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## **POWERTRAIN**

### **Ram Launches Most Powerful Pickup Ever; 1,000 lb.-ft. of torque, Cummins Turbo Diesel is stronger, quieter and leaner**

- 1,000 lb.-ft. of torque milestone achieved by Ram and Cummins with all-new 6.7-liter Cummins High Output Turbo Diesel
- New Cummins engine includes a host of upgrades, including new block, pistons, cylinder head and valvetrain, for more power, better fuel efficiency and reduced Noise, Vibration and Harshness (NVH)
- Weight-savings program removes more than 60 lbs. from Cummins Turbo Diesel
- Behind the more powerful 6.7-liter Cummins, Aisin six-speed automatic transmission delivers improved towing capability, NVH and fuel economy via hardware and software upgrades
- Standard 6.4-liter HEMI® V8 power with cylinder deactivation and Variable Cam Timing (VCT) delivers class-leading 410 horsepower and 429 lb.-ft. of torque
- Frame-mounted active vibration dampers and Active Noise Cancellation minimize NVH, allowing expanded use of cylinder deactivation on 6.4-liter HEMI V8
- New, class-exclusive TorqueFlite eight-speed automatic for 6.4-liter HEMI V8 brings shift refinement not seen in heavy-duty trucks
- New eight-speed includes convenient rotary e-shifter and more than 40 individual maps to optimize shift quality and shift points regardless of load or conditions
- Upgraded 68RFE six-speed automatic available for the 6.7-liter Cummins Turbo Diesel standard output
- Two 4x4 transfer cases, one all-new for maximum towing applications on the Ram 3500 with 6.7-liter Cummins Turbo Diesel, engineered to handle higher input loads
- New front and rear axles offer upgraded components to handle the highest capacities available in any pickup; 4x4 front axle disconnect system contributes to improved fuel efficiency
- Customizable gauges allow customers to monitor critical systems such as turbo boost and engine braking
- Unsurpassed powertrain warranty – five years/100,000 miles

January 14, 2019, Auburn Hills, Mich. - Setting new benchmarks for performance, capability and refinement, the new 2019 Ram 2500 and 3500 Heavy Duty lineup gives maximum effort all day, every day with a confident and proven powertrain lineup highlighted by an all-new Cummins High Output Turbo Diesel with 1,000 lb.-ft. of torque.

Buyers of the 2019 Ram Heavy Duty pickup have a choice between the proven and robust 6.4-liter HEMI® V8 gasoline engine, now mated to a fuel-efficient TorqueFlite eight-speed automatic transmission, and standard- and high output versions of the new 6.7-liter Cummins Turbo Diesel I6, offering unparalleled flexibility. The standard output Cummins mates to a refined 68RFE six-speed automatic transmission, while the high output Cummins bolts up to an upgraded, heavy-duty Aisin six-speed automatic transmission.

Complementing the power under the hood, the 2019 Ram Heavy Duty is equipped with upgraded transfer cases for 4x4 models, and front and rear axles that deliver improved payload and towing capacity and durability while minimizing performance-robbing friction.

"Heavy-duty pickups have the highest capability demands of any passenger vehicle and by engineering 1,000 lb.-ft. of torque into the Cummins 6.7-liter we ensure our Ram 2500 and 3500 customer's expectations are exceeded," said Bob Lee, Head of Engine, Powertrain and Electrified Propulsion, and Systems Engineering, FCA – North America. "Creating a powerful engine is only a percentage of what it takes to deliver strength, durability and refinement in a vehicle. Our entire Heavy Duty drive line, including an exclusive 8-speed transmission behind our 6.4-liter HEMI V8, new transfer cases, axles and a host of technologies work in harmony to handle the toughest jobs."

#### **Engines: 6.7-liter Cummins High Output Turbo Diesel reaches the 1,000 lb.-ft. level**

The Cummins 6.7-liter inline-6 Turbo Diesel in the new 2019 Ram 2500 and 3500 Heavy Duty is offered in two variants – standard output (370 horsepower @ 2,800 rpm/850 lb.-ft. of torque @ 1,700 rpm) and high output (400 horsepower @ 2,800 rpm/1,000 lb.-ft. of torque @ 1,800 rpm).

Changes begin at the core, with a cylinder block made from compacted graphite iron. Using compacted graphite iron instead of grey cast iron produces a cylinder block that is stronger and better able to dampen vibrations, yet weighs less. Overall, the new Cummins Turbo Diesel weighs more than 60 lbs. less than the previous-generation engine, yet delivers more power and torque.

A new cast-iron cylinder head builds on the new block with changes that include new exhaust valves and springs, and new rocker arms driven by a hollow camshaft, contributing to the weight savings. Changes to the Cummins Turbo Diesel also include a new oil pump and water pump with lightweight-aluminum housing.

Lighter and stronger pistons include new low-friction rings and connect to the crankshaft via newly design forged connecting rods and new bearings. The new Turbo Diesel has a bore of 4.21 inches and stroke of 4.88 inches, and a compression ratio of 16.2:1 for the high output and 19.0:1 for the standard output.

An all-new exhaust manifold is the mounting point for an improved variable-geometry turbocharger with laminated heat shields, delivering boost pressure up to 33 psi. The new fuel-delivery system includes a new 29,000 psi (2,000 bar) fuel pump and fuel rail. The Cummins Turbo Diesel uses ultra-low sulfur-diesel fuel and a new Selective Catalytic Reduction emission treatment system.

#### **Engines: 6.4-liter HEMI® V8 a proven performer**

The standard engine in the 2019 Ram 2500 and 3500 Heavy Duty is upgraded to the proven and potent 6.4-liter HEMI V8, delivering 410 horsepower @ 5,600 rpm and 429 lb.-ft. of torque @ 4,000 rpm to handle the payload and towing requirements of the heavy-duty truck user.

Mated to the electronically controlled TorqueFlite 8HP75 eight-speed automatic transmission, the 6.4-liter HEMI V8 employs variable cam timing technology to deliver the optimal blend of power and comfort regardless of the load and terrain.

Fuel Saver Technology deactivates four of the engine's cylinders during light acceleration and cruising to optimize fuel economy, yet quickly reverts to full eight-cylinder operation when power is demanded. Fuel use is further optimized with interactive Deceleration Fuel Shut Off, which stops fuel flow to the cylinders when decelerating.

Noise, Vibration and Harshness (NVH) levels in the cabin are minimized via the use of active-tuned mass modules – frame-mounted vibration dampers and Active Noise Cancellation – technologies lauded for significantly contributing to the refinement of the all-new 2019 Ram 1500 pickup. The combination of the technologies enables powertrain engineers to expand the operating range of the Fuel Saver Technology cylinder deactivation.

#### **Transmissions: Robust and refined**

The 2019 Ram Heavy Duty arrives with a trio of automatic transmissions that are as refined as they are robust and ready to go to work.

In a first for the Ram Heavy Duty, the 6.4-liter HEMI V8 comes mated to the proven and smooth-shifting TorqueFlite 8HP75 eight-speed automatic. This new, fully electronic transmission includes a compact rotary e-shifter gear selector in the cabin.

Tailored for heavy-duty truck work, the TorqueFlite has been upgraded with additional torque converter brazing, additional pinion gears for two of the gearsets and a heavy-duty park system.

There are more than 40 individual shift maps to optimize shift points for fuel economy, performance and drivability. Shift strategies account for a number of variables, including:

- Engine torque changes
- Gear downshifts
- Longitudinal and lateral acceleration
- Hill detection
- Vehicle speed control
- Electronic stability control interaction
- Temperature

The transmissions use shift-by-wire technology, eliminating a mechanical linkage between the transmission and the gear selector. The 2019 Ram Heavy Duty uses an innovative rotary e-shift dial mounted on the left side of the instrument panel's center stack – freeing up space traditionally occupied by a console- or column-mounted shift lever.

The TorqueFlite 8HP75 transmissions use 6th gear as a direct drive, while gears 7 and 8 have overdrive ratios. The wide gear ratio spread helps maximize fuel economy by reducing engine rpm in city and highway driving. Internally, both transmissions have four gear sets and five shift elements (multi-disc clutches and brakes). Only two shift elements are open at any time. With fewer open shift elements, drag losses due to multiple parts rotating relative to one another are reduced.

Ram Heavy Duty trucks powered by the standard output Cummins 6.7-liter Turbo Diesel are equipped with a significantly upgraded version of the 68RFE six-speed automatic transmission.

Changes designed to improve the electronically controlled transmission's shift quality include new variable-force solenoid controls for the torque-converter clutch. A new reverse accumulator improves shift feel when placing the transmission into park from reverse. Drive-to-park shifts were also improved through refined hydraulic control.

Ram 3500 Heavy Duty models equipped with the 1,000 lb.-ft. high output Cummins 6.7-liter Turbo Diesel employ the Aisin AS69RC electronically controlled six-speed automatic. This transmission is engineered to handle the colossal torque of the Turbo Diesel engine and increased vehicle weight ratings while delivering improved shift quality.

The Aisin AS69RC uses a new transmission controller with double the memory of the previous controller and a dual-core processor. This delivers faster, more precise shifts under all driving and loading conditions.

The transmission's durability and capability are enhanced with a new ring gear and heat treatment, larger thrust bearing and additional heat treatment for select components. A dynamic damper for the torque converter and hard finishing of the No. 1 pinion gear help reduce noise, vibration and harshness.

### **Transfer Cases**

Four-wheel-drive versions of the 2019 Ram 2500 and 3500 Heavy Duty are equipped with a BorgWarner part-time transfer case. Buyers who equip their truck with the 6.4-liter HEMI V8 or either variant of the Cummins 6.7-liter Turbo Diesel can choose between electronic (BW 44-46) or manual shift (BW 44-47) transfer cases.

For the new 2019 Ram Heavy Duty, the transfer case uses a new connector for the new direct-flow CV-joint front driveshaft interface to improve refinement and efficiency.

The transfer case has three operating ranges, 2Hi (2WD), 4Hi (4WD) and 4Lo (low-range reduction 4WD) plus a neutral position. 2Hi is designed for any road surface at any time, while 4Hi and 4Lo are for slick surfaces and off-road use. The driver can switch between 2Hi and 4Hi while the truck is in motion. To engage 4Lo, the transmission must be in neutral.

4Lo provides a gear reduction ratio (crawl ratio) of 2.64:1. This delivers increased low-speed torque capability for pulling power and improved driver control in off-road conditions.

Ram Heavy Duty trucks with the high output version of the Cummins 6.7-liter Turbo Diesel are equipped with an all-new part-time BorgWarner transfer case (BW 44-48). This transfer case is designed to handle the higher input loads for maximum towing capability up to 35,100 lbs. The low-range gear reduction is 2.64:1. The transfer case also uses a new connector for the direct-flow CV joint front-driveshaft interface.

#### **Axles: Where the power meets the road**

New front and rear axles on the 2019 Ram 2500 and 3500 Heavy Duty have been engineered to improve durability, handle industry-leading payload and towing capabilities, and minimize NVH, as well as take advantage of opportunities to optimize weight.

The Ram 3500 Heavy Duty with the Max Tow Package uses an all-new, larger 12-inch AAM rear axle with 4.25-inch axle tubes, larger head, tail and differential bearings, and new O-ring style axle shaft hub seals. The limited-slip differential uses a friction plate design, while the serrated axle pinion and driveshaft flanges are upgraded to handle the increased torque.

The 9.25-inch AAM front axle on the Ram 2500 and 3500 Heavy Duty 4x4 include improved pinion seals and revisions to the housing to mitigate noise, vibration and harshness. The connector for the front-axle disconnect has been improved to enhance durability and the disconnect shield is upgraded for better protection from road hazards.

The pinion angle on the 11.5-inch AAM rear axle has been changed, which minimizes NVH. A new plate-type limited-slip differential (optional) and new cast differential carrier reduce unsprung mass by more than 15 lbs.

Ram engineers revised the driveline angles for the 2019 Ram Heavy Duty to minimize articulation for reduced NVH, while also taking into account the range of driveline travel as 4x4 buyers can choose optional rear air suspension.

#### **Warranty**

The 2019 Ram 2500 and 3500 Heavy Duty are backed with an unsurpassed five-year/100,000-mile Powertrain Limited Warranty. The Powertrain Limited Warranty covers the cost of all parts and labor needed to repair a covered powertrain component – engine, transmission and drive system. Coverage also includes free towing to the nearest Ram dealer, if necessary. The warranty also is transferable, allowing customers who sell their truck during the warranty period to pass the coverage onto the new owner.

#### **Ram Truck Brand**

In 2009, the Ram Truck brand launched as a stand-alone division, focused on meeting the demands of truck buyers and delivering benchmark-quality vehicles. With a full lineup of trucks - the Ram 1500, 2500/3500 Heavy Duty, 3500/4500/5500 Chassis Cab and ProMaster - the Ram brand builds trucks that get the hard work done and families where they need to go.

Ram continues to outperform the competition and sets the benchmark for:

- Best-in-class standard horsepower
- Segment-first 1,000 lb.-ft of torque with Cummins Turbo Diesel
- Most luxurious: Ram 1500 Tungsten with real metal and leather elements and a new 14.5-inch Uconnect touchscreen
- Best ride and handling with a double wishbone front suspension and five-link solid rear axle with available, segment-exclusive, active-level, four-corner air suspension
- Best-in-class available rear leg room
- The most cargo space available in any traditional full size cargo van
- Most capable full-size off-road pickup – Ram Power Wagon
- Most awarded light-duty truck in America
- Highest owner loyalty of any half-ton pickup

The latest [J.D. Power APEAL study](#), which rates the emotional bond between customers and their vehicles, named

the 2023 Ram 1500 as the best full-size light-duty pickup.

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