Off-Highway Diesel Engines

Final Tier 4/Stage IV

JOHN DEERE

The right technology, right now

Putting customer needs first

We understand your concerns about Final Tier 4/Stage IV emissions regulations. That's why we're focused on adding the right engine technologies at the right time to maintain and maximize performance. This smart approach to meeting emissions regulations doesn't compromise on power, reliability, or ease of operation.

Meeting emissions while maximizing performance

You don't have to sacrifice one for the other. John Deere PowerTech™ Final Tier 4/Stage IV engines 56 kW (75 hp) and above are built on a proven platform of emissions control technologies including cooled exhaust gas recirculation (EGR), exhaust filters, and selective catalytic reduction (SCR).

Countless hours of testing in labs, field prototype machines, and in the toughest proving ground of all — rugged off-highway applications — have shown that John Deere engines have what it takes to get the job done.

Performance, reliability, and durability

These three words capture the core of the John Deere engine experience. You can count on John Deere engines to deliver reliable power day in and day out, year after year, and in the toughest off-highway working conditions. John Deere Final Tier 4/Stage IV engines maintain power density, torque, and transient response. It all adds up to more productivity, uptime, and value for your machines.

Final Tier 4/Stage IV engine identification

PowerTech PSS 6.8L

Displacement

Aftertreatment
- **S** – Exhaust Filter and SCR
- **X** – Exhaust Filter

Turbocharger
- **V** – Variable Geometry Turbocharger (VGT)
- **S** – Series Turbochargers
- **W** – Wastegate Turbocharger

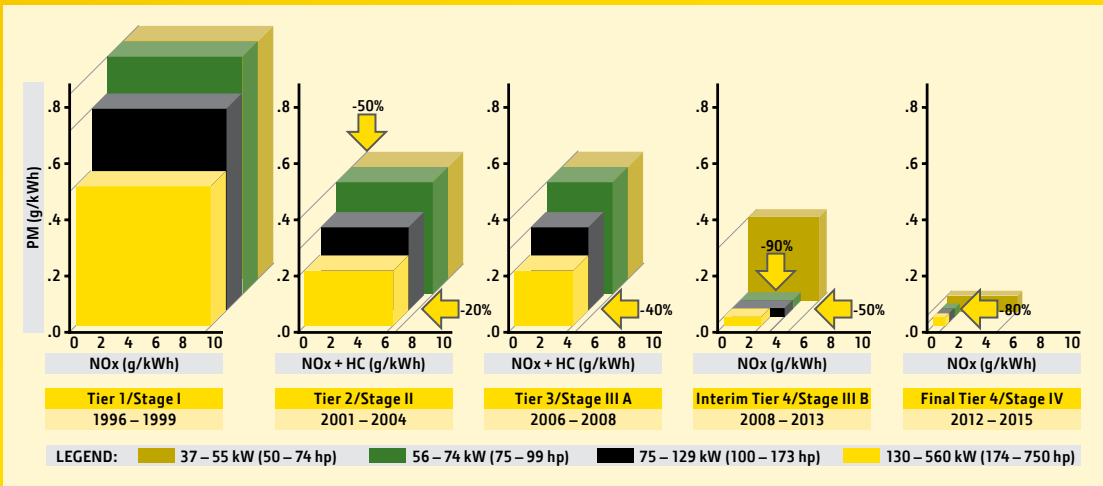
Technology
- **P** – PowerTech Plus
- **E** – PowerTech E

The final emissions countdown

Final Tier 4/Stage IV emissions regulations for engines 130 kW (174 hp) and above begin in January 2014, and will be fully implemented for engines 56 to 129 kW (75 to 174 hp) by 2015. Particulate matter (PM) levels established by Interim Tier 4/Stage III B regulations will be maintained in Final Tier 4 while nitrogen oxides (NOx) will be reduced by approximately 80 percent.

Engines that meet the Final Tier 4/Stage IV regulations set by the EPA and EU produce almost no PM and NOx emissions. That's an achievement engineers and environmentalists can both applaud.

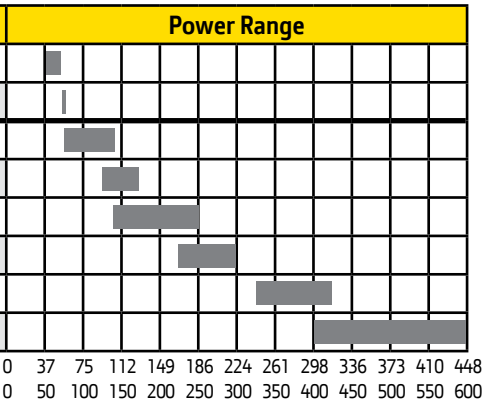
EPA and EU nonroad emissions regulations: 37 – 560 kW (50 – 750 hp)



NOx – Nitrogen oxides, which react in the atmosphere with hydrocarbons
HC – Hydrocarbons, a by-product of combustion
PM – Particulate matter, a non-gaseous product of combustion

Industrial Engine Power Ratings

Engine	Power Ratings	Turbocharging	Cooled EGR	Exhaust Filter	SCR	Power Range
PowerTech EWX 2.9L	37 – 55 kW (48 – 74 hp)	Wastegate	No	Yes	No	
PowerTech EWX 4.5L	55 kW (74 hp)	Wastegate	No	Yes	No	
PowerTech PWS 4.5L	63 – 104 kW (85 – 140 hp)	Wastegate	Yes	Yes	Yes	
PowerTech PSS 4.5L	93 – 129 kW (125 – 175 hp)	Series	Yes	Yes	Yes	
PowerTech PVS 6.8L	104 – 187 kW (140 – 250 hp)	VGT	Yes	Yes	Yes	
PowerTech PSS 6.8L	168 – 224 kW (225 – 300 hp)	Series	Yes	Yes	Yes	
PowerTech PSS 9.0L	187 – 317 kW (250 – 425 hp)	Series	Yes	Yes	Yes	
PowerTech PSS 13.5L	298 – 448 kW (400 – 600 hp)	Series	Yes	Yes	Yes	



The building blocks of our Integrated Emissions Control system

To meet increasingly stringent emissions regulations, John Deere has followed a carefully planned building-block approach. We have systematically adopted new technologies and integrated them with our field-proven solutions to meet each regulatory tier.

Cooled EGR system

NOx reduction through cooled EGR

John Deere was the first engine manufacturer to widely commercialize cooled EGR and variable geometry turbocharger (VGT) technologies in off-highway applications, introducing them in 2005 with the start of Tier 3/Stage III A regulations. At appropriate levels of engine operation, the EGR valve opens and measured amounts of cooled exhaust gas are routed back into the intake manifold and mixed with the incoming fresh air. Since this process removes oxygen from the air, the exhaust temperatures in the combustion process are lowered and the levels of NOx are reduced.

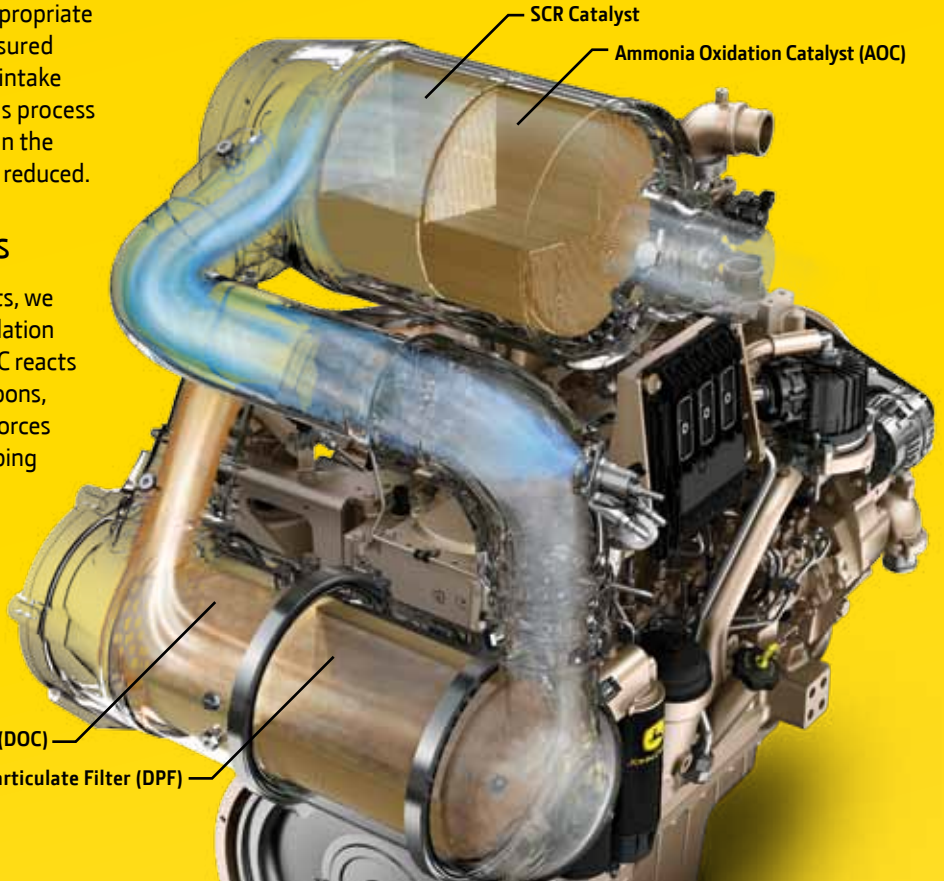
PM reduction through exhaust filters

To achieve Interim Tier 4/Stage III B emissions requirements, we added a catalyzed exhaust filter that contains a diesel oxidation catalyst (DOC) and a diesel particulate filter (DPF). The DOC reacts with exhaust gases to reduce carbon monoxide, hydrocarbons, and some particulate matter (PM). The downstream DPF forces exhaust gases to flow through porous channel walls, trapping and holding the remaining PM. During normal operating conditions (temperature, load, and speed) the engine's natural heat breaks down the PM and cleans the exhaust filter. An exhaust filter also has the benefit of replacing the muffler in most applications.

Final NOx reduction through SCR

SCR combined with our proven Interim Tier 4/Stage III B engine platform is the best solution to achieve Final Tier 4/Stage IV emissions compliance. This technology utilizes a urea-based additive, sometimes referred to as diesel exhaust fluid (DEF). The ammonia in the urea mixes with engine exhaust gases in the SCR catalyst to reduce NOx — converting it to nitrogen and water vapor. This vapor is then expelled through the exhaust pipe.

Why did John Deere wait to deploy SCR? We didn't need it before now. Our advanced cooled EGR system met all previous NOx requirements without the need for SCR and a second fluid. We are adding SCR at a time when the infrastructure for DEF is more established and its use is more accepted by equipment owners. SCR has been successfully used in on-highway applications, and the components are now more developed for off-highway applications.



The benefits of choosing John Deere engines

Optimized emissions solution

The John Deere Integrated Emissions Control system for Final Tier 4/ Stage IV compliance is optimized to meet emissions regulations while delivering improved performance and world-class fluid economy.

Fuel and fluid efficient

John Deere established an unparalleled record of fuel economy with our best-in-class Tier 3/Stage III A engines. Our Interim Tier 4/Stage III B and Final Tier 4/Stage IV technology solutions continue that efficiency by maximizing total fluid economy. With fuel economy gains achieved through increased injection pressures and lower DEF dosing rates delivered by the optimized SCR system, John Deere Final Tier 4/Stage IV engines will meet or improve upon the current total fluid economy of our Interim Tier 4/Stage III B engine models.

John Deere Final Tier 4/Stage IV engines operate efficiently with ultra-low sulfur diesel as well as B5 to B20 blends, providing optimal performance and fuel-choice flexibility.

Field-proven performance

John Deere has a strong advantage when it comes to off-highway expertise. Our Final Tier 4/Stage IV engines offer a field-proven, fluid-efficient approach that stands up to the tough demands of off-highway environments.

Application integration

John Deere is one of the few manufacturers that design both engines and construction, forestry, and agricultural equipment — which gives us a unique advantage in designing and integrating the engine, drivetrain, hydraulics, electronic control unit (ECU), cooling package, and other vehicle systems for optimized efficiency. This integrated process maximizes performance, operator convenience, fuel economy and overall value for John Deere machine owners as well as John Deere OEM customers.

Fully supported

The proven John Deere worldwide dealer network of over 4,000 service locations is prepared to fully support customers and their Final Tier 4/ Stage IV engines. John Deere dealers are highly trained to help customers with the performance, service, and support of these new engines and to optimize total machine efficiency.

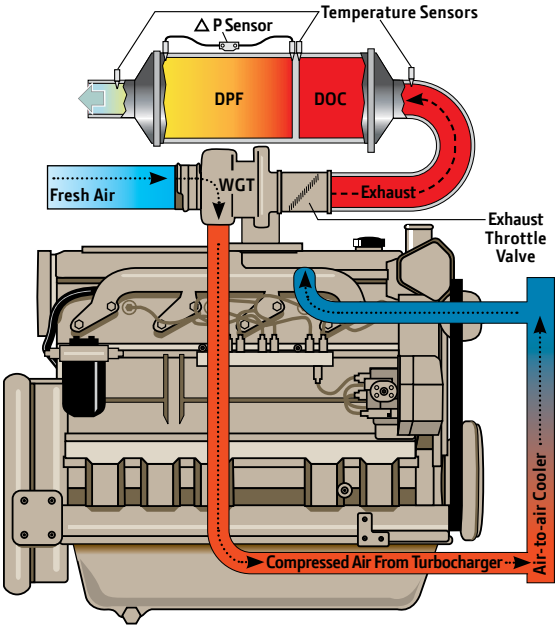
PowerTech EWX

Forthright performance and reliability

Our straightforward PowerTech EWX 2.9L and 4.5L engines have 2-valve cylinder heads, high-pressure common rail fuel systems, full-authority electronic controls, and proven exhaust filters. These compact, cost-effective engines blend advanced emissions control technologies with simple and reliable wastegated turbocharging to maintain transient response and peak torque in all operating conditions.

PowerTech EWX Engines	
PowerTech EWX 2.9L	37 – 55 kW (48 – 74 hp)
PowerTech EWX 4.5L	55 kW (74 hp)

PowerTech EWX Final Tier 4 technology



PowerTech EWX engines meet Final Tier 4/Stage III B regulations

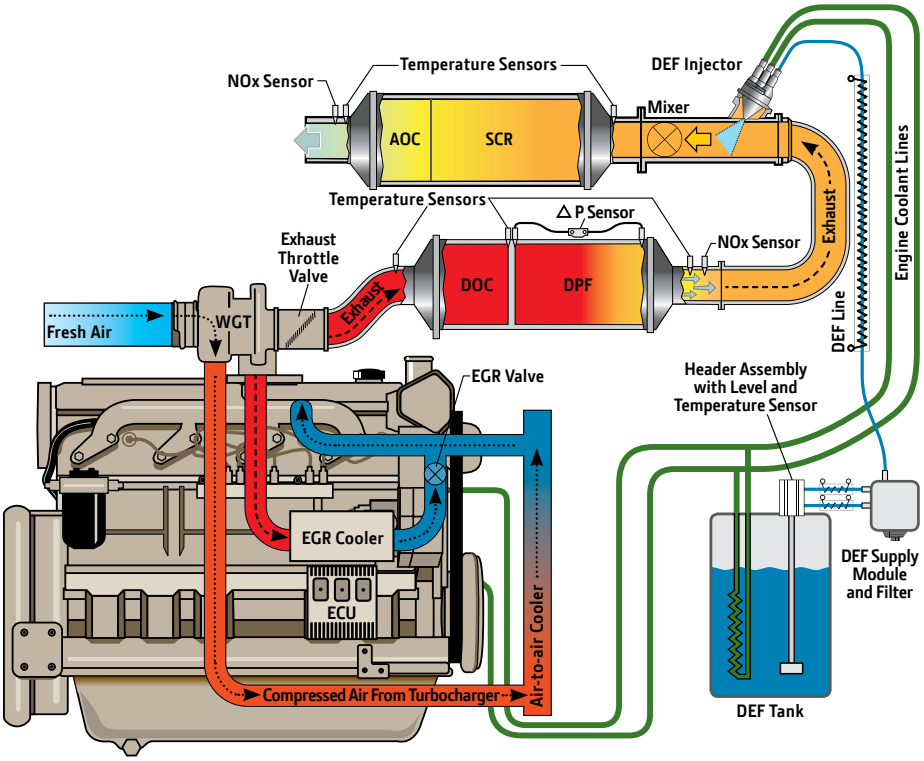
PowerTech PWS

Uncompromising power for any job

Our PowerTech PWS 4.5L engines deliver impressive power in a compact package. These efficient engines blend advanced emissions control technologies with simple and reliable wastegated turbocharging to maintain transient response and peak torque in all operating conditions.

PowerTech PWS Engines	
PowerTech PWS 4.5L	63 – 104 kW (85 – 140 hp)

PowerTech PWS Final Tier 4 technology



Wastegated turbocharger

Wastegated turbochargers are designed to develop more airflow at lower engine speeds to improve low speed torque. The wastegate control device bleeds off a portion of the exhaust flow at higher engine speeds. Wastegated turbos deliver improved transient response and higher peak torque without compromising engine envelope size.

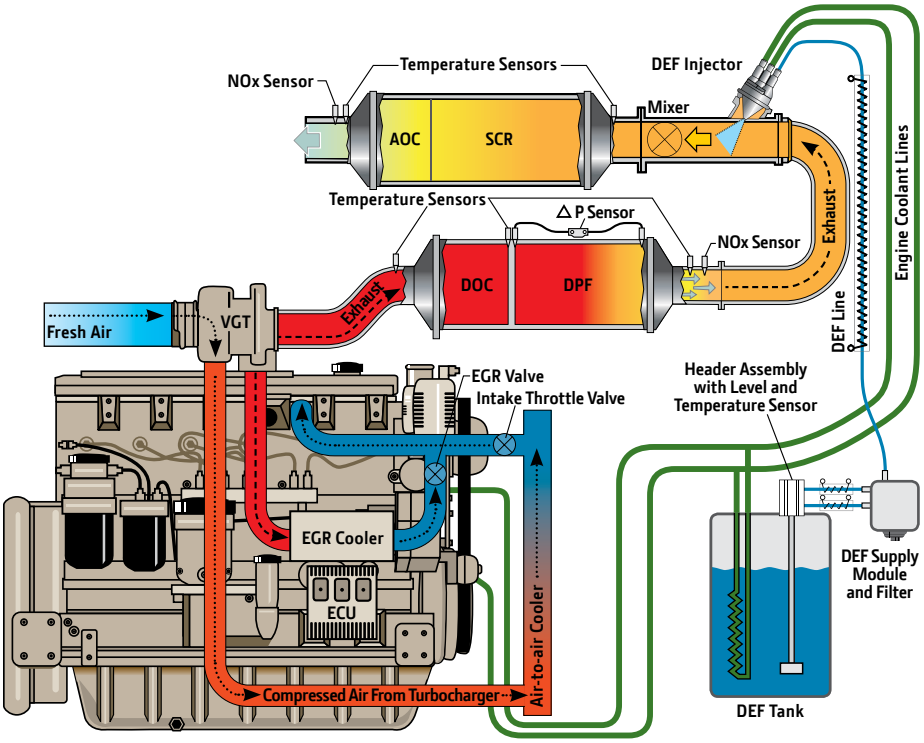
PowerTech PVS

Advanced power and fluid economy

PowerTech PVS 6.8L engines provide reliable power for a wide range of applications. They utilize our proven PowerTech Plus technology with variable geometry turbocharging (VGT) and an optimized SCR system to improve performance and combustion efficiency, reduce emissions, and increase fluid economy.

PowerTech PVS Engines	
PowerTech PVS 6.8L	104 – 187 kW (140 – 250 hp)

PowerTech PVS Final Tier 4 technology



Variable geometry turbocharger

VGT tailors the amount of recirculated exhaust gas that mixes with the fresh air. Precise electronic controls open or close the variable vanes in the turbocharger depending on engine load and speed. The optimized airflow generates more boost while maximizing low-speed torque, transient response, peak torque, and fluid economy.

VGT delivers power and efficiency

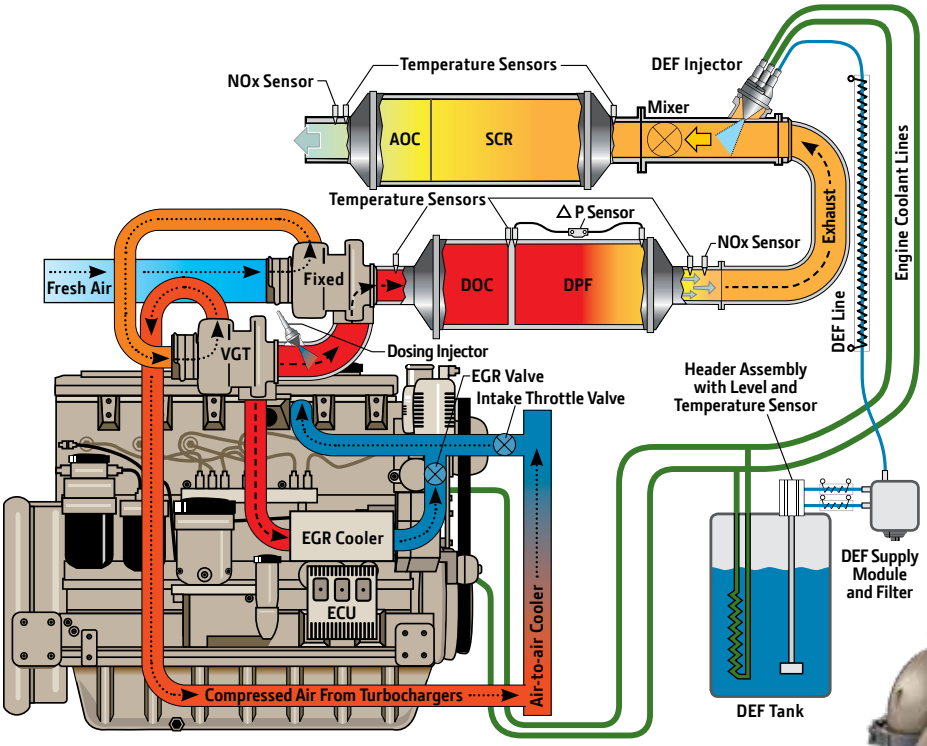
PowerTech PSS

Ultimate performance and responsiveness

For ultimate performance in off-highway applications, PowerTech PSS 4.5L, 6.8L, 9.0L, or 13.5L engine can do almost any job. They can handle steep grades at high altitudes and deliver maximum transient response and low-speed torque. Along with proven PowerTech Plus technology and an SCR system designed specifically for off-highway applications, all displacements feature series turbochargers that improve performance and responsiveness.

PowerTech PSS Engines	
PowerTech PSS 4.5L	93 – 129 kW (125 – 173 hp)
PowerTech PSS 6.8L	168 – 224 kW (225 – 300 hp)
PowerTech PSS 9.0L	187 – 317 kW (250 – 425 hp)
PowerTech PSS 13.5L	298 – 448 kW (400 – 600 hp)

PowerTech PSS Final Tier 4 technology



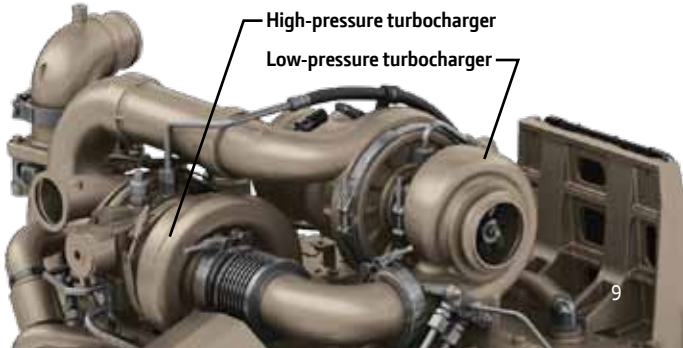
PowerTech PSS 9.0L and 13.5L engine configuration shown.

Two are better than one

Series turbocharging delivers higher power density, improved low-speed torque, and improved high-altitude operation. By splitting the compression of the charge air between two turbochargers, both can operate at peak efficiency and at slower rotating speeds. This lowers stress on turbocharger components and improves reliability.

Here's how series turbocharging works. Fresh air is drawn into the low-pressure turbocharger (fixed geometry), where air pressure is boosted. This pressurized or boosted air is then drawn into the high-pressure turbocharger (VGT or WGT), where air intake pressure is further raised. The high-pressure air is then routed to an air-to-air aftercooler, where the air is cooled and then routed to the engine's intake manifold.

Series turbochargers



Aftertreatment operation and maintenance

Convenient exhaust filter cleaning

The John Deere exhaust filter is integrated into the engine design and electronics to provide a seamless operator experience. The engine control unit (ECU) and exhaust temperature management (ETM) system work together to continuously regenerate, or clean, the exhaust filter. In most cases, filter cleaning does not impact machine operation or require operator involvement. Higher pressures created by our Final Tier 4/Stage IV high-pressure fuel system will extend intervals between automatic cleanings, while helping achieve emissions compliance.

Natural cleaning. John Deere engines and exhaust filter components are designed for uninterrupted operation using a natural cleaning process sometimes referred to as passive regeneration. It occurs during normal engine operating conditions, which is the most fuel-efficient way to clean.

Automatic cleaning. If natural filter cleaning cannot be achieved, then PM must be removed using an automatic cleaning process, sometimes referred to as active regeneration. This requires injecting fuel in the exhaust stream and elevating exhaust temperatures to clean the filter. Remember, automatic cleaning only occurs when natural cleaning is not possible based on temperature, load, and speed. It serves as a backup system.

Optimized SCR system

Our SCR system for Final Tier 4/Stage IV has been optimized for efficient operation in off-highway applications. It requires low dosing rates of DEF, which means smaller tanks and easier integration into equipment for OEMs, and lower operating costs and fewer fill-ups for operators.

A single ECU controls the engine and entire Integrated Emissions Control system. Compared to its predecessor, the ECU features increased RAM, processing speed and program memory — allowing for advanced management of the Final Tier 4/Stage IV emissions control systems. The ECU even gives you premium software options to configure external sensors, driver outputs, throttle stations, and other equipment parameters — reducing engineering expense and eliminating the need for some equipment controllers.

With an optimized engine platform including SCR, we are confident that our Final Tier 4/Stage IV engines will meet emissions regulations not only on day one but also at the end of the engine's life. Given the record of durability for John Deere engines, that will be many years down the road.

Acronyms used in this brochure

AOC	Ammonia oxidation catalyst
DEF	Diesel exhaust fluid
DOC	Diesel oxidation catalyst
DPF	Diesel particulate filter
ECU	Engine control unit
EGR	Exhaust gas recirculation
ETM	Exhaust temperature management
NOx	Nitrogen oxides
OEM	Original equipment manufacturer
PM	Particulate matter
ppm	Parts per million
SCR	Selective catalytic reduction
ULSD	Ultra-low sulfur diesel
VGT	Variable geometry turbocharger
WGT	Wastegated turbocharger


WALO
WALO
WALO

Final Tier 4/Stage IV frequently asked questions

What is the John Deere Integrated Emissions Control system?

To meet increasingly stringent emissions regulations, John Deere has followed a "building-block" approach in which it has systematically adopted technologies to meet each regulatory tier. The John Deere Integrated Emissions Control system encompasses any combination of aftertreatment and emissions reduction components. John Deere will continue to tailor its Integrated Emissions Control system configurations to fit a variety of off-highway applications.

Why is John Deere implementing selective catalytic reduction (SCR) for Final Tier 4/Stage IV?

Until facing the more stringent emission levels for nitrogen oxides (NOx) required by Final Tier 4/Stage IV, John Deere has been able to achieve the mandated NOx levels with its cooled exhaust gas recirculation (EGR) technology and a single fluid, diesel fuel. With the additional 80 percent reduction in NOx required for Final Tier 4/Stage IV, John Deere will continue to utilize its proven cooled EGR technology but will combine this with SCR technology to achieve the more stringent Final Tier 4/Stage IV NOx emission levels.

Is John Deere abandoning cooled EGR technology developed for Interim Tier 4/Stage III B?

John Deere will continue to utilize the field-proven cooled EGR technology developed for Tier 3/Stage III A and Interim Tier 4/Stage III B.

How is the John Deere SCR solution different from the solutions of other engine manufacturers?

John Deere will use a combination of our proven cooled EGR technology and SCR technology to meet more stringent Final Tier 4/Stage IV NOx emissions regulations. The John Deere solution is different because the combination of the two technologies will allow John Deere engines to utilize less diesel exhaust fluid (DEF) than alternative Interim Tier 4/Stage III B SCR technology solutions. Less consumption of DEF means DEF tanks can be smaller, impact on equipment applications are minimized, DEF filter service intervals can be extended, and operator involvement is reduced.

Why does John Deere plan to use an exhaust filter for Final Tier 4/Stage IV, while some competitors do not?

Some manufacturers have chosen to calibrate their engines to produce less particulate matter (PM), which increases the NOx out of the engine and requires more DEF to treat the increased NOx downstream. John Deere has chosen to utilize an exhaust filter, consisting of a diesel oxidation catalyst (DOC) and a diesel particulate filter (DPF), downstream of the engine to reduce the PM emission levels. This reduces the NOx created in the engine and thus requires less DEF to treat NOx. The result is improved total fluid economy, which takes into account diesel fuel and DEF.

John Deere engines are also designed to deliver the highest level of performance in a wide variety of applications to meet customer expectations around the globe. To achieve the most stringent emissions levels mandated in certain parts of the world and to maintain engine performance levels that meet or exceed those of Interim Tier 4/Stage III B, John Deere will continue to utilize its proven exhaust filter technology adopted for Interim Tier 4/Stage III B along with the cooled EGR and SCR technologies.

Will exhaust filter regeneration intervals remain the same for Final Tier 4/Stage IV?

John Deere expects to see longer intervals between exhaust filter regenerations with Final Tier 4/Stage IV. In general, the SCR technology and more efficient high-pressure fuel delivery systems with Final Tier 4/Stage IV engines will reduce particulate matter out of an engine and, as a result, increase the time between any exhaust filter regeneration.

What is regeneration?

The exhaust filter is integrated into the engine design to provide a simple and reliable solution for reducing particulate matter (PM). A single engine control unit (ECU) manages both the engine and exhaust filter, via an exhaust temperature management (ETM) system, to regenerate (clean) the exhaust filter when sufficient heat cannot be generated to passively clean the filter.

Passive regeneration — John Deere engines and exhaust filter components are designed for uninterrupted operation using passive regeneration, a natural cleaning process where engine exhaust temperatures are sufficient enough to oxidize the PM trapped in the exhaust filter. The process occurs during normal engine operating conditions, which is the most fuel-efficient way to clean. Passive regeneration does not impact machine operation or require operator involvement.

Active regeneration — If conditions (temperature, speed, and load) for passive regeneration cannot be achieved, then PM must be removed using active regeneration, an automatic cleaning process. For a short duration, this requires injecting a small quantity of fuel in the exhaust stream and elevating exhaust temperatures to clean the filter. Remember, active regeneration cleaning occurs only when passive regeneration is not possible based on temperature, load, and speed. It serves as a backup system. In most cases, active regeneration does not impact machine operation or require operator involvement.

Parked or stationary regeneration may be necessary if active regeneration is overridden by the operator, or in rare instances when the engine does not reach normal operating temperatures because of lighter loads, reduced speeds, or cool ambient conditions for extended periods of time.

How do the regeneration process steps work?

Under normal operating conditions, the DOC reacts with exhaust gases to reduce carbon monoxide, hydrocarbons, and some PM. The downstream DPF forces exhaust gases to flow through porous channel walls, trapping and holding the remaining PM. Trapped particles are eventually oxidized within the DPF through a continuous cleaning process called passive regeneration, utilizing exhaust heat created under normal operating conditions.

How does ETM work?

If conditions (ambient temperature, speed, and load) for passive regeneration cannot be achieved, ETM is an automated engine operating mode used to increase the DOC inlet temperature to initiate and maintain an active regeneration. To increase the DOC inlet temperature, ETM may reduce the amount of fresh air entering the engine via an intake air throttle valve, include a later post injection (after main injection event), retard engine timing for the main injection event, or vary the VGT vane position and elevate low idle speed. Once the needed DOC inlet temperature is achieved, a small quantity of fuel is injected into the exhaust stream. This process creates the heat needed to oxidize the PM trapped in the DPF when passive conditions cannot be achieved. In addition, ETM provides an additional benefit of a controlled warm-up and cool-down period, increasing the durability of the exhaust filter.

How will engine performance be impacted for Final Tier 4/Stage IV?

Engine performance for Final Tier 4/Stage IV will meet or exceed that of Interim Tier 4/Stage III B engines. John Deere engines will continue to provide the same or higher levels of power density and torque along with transient response that meets or exceeds that provided with Interim Tier 4/Stage III B engines.

How is the durability of the engine impacted by Final Tier 4/Stage IV technologies?

For the most part, base engine platforms will not change with Final Tier 4/Stage IV. As a result, our proven durability will continue from Interim Tier 4/Stage III B to Final Tier 4/Stage IV. The new aftertreatment components associated with SCR and Final Tier 4/Stage IV engines are designed to meet the unique needs of off-highway equipment and achieve the same durability goals as our proven Interim Tier 4/Stage III B engines and exhaust filters.

What is the expected fluid economy for John Deere Final Tier 4/Stage IV engines?

The total fluid economy (diesel fuel and DEF) with Final Tier 4/Stage IV engines is expected to meet or exceed that of our proven Interim Tier 4/Stage III B engines with cooled EGR and exhaust filters operating on diesel fuel only. When you consider that our Interim Tier 4/Stage III B engines have been tested in many applications globally and have established the benchmark for fluid economy, we are confident that John Deere Final Tier 4/Stage IV engines will continue to provide world-class fuel economy while delivering improved performance and higher machine productivity.

How much DEF will be consumed with John Deere Final Tier 4/Stage IV engines?

DEF consumption will be 1 to 3 percent of diesel fuel consumption depending on the application. As DEF becomes more widely distributed between now and January 2014, the cost of DEF is expected to become very similar to the cost of diesel fuel.

How is John Deere dealing with the potential for urea freezing in cold environments?

DEF is made of 32.5 percent urea and 67.5 percent deionized water and will begin to gel at 12° F (-11° C). From an engine perspective, there will be heated DEF lines between the DEF tank and the decomposition tube where DEF is injected into the exhaust stream. When the engine is shut down, DEF is pumped out of all lines and the supply pump back into the DEF tank. The DEF tank itself is equipped with a heating element that utilizes engine coolant to thaw DEF in temperatures below 12° F (-11° C). The engine can be operated immediately and throughout the DEF tank thawing process.

How often will users need to fill tanks with DEF?

Depending on the vehicle's DEF tank size, the DEF tank will need to be filled at least every tank of diesel fuel (1:1 minimum ratio) for mobile applications if the vehicle is equipped with a visible DEF level indicator. If there is no constantly visible DEF level indicator, the required minimum ratio in mobile applications is 2:1 or every other tank full of diesel. Stationary applications will require the greater of the DEF tank ratios described for mobile applications or a minimum of 120 hours of engine operation.

What are the additional service requirements for Final Tier 4/Stage IV?

For the most part, the service requirements for Final Tier 4/Stage IV mirror the service requirements of Interim Tier 4/Stage III B engines. One additional service requirement for Final Tier 4/Stage IV will be the replacement of a small DEF filter that can be easily changed during other routine engine service.

Will there be a change in oil or fuel requirements for Final Tier 4/Stage IV?

There will be no change in oil or fuel requirements for Final Tier 4/Stage IV. Owners and operators should use only ultra-low sulfur diesel (ULSD) fuel with a maximum of 15 mg/kg (15 ppm) sulfur content and engine oils meeting API Service Category CJ-4, ACEA Oil Sequence E9 or ACEA Oil Sequence E6. Oil change intervals of 250 or 500 hours will also remain unchanged for Final Tier 4/Stage IV.

Log on to JohnDeere.com/dealer to find the service dealer nearest you.

Customer support

The power of a worldwide support network

With John Deere, you never have far to go to find expert assistance and advice. Get service when and where you need it at any of our 4,000+ service locations worldwide.

Fast parts delivery

You can count on genuine John Deere parts. Our worldwide parts distribution system has overnight delivery available in most areas of the world. For even faster service, our dealers keep many maintenance and replacement parts in stock to get you back to work immediately.

A warranty you can count on

Equipment operators can't afford downtime or unexpected repairs. That's why we offer a 2-Year/2,000-Hour and 1-Year/ Unlimited-Hour Warranty. This warranty takes effect the date that the engine begins operation. In addition, extended warranties are available under certain conditions. Be sure to register your engine for warranty support.

Application integration support

John Deere Power Systems is one of the few companies that integrate entire powertrain systems — from the engine and electronics to the drivetrain components. Our highly trained distributors have experience integrating engines, drivetrain components, and electronics into a wide variety of applications. We also provide equipment manufacturers with product and engineering support to maximize performance and fuel economy while meeting emissions regulations.

JDLink™

The JDLink telematics system will be available on most John Deere engines installed in OEM equipment. The system enables customers to remotely monitor engine conditions and status, and allows John Deere technicians to perform engine diagnostics and some repairs. With JDLink, you can monitor, protect, and maintain your equipment 24/7.

Engine oils and diesel fuels

Engine oil type and diesel fuel have always played a role in emissions. But products used and technologies needed to meet emissions regulations make them even more important.

With the introduction of exhaust filters, the type of engine oil used can have a significant impact on the proper functioning and ash service life of these devices. Ash, a by-product of inorganic solids, will collect in the exhaust filter over time as a result of the combustion process. The use of oils meeting API CJ-4 and ACEA E9 standards, both with reduced trace metals content, are required in order to reduce ash accumulation and increase exhaust filter service life for Final Tier 4/Stage IV engines.

Similar to oils, the type of diesel fuel used can also have a significant impact on emission control devices. The EPA requires the use of diesel fuel with a sulfur content of less than 15 ppm (ultra-low sulfur diesel or ULSD) in Final Tier 4 engines, and the EU requires a sulfur content of less than 10 ppm in Stage IV engines. Diesel fuels with higher sulfur content can damage aftertreatment components, leading to early replacement of these components.

Uncompromising performance, when you need it most

To learn more about Final Tier 4 technologies and get an inside look at our engines, visit JohnDeere.com/tier4

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JOHN DEERE

DSWT88 Litho in U.S.A. (12-03)

JohnDeere.com/tier4

Off-Highway Diesel Engines

Final Tier 4/Stage IV

JOHN DEERE

The right technology, right now

Putting customer needs first

We understand your concerns about Final Tier 4/Stage IV emissions regulations. That's why we're focused on adding the right engine technologies at the right time to maintain and maximize performance. This smart approach to meeting emissions regulations doesn't compromise on power, reliability, or ease of operation.

Meeting emissions while maximizing performance

You don't have to sacrifice one for the other. John Deere PowerTech™ Final Tier 4/Stage IV engines 56 kW (75 hp) and above are built on a proven platform of emissions control technologies including cooled exhaust gas recirculation (EGR), exhaust filters, and selective catalytic reduction (SCR).

Countless hours of testing in labs, field prototype machines, and in the toughest proving ground of all — rugged off-highway applications — have shown that John Deere engines have what it takes to get the job done.

Performance, reliability, and durability

These three words capture the core of the John Deere engine experience. You can count on John Deere engines to deliver reliable power day in and day out, year after year, and in the toughest off-highway working conditions. John Deere Final Tier 4/Stage IV engines maintain power density, torque, and transient response. It all adds up to more productivity, uptime, and value for your machines.

Final Tier 4/Stage IV engine identification

PowerTech PSS 6.8L

Displacement

Aftertreatment
- **S** – Exhaust Filter and SCR
- **X** – Exhaust Filter

Turbocharger
- **V** – Variable Geometry Turbocharger (VGT)
- **S** – Series Turbochargers
- **W** – Wastegate Turbocharger

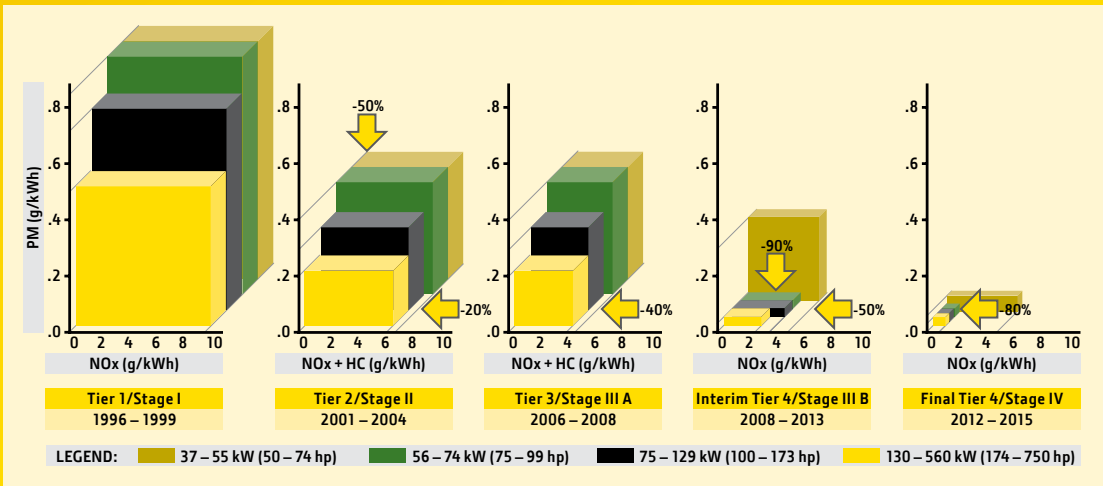
Technology
- **P** – PowerTech Plus
- **E** – PowerTech E

The final emissions countdown

Final Tier 4/Stage IV emissions regulations for engines 130 kW (174 hp) and above begin in January 2014, and will be fully implemented for engines 56 to 129 kW (75 to 174 hp) by 2015. Particulate matter (PM) levels established by Interim Tier 4/Stage III B regulations will be maintained in Final Tier 4 while nitrogen oxides (NOx) will be reduced by approximately 80 percent.

Engines that meet the Final Tier 4/Stage IV regulations set by the EPA and EU produce almost no PM and NOx emissions. That's an achievement engineers and environmentalists can both applaud.

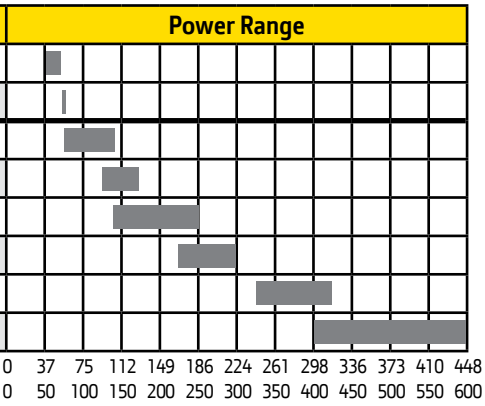
EPA and EU nonroad emissions regulations: 37 – 560 kW (50 – 750 hp)



NOx – Nitrogen oxides, which react in the atmosphere with hydrocarbons
HC – Hydrocarbons, a by-product of combustion
PM – Particulate matter, a non-gaseous product of combustion

Industrial Engine Power Ratings

Engine	Power Ratings	Turbocharging	Cooled EGR	Exhaust Filter	SCR	Power Range
PowerTech EWX 2.9L	37 – 55 kW (48 – 74 hp)	Wastegate	No	Yes	No	
PowerTech EWX 4.5L	55 kW (74 hp)	Wastegate	No	Yes	No	
PowerTech PWS 4.5L	63 – 104 kW (85 – 140 hp)	Wastegate	Yes	Yes	Yes	
PowerTech PSS 4.5L	93 – 129 kW (125 – 175 hp)	Series	Yes	Yes	Yes	
PowerTech PVS 6.8L	104 – 187 kW (140 – 250 hp)	VGT	Yes	Yes	Yes	
PowerTech PSS 6.8L	168 – 224 kW (225 – 300 hp)	Series	Yes	Yes	Yes	
PowerTech PSS 9.0L	187 – 317 kW (250 – 425 hp)	Series	Yes	Yes	Yes	
PowerTech PSS 13.5L	298 – 448 kW (400 – 600 hp)	Series	Yes	Yes	Yes	



The building blocks of our Integrated Emissions Control system

To meet increasingly stringent emissions regulations, John Deere has followed a carefully planned building-block approach. We have systematically adopted new technologies and integrated them with our field-proven solutions to meet each regulatory tier.

Cooled EGR system

NOx reduction through cooled EGR

John Deere was the first engine manufacturer to widely commercialize cooled EGR and variable geometry turbocharger (VGT) technologies in off-highway applications, introducing them in 2005 with the start of Tier 3/Stage III A regulations. At appropriate levels of engine operation, the EGR valve opens and measured amounts of cooled exhaust gas are routed back into the intake manifold and mixed with the incoming fresh air. Since this process removes oxygen from the air, the exhaust temperatures in the combustion process are lowered and the levels of NOx are reduced.

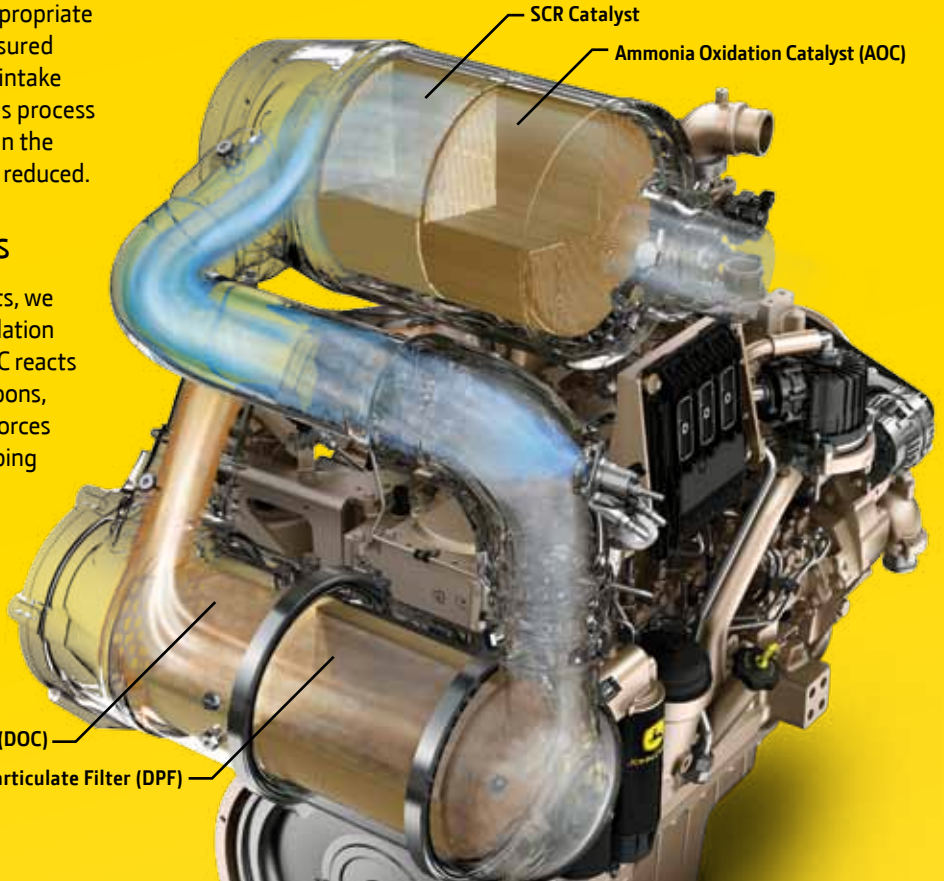
PM reduction through exhaust filters

To achieve Interim Tier 4/Stage III B emissions requirements, we added a catalyzed exhaust filter that contains a diesel oxidation catalyst (DOC) and a diesel particulate filter (DPF). The DOC reacts with exhaust gases to reduce carbon monoxide, hydrocarbons, and some particulate matter (PM). The downstream DPF forces exhaust gases to flow through porous channel walls, trapping and holding the remaining PM. During normal operating conditions (temperature, load, and speed) the engine's natural heat breaks down the PM and cleans the exhaust filter. An exhaust filter also has the benefit of replacing the muffler in most applications.

Final NOx reduction through SCR

SCR combined with our proven Interim Tier 4/Stage III B engine platform is the best solution to achieve Final Tier 4/Stage IV emissions compliance. This technology utilizes a urea-based additive, sometimes referred to as diesel exhaust fluid (DEF). The ammonia in the urea mixes with engine exhaust gases in the SCR catalyst to reduce NOx — converting it to nitrogen and water vapor. This vapor is then expelled through the exhaust pipe.

Why did John Deere wait to deploy SCR? We didn't need it before now. Our advanced cooled EGR system met all previous NOx requirements without the need for SCR and a second fluid. We are adding SCR at a time when the infrastructure for DEF is more established and its use is more accepted by equipment owners. SCR has been successfully used in on-highway applications, and the components are now more developed for off-highway applications.



The benefits of choosing John Deere engines

Optimized emissions solution

The John Deere Integrated Emissions Control system for Final Tier 4/ Stage IV compliance is optimized to meet emissions regulations while delivering improved performance and world-class fluid economy.

Fuel and fluid efficient

John Deere established an unparalleled record of fuel economy with our best-in-class Tier 3/Stage III A engines. Our Interim Tier 4/Stage III B and Final Tier 4/Stage IV technology solutions continue that efficiency by maximizing total fluid economy. With fuel economy gains achieved through increased injection pressures and lower DEF dosing rates delivered by the optimized SCR system, John Deere Final Tier 4/Stage IV engines will meet or improve upon the current total fluid economy of our Interim Tier 4/Stage III B engine models.

John Deere Final Tier 4/Stage IV engines operate efficiently with ultra-low sulfur diesel as well as B5 to B20 blends, providing optimal performance and fuel-choice flexibility.

Field-proven performance

John Deere has a strong advantage when it comes to off-highway expertise. Our Final Tier 4/Stage IV engines offer a field-proven, fluid-efficient approach that stands up to the tough demands of off-highway environments.

Application integration

John Deere is one of the few manufacturers that design both engines and construction, forestry, and agricultural equipment — which gives us a unique advantage in designing and integrating the engine, drivetrain, hydraulics, electronic control unit (ECU), cooling package, and other vehicle systems for optimized efficiency. This integrated process maximizes performance, operator convenience, fuel economy and overall value for John Deere machine owners as well as John Deere OEM customers.

Fully supported

The proven John Deere worldwide dealer network of over 4,000 service locations is prepared to fully support customers and their Final Tier 4/ Stage IV engines. John Deere dealers are highly trained to help customers with the performance, service, and support of these new engines and to optimize total machine efficiency.

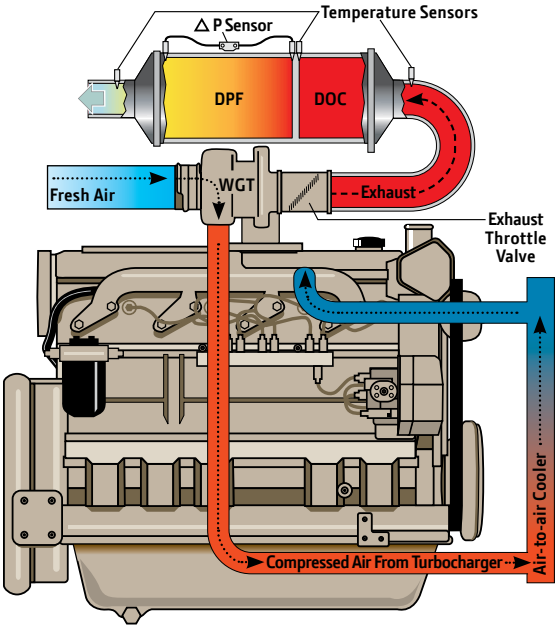
PowerTech EWX

Forthright performance and reliability

Our straightforward PowerTech EWX 2.9L and 4.5L engines have 2-valve cylinder heads, high-pressure common rail fuel systems, full-authority electronic controls, and proven exhaust filters. These compact, cost-effective engines blend advanced emissions control technologies with simple and reliable wastegated turbocharging to maintain transient response and peak torque in all operating conditions.

PowerTech EWX Engines	
PowerTech EWX 2.9L	37 – 55 kW (48 – 74 hp)
PowerTech EWX 4.5L	55 kW (74 hp)

PowerTech EWX Final Tier 4 technology



PowerTech EWX engines meet Final Tier 4/Stage III B regulations

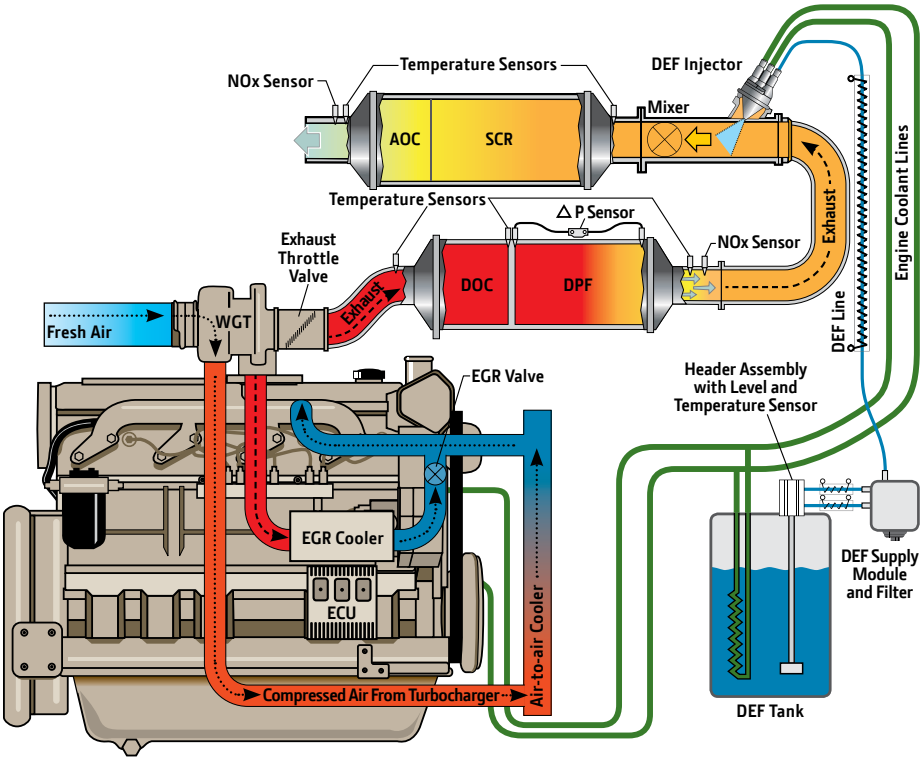
PowerTech PWS

Uncompromising power for any job

Our PowerTech PWS 4.5L engines deliver impressive power in a compact package. These efficient engines blend advanced emissions control technologies with simple and reliable wastegated turbocharging to maintain transient response and peak torque in all operating conditions.

PowerTech PWS Engines	
PowerTech PWS 4.5L	63 – 104 kW (85 – 140 hp)

PowerTech PWS Final Tier 4 technology



Wastegated turbocharger

Wastegated turbochargers are designed to develop more airflow at lower engine speeds to improve low speed torque. The wastegate control device bleeds off a portion of the exhaust flow at higher engine speeds. Wastegated turbos deliver improved transient response and higher peak torque without compromising engine envelope size.

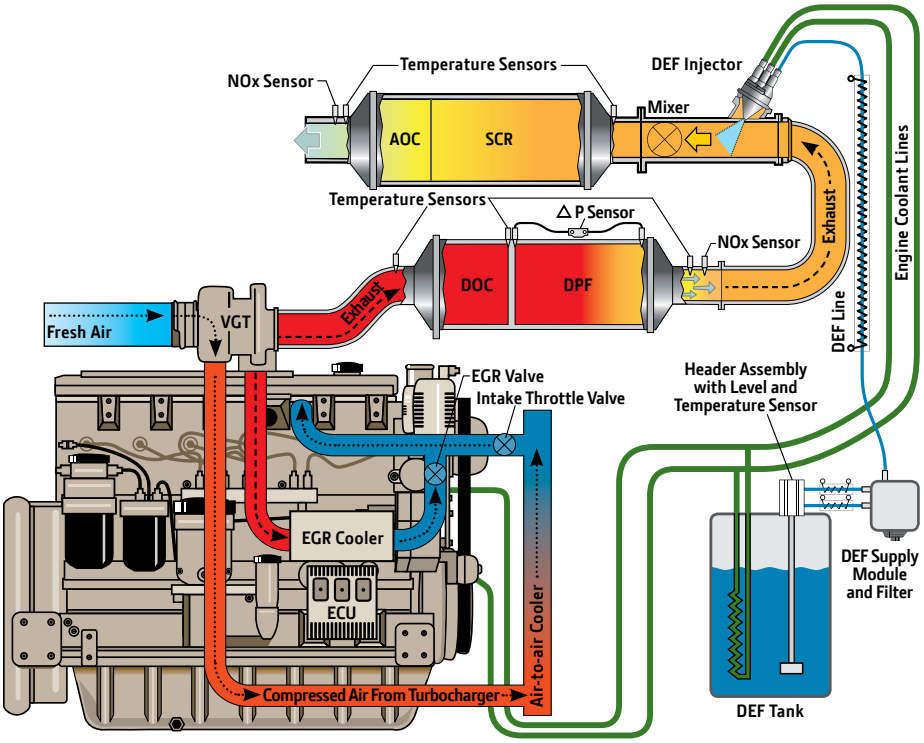
PowerTech PVS

Advanced power and fluid economy

PowerTech PVS 6.8L engines provide reliable power for a wide range of applications. They utilize our proven PowerTech Plus technology with variable geometry turbocharging (VGT) and an optimized SCR system to improve performance and combustion efficiency, reduce emissions, and increase fluid economy.

PowerTech PVS Engines	
PowerTech PVS 6.8L	104 – 187 kW (140 – 250 hp)

PowerTech PVS Final Tier 4 technology



Variable geometry turbocharger

VGT tailors the amount of recirculated exhaust gas that mixes with the fresh air. Precise electronic controls open or close the variable vanes in the turbocharger depending on engine load and speed. The optimized airflow generates more boost while maximizing low-speed torque, transient response, peak torque, and fluid economy.

VGT delivers power and efficiency

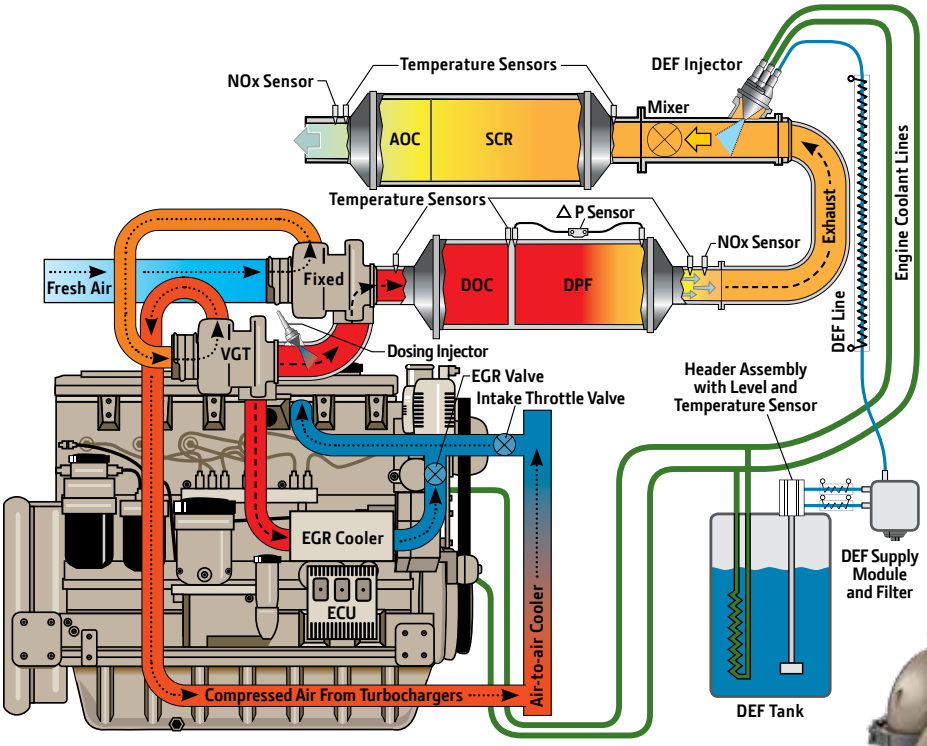
PowerTech PSS

Ultimate performance and responsiveness

For ultimate performance in off-highway applications, PowerTech PSS 4.5L, 6.8L, 9.0L, or 13.5L engine can do almost any job. They can handle steep grades at high altitudes and deliver maximum transient response and low-speed torque. Along with proven PowerTech Plus technology and an SCR system designed specifically for off-highway applications, all displacements feature series turbochargers that improve performance and responsiveness.

PowerTech PSS Engines	
PowerTech PSS 4.5L	93 – 129 kW (125 – 173 hp)
PowerTech PSS 6.8L	168 – 224 kW (225 – 300 hp)
PowerTech PSS 9.0L	187 – 317 kW (250 – 425 hp)
PowerTech PSS 13.5L	298 – 448 kW (400 – 600 hp)

PowerTech PSS Final Tier 4 technology



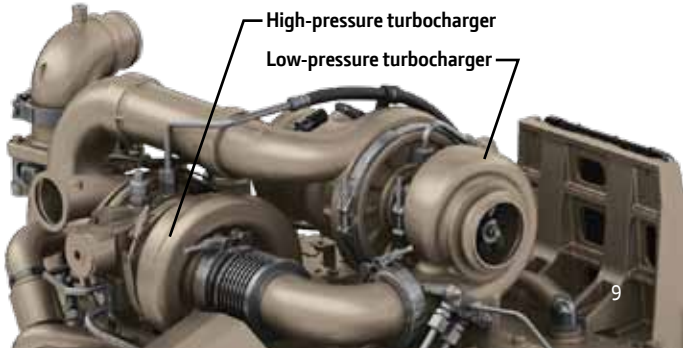
PowerTech PSS 9.0L and 13.5L engine configuration shown.

Two are better than one

Series turbocharging delivers higher power density, improved low-speed torque, and improved high-altitude operation. By splitting the compression of the charge air between two turbochargers, both can operate at peak efficiency and at slower rotating speeds. This lowers stress on turbocharger components and improves reliability.

Here's how series turbocharging works. Fresh air is drawn into the low-pressure turbocharger (fixed geometry), where air pressure is boosted. This pressurized or boosted air is then drawn into the high-pressure turbocharger (VGT or WGT), where air intake pressure is further raised. The high-pressure air is then routed to an air-to-air aftercooler, where the air is cooled and then routed to the engine's intake manifold.

Series turbochargers



Aftertreatment operation and maintenance

Convenient exhaust filter cleaning

The John Deere exhaust filter is integrated into the engine design and electronics to provide a seamless operator experience. The engine control unit (ECU) and exhaust temperature management (ETM) system work together to continuously regenerate, or clean, the exhaust filter. In most cases, filter cleaning does not impact machine operation or require operator involvement. Higher pressures created by our Final Tier 4/Stage IV high-pressure fuel system will extend intervals between automatic cleanings, while helping achieve emissions compliance.

Natural cleaning. John Deere engines and exhaust filter components are designed for uninterrupted operation using a natural cleaning process sometimes referred to as passive regeneration. It occurs during normal engine operating conditions, which is the most fuel-efficient way to clean.

Automatic cleaning. If natural filter cleaning cannot be achieved, then PM must be removed using an automatic cleaning process, sometimes referred to as active regeneration. This requires injecting fuel in the exhaust stream and elevating exhaust temperatures to clean the filter. Remember, automatic cleaning only occurs when natural cleaning is not possible based on temperature, load, and speed. It serves as a backup system.

Optimized SCR system

Our SCR system for Final Tier 4/Stage IV has been optimized for efficient operation in off-highway applications. It requires low dosing rates of DEF, which means smaller tanks and easier integration into equipment for OEMs, and lower operating costs and fewer fill-ups for operators.

A single ECU controls the engine and entire Integrated Emissions Control system. Compared to its predecessor, the ECU features increased RAM, processing speed and program memory — allowing for advanced management of the Final Tier 4/Stage IV emissions control systems. The ECU even gives you premium software options to configure external sensors, driver outputs, throttle stations, and other equipment parameters — reducing engineering expense and eliminating the need for some equipment controllers.

With an optimized engine platform including SCR, we are confident that our Final Tier 4/Stage IV engines will meet emissions regulations not only on day one but also at the end of the engine's life. Given the record of durability for John Deere engines, that will be many years down the road.

Acronyms used in this brochure

AOC	Ammonia oxidation catalyst
DEF	Diesel exhaust fluid
DOC	Diesel oxidation catalyst
DPF	Diesel particulate filter
ECU	Engine control unit
EGR	Exhaust gas recirculation
ETM	Exhaust temperature management
NOx	Nitrogen oxides
OEM	Original equipment manufacturer
PM	Particulate matter
ppm	Parts per million
SCR	Selective catalytic reduction
ULSD	Ultra-low sulfur diesel
VGT	Variable geometry turbocharger
WGT	Wastegated turbocharger


WALO
WALO
WALO

Final Tier 4/Stage IV frequently asked questions

What is the John Deere Integrated Emissions Control system?

To meet increasingly stringent emissions regulations, John Deere has followed a "building-block" approach in which it has systematically adopted technologies to meet each regulatory tier. The John Deere Integrated Emissions Control system encompasses any combination of aftertreatment and emissions reduction components. John Deere will continue to tailor its Integrated Emissions Control system configurations to fit a variety of off-highway applications.

Why is John Deere implementing selective catalytic reduction (SCR) for Final Tier 4/Stage IV?

Until facing the more stringent emission levels for nitrogen oxides (NOx) required by Final Tier 4/Stage IV, John Deere has been able to achieve the mandated NOx levels with its cooled exhaust gas recirculation (EGR) technology and a single fluid, diesel fuel. With the additional 80 percent reduction in NOx required for Final Tier 4/Stage IV, John Deere will continue to utilize its proven cooled EGR technology but will combine this with SCR technology to achieve the more stringent Final Tier 4/Stage IV NOx emission levels.

Is John Deere abandoning cooled EGR technology developed for Interim Tier 4/Stage III B?

John Deere will continue to utilize the field-proven cooled EGR technology developed for Tier 3/Stage III A and Interim Tier 4/Stage III B.

How is the John Deere SCR solution different from the solutions of other engine manufacturers?

John Deere will use a combination of our proven cooled EGR technology and SCR technology to meet more stringent Final Tier 4/Stage IV NOx emissions regulations. The John Deere solution is different because the combination of the two technologies will allow John Deere engines to utilize less diesel exhaust fluid (DEF) than alternative Interim Tier 4/Stage III B SCR technology solutions. Less consumption of DEF means DEF tanks can be smaller, impact on equipment applications are minimized, DEF filter service intervals can be extended, and operator involvement is reduced.

Why does John Deere plan to use an exhaust filter for Final Tier 4/Stage IV, while some competitors do not?

Some manufacturers have chosen to calibrate their engines to produce less particulate matter (PM), which increases the NOx out of the engine and requires more DEF to treat the increased NOx downstream. John Deere has chosen to utilize an exhaust filter, consisting of a diesel oxidation catalyst (DOC) and a diesel particulate filter (DPF), downstream of the engine to reduce the PM emission levels. This reduces the NOx created in the engine and thus requires less DEF to treat NOx. The result is improved total fluid economy, which takes into account diesel fuel and DEF.

John Deere engines are also designed to deliver the highest level of performance in a wide variety of applications to meet customer expectations around the globe. To achieve the most stringent emissions levels mandated in certain parts of the world and to maintain engine performance levels that meet or exceed those of Interim Tier 4/Stage III B, John Deere will continue to utilize its proven exhaust filter technology adopted for Interim Tier 4/Stage III B along with the cooled EGR and SCR technologies.

Will exhaust filter regeneration intervals remain the same for Final Tier 4/Stage IV?

John Deere expects to see longer intervals between exhaust filter regenerations with Final Tier 4/Stage IV. In general, the SCR technology and more efficient high-pressure fuel delivery systems with Final Tier 4/Stage IV engines will reduce particulate matter out of an engine and, as a result, increase the time between any exhaust filter regeneration.

What is regeneration?

The exhaust filter is integrated into the engine design to provide a simple and reliable solution for reducing particulate matter (PM). A single engine control unit (ECU) manages both the engine and exhaust filter, via an exhaust temperature management (ETM) system, to regenerate (clean) the exhaust filter when sufficient heat cannot be generated to passively clean the filter.

Passive regeneration — John Deere engines and exhaust filter components are designed for uninterrupted operation using passive regeneration, a natural cleaning process where engine exhaust temperatures are sufficient enough to oxidize the PM trapped in the exhaust filter. The process occurs during normal engine operating conditions, which is the most fuel-efficient way to clean. Passive regeneration does not impact machine operation or require operator involvement.

Active regeneration — If conditions (temperature, speed, and load) for passive regeneration cannot be achieved, then PM must be removed using active regeneration, an automatic cleaning process. For a short duration, this requires injecting a small quantity of fuel in the exhaust stream and elevating exhaust temperatures to clean the filter. Remember, active regeneration cleaning occurs only when passive regeneration is not possible based on temperature, load, and speed. It serves as a backup system. In most cases, active regeneration does not impact machine operation or require operator involvement.

Parked or stationary regeneration may be necessary if active regeneration is overridden by the operator, or in rare instances when the engine does not reach normal operating temperatures because of lighter loads, reduced speeds, or cool ambient conditions for extended periods of time.

How do the regeneration process steps work?

Under normal operating conditions, the DOC reacts with exhaust gases to reduce carbon monoxide, hydrocarbons, and some PM. The downstream DPF forces exhaust gases to flow through porous channel walls, trapping and holding the remaining PM. Trapped particles are eventually oxidized within the DPF through a continuous cleaning process called passive regeneration, utilizing exhaust heat created under normal operating conditions.

How does ETM work?

If conditions (ambient temperature, speed, and load) for passive regeneration cannot be achieved, ETM is an automated engine operating mode used to increase the DOC inlet temperature to initiate and maintain an active regeneration. To increase the DOC inlet temperature, ETM may reduce the amount of fresh air entering the engine via an intake air throttle valve, include a later post injection (after main injection event), retard engine timing for the main injection event, or vary the VGT vane position and elevate low idle speed. Once the needed DOC inlet temperature is achieved, a small quantity of fuel is injected into the exhaust stream. This process creates the heat needed to oxidize the PM trapped in the DPF when passive conditions cannot be achieved. In addition, ETM provides an additional benefit of a controlled warm-up and cool-down period, increasing the durability of the exhaust filter.

How will engine performance be impacted for Final Tier 4/Stage IV?

Engine performance for Final Tier 4/Stage IV will meet or exceed that of Interim Tier 4/Stage III B engines. John Deere engines will continue to provide the same or higher levels of power density and torque along with transient response that meets or exceeds that provided with Interim Tier 4/Stage III B engines.

How is the durability of the engine impacted by Final Tier 4/Stage IV technologies?

For the most part, base engine platforms will not change with Final Tier 4/Stage IV. As a result, our proven durability will continue from Interim Tier 4/Stage III B to Final Tier 4/Stage IV. The new aftertreatment components associated with SCR and Final Tier 4/Stage IV engines are designed to meet the unique needs of off-highway equipment and achieve the same durability goals as our proven Interim Tier 4/Stage III B engines and exhaust filters.

What is the expected fluid economy for John Deere Final Tier 4/Stage IV engines?

The total fluid economy (diesel fuel and DEF) with Final Tier 4/Stage IV engines is expected to meet or exceed that of our proven Interim Tier 4/Stage III B engines with cooled EGR and exhaust filters operating on diesel fuel only. When you consider that our Interim Tier 4/Stage III B engines have been tested in many applications globally and have established the benchmark for fluid economy, we are confident that John Deere Final Tier 4/Stage IV engines will continue to provide world-class fuel economy while delivering improved performance and higher machine productivity.

How much DEF will be consumed with John Deere Final Tier 4/Stage IV engines?

DEF consumption will be 1 to 3 percent of diesel fuel consumption depending on the application. As DEF becomes more widely distributed between now and January 2014, the cost of DEF is expected to become very similar to the cost of diesel fuel.

How is John Deere dealing with the potential for urea freezing in cold environments?

DEF is made of 32.5 percent urea and 67.5 percent deionized water and will begin to gel at 12° F (-11° C). From an engine perspective, there will be heated DEF lines between the DEF tank and the decomposition tube where DEF is injected into the exhaust stream. When the engine is shut down, DEF is pumped out of all lines and the supply pump back into the DEF tank. The DEF tank itself is equipped with a heating element that utilizes engine coolant to thaw DEF in temperatures below 12° F (-11° C). The engine can be operated immediately and throughout the DEF tank thawing process.

How often will users need to fill tanks with DEF?

Depending on the vehicle's DEF tank size, the DEF tank will need to be filled at least every tank of diesel fuel (1:1 minimum ratio) for mobile applications if the vehicle is equipped with a visible DEF level indicator. If there is no constantly visible DEF level indicator, the required minimum ratio in mobile applications is 2:1 or every other tank full of diesel. Stationary applications will require the greater of the DEF tank ratios described for mobile applications or a minimum of 120 hours of engine operation.

What are the additional service requirements for Final Tier 4/Stage IV?

For the most part, the service requirements for Final Tier 4/Stage IV mirror the service requirements of Interim Tier 4/Stage III B engines. One additional service requirement for Final Tier 4/Stage IV will be the replacement of a small DEF filter that can be easily changed during other routine engine service.

Will there be a change in oil or fuel requirements for Final Tier 4/Stage IV?

There will be no change in oil or fuel requirements for Final Tier 4/Stage IV. Owners and operators should use only ultra-low sulfur diesel (ULSD) fuel with a maximum of 15 mg/kg (15 ppm) sulfur content and engine oils meeting API Service Category CJ-4, ACEA Oil Sequence E9 or ACEA Oil Sequence E6. Oil change intervals of 250 or 500 hours will also remain unchanged for Final Tier 4/Stage IV.

Log on to JohnDeere.com/dealer to find the service dealer nearest you.

Customer support

The power of a worldwide support network

With John Deere, you never have far to go to find expert assistance and advice. Get service when and where you need it at any of our 4,000+ service locations worldwide.

Fast parts delivery

You can count on genuine John Deere parts. Our worldwide parts distribution system has overnight delivery available in most areas of the world. For even faster service, our dealers keep many maintenance and replacement parts in stock to get you back to work immediately.

A warranty you can count on

Equipment operators can't afford downtime or unexpected repairs. That's why we offer a 2-Year/2,000-Hour and 1-Year/ Unlimited-Hour Warranty. This warranty takes effect the date that the engine begins operation. In addition, extended warranties are available under certain conditions. Be sure to register your engine for warranty support.

Application integration support

John Deere Power Systems is one of the few companies that integrate entire powertrain systems — from the engine and electronics to the drivetrain components. Our highly trained distributors have experience integrating engines, drivetrain components, and electronics into a wide variety of applications. We also provide equipment manufacturers with product and engineering support to maximize performance and fuel economy while meeting emissions regulations.

JDLink™

The JDLink telematics system will be available on most John Deere engines installed in OEM equipment. The system enables customers to remotely monitor engine conditions and status, and allows John Deere technicians to perform engine diagnostics and some repairs. With JDLink, you can monitor, protect, and maintain your equipment 24/7.

Engine oils and diesel fuels

Engine oil type and diesel fuel have always played a role in emissions. But products used and technologies needed to meet emissions regulations make them even more important.

With the introduction of exhaust filters, the type of engine oil used can have a significant impact on the proper functioning and ash service life of these devices. Ash, a by-product of inorganic solids, will collect in the exhaust filter over time as a result of the combustion process. The use of oils meeting API CJ-4 and ACEA E9 standards, both with reduced trace metals content, are required in order to reduce ash accumulation and increase exhaust filter service life for Final Tier 4/Stage IV engines.

Similar to oils, the type of diesel fuel used can also have a significant impact on emission control devices. The EPA requires the use of diesel fuel with a sulfur content of less than 15 ppm (ultra-low sulfur diesel or ULSD) in Final Tier 4 engines, and the EU requires a sulfur content of less than 10 ppm in Stage IV engines. Diesel fuels with higher sulfur content can damage aftertreatment components, leading to early replacement of these components.

Uncompromising performance, when you need it most

To learn more about Final Tier 4 technologies and get an inside look at our engines, visit JohnDeere.com/tier4

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JOHN DEERE

DSWT88 Litho in U.S.A. (12-03)

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