Off-Highway Diesel Engine Ratings

Interim Tier 4/Stage III B engines
130 kW (174 hp) and above
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Model designation key

Below is a key for the engine models shown in this guide.

A model designated as 6135H is a 6-cylinder, 13.5-liter turbocharged and aftercooled, air-to-air engine. A model designated as a 4045T is a 4-cylinder, 4.5-liter turbocharged engine.

**6135H**

- Indicates air intake system
- Displacement in liters
- Number of cylinders

**Engine identification plate**

- **Engine identification plate**
- **JOHN DEERE**
- **Engine Serial Number**
- **DEERE & COMPANY MOLINE, ILLINOIS MADE IN USA**
- **RG6135HFC95**
- **RG 6 135 H F C95**

**Factory manufactured by**
- RG  Waterloo, Iowa, USA
- CD  Saran, France
- PE  Torreón, Mexico
- PY  Pune, India

**Number of cylinders and total displacement**

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**Emissions certification**

- A, B, D, H, T  Non-emissions regulated
- C, D, E, F, H, T  Tier 1/Stage I
- D, G, H, J, K, T  Tier 2/Stage II
- L, M, N, P  Tier 3/Stage III A

**Engine serial number**

- 6135HFC95

**User type**

- F  OEM (John Deere Power Systems)
- XX  Other letters are used to identify John Deere equipment manufacturing locations

**Air intake system**

- D  Naturally aspirated
- T  Turbocharged
- A  Turbocharged and aftercooled, air-to-water
- H  Turbocharged and aftercooled, air-to-air

**New designations**

- 94=PVX  Example: 6090HFC94
- 95=PSX  Example: 6090HFC95
- C=Industrial  Example: 6090HFC94
- G=Gen-set  Example: 6090HFC94
Emissions information

The ultimate in performance, fuel economy, and emissions compliance is available with John Deere engines. To meet emissions regulations, John Deere worked closely with equipment manufacturers to identify engine technologies that best suited their needs.

John Deere engines comply with nonroad emissions regulations for the U.S. Environmental Protection Agency (EPA), the European Union (EU), and the California Area Resources Board (CARB).

**EPA and EU nonroad emissions regulations:** 37 – 560 kW (50 – 750 hp)
The concept behind EGR is simple. During certain conditions of engine operation, the EGR valve opens and measured amounts of 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.

Interim Tier 4 PowerTech PVX technology

Variable geometry turbocharger (VGT)
Varies exhaust pressure based on load and speed to ensure proper EGR flow. The combination of the cooled EGR and VGT provide low-speed torque, quicker transient response, higher-peak torque, and world-class fuel economy.

Cooled exhaust gas recirculation (EGR)
EGR cools and mixes measured amounts of cooled exhaust gas with incoming fresh air to lower peak combustion temperatures, thereby reducing NOx.

Exhaust filters
These engines will utilize a catalyzed exhaust filter that contains a diesel oxidation catalyst (DOC) and a diesel particulate filter (DPF). Under normal operating conditions, 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. Trapped PM is eventually oxidized within the DPF through a self-activating cleaning process called passive regeneration, utilizing exhaust heat created under normal operating conditions.

High-pressure common-rail (HPCR) and engine control unit (ECU)
The HPCR fuel system provides variable common-rail pressure and higher injection pressures up to 1,975 bar (29,000 psi). It also controls fuel injection timing and provides precise control for the start, duration, and end of injection.
4-valve cylinder head
The 4-valve cylinder head provides excellent airflow resulting in greater low-speed torque and better transient response time by utilizing a cross-flow design (6.8L) and a U-flow design (9.0L).

Air-to-air aftercooled
This is the most efficient method of cooling intake air to help reduce engine emissions while maintaining low-speed torque, transient response time, and peak torque. It enables an engine to meet emissions regulations with better fuel economy and the lowest installed costs.

Compact size
- Lower installed cost
- Mounting points for Tier 4/Stage III B engine models same as Tier 3/Stage III A engine models

Engine performance
- Multiple rated speeds to further reduce noise and improve fuel economy
- Higher level of peak torque (6.8L)
- Transient response time equal to or better than Tier 3/Stage III A
- Low-speed torque equal to or better than Tier 3/Stage III A
- Optional power bulge equal to or better than Tier 3/Stage III A

John Deere electronic engine controls
- Faster engine control unit (ECU) manages both the engine and the exhaust filter
- Full authority electronic controls
- Four times the memory, twice the RAM and double the processing speed
- The input/output capability has increased 40%

Additional features*
- Glow plugs (6.8L)
- Gear-driven auxiliary drives
- 500-hour oil change
- Self-adjusting poly-vee fan drive
- R.H. and L.H. engine-mounted final fuel filters (6.8L)
- Single-piece low-friction piston (9.0L)
- Optional rear PTO (9.0L)
- Low-pressure fuel system with “auto-prime” feature
- Directed top-liner cooling (9.0L)

*Available on all PowerTech PVX engines unless noted
PowerTech PVX 6.8L engines

- Power range: 138 – 187 kW (185 – 250 hp)
- Power bulge — up to 10%
- Peak torque — up to 35%
- Low-speed (1000 rpm) torque — up to 126% of rated speed torque
- Torque rise — up to 33% faster
- Transient response that meets or exceeds Tier 3/Stage III A
- World-class fuel economy
- Lower rated speeds to reduce noise and improve fuel economy
- Cold-starting capabilities that meet or exceed Tier 3/Stage III A
- Maintained compact size and same mounting locations

**Interim Tier 4/Stage III B PowerTech PVX 6.8L engines**

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**Bore Stroke Length Width Height Weight**

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Ratings are subject to change.
PowerTech PVX 9.0L engines

- Power range: 187 – 224 kW (250 – 300 hp)
- Power bulge — up to 10%
- Peak torque — up to 38%
- Low-speed (1000 rpm) torque — up to 123% of rated speed torque
- Torque rise — up to 20% faster
- Transient response that meets or exceeds Tier 3/Stage III A
- World-class fuel economy
- Lower rated speed to reduce noise and improve fuel economy
- Cold-starting capabilities that meet or exceed Tier 3/Stage III A
- Maintained compact size and same mounting locations

Interim Tier 4/Stage III B PowerTech PVX 9.0L engines

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Bore Stroke Length Width Height Weight

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Ratings are subject to change.
Series turbochargers
In series turbocharging, 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), where air intake pressure is further raised. The high-pressure air is then routed to a charge air cooler, where the air is cooled and then routed to the engine’s intake manifold.

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. Series turbocharging also delivers higher power density, improved low-speed torque, and improved high altitude operation.

Cooled exhaust gas recirculation (EGR)
EGR cools and mixes measured amounts of cooled exhaust gas with incoming fresh air to lower peak combustion temperatures, thereby reducing NOx.

Exhaust filters
These engines will utilize a catalyzed exhaust filter that contains a diesel oxidation catalyst (DOC) and a diesel particulate filter (DPF). Under normal operating conditions, 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. Trapped particles are eventually oxidized within the DPF through a self-activating cleaning process called passive regeneration, utilizing exhaust heat created under normal operating conditions.
High-pressure common-rail (HPCR) and engine control unit (ECU)
The HPCR fuel system provides variable common-rail pressure, multiple injections, and higher injection pressures up to 1,975 bar (29,000 psi). It also controls fuel injection timing and provides precise control for the start, duration, and end of injection. (6.8L & 9.0L)

Electronic unit injector (EUI) and engine control unit (ECU)
The EUI fuel system provides higher injection pressures up to 2,275 bar (33,000 psi). It also controls fuel injection timing and provides precise control for start, duration, and end of injection. (13.5L)

4-valve cylinder head
The 4-valve cylinder head provides excellent airflow resulting in greater low-speed torque and better transient response time by utilizing a cross-flow design (6.8L and 13.5L) and a U-flow design (9.0L).

Air-to-air aftercooled
This is the most efficient method of cooling intake air to help reduce engine emissions while maintaining low-speed torque, transient response time, and peak torque. It enables an engine to meet emissions regulations with better fuel economy and the lowest installed costs.

Compact size
– Lower installed cost
– Mounting points for Tier 4/Stage III B engine models same as Tier 3/Stage III A engine models

Engine performance
– Multiple rated speeds to further reduce noise and improve fuel economy
– Higher level of peak torque
– Transient response time equal to or better than Tier 3/Stage III A
– Low-speed torque equal to or better than Tier 3/Stage III A
– Optional power bulge equal to or better than Tier 3/Stage III A

John Deere electronic engine controls
– Faster engine control unit (ECU) manages both the engine and the exhaust filter
– Full authority electronic controls
– Four times the memory, twice the RAM and double the processing speed
– The input/output capability has increased 40%

Additional features*
– Glow plugs (6.8L)
– Gear-driven auxiliary drives
– 500-hour oil change
– Self-adjusting poly-vee fan drive
– R.H. and L.H. engine-mounted fuel filters (6.8L)
– Single-piece low-friction piston (9.0L and 13.5L)
– Optional rear PTO (9.0L and 13.5L)
– Low-pressure fuel system with “auto-prime” feature
– Directed top-liner cooling (9.0L and 13.5L)

*Available on all PowerTech PSX engines unless noted
PowerTech PSX 6.8L engines

- Power range: 168 – 187 kW (225 – 250 hp)
- Power bulge — up to 10%
- Peak torque — up to 35%
- Low-speed (1000 rpm) torque — up to 122% of rated speed torque
- Torque rise — up to 33% faster
- Transient response that meets or exceeds Tier 3/Stage III A
- World-class fuel economy
- Lower rated speeds to reduce noise and improve fuel economy
- Cold-starting capabilities that meet or exceed Tier 3/Stage III A
- Maintained compact size and same mounting locations

Interim Tier 4/Stage III B PowerTech PSX 6.8L vs. Tier 3/Stage III A PowerTech Plus 6.8L

<table>
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<th>Engine model</th>
<th>Rated power kW</th>
<th>Rated speed (rpm)</th>
<th>Peak power kW</th>
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Ratings are subject to change.
PowerTech PSX 9.0L engines

- Power range: 242 – 317 kW (325 – 425 hp)
- Best-in-class power density
- Power bulge — up to 10%
- Peak torque — up to 38%
- Low-speed (1000 rpm) torque — up to 130% of rated speed torque
- Torque rise — up to 20% faster
- Transient response that meets or exceeds Tier 3/Stage III A
- World-class fuel economy
- Lower rated speeds to reduce noise and improve fuel economy
- Cold-starting capabilities that meet or exceed Tier 3/Stage III A
- New compact size

Interim Tier 4/Stage III B PowerTech PSX 9.0L engines

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Ratings are subject to change.
PowerTech PSX 13.5L engines

- Maintained power range: 261 – 448 kW (350 – 600 hp)
- Best-in-class power density
- Power bulge — up to 13%
- Peak torque — up to 38%
- Low-speed (1000 rpm) torque — up to 133% of rated speed torque
- Torque rise — up to 40% faster
- Transient response that meets or exceeds Tier 3/Stage III A
- World-class fuel economy
- Lower rated speeds to reduce noise and improve fuel economy
- Cold-starting capabilities that meet or exceed Tier 3/Stage III A
- Compact size

Interim Tier 4/Stage III B PowerTech PSX 13.5L engines

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Bore Stroke Length Width Height Weight
mm in mm in mm in mm in mm in kg lb
132 5.2 165 6.5 1305 51.4 873 34.4 1550 61.0 1542 3400

Engine performance curves

Interim Tier 4/Stage III B PowerTech PSX 13.5L
vs. Tier 3/Stage III A PowerTech Plus 13.5L

Power curves

Torque curves

Maintained power range: 261 – 448 kW (350 – 600 hp)
Best-in-class power density
Power bulge — up to 13%
Peak torque — up to 38%
Low-speed (1000 rpm) torque — up to 133% of rated speed torque
Torque rise — up to 40% faster
Transient response that meets or exceeds Tier 3/Stage III A
World-class fuel economy
Lower rated speeds to reduce noise and improve fuel economy
Cold-starting capabilities that meet or exceed Tier 3/Stage III A
Compact size

Ratings are subject to change.
Interim Tier 4/Stage III B FAQ for engines 130 kW (174 hp) and greater

**Q: How will John Deere meet Interim Tier 4/Stage III B regulations?**

**A:** John Deere Power Systems will achieve compliance with Interim Tier 4/Stage III B emissions regulations by starting with our proven Tier 3/Stage III A PowerTech Plus engine platform that includes cooled exhaust gas recirculation (EGR) for NOx control with the addition of an exhaust filter for reducing particulates. Our PowerTech M and PowerTech E 2.4L engines below 56 kW (75 hp) meet Interim Tier 4 regulations without the addition of an exhaust filter.

**Q: How will John Deere Interim Tier 4/Stage III B engines stand out from the competition?**

**A:** John Deere is an innovator in the commercial application of cooled EGR and variable geometry turbocharger (VGT) technologies for off-highway use. Throughout Tier 3/Stage III A, John Deere has gained experience with these technologies over a wide range of applications and has established a proven record of reliability; other engine manufacturers are just now considering adopting these technologies for off-highway applications. John Deere engines have a strong reputation of performance, durability, and reliability, and we are designing our new engines to exceed those expectations. These new engines will also feature more power and increased performance, world-class fuel economy, reduced noise, and low overall operating costs.

**Q: When will the Interim Tier 4/Stage III B engines be available?**

**A:** Engines will be available in limited production quantities starting in early 2010. Regular production delivery begins in January 2011. Interim Tier 4-compliant engines less than 56 kW (74 hp) are available and in production today.
Q: Why cooled EGR and exhaust filters?
A: John Deere has determined that cooled EGR, combined with exhaust filter technology, is the right choice to meet these regulations because it is a simpler, proven and less costly technology. Like the cooled EGR system and the VGT, the exhaust filter was specifically designed to meet the demands of off-highway applications. The exhaust filter also has the benefit of replacing the muffler in most applications.

Q: Does the John Deere solution require urea?
A: Urea, a second fluid, is required for an alternative NOx reduction system called selective catalytic reduction (SCR). The SCR system injects liquid urea into the exhaust stream to reduce NOx. While it is effective, it also requires that the vehicle or machine be fitted with a separate tank, a sophisticated urea injection system, and a tamper-proof diagnostic system required by regulation. Since urea freezes, heating systems for the tank and delivery lines are required. In addition, currently urea is not conveniently available in many parts of the world, especially for off-highway applications, which creates availability and storage concerns. Most importantly, operation of John Deere’s cooled EGR solution does not require operator intervention. The operator doesn’t have to deal with the cost and hassle of a second fluid. SCR may be an appropriate technology for the future when the technology is more developed for off-highway applications; however, for Interim Tier 4/Stage III B, the cooled EGR and exhaust filter technology approach provides the proven, best value product to the end-user. Since the John Deere Interim Tier 4/Stage III B solution does not use SCR, urea is not required.

Q: What performance changes will John Deere Interim Tier 4/Stage III B engines have?
A: With our Tier 3/Stage III A PowerTech Plus engines, John Deere Power Systems was able to achieve record fuel economy gains over our Tier 2/Stage II models and achieve best-in-class fuel economy. John Deere was also able to maintain or improve other performance characteristics, such as cold-weather starting, transient response time, power bulge, peak torque, and low-speed torque. Because John Deere Interim Tier 4/Stage III B engines continue to use the same technologies as our Tier 3/Stage III A engines, our Interim Tier 4/Stage III B engines will maintain similar performance and fuel economy leadership in the off-highway industry.
Q: Will serviceability and service intervals change with Interim Tier 4/Stage III B engines?

A: Much of the current engine maintenance schedule remains unchanged. The oil change interval will be the same interval offered for Tier 3/Stage III A engines at either 500 hours or 250 hours. One noticeable difference will come with the addition of the exhaust filter. The regulations require an exhaust filter minimum service interval of 4,500 hours for engines 130 kW (174 hp) and greater and 3,000 hours for engines less than 130 kW (174 hp). The John Deere exhaust filter design allows for higher hour exhaust filter service intervals to maximize vehicle uptime.

Q: What will John Deere do to meet Final Tier 4/Stage IV regulations?

A: John Deere is developing and testing the technologies it will adopt to achieve Final Tier 4/Stage IV emissions regulations. Final Tier 4/Stage IV emissions regulations for engines 130 kW (174 hp) and greater begin in January 2014. Technologies such as cooled EGR, VGT, and exhaust filters will likely be the foundation for meeting Final Tier 4/Stage IV regulations. We are constantly evaluating emerging technologies for their effectiveness and for their ability to provide reliable and durable products in an off-highway setting. And as with engine configurations that meet previous emissions tiers, we’ll continue to tailor our Final Tier 4/Stage IV engine solutions to fit the variety of off-highway applications customers use them in.

Conversions

Torque rise = \frac{\text{maximum torque}}{\text{torque at rated speed}}

Power bulge = \frac{\text{maximum power}}{\text{power at rated speed}}

Customer support

With John Deere, you never have far to go to find expert assistance and advice. The more than 4,000 service locations throughout the world give you peace of mind that you can get service when and where you need it.

We have centralized parts warehouses in the United States and Europe, plus numerous worldwide depots that employ overnight parts shipping — so you’ll never have to wait long for parts.

In addition, John Deere service personnel are highly trained technicians who stay on top of changing engine technologies and service techniques.

John Deere dealers and distributors are your best source for service, knowledge, and engine accessories. They’re one of the many reasons to specify John Deere engines in your equipment.
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