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All-new 2017 Chrysler Pacifica Maintains Segment Leadership for FCA US with Upgraded Gas-Powered Model and First Hybrid Minivan

- Upgraded next-generation gasoline version of award-winning Pentastar V-6 engine features multiple fuel-saving technologies, along with additional low-end torque and class-leading refinement
- Significant enhancements include:
    - Two-step variable-valve lift (VVL) benefits fuel economy and Pentastar's class-leading refinement
    - Cooled exhaust-gas recirculation (EGR) delivers greater efficiency and enables knock-free operation at higher, real-world loads
    - Upgraded variable-valve timing (VVT) system
    - Redesigned components reduce overall engine weight – despite added content
    - Gas-powered Pacifica model also benefits from segment-exclusive TorqueFlite nine-speed automatic transmission with e-shift technology
- Combination of new Pentastar V-6 and segment-exclusive TorqueFlite nine-speed automatic transmission produces 287 horsepower and 262 lb.-ft. of torque, while delivering an unsurpassed 28 miles per gallon (mpg) on the highway
- Pacifica Hybrid model pairs innovative dual-motor eFlite electrically variable transmission (EVT) with a specially modified version of the upgraded 3.6-liter Pentastar V-6 gasoline engine that features an Atkinson cycle combustion system
- First electrified vehicle in minivan segment rated at 84 miles per gallon equivalent (MPGe) in electric-only mode and 33 miles of all-electric range

January 11, 2016, Auburn Hills, Mich. - The all-new 2017 Chrysler Pacifica minivan features a choice of two powerful, efficient and advanced powertrains – the next-generation of the award-winning Pentastar V-6 gasoline engine, mated to a segment-exclusive TorqueFlite nine-speed automatic transmission and the segment's first electrified hybrid model pairing an innovative dual-motor eFlite electrically variable transmission (EVT) with a specially adapted version of award-winning 3.6-liter Pentastar V-6 gasoline engine.

Powerful powertrain

Already unique among gasoline-powered V-6 engines for its refinement, power, efficiency and adaptability, the formidable 3.6-liter Pentastar has been remade. The redesigned V-6 gas engine delivers 287 horsepower, 262 lb.-ft. of torque and an unsurpassed 28 miles per gallon (mpg) on the highway.

Enhancements such as two-step variable-valve lift (VVL), cooled exhaust-gas recirculation (EGR) and innovative weight-reduction strategies boost the engine's efficiency and performance, all while preserving the smoothness that remains a hallmark of the Pentastar brand.

Increased fuel efficiency was a key impetus in the development of the redesigned 3.6-liter Pentastar V-6 engine. FCA US powertrain engineers identified the combination of features that deliver the greatest benefits in the widest operating range.

Improvements were measured right down to the component level. And no improvement was too small to chase. Arguably the most compelling enhancement is the two-step VVL. The system is designed to remain mostly in low-lift mode until the customer demands more power; then it responds by switching to high-lift mode for improved performance.

The addition of cooled EGR firmly establishes the redesigned Pentastar among the V-6 elite. In addition to the obvious emissions-reduction benefits, the system further cuts pumping losses and enables knock-free operation at higher, real-world loads.

Pumping losses are again targeted with the engine's upgraded variable-valve timing (VVT) system, which moves to torque-driven cam-phasing, and reduces oil demand.

The new VVT system also increases its range of authority to 70 degrees from 50 degrees. This helps mitigate knock during hot starts and expands the operating envelope of engine stop-start (ESS), a fuel-saving feature that is carried over from the previous-generation 3.6-liter Pentastar engine.

A new VVT system calibration helps deliver more torque more quickly to leverage the benefits of the new intake manifold's longer runners. The result is a torque boost of more than 10.9 percent on the new Chrysler Pacifica. And this occurs between 2,000 and 4,000 rpm – engine speeds most customers see frequently.

The redesigned 3.6-liter Pentastar V-6 engine benefits from numerous upgrades, which better harness the combustion event. The upshot is improved efficiency. Most notably, the engine's compression ratio jumps to 11.3:1 from 10.2:1, compared with the engine's previous iteration.

High-tumble intake ports combine with shrouded valves to take advantage of the engine's new fuel injectors. Featuring eight holes each, twice the number in the previous iteration's injectors, the intake ports offer optimized atomization and targeting.

Factor in the effect of 100-millijoule high-energy ignition coils with platinum sparkplugs and the above combustion enhancements account for a 1.5-percent improvement in fuel economy.

Multiple friction-reduction strategies contribute to an additional 1 percent fuel-economy hike, compared with the engine's previous iteration. Particularly notable is the use of HG-R1 on the timing drive guide-faces. The new Pentastar is the first production engine to feature this low-friction material. Also contributing to friction reduction are new valve springs, low-tension piston rings and piston pins, which feature diamond-like carbon coating.

Just as refinement is a defining trait of the Pentastar V-6 engine family, so is component design. Its integrated exhaust manifold contributes to packaging efficiencies that enable plug-and-play-type integration across a range of vehicle segments and drivetrain configurations.

The new intake manifold improves airflow, which benefits volumetric efficiency and enables a boost up to 287 horsepower.

During engine development, FCA US powertrain engineers were challenged by the potential negative effects of incremental weight, wrought by the engine's new feature content. However, clever component redesign produced an engine that weighs only 326 pounds in the all-new Chrysler Pacifica. That's four pounds less than the previous generation 3.6-liter Pentastar engine, despite the addition of new content weighing 13 pounds.

A thin-wall strategy was used to reduce the nominal thickness of certain die-cast components – without compromising the superb noise, vibration and harshness (NVH) characteristics for which Pentastar engines are known.

Windage-tray weight was slashed by 19 percent and front-cover weight was cut by 5 percent. The oil pan was redesigned from a two-piece to a single-piece pan and the sump was reduced from a 6-quart fill to a 5-quart fill – resulting in an overall 5-pound weight savings compared with the previous generation Pentastar V-6 engine.

The engine's crankshaft also went on a diet. Its main bearings and pins were trimmed, which contributed to an overall block-assembly weight reduction of six pounds. This generates additional friction reduction.

Engine stop-start

Standard fuel-saving engine stop-start (ESS) technology will be introduced later in the model year on the 2017 Chrysler Pacifica.

At its heart is a high-speed and high-durability starter that reduces crank time, culminating in quicker restarts. Its function is regulated by algorithms, which act on a vehicle's powertrain and chassis components.

Accordingly, acceleration is always aligned with driver inputs. Passive accelerator application is met with measured throttle response; hard inputs trigger aggressive starts. And there's no waiting for either.

ESS works this way:

- Engine controls constantly monitor vehicle speed
- When the vehicle brakes to a stop, fuel flow is cut and the engine turns off – events that save gas and reduce emissions
- Beefier batteries maintain other vehicle systems, so in-cabin comfort is unaffected
- When the brake pedal is released, the engine automatically restarts and the segment-exclusive nine-speed automatic transmission is engaged

If a driver chooses to forgo the benefits of ESS, the feature can be deactivated with the push of a button, and then reactivated.

TorqueFlite nine-speed automatic transmission

The newest member of the FCA US TorqueFlite transmission family, the nine-speed gearbox benefits from a unique calibration and an ergonomic rotary dial electronic shifter located on the vehicle's integrated center console. This nine-speed application on the all-new gasoline-powered 2017 Chrysler Pacifica is the first of its kind in the minivan category of the global vehicle E-segment (and amongst its primary competitors).

Features of the advanced transmission include:

- Compact design for ease of packaging
- Wide 9.81 ratio spread for enhanced performance and fuel economy

Unique transmission calibration allows for outstanding vehicle launch characteristics with smooth transfer between gears and enhanced fuel efficiency.

The 4.70 first gear ratio ensures an excellent launch character that has been tuned specifically to the new Pacifica. Small ratio steps for mid-range gears ensures quick, smooth transitions between gears. In higher gears, overdriven gear ratios lower engine speeds, and in turn, enhance fuel efficiency.

With its superior gear and ratio spread, the TorqueFlite nine-speed automatic transmission benefits from a compact design. It is sized similar to – and in many cases smaller than – its traditional six-speed counterparts. It's this sizing that enables its application on vehicles such as the new Chrysler Pacifica.

The compact design is enabled by:

- "Nested" carrier configuration that ensures gear sets are optimally packaged
- Ingenious incorporation of dog clutches rather than traditional and large-diameter "friction discs," in some locations. As a result, some gear-shifts are handled via male-to-female spline engagement (similar to a manual transmission). This "friction-less" clutch system yields both efficiency and packaging benefits

Rotary dial e-shift

Unlike any in its minivan competitive set, all 2017 Chrysler Pacifica models will be equipped with an e-shift rotary dial

shifter located on the integrated center console that electronically actuates shift selection.

Also known as Electronic Transmission Range Selection (ETRS), e-shift applications are commonly found across the luxury vehicle segment and viewed as a “price of entry” feature by many luxury buyers.

The e-shift system replaces traditional shift cables and levers with sophisticated software and electronics. The simple dial shift interface – a dramatic departure from standard mechanical shift systems – brings feel, effort and operation created to compete with best-in-class performance.

The e-shift system also enables more packaging and design flexibility when compared to mechanical shift systems.

Customer benefits include:

- **Technologically Advanced** — The e-shift is a forward-thinking innovation; a premium, sophisticated feature that demonstrates progressiveness
- **Attractive Design** — The compact design of the e-shift dial shifter enables more appealing interior styling and design cues (when compared to a traditional shifter)
- **Space Savings** — The elimination of cables and mechanical components frees up valuable real estate on and underneath the center console for enhanced storage opportunities
- **Quiet Cabin** — Removal of the mechanical connection between the shift lever and gearbox reduces noise paths into the cabin
- **Uncommon Tactility & Simplicity** — The shifting task becomes more a “turn/touch” function than “slot-shift” exercise. Shifting to Drive (D), Park (P) or Reverse (R) is essentially a turn of the dial and nothing more

First hybrid powertrain in minivan segment
“Due to its large footprint and multiple daily trip patterns, the minivan is ideally suited for electrification technology,” said Bob Lee, Vice President and Head of Engine, Powertrain and Electrified Propulsion Systems Engineering, FCA – North America. “The all-new 2017 Chrysler Pacifica lives up to this promise and then some, with efficiency, power and refinement.”

The Pacifica Hybrid is the industry’s first electrified minivan. With an estimated 260 total system horsepower, the vehicle will deliver an estimated range of 33 miles solely on zero-emissions electric power from a 16-kWh lithium-ion (Li-ion) battery.

In electric-only mode, it achieved an efficiency rating of 84 miles per gallon equivalent (MPGe), based on U.S. Environmental Protection Agency standards.

When the battery’s energy is depleted to a certain threshold, the Pacifica Hybrid becomes a part-time electric vehicle, like a conventional hybrid. Power to the wheels is supplied by the electric drive system or supplemented by a specially adapted new version of the award-winning FCA US Pentastar 3.6-liter V-6 engine.

The battery pack – neatly packaged under the second row floor in the new unique battery case – may be fully recharged in as little as two hours using a 240-volt plug-in system.

The pivotal technology behind the all-new Chrysler Pacifica Hybrid is its innovative eFlite electrically variable transmission (EVT). Designed by FCA US, the device features two electric motors – both of which are capable of driving the vehicle’s wheels.

Conventional electrification schemes dedicate one motor to serve as a generator and a second motor – usually much larger – to deliver torque to the wheels. But the all-new 2017 Chrysler Pacifica Hybrid uses a one-way clutch that allows the motor typically used only as a generator to deliver torque to the wheels, depending on driving conditions. The result is increased efficiency, refinement and improved component packaging.

Unique hybrid engine
Based on the newly upgraded Pentastar engine architecture, the new hybrid engine features an Atkinson cycle

combustion system for improved pumping efficiency without compromising vehicle performance due to its hybrid electric motors working in tandem with the engine when full load performance is required.

Unique “handed” pistons provide a compression ratio increase to 12.5:1 for further thermodynamic efficiency improvement.

The front cover and front accessory drive system was re-engineered due to the elimination of the alternator and power steering pump which is common to most hybrid engines.

Friction reduction improvements, along with ignition and fuel injection improvements found on the upgraded Pentastar V-6 are all part of the specially adapted hybrid Pentastar engine, while 2-step valve lift and cooled EGR have been removed with the addition of Atkinson cycle combustion system.

Recharging
Deceleration triggers the motor to turn into a generator, which creates electricity to send back to the battery pack.

The 16-kWh lithium-ion battery pack in the 2017 Chrysler Pacifica is stored efficiently under the second-row floor, keeping the rear cargo area as roomy as ever and preserving the third-row Stow ‘n Go seating and storage.

The exterior charge port is located on the driver’s side fender for quick and easy plug in after exiting the vehicle. On the inside, a charging indicator light is located on the instrument panel so owners can easily monitor the battery charge process.

Chrysler Brand
The Chrysler brand has delighted customers with distinctive designs, craftsmanship, and advanced innovation and technology since the company was founded in 1925. Chrysler continues to build on that nearly 100-year legacy of creating ingenious products and technologies for mainstream customers, moving forward on an electrified transformation that will launch the brand’s first battery-electric vehicle in 2025 and an all-electric portfolio in 2028.

The Chrysler Pacifica continues to reinvent the minivan, a segment Chrysler created 40 years ago. The Chrysler Pacifica Plug-in Hybrid symbolizes the brand’s electrification evolution, representing the first electrified minivan in the segment and achieving 82 MPGe, an all-electric range of 32 miles and a total range of 520 miles. Chrysler Pacifica delivers the most standard safety features and most advanced available all-wheel-drive system in its class and is also the most awarded minivan over the last seven years with more than 175 honors and industry accolades since its introduction as a minivan.

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