

2005 F-Series Super Duty Chassis

2005 FORD SUPER DUTY PUSHES THE ENVELOPE OF PICKUP TRUCK PERFORMANCE

For 2005, Ford has made the best even better, improving the capability of Super Duty in every key measure – towing, hauling, power, ride and handling – to again set new standards for the class.

“Capability is the heart of a pickup truck – and the soul of the Ford Super Duty,” said Frank Davis, Ford vehicle programs director for pickups and commercial vehicles.

Towing is central to most Super Duty customers – 90 percent of them tow. But capability is measured in more than raw numbers. Capability is about the ability to use all of a truck’s capacity in the real world – and to want to use it again and again.

“That’s the kind of thinking that went into the development of Ford’s exclusive new TowCommand System,” said F-Series Super Duty chief engineer Susan Dehne.

This package of features and capabilities was designed by professionals who tow and haul heavy loads, leveraging new technology and smart engineering. The all-new TowCommand System includes:

- **Integrated trailer brake controller** – an industry first, the electronic trailer brake controller is fully integrated into the vehicle’s braking system. This means it can better infer drive intent for unprecedented smoothness – and it is the only trailer brake controller that can adapt its operation based on information from the tow vehicle’s anti-lock braking system. It’s also the only factory-installed and warranted electronic trailer brake controller on the market.
- **TorqShift automatic transmission with tow-haul mode** – Ford’s advanced TorqShift transmission, now available on all Super Duty gas and diesel engines, offers a shift strategy specially designed for towing and hauling heavy loads. On downhill stretches, the transmission and engine work together to help control vehicle speed.
- **Adjustable trailer towing mirrors** – Super Duty’s distinctive, user-friendly towing mirrors offer a large viewing area, convex mirrors on both sides and a telescoping feature allowing the mirrors to be adjusted outward to see beyond wide trailers. The mirrors are heated and power-adjustable with an integrated turn signal.
- **Best-in-class braking** – Super Duty’s braking system is upgraded in nearly every way, to offer confident stopping power or to hold a heavy load stationary on an incline, using the parking brake.

Class-Leading Tow Rating

If there’s one number that defines the hierarchy in this class, it’s the tow rating. This represents the heaviest trailer that a vehicle is rated to tow, with proper equipment. Ford Super Duty leads in nearly every category – with four-wheel or two-wheel-drive, conventional or fifth-wheel towing.

The 2005 Ford F-350 has the ability to tow up to 17,000 pounds with a fifth-wheel hitch. Conventional tow rating also tops the class at up to 15,000 pounds. Either way the F-350 is the most capable tow vehicle in the class.

Industry-First Trailer Brake Controller

The marquee player in Ford’s optional new TowCommand System is the new industry-first integrated trailer brake controller, which offers these game-changing features:

- Smooth, intuitive braking feel, with the trailer's brakes and the Super Duty's brakes working at the same rate.
- Safety features include audible and visual warnings. The message center in the Super Duty's gauge cluster alerts the driver to any malfunctions, including if the trailer wiring becomes disconnected.
- Ability to draw information from the vehicle's anti-lock braking system (ABS), engaging a different trailer braking strategy during vehicle ABS operation for improved control.
- Superior ergonomics, with an integrated appearance, intuitive controls, visual confirmation that the trailer wiring is properly connected and graphic display of braking force.
- Ford factory installation and warranty protection.

Towing enthusiasts have long relied on aftermarket controllers to help them take advantage of the electric brakes on their trailers and campers. In fact, Ford market research shows 80 percent of Super Duty owners currently install aftermarket trailer brake controllers.

But these aftermarket units bring compromises. For example, their braking performance can be harsh or jerky, particularly at slow speeds. When they send power to the trailer brakes, which are activated electrically, it can be like a light switch – full power, or none at all.

Some aftermarket brake controllers use mechanical devices, such as internal pendulums or inertial sensors, to try to infer driver intent. Others introduce an automatic lag into the brake force buildup, to reduce that “light switch effect.” But all of those approaches are compromises, meant to reduce objectionable results while allowing full brake force when needed.

Integrated Design Offers Advantages

Most aftermarket braking controllers look like afterthoughts – they are typically mounted to the lower dash panel with brackets and screws, trailing a pigtail of wiring.

With its trailer brake controller, Ford changes the game by integrating the trailer brake control features into a convenient in-dash unit. The controller uses actual braking pressure, measured inside the vehicle's master cylinder, to know how much braking force the driver means to apply. It can modulate the trailer brakes in real time.

Because the controller is integrated, it is the first trailer brake controller to adapt its output based on the state of the vehicle's anti-lock braking system (ABS).

“We're constantly getting information from the ABS module and from the powertrain controller on the high-speed network,” said Doug Marsden, Ford supervisor of Advanced Brake Controls.

“We alter our control strategy when the ABS senses that the tow vehicle's wheels are slipping, so the trailer wheels are less likely to lock up,” Marsden said. “We also adapt trailer braking based on vehicle speed – no aftermarket controller knows the tow vehicle's speed.”

Following a simple, intuitive adjustment by the driver to account for the trailer weight and road conditions, the trailer brake controller works so seamlessly that it's possible to forget there's a heavy load on board. The trailer's brakes work at the same rate as the Super Duty brakes, for smooth, assured stopping.

Operation is Speed-Sensitive

In stop-and-go city driving – where many drivers simply turn off their conventional trailer brakes in frustration due to uncomfortable lurching and grabbing – Super Duty's integrated brake controller really shines. By automatically reducing brake force at lower speeds and lower brake pedal pressures, this system lets the driver creep forward in traffic, stop smoothly at intersections and

maneuver easily in parking lots – all with smooth, seamless braking.

At higher speeds, more aggressive trailer braking is possible without driver adjustment. This assures short stopping distances. Customers will not have to continuously adjust the controller depending on whether they are on the highway or in the campground.

For the first time, not only does the new trailer brake controller let the driver easily and naturally modulate the trailer brakes, it actually looks like it belongs – integrated into the dashboard within the driver’s reach, with clear, matching graphics and a dimmer function linked to the other instrument panel lights.

Display Presents Information at a Glance

The front panel shows a simple graphic to confirm that trailer wiring is properly connected, and shows the amount of force being sent to the trailer as the brakes are applied. Because the controller is wired into the vehicle’s electronics, it can send important information to the message center in the gauge cluster.

The controller’s location and design were developed and confirmed using Ford’s ergonomics programs as well as extensive field testing – another advantage over aftermarket units.

“The Super Duty was already the best tow vehicle – this just makes it better,” said Harry Rawlins, 4x4 and trailer tow engineer, and one of Ford’s in-house towing experts.

Ford Team Fine-Tunes Towing Capability

Rawlins, a Texan who has towed everything from construction equipment to prized longhorn bulls, was a member of Ford’s team of experts in evaluating the best – and worst – features of competitive tow vehicles and brake controllers.

This kind of institutional knowledge is critical for a vehicle like Super Duty that has to function as an extension of the driver – like a hammer for a carpenter. For example, the Super Duty towing mirrors, which pull outward for a better rearward view around wide trailers, have been a big hit with consumers.

“People really appreciate the towing mirrors,” Rawlins said. “If you’ve ever towed with little mirrors, you understand!”

There’s a tendency to think of heavy trailers and big RV campers as being towed only via fifth-wheel or gooseneck hitches. But that’s not always the case. Approximately 60 percent of Super Duty customers who tow – both retail and commercial users – use a conventional hitch.

Those customers will appreciate another new Super Duty feature – a factory-installed 2.5-inch receiver, optional with dual-rear-wheel F-350 trucks equipped with the 6.0-liter Power Stroke diesel or 6.8-liter Triton V-10 gasoline engine.

The bigger draw bar – up from the previous 2-inch receiver – allows towing conventional trailers up to 15,000 pounds.

“We’re including an adapter that takes the receiver down to 2 inches if desired, so our customers can still use their current towing equipment,” Rawlins said.

TorqShift, Tow-Haul Mode Available With All Engines

Expanded availability of Ford’s TorqShift automatic transmission brings the convenience of tow-haul mode to all Super Duty models that are equipped with automatic transmissions. This feature, previously available only with Power Stroke diesel engines, adjusts transmission response to

improve performance on both acceleration and deceleration.

On downhill stretches, the transmission and engine work together to help keep the vehicle from gaining speed. This enhances the driver's feeling of control, especially when the vehicle is heavily loaded or towing a large trailer. It also helps to reduce brake wear.

Uphill, the transmission will hold a gear longer when in tow-haul mode, to reduce the "hunting" effect that can occur when cresting one rise, only to encounter another. The engine remains in its power band. Both gasoline engines – the new 5.4-liter, 3-valve Triton V-8 and new 6.8-liter, 3-valve Triton V-10 – are now rated to higher RPM, to take advantage of this feature of tow-haul mode.

Another significant advantage of bringing the five-speed TorqShift automatic transmission to the gasoline engine family is the wider overall ratio spread of its gearing. A higher first gear improves launch performance from a dead stop.

"Competitive vehicles that brag about their 0-60 mph times are going to find themselves staring at the Super Duty tailgate," Dehne said.

New Suspension Enhances Towing

The final major contributors to Super Duty's class-leading towing capability are the all-new front suspension geometry that provides better steering feel and response, as well as brake system improvements for class-leading braking.

The new suspension design improves lateral stability – especially noticeable in cross-winds or quick lane-changes – and reduces steering efforts. The new monobeam, coil-spring front suspension on F-250 and F-350 4x4 trucks dramatically reduces the turning circle, while offering superior ride and comfort.

"Going from a leaf spring to a link-coil front suspension gives us several advantages, including increased roll stiffness and the ability to fine-tune the ride," said Pete Reyes, F-Series Super Duty vehicle engineering manager. "We can handle a load better, and that's very important for our customers."

The front radius arms on 4x4 vehicles also act as "anti-windup" bars, improving traction and reducing the chance of wheel-hop under hard acceleration. The front suspension on two-wheel-drive pickups is unchanged.

The rear suspension has been improved, as well, with new spring rates and new staggered rear shock geometry to improve ride quality. Rear gross axle weight rating for the F-350 dually is increased from 8,250 to 9,000 pounds.

Upgraded Axles Assist Plowing

One scenario that points up the improvements of four-wheel-drive F-250 and F-350 pickups is their ability to handle the load of a front snowplow.

Over rolling surfaces, the reduction in vehicle pitch and roll keeps the plow blade under control, whether it's in the raised or lowered position. Some competitive trucks allow so much front-rear pitch that a front-mounted snowplow can contact the ground unintentionally during highway driving.

For the first time, a factory-installed snowplow prep package will be offered on two-wheel-drive versions of the F-450 and F-550 chassis cabs. Snowplow prep also is offered on more pickups, and larger size snowplows can now be installed thanks to upgraded front axle weight ratings – 6,000

pounds on F-250 and F-350 and 7,000 pounds on F-450 and F-550.

With the monobeam and coil-spring replacing the leaf spring suspension, 4x4 F-250 and F-350 owners now can turn their front wheels 18 percent farther in either direction, which dramatically improves maneuverability and reduces the average turning circle by more than 5.5 feet.

Improved Ride and Handling

Scrub radius – a key measure that affects how force is transmitted to and from the front wheels – was reduced by moving the steering pivot point farther outboard on 4x4 vehicles, creating a 51-percent improvement. This design offers better steering feel and more resistance to “pull” and bump steer from road irregularities or uneven crowning. Parking efforts are improved by 45 percent on 4x4 trucks.

Changes to the steering geometry and tighter tolerances in the steering gear improve response, while new internal valving improves steering feel. The F-450 and F-550 Super Duty chassis cabs get variable assist steering to go with more than a 12-foot improvement in average turning circle.

“It’s all about capability,” Reyes said. “With these improvements, our trucks will ride and handle as well as anything on the market – but with a larger payload.”

Tires play an important part in ride and handling, as well as load-carrying capability. New for 2005, Super Duty comes standard with 17-inch wheels, with 18-inch wheels available on several models. The 2005 Ford Harley-Davidson™ F-Series Super Duty will feature 20-inch wheels – the first time this wheel size has been offered in this class.

Tire construction and tread pattern have been customized to work with the Super Duty improvements, including its more powerful brakes.

Larger Brakes Inspire Confidence

For 2005 Super Duty braking is improved for increased performance, usability and durability.

Key durability improvements include up to 50 percent more brake lining life on single-rear-wheel models and double the life on dual-rear-wheel trucks.

That’s a significant customer benefit – and one that really adds up for fleet owners.

Braking engineers took advantage of the larger standard wheel sizes to increase the size of the truck’s brake rotors by approximately 5 percent, to 347 mm in front and 340 mm rear. This provides greater swept area for maximum braking and helps to dissipate heat, especially on long, steep downhill roads.

Other improvements include larger calipers for both F-250 and F-350. The front calipers have twin 60 mm pistons – up 11 percent from the previous model – and are 30 percent stiffer for better braking feel. Rear calipers have twin 48 mm calipers on F-250 and twin 54 mm pistons on F-350 models. Chassis cab models also benefit from stiffer calipers and larger brake rotors.

The larger parking brake for F-250 and F-350 models allowed an increase of over 15 percent in its maximum load rating. The hydraulic master cylinder also has been upsized, with a new boost assist curve, for better brake pedal feel. New brake pad material provides quieter stops while more than doubling lining life.

The calipers are rear-mounted for protection, taking into account the rough environment in which many Super Duty trucks live. Brake lines are nylon-coated for durability.

Better Pedal Feel

The day-to-day consumer benefits from braking system improvements include an enhanced pedal feel and more intuitive brake response. Changes to the suspension and steering geometry complement the braking system upgrades by reducing “pull” under braking when the tires have differing traction. Available adjustable pedals also enhance the interface between the driver and braking system.

“We’ve really moved the needle on pedal feel,” said Hal Felch, braking supervisor. “There’s a lot more modulation – you really feel the stopping power. Even at the increased gross vehicle weight rating, with a full load of cargo, you’ll notice a strong, confident brake feel.”

Super Duty also benefits from a next-generation ABS system, using the vehicle’s high-speed data network. New wheel sensors provide more information, more quickly, by processing data internally before sending the information to the central ABS computer.

“That’s consistent with all of the Super Duty improvements,” Felch said. “We have increased the overall capacity while improving the customer experience. The best has gotten better.”

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