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## ENGINEERING

### **2019 Ram Heavy Duty is Most Capable Ever — Engineers Combine Efficiency and Capability to Deliver the Highest Towing and Payload Capacity at 35,100 lbs. and 7,680 lbs.**

- Ram out-powers, out-tows and out-hauls every other pickup available — the highest capability numbers for diesel- and gas- powered pickups — 35,100-lb. towing and 7,680-lb. payload (3500)
- Ram redesigns Heavy Duty line to be the best-riding, handling and towing ever with an emphasis on comfort and confidence
- New 98.5-percent high-strength steel frames offer greater capacities, reduced weight and the best torsional rigidity in the segment
- Quietest Ram Heavy Duty ever – upgrades improve NVH; new C-pillar hydromounts, anti-vibration devices, new engine mounts, active noise cancelling and new exhaust-system attachments
- Improved ride quality with suspension tuning that includes Frequency Response Damping (FRD) shocks, progressive springs and re-engineered bushings
- Lightweight materials in the frame, powertrain and an aluminum hood reduce overall weight by up to 143 lbs
- New braking system upgrades calipers, booster and master cylinder to shorten stopping distances, increase capability and improve brake feel
- Power-release tailgate with damping and power side steps offer greater functionality without sacrifice
- The most advanced Vehicle System Interface Module (VSIM) in the segment communicates between aftermarket modules and various vehicle-control modules
- Suspension upgraded to handle additional capabilities and improve ride with exclusive link-coil rear suspension on Ram 2500, factory rear air suspension option for Ram 2500 and exclusive factory supplemental air suspension system for Ram 3500
- Exclusive rear air suspension now features driver-activated Bed Lowering Mode, Normal/Payload Mode and Trailer Tow Mode, which automatically adjusts to achieve appropriate load-leveling characteristics or desired height
- Segment-leading drag coefficient of .409 to improve efficiency
- Standard 23,000-lb. Class 5 hitch on Ram 3500, 20,000-lb. Class 5 hitch on Ram 2500
- New Ram Power Wagon offers new equipment and technology, upholding Most Off-road Capable Pickup title
- America's longest-lasting pickup with unsurpassed powertrain warranty – five years/100,000 miles

January 14, 2019, Auburn Hills, Mich. - The 2019 Ram Heavy Duty is the most powerful, most capable pickup in the segment with a towing capacity of 35,100 lbs. and payload capacity of 7,680 lbs. But big capability is not relevant if the truck does not instill confidence to the driver. Ram redefines the phrase "you don't even know it's back there" when towing or hauling.

The new Ram Heavy Duty outpaces the competition with an all-new lighter high-strength steel frame, more powerful braking system, improved suspension and active safety systems such as Automatic Emergency Braking—not found on any other heavy-duty pickup. All combine to not only carve the way to higher payload and trailer weights, but to do

so in comfort and civility.

“Our 2019 Ram Heavy Duty capability story starts with a new frame and suspension joined by powerful engines able to achieve the highest-ever towing capacities of 35,100 lbs. on the 3500 and 19,780 lbs. on the 2500,” said Rob Wichman, Head of Ram Engineering. “The Ram Heavy Duty line can move mountains and climb them, but customers will truly appreciate the comfort and competence our engineers have established through real-world tuning of the chassis and suspension. We not only set out to be the most capable, we also instill best-in-class confidence.”

## **FRAME**

Ram Heavy Duty trucks feature all-new frames built with 98.5-percent high-strength steel, six separate crossmembers, hydroformed main rails and fully boxed rear rails for optimal strength and mass efficiency — the highest levels of torsional rigidity in the segment. Although the new Ram Heavy Duty is stronger and more capable, lightweight materials in the frame, powertrain and an aluminum hood reduce overall weight by up to 143 lbs. Greatly improved chassis controls on the new Ram Heavy Duty enhance ride and handling characteristics while new hydromounts, new engine mounts and new exhaust-system attachments improve NVH. Two Active-Tuned Mass Modules (ATMM) mounted on the frame rails search out unfavorable vibrations and apply countermeasures to eliminate them. This system not only improves driving comfort of the new Ram Heavy Duty, it also allows wider operational use of cylinder deactivation (Fuel Saver Mode) on the 6.4-liter HEMI® V8. By offsetting the additional vibration created by the big V8 in four-cylinder mode at high or low RPM ranges, the engine can run in those modes more often in order to save fuel.

Wide front frame rails enable front suspension springs to be positioned slightly outboard – an enabler for generating positive roll stiffness. A large plated structure interface to the frame brings a lengthened weld surface creating a stiff, robust front section. The design ensures optimum mass efficiency with no need for reinforcements to deliver strength, despite shape complexity. Center frame-rail sections are roll-formed, an efficient means for maintaining consistent strength in less complex longitudinal sections.

In the rear portion of the new frame, the structure includes fully boxed rear rails. The rear-axle structural crossmember with provisions for fifth-wheel and gooseneck hitches, has been upgraded for 2019 to accommodate the increased towing capacity. The optional fifth-wheel/gooseneck hardware for 2500/3500 is fully integrated into the production box floor, and includes fifth-wheel pucks, gooseneck bolt plates, and gooseneck center castings. In addition to the standard 4/7-pin trailer connector at the bumper, an additional 7-pin connector is integrated into the rear of the bed for easy wiring of trailers (included in fifth-wheel/gooseneck option).

On vehicles equipped with the optional auxiliary camera prep package, the standard 4/7-pin bumper connector is replaced with a 12/7-pin connector to support the remote camera option (available Mopar accessory). A tailgate handle-mounted, rear high-definition camera backup system is standard with dynamic imaging on the 12-inch, 8.4-inch or 5-inch displays with turning guidelines. Also, the cargo-view camera located in the Center High-Mounted Stop Light (CHMSL) provides a view of the bed for easier connection to fifth-wheel or gooseneck trailers, as well as monitoring bed loads.

A new 20,000-lb. Class 5 hitch is standard on Ram 2500 and a 23,000-lb. Class 5 hitch is standard on Ram 3500.

## **SUSPENSION**

Heavy Duty trucks generally have suspension equipped for constant, heavy payloads. This leads to a harsher ride when unloaded. Ram innovation continues to lead for 2019. The new Ram 2500 and 3500 improve upon segment-leading suspension systems with the best ride and handling loaded or unloaded.

The 2019 Ram Heavy Duty includes Frequency Response Damping (FRD) shocks on all four corners. The valves of an FRD shock automatically adjust for the type of vertical wheel input, allowing the Ram Heavy Duty to have sports-car-like suspension for handling and a supple suspension on rough terrain. The FRD shocks filter out both actuation frequencies by using a creative internal design. When the Ram Heavy Duty experiences a slower input, common during cornering and heavy braking, the bypass valve is closed for more aggressive damping, which provides additional stability and poise. When driving normally or exposed to faster shock inputs – which is common on rough

roads or at higher speeds – the valve will open to soften the damping, giving the driver more comfort, confidence and control.

Ram added progressive springs and reengineered bushings to the suspension system, including the exclusive five-link coil design on Ram 2500, providing better load-carrying characteristics and improved articulation over obstacles when compared to a leaf-spring system. The upgrades add to an already unexpected ride and handling experience for a three-quarter-ton pickup.

The five-link coil design incorporates support at all major points of force. Leaf-spring suspensions struggle to combat axle wrap by using staggered shock absorbers (one mounted on the front of the axle tube and one mounted on the rear of the axle tube). The superior design of the five-link coil system functionally resists unwanted axle rotation. Leaf-spring configurations also lack lateral support, forcing the leaf ends and shackles to hold against lateral loads — a task they're not particularly good at and a reason competitive leaf-spring rear suspensions shudder on rough surfaces.

Because of the unique five-link axle control and natural rotation, U-joints in the driveshaft run smoothly and with less vibration through the suspension's range of motion, an advantage not shared with leaf springs. Another benefit of coil springs is less un-sprung mass and elimination of stick-slip friction found between the leaf springs. Additionally, links are engineered in-line with frame rails, so overall packaging is better, not to mention an overall weight reduction of about 40 lbs. when compared to a leaf-spring configuration.

A class-exclusive Active-Level rear air suspension is available on both the Ram 2500 and Ram 3500. The 2019 Ram 2500 uses two air bags to replace the coil springs. Load capacity is not sacrificed and the Ram 2500's best-in-class ride and handling gets even better, crushing the competition with two doses of engineering innovation (five-link coil with an air suspension option). The Ram 3500 features a Hotchkiss rear leaf-spring system with optional air suspension. By adding supplemental air bags, Ram engineers were able to soften the heavy-load leaf springs, allowing for more unladed suspension movement.

On both models, the air suspension has three methods of operation; Normal/Payload Mode, Trailer Mode and Bed Lowering Mode. In Normal/Payload Mode the system automatically detects load on the rear suspension from a trailer or payload. The air pressure increases until the vehicle reaches normal ride height – leveling the truck and improving stability and loaded ride. When a high-load capacity condition exists, the air suspension automatically fills the rear air bags to level the truck and improve stability and ride quality — even with the highest available towing at 35,100 lbs. In the Trailer/Tow Mode, the system can lower the rear suspension approximately one inch to ensure a level/parallel relationship between truck and trailer. The lowered position also directs “bed spray” outward/away from the truck due to its rearward pitch. The third operation of Ram's available rear air suspension is Bed Lowering Mode, which brings the rear suspension to its lowest position for easier trailer hook-up. This mode allows the operator to raise the rear suspension once the hitch ball is properly aligned, connecting the trailer with little or no jack crank. Additionally, Bed Lowering Mode allows easier access to the box for transferring materials or getting in and out.

In the front, a new, two-piece, front-suspension crossmember structure adds a longer welded interface and greater strength to the frame. The Ram Heavy Duty line features an advanced three-link front suspension to ensure roll stiffness. Greater roll stiffness, also known as body roll, is an important characteristic in taller vehicles and especially trucks with heavy payloads. This is accomplished with a powerful (35mm) stabilizer bar and outward-positioned springs, as well as two large frame-to-axle radius arms. Constructed of steel and approximately 40 inches in length, the arms ensure optimal front torsional stiffness with massive “can” bushings located at the three (per arm) frame and axle connections. The bushings naturally generate a force to counteract roll motion, regardless of load.

## **STEERING**

Hydraulic-powered, the steering system features a recirculating-ball steering gear, which delivers precise on-center feel despite the vehicle's immense towing and payload capacities. Large-diameter drag- (29mm) and cross-vehicle links (51mm) ensure premium steering characteristics regardless of payload or towing load, and the new steering gear enhances steering smoothness, reduces lash, and provides improved on-center feel.

## **BRAKES**

A new braking system upgrades the calipers, booster and master cylinder. Combined with a larger-ratio pedal swing, the 2019 Ram Heavy Duty delivers a more confident and powerful execution with little effort from the driver. The reengineered system also offers shorter stopping distances and braking to match the highest capability. Four-wheel disc brakes are standard on all 2019 Ram Heavy Duty truck models. Front rotors measure 14.17 inches (360 mm) in diameter and are clamped with dual-piston calipers; rear rotors are 14.09 inches (358 mm) and also use dual-piston calipers. A new, larger parking brake is redesigned to handle higher-weight capacities.

## **BODY**

Several body elements are upgraded from mild steel to high-strength steel on the 2019 Heavy Duty pickups, including front-end hydroform structures and tailgate-surround reinforcements. Additional light-weighting efforts consist of an aluminum hood, which contributes to an overall weight reduction of 143 lbs. on the volume model. A power-release tailgate with damping and power side steps offer greater functionality without sacrifice.

Through wind-tunnel analyses and three million miles of real-world durability tests, engineers have created the quietest Ram Heavy Duty ever with a segment-leading drag coefficient of .409. Upgrades to improve Noise, Vibration and Harshness (NVH) include new C-pillar hydromounts, anti-vibration devices, new engine mounts, active noise cancelling and new exhaust-system attachments. The Ram Heavy Duty comes equipped with pioneering hydromounts at C-pillar positions for class-leading NVH characteristics, despite the truck's aptitude for higher payloads and towing.

## **ELECTRICAL**

As the Ram Heavy Duty continues to offer more feature content, it created the need for a technology that allows more information to be electronically communicated within the truck. The Powernet electrical-architecture system allows both high- and low-speed data networks to be equipped with as many as 40 individual modules, all designed to improve vehicle performance and enhance the comfort and safety of driver and passengers. Within the Powernet high-speed network, each module (e.g., electronic stability control) processes its individual data and transmits the appropriate commands within the vehicle to activate any additional systems (e.g. active safety and ABS).

A majority of the commercial truck customers need to tie into the electrical system and certain fleet customers require access to vehicle information to even be considered, especially ambulance packages and some utility companies. A best-in-class Vehicle System Interface Module (VSIM) is capable of communicating between aftermarket modules and various factory control modules. The VSIM upfitter interface module now features more than 70 circuits, including lighting controls, door position, and throttle and transmission position. The class-exclusive module acts as a secure gateway to the vehicles' electrical systems and data-bus architecture to enable safe, secure plug-and-play connectivity for upfitter friendliness. The new Ram Heavy Duty also features an exclusive remote-camera option to be placed in a location, which best serves the operator.

The 2019 Ram Heavy Duty is equipped with intelligent battery-sensor technology, which continually measures the flow of current into and out of the battery. The system is an enabler for intelligent load shedding, systematically shutting off select electrical systems onboard the vehicle when the battery is running low to help prevent further depleting the battery.

Ram offers two different dual-alternator systems on the 2019 Ram Heavy Duty, providing additional power for higher electrical loads from commercial vehicle upfits and accessories. Ram 2500 models equipped with the Cummins 6.7-liter diesel engine offer dual 220-amp alternators (best-in-class 440 amps).

Both the Ram 2500 and 3500 equipped with the new 6.4-liter HEMI® V8 gas engine also offer a dual-alternator system – the first gas-driven application of its kind in either class – that combines 220- and 160-amp units for 380-amps of total best-in-class output.

## **NEW POWER WAGON CONTENT**

2019 Ram Power Wagon is the most capable production off-road truck in the industry. Based on the Ram 2500 Heavy Duty 4x4 Crew Cab, the Power Wagon features a number of off-road-specific enhancements, including a

unique suspension, factory suspension lift, locking front and rear differentials, disconnecting sway bar and a 12,000-lb. winch, giving this off-road powerhouse a significant advantage over all other production pickups.

On the technology front, a new 360 camera option gives a bird's-eye-view with forward view gridlines to easily navigate obstacles. An all-new and integrated front-mounted WARN Zeon-12 winch is standard on Power Wagon.

The new winch setup features a unique fairlead and fairlead retainer with a new synthetic line that cannot kink, does not fray and is more maneuverable. The new line also cuts weight by 28 lbs. A unique part of Power Wagon heritage, the recovery component remains the only factory-installed winch in the industry.

A Power Wagon content package continues to be available on Tradesman, which includes all the off-road equipment but keeps the Tradesman design elements.

## **ADDITIONAL FEATURES**

Ram Heavy Duty customers can enjoy the convenience of power folding mirrors and power rear-sliding window with defrost. Central locking includes the RamBox Cargo Management System and tailgate power locks, creating a convenient solution for locking all exterior doors and storage with one push of a button. Auto rain-sensing wipers and SmartBeam headlamps also are available, adding to a truckload of content offered in the new 2019 Ram Heavy Duty.

Total Cost Of Ownership And Unsurpassed Powertrain Warranty — Five Years/ 100,000 Miles

Operating costs are of great consideration for owners who use their trucks for work. The 2019 Ram Heavy Duty holds class-leading features in:

- Fuel economy
- Extended maintenance cycle (oil change of 15,000 miles, fuel-filter life on diesel)
- Brake life with advanced engine-exhaust brake

The 2019 Ram Heavy Duty is 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 Truck dealer if necessary. The warranty also is transferable allowing customers who sell their truck during the warranty period to pass the coverage on to the new owner. The standard five-year/36,000-mile Basic Limited Warranty provides bumper-to-bumper coverage for the Ram Heavy Duty from the body to the electrical system.

## **MANUFACTURING**

The 2019 Ram Heavy Duty is built at the Saltillo Truck Assembly Plant in Coahuila, Mexico.

### **About 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.

That focus leads Ram to design the industry's most innovative, award-winning trucks, emphasizing durability, strength, technology and efficiency.

With a full lineup of trucks, including ProMaster and ProMaster City vans, the Ram brand builds trucks that get the hard work done and families where they need to go. From the no-compromise Ram 1500 that defines the future of pickup trucks with innovative design, the highest quality materials and class-exclusive technology, to the Ram Heavy Duty which combines the ability to out-power, out-tow and out-haul every single competitor with the segment's most comfortable ride and handling, Ram is committed to product leadership.

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

- Most powerful: 1,000 lb.-ft of torque with Cummins Turbo Diesel
- Highest towing capacity: 35,100 lbs. with Ram 3500
- Heaviest payloads: 7,680 lbs. with Ram 3500
- Most luxurious: Ram Limited with real wood, real leather and 12-inch Uconnect touchscreen

- Best ride and handling with exclusive link coil rear and auto-level air suspensions
- Most interior space with Ram Mega Cab
- 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
- Over the last 30 years, Ram has the highest percentage of pickups still on the road

Giving maximum effort all day, every day with confidence, the Ram Truck lineup steps forward with the full force of modern capability providing confidence-inspiring features and class-exclusive vehicle safety.

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