

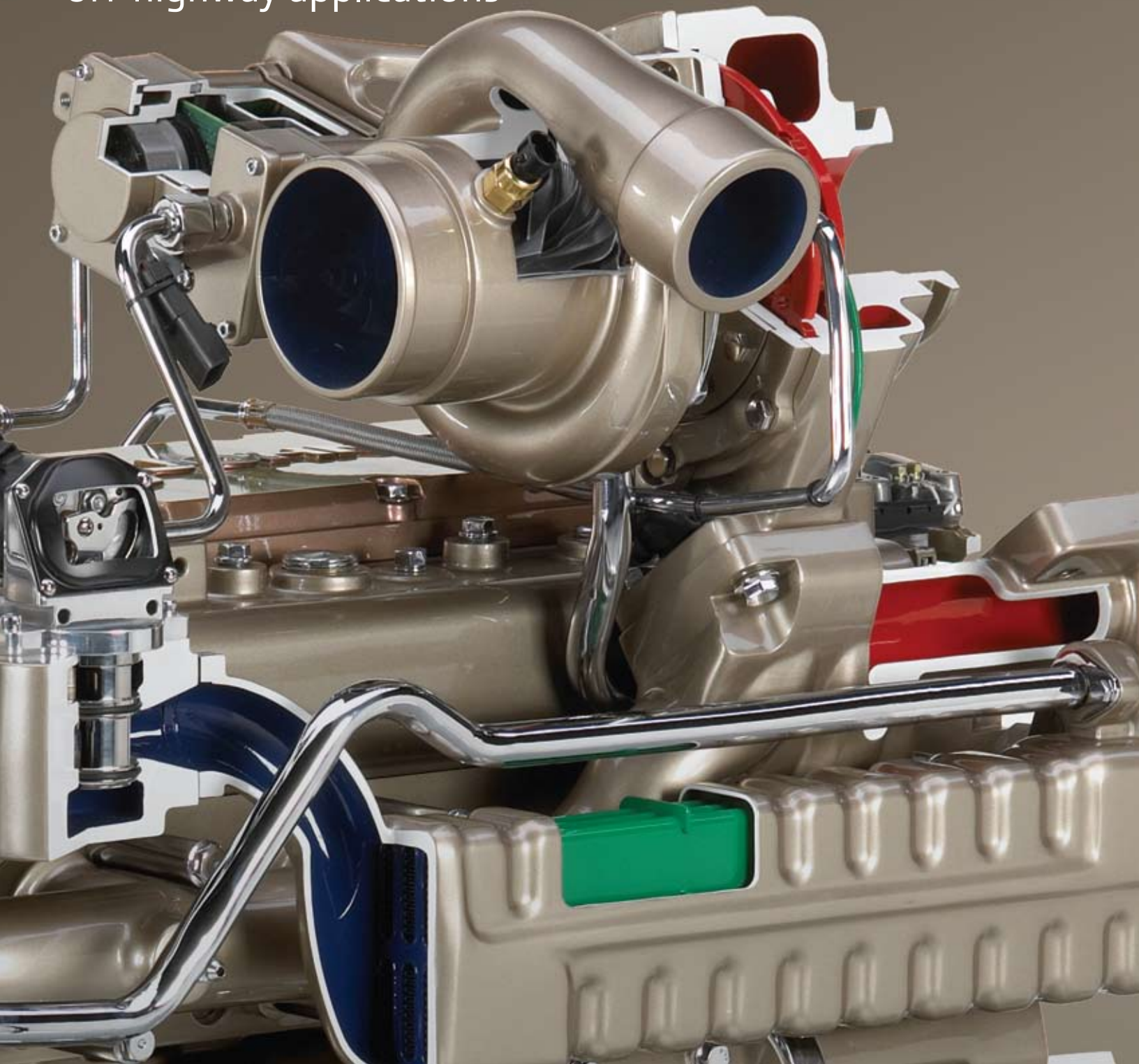
# Off-Highway Diesel Engines

Tier 3/Stage III A



**JOHN DEERE**

Proven solutions for  
off-highway applications





# Different technologies for different applications

If there's one thing you can count on in the off-highway industry, it's every application having different power demands. The jobs that our family of PowerTech™ engines tackle every day are as varied as the equipment they power.

You might have minimal horsepower demands. Or you might need an engine that can be pushed to the limits without increasing your fuel costs. Either way, John Deere has an engine platform to fit your performance needs, while meeting emissions regulations.



## PowerTech M

The simplest of the PowerTech family, these engines have 2-valve heads, fixed geometry turbochargers, and mechanical fuel systems. PowerTech M engines (2.4L and 4.5L) are perfect for less demanding applications. Their mechanical controls are simple to operate and maintain.

## PowerTech E

These engines also have 2-valve heads and fixed geometry turbochargers, but introduce full-authority electronic controls and more sophisticated fuel delivery. The smaller engines (2.4L and 3.0L) use electronic unit pump fuel systems, and the larger engines (4.5L and 6.8L) use a high-pressure common-rail (HPCR) fuel system.

## PowerTech Plus

Utilizing the most advanced engine technology, PowerTech Plus engines have a 4-valve cylinder head, full-authority electronic controls, variable geometry turbocharger (VGT), and cooled exhaust gas recirculation (EGR). They are available in larger displacements (4.5L, 6.8L, 9.0L, and 13.5L) and provide ultimate performance and best-in-class fuel economy.

## Industrial Engine Power Ratings

Engine	Power Rating																					
PowerTech M 2.4L	36 – 37 kW (48 – 49 hp)																					
PowerTech E 2.4L	45 – 60 kW (60 – 80 hp)																					
PowerTech E 3.0L	57 – 74 kW (76 – 99 hp)																					
PowerTech M 4.5L	56 – 74 kW (75 – 99 hp)																					
PowerTech E 4.5L	63 – 104 kW (85 – 140 hp)																					
PowerTech Plus 4.5L	111 – 129 kW (149 – 173 hp)																					
PowerTech E 6.8L	104 – 149 kW (139 – 200 hp)																					
PowerTech Plus 6.8L	134 – 205 kW (180 – 275 hp)																					
PowerTech Plus 9.0L	168 – 298 kW (225 – 400 hp)																					
PowerTech Plus 13.5L	261 – 448 kW (350 – 600 hp)																					

kW 0 19 37 56 75 93 112 130 149 168 186 205 224 242 261 280 298 317 336 354 373 391 410 429 448  
 hp 0 25 50 75 100 125 150 175 200 225 250 275 300 325 350 375 400 425 450 475 500 525 550 575 600

# PowerTech M 2.4L and 4.5L engines

## Flexibility and cost savings

PowerTech M engines are ideal for lower horsepower applications. Their simple design and mechanical controls give OEMs and end users additional flexibility and cost savings while maintaining the same engine platform as Tier 2/Stage II engines.

To meet emissions regulations, PowerTech M engines are equipped with a new rotary injection pump that develops higher injection pressures (4.5L), a new fuel injection nozzle, and an improved combustion strategy that utilizes a new camshaft for better timing of the valve events. These changes work together to improve combustion efficiency. PowerTech M engines also feature 2-valve cylinder heads, fixed geometry turbochargers, self-adjusting poly-vee fan drives, mechanical rotary (4.5L), or mechanical unit pump (2.4L) fuel systems, 500-hour oil changes, and turbocharged, and air-to-air aftercooled aspirations. The PowerTech M 2.4L engine features self-adjusting hydraulic lifters and very low noise levels, while the PowerTech M 4.5L engine features replaceable wet-type cylinder liners and a dynamically balanced crankshaft.

PowerTech M 2.4L engines meet EPA Interim Tier 4 and EU Stage III A emissions regulations.



**PowerTech M 2.4L**  
36 – 37 kW (48 – 49 hp)



**PowerTech M 4.5L**  
56 – 74 kW (75 – 99 hp)



### PowerTech M Scorecard

(Tier 3, Interim Tier 4, and Stage III A compared to Tier 2/Stage II engines)

Peak torque	Improved or maintained
Low-speed torque	Exceeded current level
Transient response time	Improved or maintained

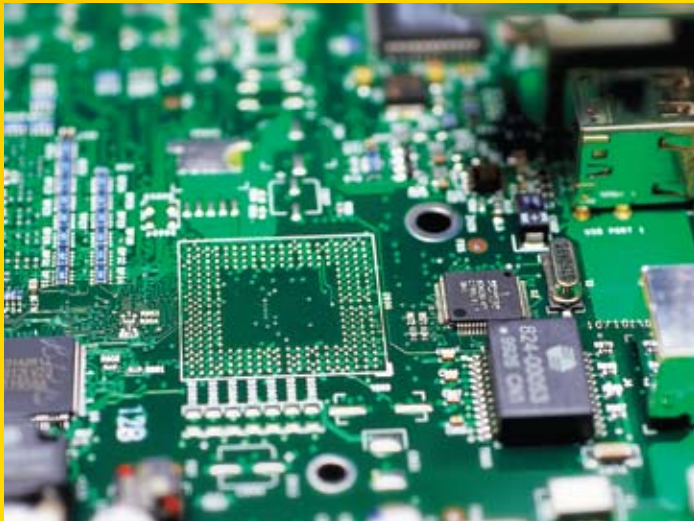
# PowerTech E 2.4L, 3.0L, 4.5L, and 6.8L engines

## Performance without sacrifice

PowerTech E engines meet emissions regulations without sacrificing peak torque, low-speed torque, or transient response time. They provide improved performance in the same package size as Tier 2/Stage II engines.

## The benefits of electronic controls

PowerTech E engines offer electronically controlled fuel systems with improved cold-start performance, precise engine speed control, torque curve shaping, and more. Because these systems have less need for redundant sensors, add-on electronic governors, and shutdown devices — they result in a lower total installed cost.



These engines are equipped with the CAN communication link to utilize input from existing sensors and to communicate with other machine systems. They monitor important engine and auxiliary component data, warn the user about high temperatures and low oil pressure, and control such cold-starting aids as glow plugs (2.4L and 3.0L) and air intake grid heaters (4.5L and 6.8L). In addition, electronic controls enable you to select droop or isochronous engine governing. They boost equipment uptime by derating or shutting down when necessary.

In addition to engine-mounted or remote-mounted engine control units (ECU) and full-authority electronic engine controls, PowerTech E engines also feature 2-valve cylinder heads, fixed geometry turbochargers, self-adjusting poly-vee fan drives, 500-hour oil change intervals, and turbocharged and air-to-air-aftercooled aspirations. The PowerTech E 2.4L and 3.0L engines feature a high-pressure electronic unit pump fuel system and a low-pressure fuel filter system with a water-in-fuel sensor. The PowerTech E 4.5L and 6.8L engines feature dual fuel filter low-pressure system with water-in-fuel sensor, low fuel pressure sensor, and HPCR fuel systems, which increase fuel injection pressure for more efficient combustion.

PowerTech E engines offer programmable parameters for specific applications. Snapshot diagnostics record and store up to seven different sets of engine data, while the display panel shows continuous data on engine hours, load factor, engine rpm, and critical operation conditions. The bottom line: Electronic controls increase productivity, improve fuel economy, lower total installed costs, and reduce ownership costs. The PowerTech E 3.0L, 4.5L, and 6.8L meet Tier 3/Stage III A emissions regulations while the PowerTech E 2.4L engines are Interim Tier 4 and Stage III A compliant.



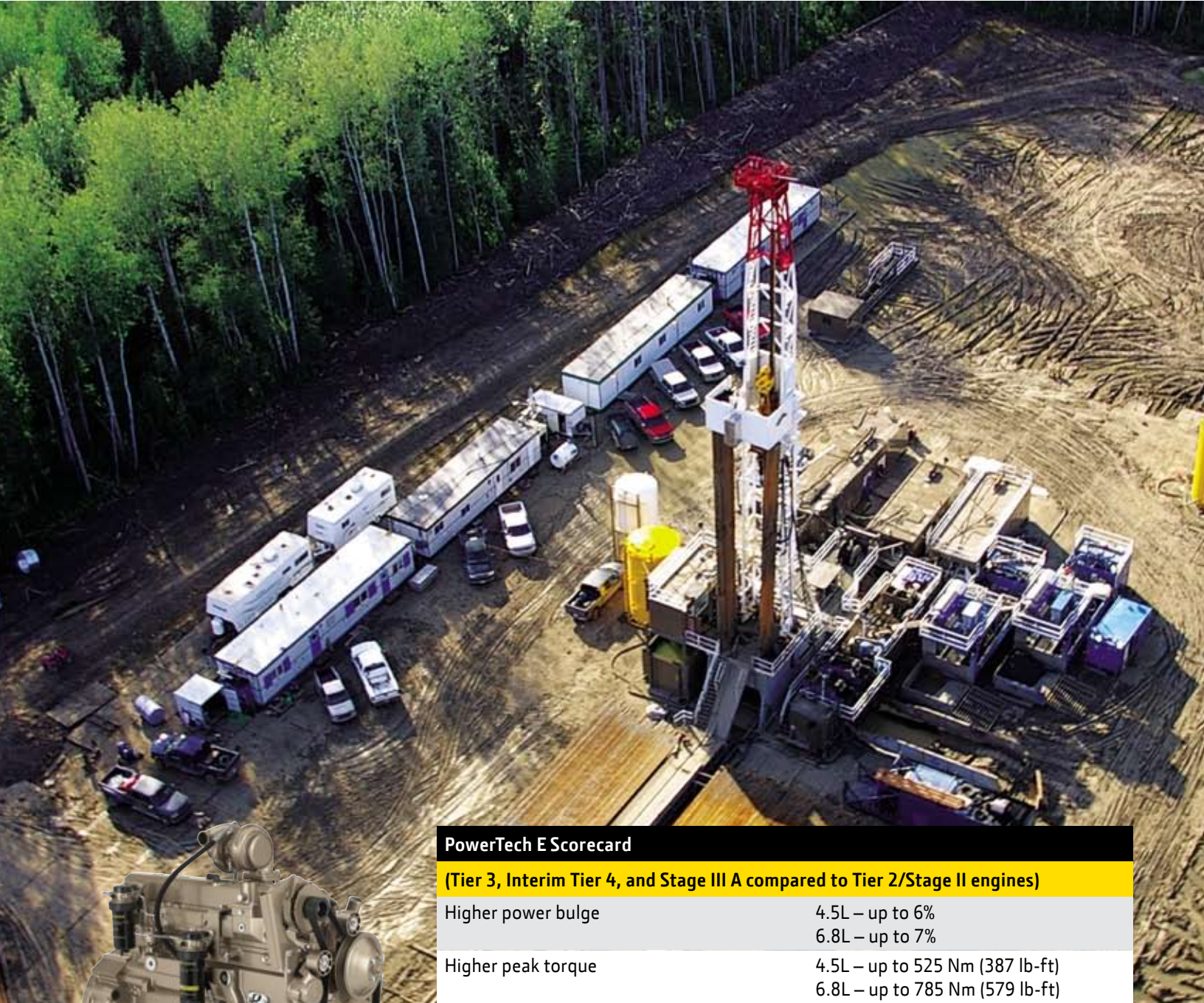
PowerTech E 2.4L  
45 – 60 kW (60 – 80 hp)



PowerTech E 3.0L  
57 – 74 kW (76 – 99 hp)



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



**PowerTech E 6.8L**  
104 – 149 kW (139 – 200 hp)

### PowerTech E Scorecard

**(Tier 3, Interim Tier 4, and Stage III A compared to Tier 2/Stage II engines)**

Higher power bulge	4.5L – up to 6% 6.8L – up to 7%
Higher peak torque	4.5L – up to 525 Nm (387 lb-ft) 6.8L – up to 785 Nm (579 lb-ft)
More low-speed torque*	4.5L – up to 130% 6.8L – up to 132%
Transient response time	Improved or maintained
Fuel economy	World-class
Cold-weather starting	Improved or maintained

\*% of rated speed torque

## PowerTech Plus 4.5L, 6.8L, 9.0L, and 13.5L engines

### The ultimate in emissions compliance, performance, and fuel economy

John Deere PowerTech Plus engines include cooled EGR and VGT technologies for the ultimate in engine efficiency and performance. The higher an engine's peak combustion temperature, the greater the amount of NOx created. Cooled EGR is an effective method of lowering peak combustion temperature. The concept is simple: With cooled EGR, measured amounts of exhaust gas are cooled and mixed with incoming fresh air to lower peak combustion temperatures, thereby reducing NOx. Another key feature of our PowerTech Plus engines is the VGT, which helps drive cooled EGR. The VGT tailors the amount of recirculated exhaust gas that mixes with the fresh air. The amount of cooled EGR required is determined by load and speed. Thus, when the engine load increases, the engine control unit adjusts the VGT vanes to the appropriate pitch.

To reduce particulate matter, we've taken the following steps.

- Increased fuel injection pressure by utilizing HPCR fuel systems and electronic unit injector technology
- Improved power cylinder components, resulting in reduced oil consumption
- Adopted VGT to control transient smoke
- Improved shape of the combustion bowl to maximize air/fuel mixing and optimize the combustion process, reducing the amount of emissions



**PowerTech Plus 4.5L**  
111 – 129 kW (149 – 173 hp)

## New technology

The new ECU electronically controls the air-to-fuel ratio, multiple fuel injections, the amount of cooled EGR, and VGT output. Our patented ECU has twice the memory and five times the computing power of units found on our Tier 2/Stage II engines. This ECU also features snapshot diagnostics, which can record and store up to seven different sets of diagnostic data.

## High performance

PowerTech Plus engines meet Tier 3/Stage III A emissions without sacrificing performance or fuel economy, which is best-in-class. John Deere has maintained or increased power output from all PowerTech Plus models. In many cases, power bulge, peak torque levels, transient response time, low-speed torque, and cold-weather starting have actually been improved compared to Tier 2/Stage II.

## Durability

Tier 3/Stage III A PowerTech Plus diesel engines are designed for rugged off-highway operation, with features such as new power cylinder materials for unparalleled durability.

## Ease of installation

Because we maintained our Tier 2/Stage II engine package size without derating power, changing over to Tier 3/Stage III A models was easier. John Deere PowerTech Plus models take up less engine envelope space than many competitive diesel engines with similar horsepower.

### PowerTech Plus Scorecard

#### (Tier 3/Stage III A compared to Tier 2/Stage II engines)

Higher power bulge	4.5L – up to 9% 6.8L – up to 13% 9.0L – up to 11% 13.5L – up to 14%
Higher peak torque	4.5L – up to 645 Nm (476 lb-ft) 6.8L – up to 1025 Nm (756 lb-ft) 9.0L – up to 1554 Nm (1146 lb-ft) 13.5L – up to 2550 Nm (1881 lb-ft)
More low-speed torque*	4.5L – up to 123% 6.8L – up to 145% 9.0L – up to 150% 13.5L – up to 138%
Transient response time	Improved or maintained
Fuel economy	Best-in-class
Cold-weather starting	Improved or maintained

\*% of rated speed torque



PowerTech Plus 6.8L  
134 – 205 kW (180 – 275 hp)

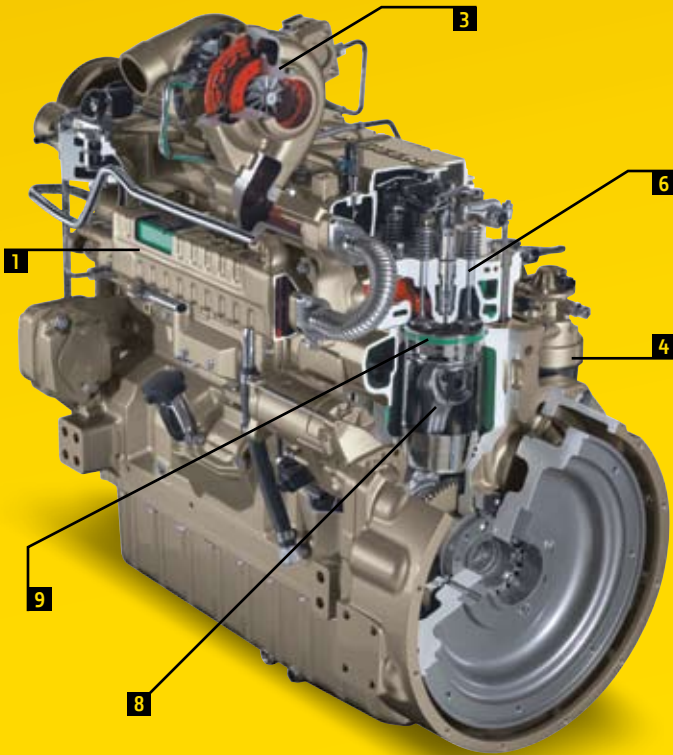


PowerTech Plus 9.0L  
168 – 298 kW (225 – 400 hp)



PowerTech Plus 13.5L  
261 – 448 kW (350 – 600 hp)

## PowerTech Plus engines



- 1** Cooled EGR allows measured amounts of cooled exhaust gas to mix with incoming fresh air, lowering exhaust temperature and reducing NOx
- 2** Air-to-air aftercooled aspiration reduces NOx and increases power density
- 3** VGT controls the amount of recirculated exhaust gas that mixes with the fresh air
- 4** Low pressure fuel system with auto prime feature that eliminates hand priming, hard starting, and provides sensors that detect water in fuel and low fuel pressure
- 5** Full-authority electronic controls manage the fuel system, air-to-fuel ratio, VGT output, cooled exhaust gas, and fresh air mixing
- 6** 4-valve cylinder head dramatically increases efficiency, power, and torque
- 7** Electronic unit injector (13.5L) and HPCR (4.5L, 6.8L, and 9.0L) fuel systems increase fuel pressure for more efficient combustion
- 8** Low friction, single-piece steel piston provides improved fuel economy, reduced emissions, and increased durability (9.0L and 13.5L)
- 9** Directed top liner cooling contributes to improved oil control and increased durability (9.0L and 13.5L)
- 10** 500-hour oil change intervals
- 11** Engine or remote mounted ECU

## Customer support



Log on to [www.JohnDeere.com/dealer](http://www.JohnDeere.com/dealer) to find the service dealer nearest you.

## The power of a worldwide support network

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.

## Easy maintenance

Here are just a few of the ways John Deere makes engines easy to service and maintain. Automatic belt tensioners minimize maintenance cost and increase belt life. Larger fuel filters, water separators, fuel pressure sensors, and fault code diagnostics optimize filter life. Extended 500-hour oil change and filter intervals add convenience. And single-side service points make it easy to check and maintain fuel filters, oil filters, starters, and fluid levels.

# Worldwide locations

## North America

John Deere Power Systems  
3801 West Ridgeway Avenue  
P.O. Box 5100  
Waterloo, IA 50704-5100  
Phone: +1 800 533 6446 (U.S.)  
Phone: +1 319 292 6060 (Canada)  
Fax: +1 319 292 5075  
E-mail: [jdpower@JohnDeere.com](mailto:jdpower@JohnDeere.com)

## Mexico

Industrias John Deere S.A. de C.V.  
Boulevard Díaz Ordaz No. 500  
Garza García, Nuevo Leon 66210  
Mexico  
Phone: +52 81 8288 1212  
Fax: +52 81 8288 8456  
E-mail: [jdpower@JohnDeere.com](mailto:jdpower@JohnDeere.com)

## Central America, South America, and Caribbean

John Deere Power Systems  
3801 West Ridgeway Avenue  
P.O. Box 5100  
Waterloo, IA 50704-5100  
Phone: +1 800 533 6446 (U.S.)  
Phone: +1 319 292 6060 (Outside U.S.)  
Fax: +1 319 292 5075  
E-mail: [jdpower@JohnDeere.com](mailto:jdpower@JohnDeere.com)

## Argentina

Industrias John Deere Argentina, S.A.  
Juan Orsetti 481  
2152 Grandero Baigorria  
Sante Fe, Argentina  
Phone: +54 341 471 8000  
Fax: +54 341 471 8001

## Europe, Africa, and Middle East

John Deere Power Systems  
Usine de Saran  
La Foulonnerie – B.P. 11013  
45401 Fleury-les-Aubrais Cedex – France  
Phone: +33 2 38 82 61 19  
Fax: +33 2 38 84 62 66  
E-mail: [jdengine@JohnDeere.com](mailto:jdengine@JohnDeere.com)

## Australia and New Zealand

John Deere Limited  
Power Systems Division  
P.O. Box 1126, Camden  
NSW 2570 Australia  
Phone: +61 2 4647 4857  
+61 2 4647 7867  
Fax: +61 2 4646 1236  
E-mail: [23SYDDC@JohnDeere.com](mailto:23SYDDC@JohnDeere.com)  
[www.deere.com.au](http://www.deere.com.au)

## Far East

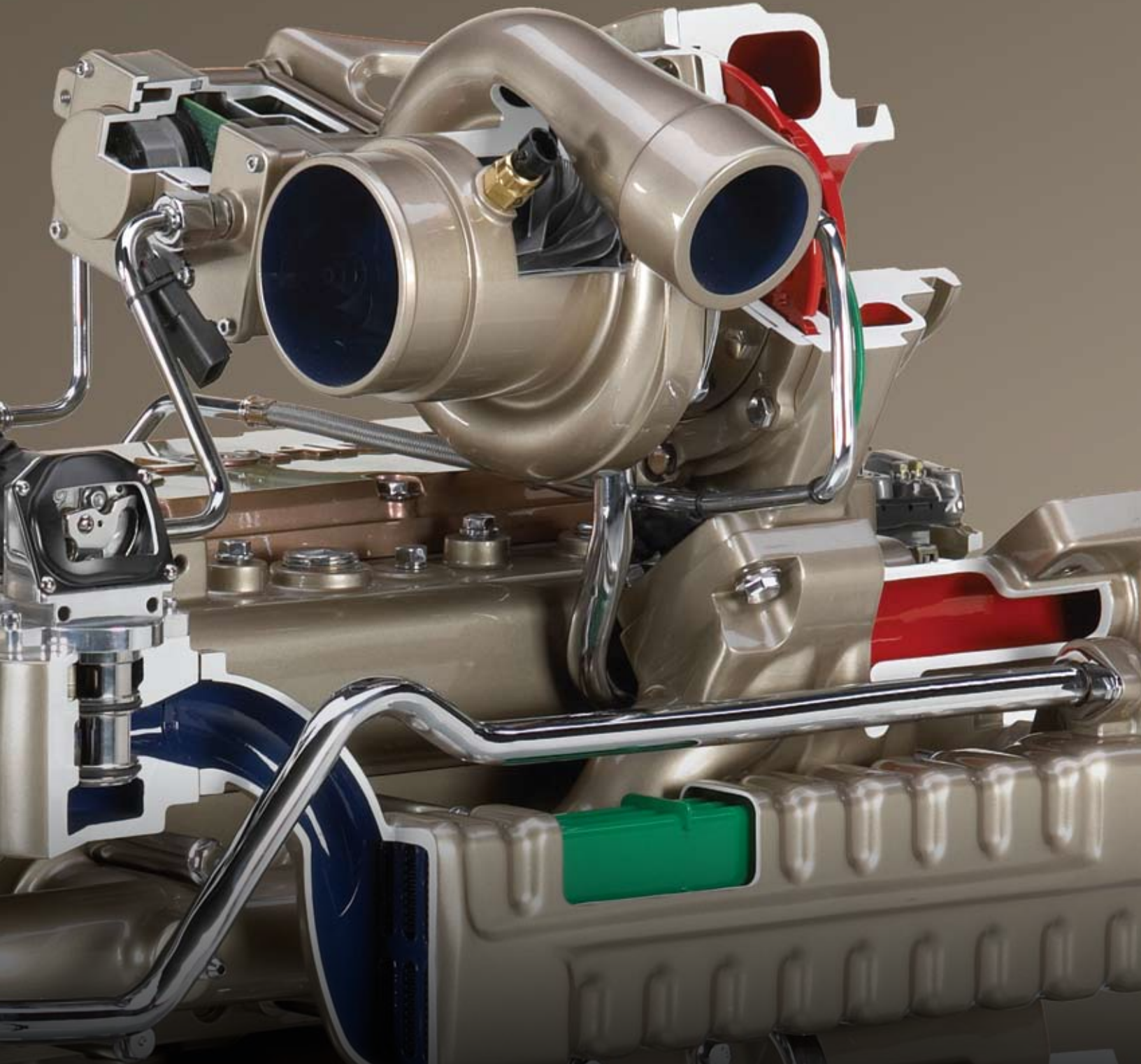
John Deere Asia (Singapore) Pte Ltd  
#06-02/03 Alexandra Point  
438 Alexandra Road  
119958 Singapore  
Phone: +65 (68) 79 88 00  
Fax: +65 (62) 78 03 63  
E-mail: [LiewLeongKong@JohnDeere.com](mailto:LiewLeongKong@JohnDeere.com)



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