; it is up to 500 percent stronger than mild steel

Higher-strength steels also are lighter than conventional grades, so vehicles may benefit from weight reduction and improved fuel-efficiency. The all-new Chrysler Pacifica is 250 pounds lighter than the vehicle it replaced, and more than half of that weight savings is attributed to body structure.

The debut of LED headlamps in the FCA US lineup further reflects the Company's staunch pursuit of technologies that improve the driving experience. The 2017 Jeep Wrangler's headlamps generate high-beam light output that is 90 percent greater than the halogen lamps in prior models; low-beam output also jumps 63 percent.

"Such lighting helps afford the driver a better view of the road ahead, the benefits of which are literally plain to see," Dahl says.

Despite their increased output, the new Wrangler's headlamps draw 67 percent less power than comparable halogen lamps.

Structural systems and advanced lighting technology comprise a snapshot of FCA US strategy. The following are among the additional safety and security features available in FCA US vehicles:

Structural System Technology

- **Energy-absorbing steering column:** Manual-adjust steering column features two hydroformed coaxial tubes that move relative to each other to allow for enhanced energy absorption during an impact; power-adjust steering column employs a calibrated bending element that deforms during column stroke for optimal energy management
- **Front and rear crumple zones:** Specially-formed structural members that crumple and absorb energy in a collision, helping protect the occupant cabin
- **Laminated glass:** Plastic sandwiched between glass panes to provide added strength; discourages break-ins
- **Safety-cage body structure:** Helps protect occupants by managing and controlling energy in the event of an impact
- **Side-guard door beams:** Reinforcement beams inside the doors that help provide occupant protection in certain side collisions

Driver Warning and Assist, Chassis Control and Brake Systems

- **Advance Brake Assist:** Works with Full-speed Forward Collision Warning-Plus; increases deceleration if driver does not apply brake with sufficient force to respond to collision condition
- **Adaptive Cruise Control-Plus with Full Stop:** Helps maintain distance from vehicle ahead; under certain traffic conditions, system can bring vehicle to full stop without driver intervention
- **All-speed traction control system:** While driving, helps keep wheels from spinning during acceleration from a stop or at speed by applying brakes alone or in combination with engine torque limitation
- **Anti-lock Brake System (ABS):** Senses and prevents wheel lockup, offering improved steering control under extreme braking and/or slippery conditions
- **Blind-spot Monitoring (BSM):** Uses radar sensors to aid driver when changing lanes, passing or being passed; blind-spot vehicle presence noted via illuminated icons in sideview mirrors and driver-selectable audible chime
- **Brake Assist:** System applies maximum braking power in emergency braking situations, minimizing stopping distance
- **Brake-lock Differential System (BLDS):** Allows the vehicle to maintain forward motion if one or two wheels lose traction by selectively and aggressively applying brakes to the spinning wheels

- **Brake-throttle override:** Standard equipment on every FCA US vehicle, it allows driver to stop the vehicle when throttle and brake inputs occur simultaneously; electronic throttle control also reduces engine-power output
- **Brake/park interlock:** Prevents transmission from being shifted out of "Park" unless the brake pedal is pushed
- **Brake Traction-control System (BTCS):** Helps to keep wheels from spinning during acceleration from a stop or during slow speeds by applying individual brakes to the slipping wheel(s)
- **Electronic Brake-force Distribution (EBD):** Optimizes stopping distances and control under all vehicle loading conditions by regulating braking pressure, front-to-rear
- **Electronic Roll Mitigation (ERM):** Uses input from electronic stability control (ESC) sensors to anticipate potential rollover conditions; applies brakes individually and modulates the throttle position to help driver maintain control
- **Electronic Stability Control (ESC):** Enhances directional control and stability of vehicle in various driving conditions; activation occurs when steering-wheel angle differs inconsistent with vehicle; automatically reduces throttle input and/or selectively deploys brakes to counteract oversteer or understeer
- **Full-speed Forward Collision Warning-Plus:** Radar and camera technology combine to determine if frontal impact with another vehicle appears imminent; if so, system pre-fills brakes, then transmits audible and visual warnings for driver to intervene; no driver response triggers brief brake application as tactile alert; if driver remains unresponsive and frontal collision risk remains, brakes are applied to slow vehicle before impact; system may bring vehicle to full stop if imminent frontal collision detected at speeds below 25 mph
- **Forward Collision Warning-Plus:** Radar and camera technology combine to determine if frontal impact with another vehicle appears imminent; if so, system pre-fills brakes, then transmits audible and visual warnings for driver to intervene; no driver response triggers brief brake application as tactile alert; if driver remains unresponsive and frontal collision risk remains, brakes are applied to slow vehicle before impact
- **Forward Collision Warning:** Radar determines if a frontal impact with another vehicle appears imminent; if so, system pre-fills brakes, then transmits audible and visual warnings for driver to intervene
- **Hill-start Assist:** Assists drivers when starting from a stop on a hill; maintains brake pressure for short period of time after driver's foot is removed from the brake pedal; if throttle is not applied within short period of time thereafter, brake pressure will be released
- **Lane Departure Warning with Lane-Keep Assist:** Alerts and assists driver; leverages electric power steering (EPS) to deliver subtle steering-wheel input when system detects need for course correction
- **ParkSense Parallel/Perpendicular Park Assist:** Features ultrasonic sensors on the bumper to find and guide driver into parking space; guidance system automatically controls the steering angle while driver controls gear position, brake, and accelerator; parallel parking possible on either side of the car; to accommodate perpendicular parking, vehicle is backed into the space
- **ParkSense Rear Park Assist Systems with Stop and Release:** In reverse, at low speeds, ultrasonic sensors detect stationary objects; if imminent collision is detected, system will provide momentary, autonomous brake pulse; below 4.4 mph, system will bring vehicle to a stop before releasing
- **ParkView rear backup camera:** Provides wide-angle view of area immediately behind vehicle, giving driver greater peace of mind before reversing; features dynamic grid lines to aid driver when maneuvering

into parking spaces or narrow areas; also assists when lining up trailer to vehicle's hitch, when so equipped; image displayed on the navigation screen when the transmission is shifted into Reverse

- **Rain brake support:** In rainy conditions, occasionally pushes brake pads lightly against brake rotors to keep rotors dry
- **Ready Alert Braking (RAB):** Anticipates situations when driver may initiate an emergency brake stop and uses ESC pump to set brake pads against rotors, decreasing time required for full brake application
- **Rear Cross Path (RCP) Detection:** In parking-lot situations, warns drivers of lateral traffic when backing out of parking spaces; automatically activates any time a vehicle is in reverse gear; driver alerted of approaching vehicle(s) via illuminated icons on sideview mirrors and driver-selected audible chime
- **Trailer-sway mitigation:** Uses input from electronic stability control (ESC) sensors to anticipate potential trailer-induced yaw conditions; applies brakes individually and modulates throttle to help driver maintain control

Occupant Restraint Technology

- **Active head restraints:** Deploy during collision; designed to help reduce injuries by minimizing gap between occupant's head and the head restraint
- **Advanced multistage driver and front-passenger air bags:** Inflate with force appropriate to the severity of the impact; meet FMVSS 208 advanced air bag requirements for smaller, out-of-position occupants
- **All-row, full-length side-curtain air bags:** Extend to all outboard front- and rear-seat passengers; housed in headliner above side windows, each side air bag has its own impact sensor that triggers deployment on the side of the vehicle where impact occurs
- **BeltAlert:** Activates chime and/or illuminates icon in instrument cluster to remind driver and front passenger to buckle up if vehicle is driven without belted front-seat occupants
- **Child Seat Anchor System:** LATCH (Lower Anchors and Tethers for CHildren) designed to ease installation of compatible aftermarket child seats
- **Constant-force retractors:** Regulates force exerted on occupant by seat belt, then gradually releases webbing in controlled manner
- **Front seat-belt pretensioners:** During a collision, impact sensors initiate front seat-belt pretensioners to remove slack in the seat-belt system, thereby reducing the forward movement of the occupant's head and torso
- **Front-seat-mounted side pelvic thorax bags:** Help provide enhanced protection to driver and front passenger in certain impacts; each side air bag has its own impact sensor that triggers deployment on side where an impact occurs
- **Driver's-side knee air bag:** Deploys with advanced multistage driver air bag; located below instrument panel, device designed to properly position occupant during impact
- **Height-adjustable seat belts (front row):** Outboard seat belts feature height adjustment, allowing for seat belt to be placed in optimal position for any driver
- **Occupant restraint controller:** Detects impact and determines if air bag deployment, and degree of deployment is appropriate; also deploys front seat-belt pretensioners

Lighting and Visibility Systems

- **Active turn signals:** Turn signal flashes three times when stalk is depressed for one second
- **Auto-adjust exterior mirrors:** Sideview mirrors automatically adjust to accommodate rearview when vehicle shifted into reverse
- **Auto-dimming rearview mirror:** Auto-dimming mirror automatically reduces glare from bright light allowing driver to have a clearer view of the road ahead
- **Automatic defog:** Automatic temperature control system measures interior humidity and activates defogging system without driver intervention
- **Automatic headlamps:** Headlamps turn on and off automatically depending on exterior light levels and if windshield wipers are operating
- **Automatic high-beam headlamps:** Headlamp system adjusts to ambient light and oncoming traffic to deliver maximum lighting
- **Daytime Running Lamps (DRL):** Low-intensity halogen or signature LED lights that illuminate during daytime conditions, increasing vehicle's visibility to other drivers
- **Enhanced Accident Response System (EARS):** Makes it easier for emergency personnel to see and reach occupants in the event of an accident by turning on the interior lighting and unlocking doors after air bag deployment; also shuts off flow of fuel to the engine
- **Heated windshield washer nozzles:** Delivers heated washer fluid to more efficiently clear windshield in inclement weather
- **High-intensity Discharge (HID) Headlamps:** Provide approximately three times the light output than conventional reflector lamps
- **Halogen Infrared Reflecting Bulbs (HIR):** Unique component coating delivers greater light output than conventional bulbs
- **LED fog lamps:** Provide improved illumination during inclement weather
- **LED tail lamps:** Provide dual-function illumination (brake, stop, turn and running light functions)
- **LED headlamps:** Provide improved illumination
- **Rain-sensing wipers:** A driver convenience feature that automatically senses moisture on the windshield and activates wipers

Emergency Connectivity and Other Features

- **9-1-1 call/Assist Call:** Enabled by built-in data connection, rearview mirror-mounted button connects occupants directly with emergency service providers; for roadside assistance or Uconnect system questions, a separate button establishes direct contact with appropriate call-takers
- **Auto-reverse sunroof:** Automatically reverses when it senses an obstruction while closing
- **Auto-reverse windows:** Automatically reverses when it senses an obstruction while closing
- **Capless fuel-filler door:** Enables fuel-filling simplicity

- **Child-protection rear door locks:** Disables rear doors' inside-release handle by adjusting a small lever opposite the doorjamb
- **Electronic locking fuel-filler door:** Prevents theft or tampering, which can lead to damage, inefficiency and unwanted fuel vapor release
- **Express up/down windows:** One-touch express up/down window button located on the front driver and passenger-side door
- **Global Position Sensor (GPS):** Used for navigation guidance and electronic vehicle tracking
- **Intelligent Battery Sensor (IBS):** Continually measures flow of current into and out of battery; if battery is running low, system shuts off less-critical electrical systems to conserve power; icon in cluster denotes activation
- **Inside emergency trunk-lid release:** Glow-in-the-dark handle enables unlocking from inside trunk
- **Keyless Enter 'n Go:** Electronic sensors detect if unique vehicle key fob is present, which enables passive cabin entry and trunk access; illuminates interior lamps and enables push-button ignition – no need to insert key
- **Remote Keyless Entry:** Locks and unlocks doors and turns on interior lamps. If vehicle is equipped with security alarm, remote also arms and disarms system
- **Remote start:** Fob-activated convenience; starts engine and activates interior climate settings while maintaining vehicle security
- **Sentry Key engine immobilizer:** Utilizes engine key with embedded transponder and preprogrammed security code to discourage vehicle theft; when key is inserted into the ignition, controller sends a random number to the transponder and engine is allowed to start; engine will shut off after a few seconds if an incorrect key is used
- **SiriusXM Traffic:** Real-time local traffic updates via SiriusXM Radio
- **SiriusXM Travel Link:** Provides passengers with real-time weather, information and entertainment to make every trip more efficient and secure
- **Speed-sensitive door locks:** System automatically locks doors when vehicle acceleration reaches prescribed threshold
- **Tilt-and-telescoping steering column:** Allows steering column to tilt and move toward or away from the driver to achieve a safe and comfortable distance from the advanced multistage front driver air bag, if deployed
- **Tire-pressure Monitoring (TPM) System – Lock-on Sync:** Informs driver when tire pressure is too low; pressure-sensor modules within valve stems of all four wheels send continuous radio-frequency signals to a receiver; available systems use graphic display to indicate tire-specific pressure
- **Uconnect Access Mobile Hot Spot:** Turns vehicle into mobile Internet hot spot; available to registered Uconnect Access subscribers
- **Uconnect Access remote services:** Enables registered Uconnect Access subscribers with compatible cell phones to lock or unlock their vehicles or activate panic alarm; can also activate remote start
- **Uconnect Access voice-to-text:** Enables cloud-based text-message dictation via compatible Bluetooth-

enabled cell phones; available to registered Uconnect Access subscribers

- **Uconnect Access stolen vehicle location assistance:** Leverages GPS data-sending capability to help authorities find stolen vehicles
- **Uconnect Voice Command:** Voice-recognition technology enables handsfree navigation-system inputs and access to real-time information, such as weather forecasts via SiriusXM Travel Link
- **Uconnect Voice Command with Bluetooth:** Voice-recognition technology enables drivers to use Bluetooth-enabled phones while keeping their hands on the wheel and eyes on the road

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