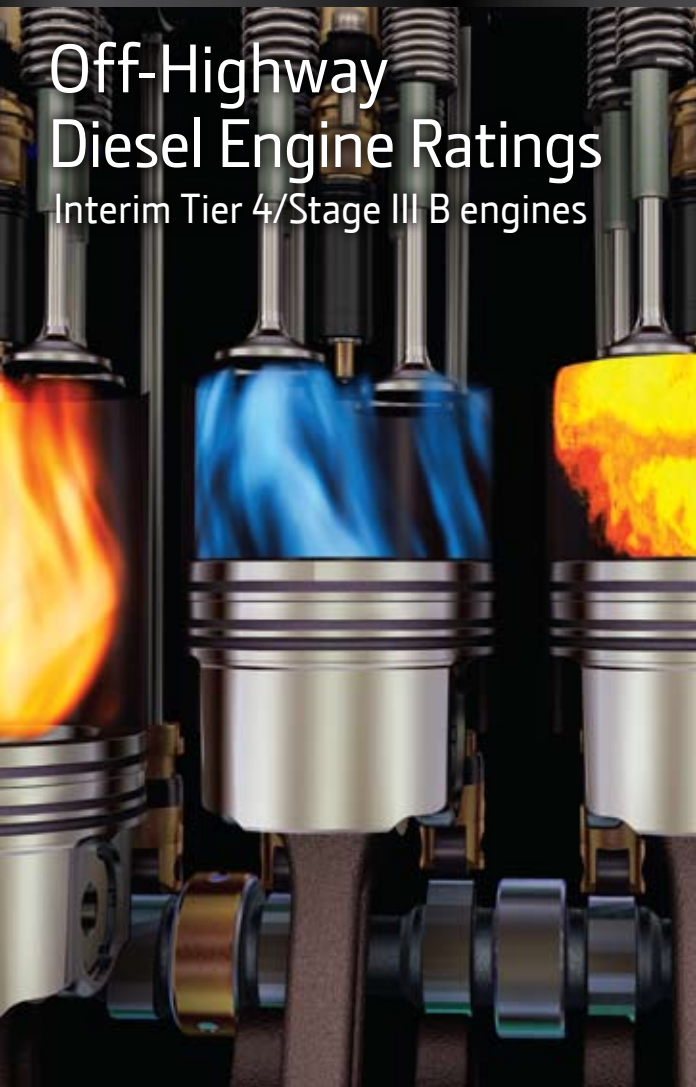


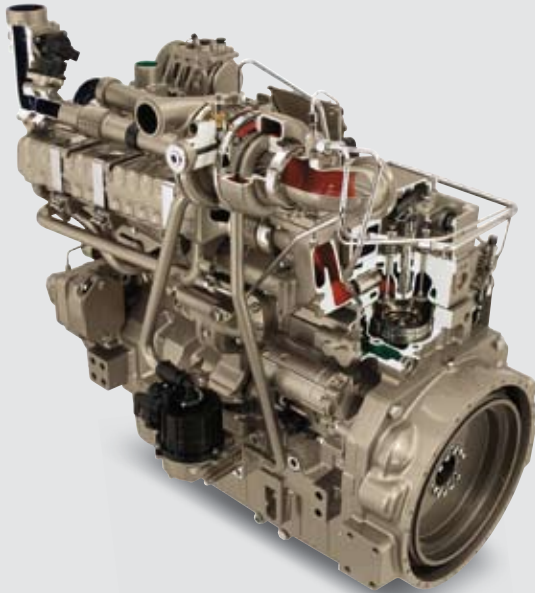


**JOHN DEERE**

# Off-Highway Diesel Engine Ratings

Interim Tier 4/Stage III B engines





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## Industrial engine power ratings

Engine	Power Rating	Turbocharging	Exhaust Filter	Dosing	Power Range
PowerTech M 2.4L	36 kW (48 hp)	Fixed	No	NA	0 - 36
PowerTech E 2.4L	45 – 49 kW (60 – 66 hp)	Fixed	No	NA	0 - 49
PowerTech M 4.5L	55 kW (74 hp)	Fixed	No	NA	0 - 55
PowerTech PWX 4.5L	56 – 91 kW (75 – 122 hp)	Wastegate	Yes	Internal	56 - 91
PowerTech PVX 4.5L	93 – 129 kW (125 – 173 hp)	VGT	Yes	Internal	93 - 129
PowerTech PVX 6.8L	104 – 129 kW (140 – 173 hp)	VGT	Yes	Internal	104 - 129
PowerTech PVX 6.8L	138 – 187 kW (185 – 250 hp)	VGT	Yes	External	138 - 187
PowerTech PSX 6.8L	168 – 224 kW (225 – 300 hp)	Series	Yes	External	168 - 224
PowerTech PVX 9.0L	187 – 224 kW (250 – 300 hp)	VGT	Yes	External	187 - 224
PowerTech PSX 9.0L	242 – 317 kW (325 – 425 hp)	Series	Yes	External	242 - 317
PowerTech PSX 13.5L	298 – 448 kW (400 – 600 hp)	Series	Yes	External	298 - 448

kW 0 37 75 112 149 186 224 261 298 336 373 410 448  
 hp 0 50 100 150 200 250 300 350 400 450 500 550 600

# Interim Tier 4/Stage III B Engine identification plate



**RG 6 135 H F C95**

Engine model number

## 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 air-to-air aftercooled engine. A model designated as a 4045T is a 4-cylinder, 4.5-liter turbocharged engine.

**6135H**

Aspiration  
Displacement in liters  
Number of cylinders

### Emissions certification

281, 290, 295	Interim Tier 4 and Stage III A
92, 93, 94, 95	Interim Tier 4/Stage III B
96, 97, 98, 99	Final Tier 4/Stage IV

### New Interim Tier 4/Stage III B designations

92=PWX	Example: 4045HFC92
93=PVX	Example: 4045HFC93
94=PVX	Example: 6090HFC94
95=PSX	Example: 6090HFC95
C=Industrial	Example: 6090HFC94

### User type

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

### Aspiration

T	Turbocharged
H	Turbocharged and air-to-air aftercooled

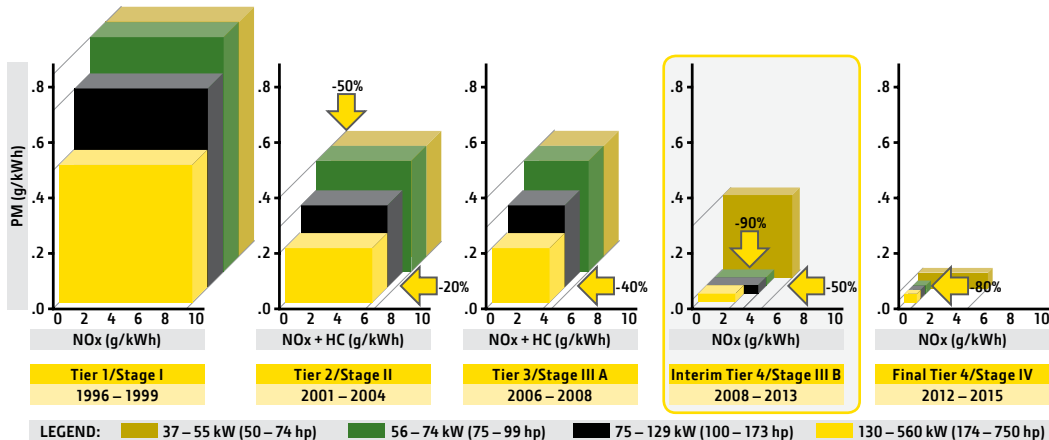
# Emissions information

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 Air Resources Board (CARB).



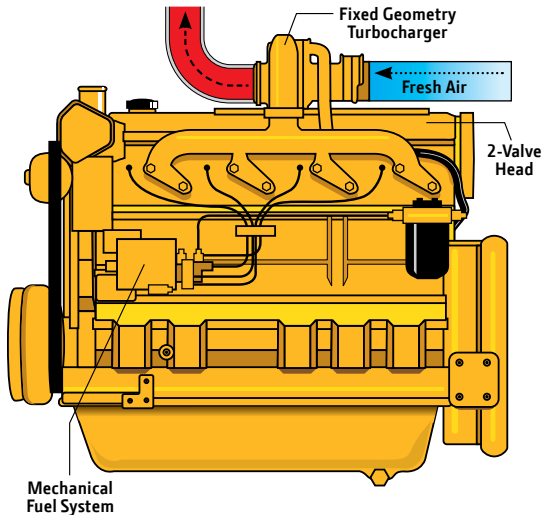
## EPA and EU nonroad emissions regulations: 37 – 560 kW (50 – 750 hp)



# PowerTech M

## 2.4L and 4.5L engines

### PowerTech M technology



### Fixed geometry turbocharger

Fixed geometry turbochargers are sized for a specific power range and optimized to provide excellent performance across the entire torque curve. They are also designed to maximize fuel economy between the engine's rated speed and peak torque.

### Mechanical unit pump (MUP) fuel system

This system uses camshaft-driven MUPs, connected to the injectors by a short fuel line. This short fuel line between the unit pumps and the injectors helps to alleviate after-injection, secondary injection, and other injection abnormalities (2.4L).

### Mechanical rotary fuel pump

The timing and fuel injection pressures are optimized to maximize performance and fuel economy at a given rated speed (4.5L).

### 2-valve cylinder head

Cross-flow (4.5L) and U-flow (2.4L) head design provides excellent breathing from a lower-cost 2-valve cylinder head.

### Turbocharged

In turbocharged engines, the air is precompressed. Due to the higher pressure, more air is supplied into the combustion chamber allowing a corresponding increase in fuel injection, which results in greater engine output.

### Compact size

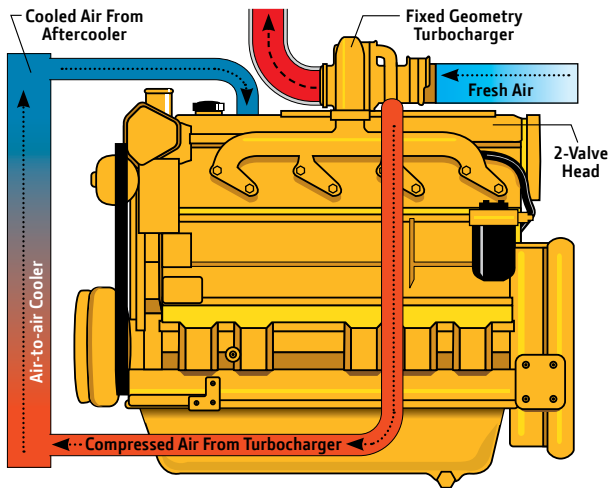
Mounting points are the same as previous engine models.

### Additional features

- Self-adjusting poly-vee fan drive
- Forged-steel connecting rods
- Either-side service
- 500-hour oil change
- Glow plugs (2.4L)
- Optional balancer shafts
- Optional air intake grid heater (4.5L)

# PowerTech E 2.4L engines

## PowerTech E technology



### Fixed geometry turbocharger

Fixed geometry turbochargers are sized for a specific power range and optimized to provide excellent performance across the entire torque curve. They are also designed to maximize fuel economy between the engine's rated speed and peak torque.

### Electronic unit pump (EUP) fuel system

Rated speed flexibility and improved cold-start and warm-up control.

### 2-valve cylinder head

U-flow head design provides excellent breathing from a lower-cost 2-valve cylinder head.

### 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

Mounting points are the same as previous engine models.

### John Deere electronic engine controls

Electronic engine controls monitor critical engine functions, providing warning and/or shutdown to prevent costly engine repairs and eliminate the need for add-on governing components, all lowering total installed costs.

### Engine performance

- Increased low-speed torque
- Higher level of peak torque
- Faster torque rise
- Lower rated speeds available for reduced noise and improved fuel economy

### Additional features

- Self-adjusting poly-vee fan drive
- Forged-steel connecting rods
- Either-side service
- 500-hour oil change
- Gear driven auxiliary drive
- Glow plugs
- Optional balancer shafts

## PowerTech M 2.4L and 4.5L engines



### PowerTech M 2.4L

- Power range: 36 kW (48 hp)
- Peak torque – 175 Nm (129 lb-ft)
- Torque rise – 42%
- Low-speed (1000 rpm) torque — 110% of rated speed torque
- Transient response comparable to Tier 2/Stage II
- Cold-starting capabilities that meet or exceed Tier 2/Stage II

### PowerTech M 4.5L

- Power range: 55 kW (74 hp)
- Power bulge – 2%
- Peak torque – 265 Nm (195 lb-ft)
- Torque rise – 21%
- Low-speed (1000 rpm) torque — 112% of rated speed torque
- Transient response comparable to Tier 2/Stage II
- Cold-starting capabilities that meet or exceed Tier 2/Stage II

### PowerTech M 2.4L and 4.5L Interim Tier 4 engines

Engine model	Intermittent power		Continuous power		Rated speed rpm	Peak power		Peak torque		Peak torque rpm	
	kW	hp	kW	hp		kW	hp	Nm	lb-ft		
4024TF281*	36	48	31	41	2800	36	48	2800	175	129	1500
4045TF290	55	74	47	64	2400	56	75	2200	265	195	1700

\*Meets Interim Tier 4 and Stage III A emissions regulations

Engine model	Bore		Stroke		Length		Width		Height		Weight	
	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
4024TF281	86	3.4	105	4.1	662	26.1	541	21.3	772	30.4	251	554
4045TF290	106	4.2	127	5	860	33.9	612	24.1	856	33.7	387	851

## PowerTech E 2.4L engines



- Power range: 45 – 49 kW (60 – 66 hp)
- Peak torque — up to 256 Nm (189 lb-ft)
- Low-speed (1000 rpm) torque — up to 114% of rated speed torque
- Torque rise — up to 37%
- Transient response comparable to Tier 2/Stage II
- Lower rated speeds to reduce noise and improve fuel economy
- Cold-starting capabilities that meet or exceed Tier 2/Stage II

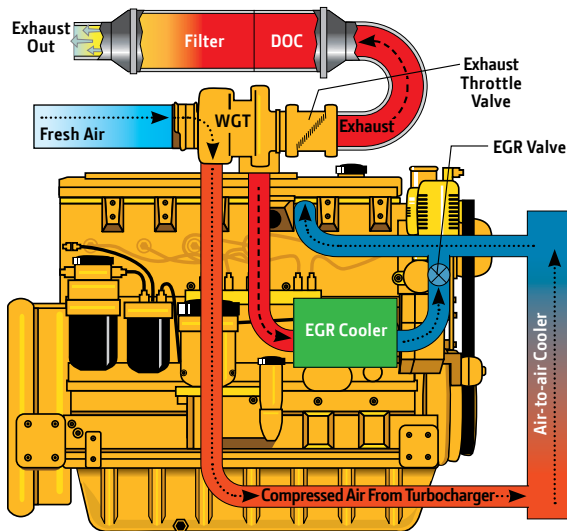
### PowerTech E 2.4L Interim Tier 4 and Stage III A engines

Engine model	Intermittent power		Continuous power		Rated speed rpm	Peak power		Peak torque		Peak torque rpm	
	kW	hp	kW	hp		kW	hp	Nm	lb-ft		
4024HF295	45	60	NA	NA	2400	45	60	2400	227	168	1800
4024HF295	46	61	NA	NA	2800	46	61	2800	214	158	2000
4024HF295	49	66	NA	NA	2400	49	66	2400	256	189	1800
4024HF295	49	66	NA	NA	2800	49	66	2800	227	167	2000

Bore		Stroke		Length		Width		Height		Weight	
mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
86	3.4	105	4.1	662	26.1	541	21.3	772	30.4	251	554

# PowerTech PWX 4.5L engines

## PowerTech PWX Interim Tier 4 technology



## Wastegated turbocharger

Wastegated turbochargers are designed to develop more air flow 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. They also provide the lowest installed cost across a given power range.

## 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 NO<sub>x</sub>.

## Exhaust filters

These engines utilize an exhaust filter that contains a diesel oxidation catalyst (DOC) and a particulate filter. The DOC reacts with exhaust gases to reduce carbon monoxide, hydrocarbons, and some particulate matter (PM). The downstream filter traps and holds the remaining PM. Trapped particles are oxidized within the filter through a continuous cleaning process called passive regeneration. Regeneration occurs during normal operating conditions when heat from the exhaust stream and catalysts within the exhaust filter trigger the oxidation of the trapped PM.

## 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.

## 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

- Simplifies installation
- Mounting points are the same as previous models

## Engine performance

- Multiple rated speeds to further reduce noise and improve fuel economy
- Higher level of peak torque
- Low-speed (1000 rpm) 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
- Gear-driven auxiliary drives
- 500-hour oil change
- Self-adjusting poly-vee fan drive
- Variable-speed fan drive
- R.H. and L.H. engine-mounted final fuel filters
- Optional low-pressure fuel system with electrical transfer pump and “auto-prime” feature

# PowerTech PWX 4.5L engines



- Power range: 56 – 91 kW (75 – 122 hp)
- Power bulge — up to 8%
- Peak torque — up to 480 Nm (354 lb-ft)
- Torque rise — up to 33%
- Low-speed (1000 rpm) torque — up to 133% of rated speed torque
- Transient response comparable to Tier 3/Stage III A
- Lower rated speeds to reduce noise and improve fuel economy
- Cold-starting capabilities that meet or exceed Tier 3/Stage III A

## PowerTech PWX 4.5L Interim Tier 4/Stage III B engines

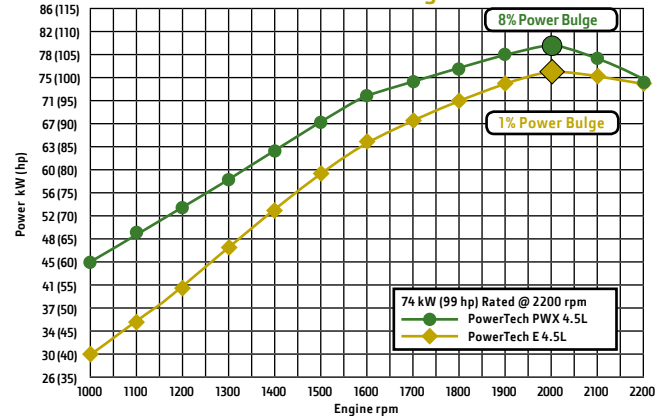
Engine model	Intermittent power		Continuous power		Rated speed rpm	Peak power		Peak torque		Peak torque rpm	
	kW	hp	kW	hp		kW	hp	rpm	Nm		lb-ft
4045HFC92	56	75	56	75	2400	56	75	2400	297	219	1600
4045HFC92	56	75	56	75	2400	60	81	2400	297	219	1600
4045HFC92	56	75	56	75	2200	56	75	2200	323	238	1600
4045HFC92	56	75	56	75	2200	60	81	2200	323	238	1600
4045HFC92	60	80	60	80	2400	60	80	2400	317	233	1600
4045HFC92	60	80	60	80	2400	65	87	2200	317	233	1600
4045HFC92	60	80	60	80	2200	60	80	2200	346	255	1600
4045HFC92	60	80	60	80	2200	65	87	2000	346	255	1600
4045HFC92	63	85	63	85	2400	63	85	2400	333	245	1600
4045HFC92	63	85	63	85	2400	68	91	2200	333	245	1600
4045HFC92	63	85	63	85	2200	63	85	2200	363	268	1600
4045HFC92	63	85	63	85	2200	68	91	2000	363	268	1600
4045HFC92	74	99	74	99	2400	74	99	2400	391	288	1600
4045HFC92	74	99	74	99	2400	80	107	2200	391	288	1600
4045HFC92	74	99	74	99	2200	74	99	2200	427	315	1600
4045HFC92	74	99	74	99	2200	80	107	2000	427	315	1600
4045HFC92	86	115	74	99	2400	86	115	2400	455	335	1600
4045HFC92	86	115	74	99	2400	91	122	2200	455	335	1600
4045HFC92	86	115	74	99	2200	86	115	2200	480	354	1600
4045HFC92	91	122	74	99	2200	91	122	2200	480	354	1600

Bore		Stroke		Length		Width		Height		Weight	
mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
106	4.2	127	5.0	867	34.1	680	26.8	1076	41.5	540	1191

## Engine performance curves

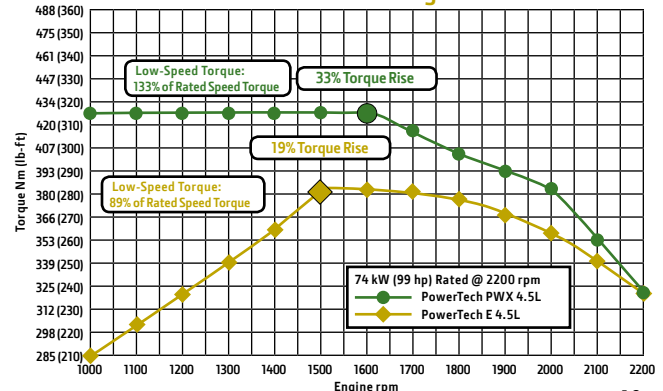
### Power curves

#### PowerTech PWX 4.5L Interim Tier 4/Stage III B vs. PowerTech E 4.5L Tier 3/Stage III A



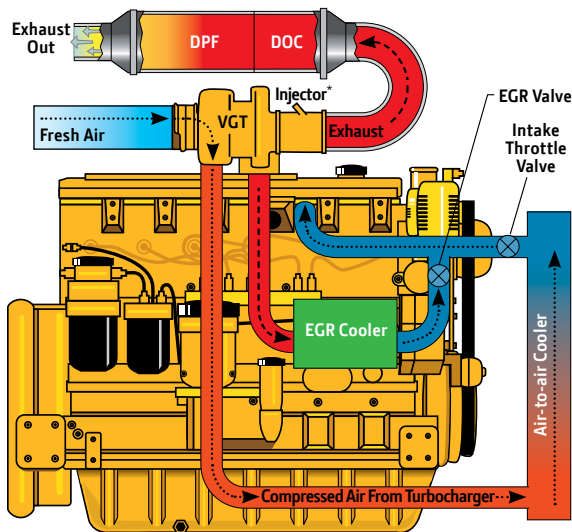
### Torque curves

#### PowerTech PWX 4.5L Interim Tier 4/Stage III B vs. PowerTech E 4.5L Tier 3/Stage III A



# PowerTech PVX 4.5L, 6.8L and 9.0L engines

## PowerTech PVX Interim Tier 4 technology



\*For engines 130 kW (174 hp) and greater.

## 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 utilize 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 traps and holds the remaining PM. Trapped particles are oxidized within the DPF through a continuous cleaning process called passive regeneration. Passive regeneration occurs during normal operating conditions when heat from the exhaust stream and catalysts within the exhaust filter trigger the oxidation of the trapped PM. If passive regeneration cannot be achieved due to low temperature, load, or speed, then PM is removed using active regeneration — an automatic cleaning process controlled by the exhaust temperature management system. Engines below 130 kW (174 hp) use an in-cylinder dosing system for active regeneration, while larger engines use an external dosing system.

## 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 (4.5L and 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 are the same as previous engine models

## Engine performance

- Multiple rated speeds to reduce noise and improve fuel economy
- Higher levels of peak torque (6.8L)
- Low-speed (1000 rpm) torque similar to 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 (4.5L and 6.8L)
- Gear-driven auxiliary drives
- 500-hour oil change
- Self-adjusting poly-vee fan drive
- Variable-speed fan drive
- R.H. and L.H. engine-mounted final fuel filters (4.5L and 6.8L)
- Steel single-piece low-friction piston with integrated oil cooled gallery (9.0L)
- Aluminum piston with integrated oil cooled gallery (6.8L)
- Directed top-liner cooling (9.0L)
- Low-pressure fuel system with electrical transfer pump and “auto-prime” feature (standard on 6.8L and 9.0L, optional on 4.5L)
- Optional Rear PTO (9.0L)

\*Available on all PowerTech PVX engines unless noted

# PowerTech PVX 4.5L engines



- Power range: 93 – 129 kW (125 – 173 hp)
- Power bulge – 8%
- Peak torque — up to 713 Nm (526 lb-ft)
- Torque rise — up to 33%
- Low-speed (1000 rpm) torque — up to 133% of rated speed torque
- Transient response comparable to Tier 3/Stage III A
- Lower rated speeds to reduce noise and improve fuel economy
- Cold-starting capabilities that meet or exceed Tier 3/Stage III A

## PowerTech PVX 4.5L Interim Tier 4/Stage III B engines

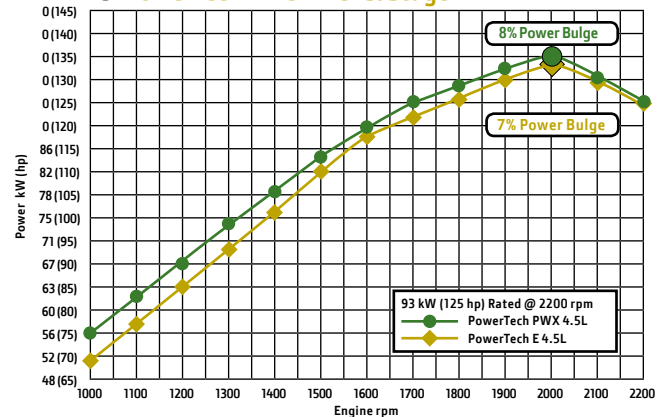
Engine model	Intermittent power		Continuous power		Rated speed rpm	Peak power		Peak torque		Peak torque rpm	
	kW	hp	kW	hp		kW	hp	Nm	lb-ft		
4045HFC93	93	125	93	125	2400	93	125	2400	492	363	1600
4045HFC93	93	125	93	125	2400	100	134	2200	492	363	1600
4045HFC93	93	125	93	125	2200	93	125	2200	536	395	1600
4045HFC93	104	140	104	140	2400	104	140	2400	549	405	1600
4045HFC93	104	140	104	140	2400	112	150	2200	549	405	1600
4045HFC93	104	140	93	125	2200	104	140	2200	600	442	1600
4045HFC93	104	140	93	125	2200	112	150	2000	600	442	1600
4045HFC93	116	155	104	140	2400	116	155	2400	613	452	1600
4045HFC93	116	155	104	140	2400	125	167	2200	613	452	1600
4045HFC93	116	155	104	140	2200	116	155	2200	669	493	1600
4045HFC93	116	155	104	140	2200	125	167	2000	669	493	1600
4045HFC93	129	173	104	140	2400	129	173	2400	682	503	1600
4045HFC93	129	173	104	140	2200	129	173	2200	713	526	1600

Bore		Stroke		Length		Width		Height		Weight	
mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
106	4.2	127	5.0	867	34.1	680	26.8	1211	47.7	540	1191

## Engine performance curves

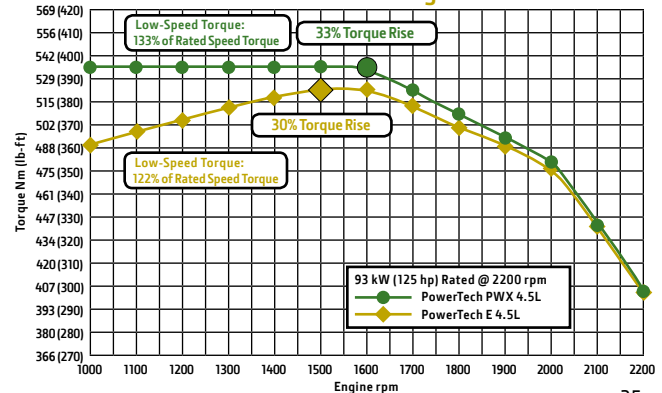
### Power curves

#### PowerTech PVX 4.5L Interim Tier 4/Stage III B vs. PowerTech E 4.5L Tier 3/Stage III A



### Torque curves

#### PowerTech PVX 4.5L Interim Tier 4/Stage III B vs. PowerTech E 4.5L Tier 3/Stage III A



# PowerTech PVX 6.8L engines



- Power range: 104 – 187 kW (140 – 250 hp)
- Power bulge — up to 10%
- Peak torque — up to 1025 Nm (756 lb-ft)
- Torque rise — up to 35%
- Low-speed (1000 rpm) torque — up to 126% of rated speed torque
- Transient response comparable to Tier 3/Stage III A
- Lower rated speeds to reduce noise and improve fuel economy
- Cold-starting capabilities that meet or exceed Tier 3/Stage III A

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

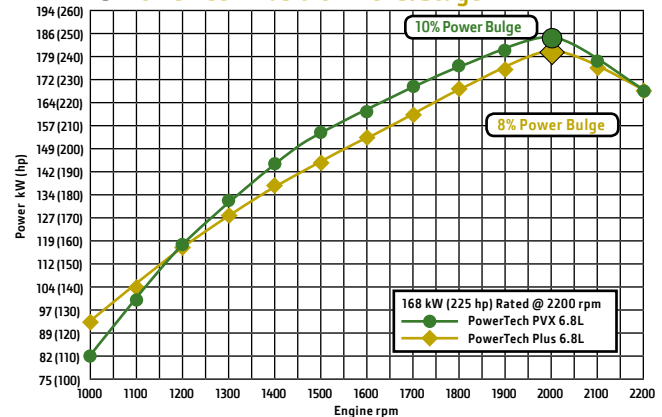
Engine model	Intermittent power		Continuous power		Rated speed rpm	Peak power		Peak torque		Peak torque rpm	
	kW	hp	kW	hp		kW	hp	rpm	lb-ft		
6068HFC93	104	140	104	140	2400	104	140	2400	549	405	1600
6068HFC93	104	140	104	140	2400	112	150	2200	549	405	1600
6068HFC93	104	140	104	140	2200	104	140	2200	600	442	1600
6068HFC93	104	140	104	140	2200	112	150	2000	600	442	1600
6068HFC93	116	155	116	155	2400	116	155	2400	613	452	1600
6068HFC93	116	155	116	155	2400	125	167	2200	613	452	1600
6068HFC93	116	155	116	155	2200	116	155	2200	669	493	1600
6068HFC93	116	155	116	155	2200	125	167	2000	669	493	1600
6068HFC93	129	173	129	173	2400	129	173	2400	682	503	1600
6068HFC93	129	173	129	173	2200	129	173	2200	743	548	1600
6068HFC94	138	185	138	185	2400	138	185	2400	741	547	1600
6068HFC94	138	185	138	185	2400	152	204	2200	741	547	1600
6068HFC94	138	185	138	185	2200	152	204	2000	809	596	1600
6068HFC94	138	185	138	185	2000	152	204	1800	890	656	1600
6068HFC94	149	200	149	200	2400	149	200	2400	800	590	1600
6068HFC94	149	200	149	200	2400	164	220	2200	800	590	1600
6068HFC94	149	200	149	200	2200	164	220	2000	873	644	1600
6068HFC94	149	200	149	200	2000	164	220	1800	961	708	1600
6068HFC94	168	225	149	200	2400	168	225	2400	902	666	1600
6068HFC94	168	225	149	200	2400	185	248	2200	902	666	1600
6068HFC94	168	225	149	200	2200	185	248	2000	984	726	1600
6068HFC94	168	225	149	200	2000	185	248	1800	1025	756	1600
6068HFC94	187	250	149	200	2400	191	255	2200	1004	741	1600
6068HFC94	187	250	149	200	2200	191	255	2000	1025	756	1600
6068HFC94	187	250	149	200	2000	191	255	1800	1025	756	1600

Bore		Stroke		Length		Width		Height		Weight	
mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
106	4.2	127	5.0	1161	45.7	716	28.2	1147	45.2	730	1614

## Engine performance curves

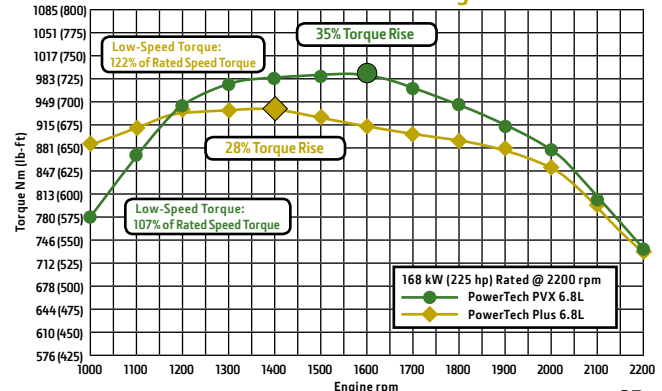
### Power curves

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



### Torque curves

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



# PowerTech PVX 9.0L engines

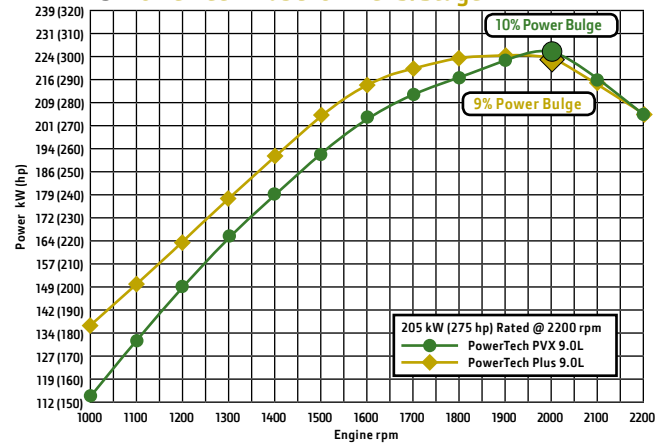


- Power range: 187 – 224 kW (250 – 300 hp)
- Power bulge — up to 10%
- Peak torque — up to 1305 Nm (963 lb-ft)
- Torque rise — up to 38%
- Low-speed (1000 rpm) torque — up to 123% of rated speed torque
- Transient response comparable to Tier 3/Stage III A
- Lower rated speed to reduce noise and improve fuel economy
- Cold-starting capabilities that meet or exceed Tier 3/Stage III A

## Engine performance curves

### Power curves

#### PowerTech PVX 9.0L Interim Tier 4/Stage III B vs. PowerTech Plus 9.0L Tier 3/Stage III A



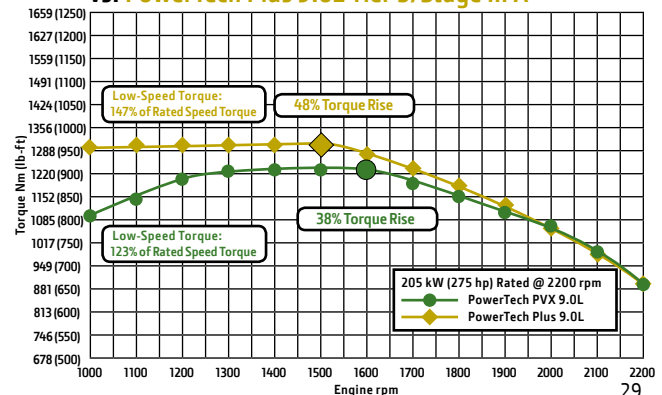
### PowerTech PVX 9.0L Interim Tier 4/Stage III B engines

Engine model	Intermittent power		Continuous power		Rated speed rpm	Peak power		Peak torque		Peak torque rpm	
	kW	hp	kW	hp		kW	hp	Nm	lb-ft		
6090HFC94	187	250	187	250	2200	192	257	2000	1120	826	1600
6090HFC94	187	250	187	250	2200	206	276	2000	1120	826	1600
6090HFC94	187	250	187	250	2000	206	276	1800	1232	909	1600
6090HFC94	205	275	205	275	2200	210	281	2000	1224	903	1600
6090HFC94	205	275	205	275	2200	226	303	2000	1224	903	1600
6090HFC94	205	275	205	275	2000	225	302	1800	1305	963	1600
6090HFC94	224	300	224	300	2200	227	304	2000	1305	963	1600
6090HFC94	224	300	224	300	2200	235	316	2000	1305	963	1600
6090HFC94	224	300	224	300	2000	235	316	1800	1305	963	1600

Bore		Stroke		Length		Width		Height		Weight	
mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
118	4.6	136	5.4	1230	48.4	800	31.5	1340	52.8	902	1989

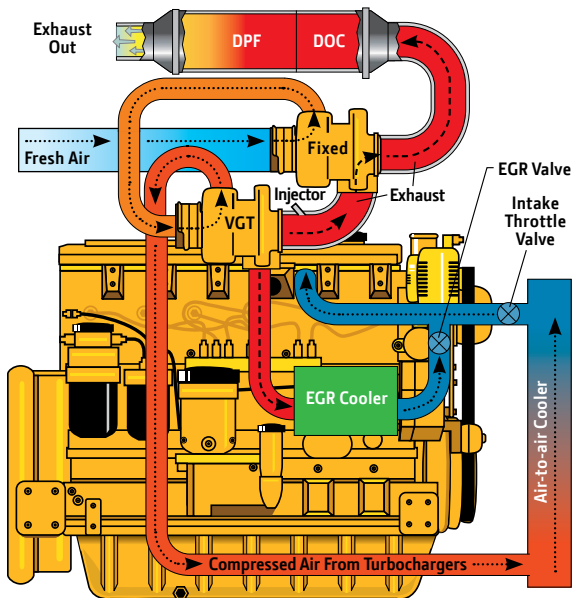
### Torque curves

#### PowerTech PVX 9.0L Interim Tier 4/Stage III B vs. PowerTech Plus 9.0L Tier 3/Stage III A



# PowerTech PSX 6.8L, 9.0L, and 13.5L engines

## PowerTech PSX Interim Tier 4 technology



## Series turbochargers

Fresh air is first drawn into the low-pressure turbocharger (fixed geometry) and compressed to a higher pressure. The compressed air is then drawn into the high-pressure turbocharger (VGT), where the air is further compressed. The high-pressure air is then routed through a charge air cooler and into the engine's intake manifold. By splitting the work between two turbochargers, both can operate at peak efficiency and at slower rotating speeds — lowering stress on turbocharger components and improving reliability. Series turbocharging delivers more boost pressure than single turbocharger configurations which results in 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 utilize 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 traps and holds the remaining PM. Trapped particles are oxidized within the DPF through a continuous cleaning process called passive regeneration. Passive regeneration occurs during normal operating conditions when heat from the exhaust stream and catalysts within the exhaust filter trigger the oxidation of the trapped PM. If passive regeneration cannot be achieved due to low temperature, load, or speed, then PM is removed using active regeneration — an automatic cleaning process controlled by the exhaust temperature management system.

## 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 and 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 are the same as previous 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 Tier 3/Stage III A
- Low-speed torque 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)
- Aluminum piston with integrated oil cooled gallery (6.8L)
- Directed top-liner cooling (9.0L and 13.5L)
- Low-pressure fuel system with electrical transfer pump and “auto-prime” feature
- Optional Rear PTO (9.0L and 13.5L)

\*Available on all PowerTech PSX engines unless noted

# PowerTech PSX 6.8L engines

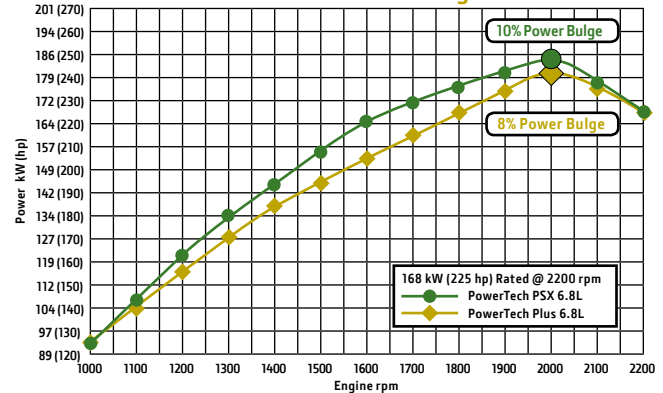


- Power range: 168 – 224 kW (225 – 300 hp)
- Power bulge — up to 10%
- Peak torque — up to 1100 Nm (811 lb-ft)
- Torque rise — up to 35%
- Low-speed (1000 rpm) torque — up to 122% of rated speed torque
- Transient response comparable to Tier 3/Stage III A
- Lower rated speeds to reduce noise and improve fuel economy
- Cold-starting capabilities that meet or exceed Tier 3/Stage III A

## Engine performance curves

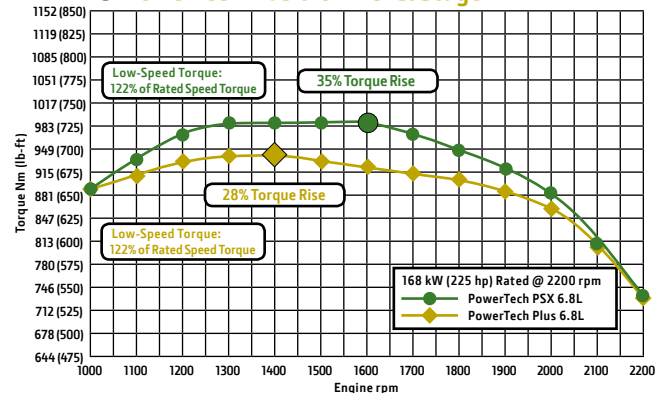
### Power curves

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



### Torque curves

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



## PowerTech PSX 6.8L Interim Tier 4/Stage III B engines

Engine model	Intermittent power		Continuous power		Rated speed rpm	Peak power kW hp	Peak power rpm	Peak torque		Peak torque rpm
	kW	hp	kW	hp				Nm	lb-ft	
6068HFC95	168	225	NA	NA	2200	185 248	2000	984	726	1600
6068HFC95	187	250	NA	NA	2200	191 255	2000	1025	756	1600
6068HFC95*	205	275	NA	NA	2400	209 280	2000	1100	811	1600
6068HFC95*	224	300	NA	NA	2400	228 306	2000	1100	811	1600

\*Later availability

Bore		Stroke		Length		Width		Height		Weight	
mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
106	4.2	127	5	1161	45	768	30.2	1144	45	750	1653

# 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 1685 Nm (1243 lb-ft)
- Torque rise — up to 38%
- Low-speed (1000 rpm) torque — up to 130% of rated speed torque
- Transient response comparable to Tier 3/Stage III A
- Lower rated speeds to reduce noise and improve fuel economy
- Cold-starting capabilities that meet or exceed Tier 3/Stage III A

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

Engine model	Intermittent power		Continuous power		Rated speed rpm	Peak power		Peak power		Peak torque		Peak torque rpm
	kW	hp	kW	hp		kW	hp	rpm	Nm	lb-ft		
6090HFC95	242	325	242	325	2200	247	332	2000	1444	1065	1600	
6090HFC95	242	325	242	325	2200	266	357	2000	1444	1065	1600	
6090HFC95	242	325	242	325	2000	266	357	1800	1590	1173	1600	
6090HFC95	261	350	242	325	2200	267	359	2000	1564	1154	1600	
6090HFC95	261	350	242	325	2200	287	385	2000	1564	1154	1600	
6090HFC95	261	350	242	325	2000	287	385	1800	1683	1241	1600	
6090HFC95	280	375	242	325	2200	286	384	2000	1671	1232	1600	
6090HFC95	280	375	242	325	2200	308	413	2000	1671	1232	1600	
6090HFC95	280	375	242	325	2000	301	403	1800	1683	1242	1600	
6090HFC95	298	400	242	325	2200	298	400	2200	1685	1243	1600	
6090HFC95	298	400	242	325	2200	316	424	2000	1685	1243	1600	
6090HFC95	298	400	242	325	2000	301	403	1800	1683	1241	1600	
6090HFC95*	317	425	242	325	2200	317	425	2200	1685	1243	1600	

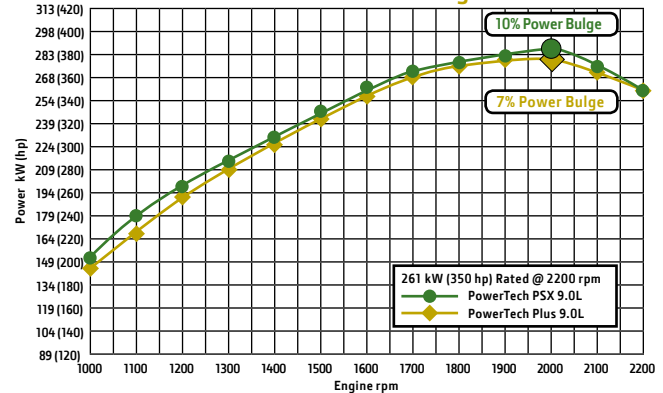
\*Restricted rating

Bore		Stroke		Length		Width		Height		Weight	
mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
118	4.6	136	5.4	1230	48.4	800	31.5	1340	52.8	1052	2319

## Engine performance curves

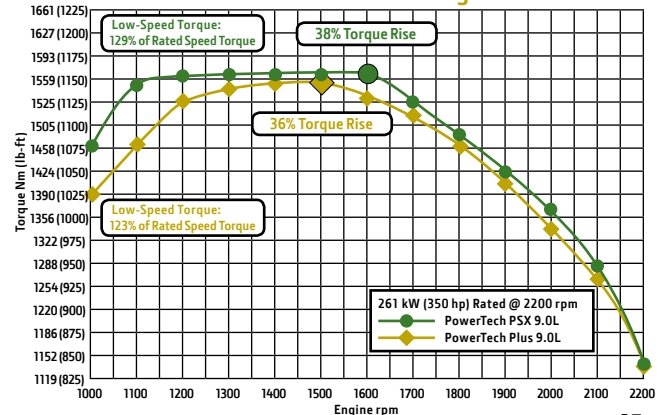
### Power curves

#### PowerTech PSX 9.0L Interim Tier 4/Stage III B vs. PowerTech Plus 9.0L Tier 3/Stage III A



### Torque curves

#### PowerTech PSX 9.0L Interim Tier 4/Stage III B vs. PowerTech Plus 9.0L Tier 3/Stage III A



# PowerTech PSX 13.5L engines



- Power range: 298 – 448 kW (400 – 600 hp)
- Best-in-class power density
- Power bulge — up to 13%
- Peak torque — up to 2660 Nm (1962 lb-ft)
- Torque rise — up to 38%
- Low-speed (1000 rpm) torque — up to 133% of rated speed torque
- Transient response comparable to Tier 3/Stage III A
- Lower rated speeds to reduce noise and improve fuel economy
- Cold-starting capabilities that meet or exceed Tier 3/Stage III A

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

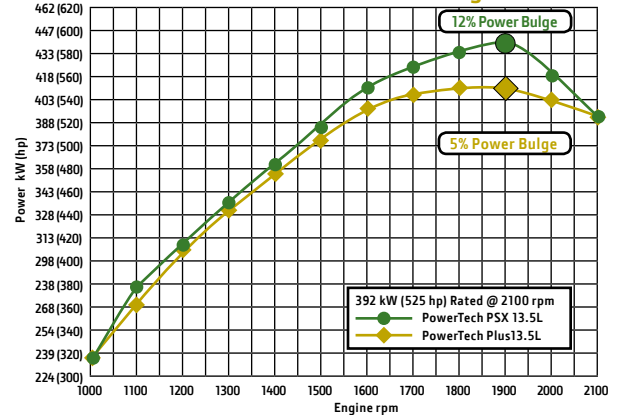
Engine model	Intermittent power		Continuous power		Rated speed rpm	Peak power		Peak torque		Peak torque rpm	
	kW	hp	kW	hp		kW	hp	rpm	Nm		lb-ft
6135HFC95	298	400	298	400	2100	311	417	1900	1870	1379	1600
6135HFC95	298	400	298	400	2100	340	456	1900	1870	1525	1600
6135HFC95	298	400	298	400	1900	340	456	1700	2067	1525	1600
6135HFC95	317	425	317	425	2100	330	443	1900	1989	1467	1600
6135HFC95	317	425	317	425	2100	361	485	1900	1989	1467	1600
6135HFC95	317	425	317	425	1900	361	485	1700	2199	1662	1600
6135HFC95	336	450	336	450	2100	350	469	1900	2105	1553	1600
6135HFC95	336	450	336	450	2100	376	505	1900	2105	1553	1600
6135HFC95	336	450	336	450	1900	376	505	1700	2327	1716	1600
6135HFC95	373	500	373	500	2100	389	521	1900	2341	1727	1600
6135HFC95	373	500	373	500	2100	418	560	1900	2341	1727	1600
6135HFC95	373	500	373	500	1900	418	560	1700	2587	1908	1600
6135HFC95	392	525	392	500	2100	408	548	1900	2457	1812	1600
6135HFC95	392	525	392	500	2100	439	589	1900	2457	1812	1600
6135HFC95	392	525	392	500	1900	439	589	1700	2660	1962	1600
6135HFC95	410	550	410	500	2100	427	573	1900	2573	1898	1600
6135HFC95	410	550	410	500	2100	459	616	1900	2573	1898	1600
6135HFC95	410	550	410	500	1900	454	608	1700	2660	1962	1600
6135HFC95	448	600	448	500	2100	460	617	1900	2660	1962	1600

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

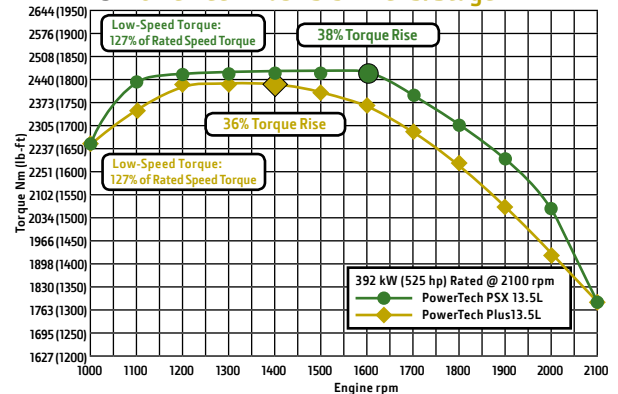
### Power curves

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



### Torque curves

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



# Interim Tier 4/Stage III B FAQ

Beginning in 2011, the United States Environmental Protection Agency (EPA) and European Union (EU) will require off-highway diesel engines to meet stringent Interim Tier 4/Stage III B emissions regulations. The regulations call for a 90 percent reduction in particulate matter (PM) and a 50 percent drop in nitrogen oxides (NOx). Final Tier 4/Stage IV emissions regulations will take PM and NOx to near-zero levels by 2014.



## What's the background on these regulations?

The drive to reduce emissions has been in the works for more than 10 years and has followed a tiered approach (see chart above). Tier 1 regulations set limits on particulate matter (PM) and nitrogen oxides (NOx) emissions. Final Tier 4 regulations take effect in 2014 and require the air coming out of the exhaust to be virtually as clean as the air going into the engine.

## What tier are we at today?

We are at Tier 3 for engines 56 to 560 kW (75 to 750 hp). While Final Tier 4 takes place in 2014, there's a step between it and Tier 3. That's Interim Tier 4 (IT4) and it's the biggest step yet.

IT4 takes effect in 2011 and requires diesel engines with 174 horsepower or more to reduce PM emissions by 90 percent, and NOx emissions by 50 percent.

## What is PM and NOx?

Particulate matter, or PM, is called "smoke" because it comes out of the exhaust pipe in the form of smoke. It's essentially an incomplete combustion of diesel fuel — just like a smoky fire that provides less heat than a hot, clean-burning fire.

Nitrogen oxides, or NOx, are sometimes called "smog" because they contribute to the formation of atmospheric pollution.

## How do IT4 engines reduce nitrogen oxides and particulate matter?

There are two ways to reduce emissions: The first is with cooled exhaust gas recirculation (EGR) and an exhaust filter. EGR lowers NO<sub>x</sub> and the exhaust filter reduces PM. The second way to reduce emissions is with selective catalytic reduction (SCR) and a diesel oxidation catalyst (DOC). The SCR system lowers NO<sub>x</sub> while the diesel oxidation catalyst reduces PM.

### How does cooled EGR work?

Cooled EGR is essentially the opposite of SCR. It cools and mixes measured amounts of exhaust gas with incoming fresh air to lower the engine's peak combustion temperature, thereby reducing NO<sub>x</sub> to an acceptable level.

Because of the lower combustion temperatures used to reduce NO<sub>x</sub>, there is an increase in PM. To reduce PM to acceptable levels, exhaust gases are routed through an exhaust filter containing a diesel oxidation catalyst and a diesel particulate filter. PM is trapped in the filter and – through a process called regeneration — oxidized into nitrogen gas and carbon dioxide, then expelled through the exhaust pipe.



Cooled EGR

## Does the operator have to stop the machine for it to regenerate?

In most cases the regeneration process uses exhaust heat created under normal engine operating conditions. When necessary, the engine's control system can raise exhaust temperature to regenerate the filter. In either case, regeneration does not impact machine operation.

### How does SCR work?

Let's go back to the smoky fire example. SCR raises the peak combustion temperature in the engine so the engine runs like a hot, cleaner-burning fire. As a result, there is less particulate matter created. Any further reduction in particulate matter is accomplished by a chemical reaction in the diesel oxidation catalyst. However, because of the higher combustion temperatures, the engine creates more NO<sub>x</sub>.

To reduce NO<sub>x</sub>, a diesel exhaust fluid (DEF), also called urea, is injected into the exhaust stream. When the exhaust gases combine with the urea in the SCR catalyst, NO<sub>x</sub> is broken down into nitrogen gas and water vapor and expelled through the exhaust pipe.

## What technology will John Deere use to meet IT4 regulations?

Cooled EGR. We're taking our proven Tier 3 PowerTech™ Plus engine platform with cooled EGR and adding an exhaust filter. It's a more operator-friendly technology and less complex to maintain when compared to SCR systems. In addition, it's field-proven. We were the first manufacturer to widely commercialize off-highway Tier 3 cooled EGR diesel engines. We've used these engines with a proven record of reliability.

## Why not SCR?

There are a number of reasons. First is the fact DEF is not widely available today. You may have to drive a distance to get to a DEF retailer. Its price also can be high and it can be difficult to store. For example, it will turn to a gel and even freeze in cold temperatures. Not only do you need to store diesel around your operation, you also have to store DEF and keep it from freezing. These IT4 regulations take effect in 2011, which is just around the corner, and we believe the infrastructure for the delivery and storage of DEF to our nonroad customers will not be adequate by that time.

Second, we're looking to the end result, and that's Final Tier 4 in 2014. Proven technologies such as cooled EGR and exhaust filters will be the foundation for meeting Final Tier 4 regulations. If we removed the EGR components from our engines to meet IT4, we would need to put them back on for Final Tier 4. So from a logical engineering progression, it makes more sense to build upon our already-proven cooled EGR technology for IT4 and add the exhaust filter.

With SCR, you must also consider the total fluid consumption including diesel fuel and DEF additive. The single-fluid approach of cooled EGR is easier for operators to use and delivers better total fluid economy.

## Is cooled EGR the right choice for IT4?

Cooled EGR is what our customers told us they want for IT4. It's a simple solution for the operator that leverages the proven fuel efficiency of our PowerTech Plus engines and is part of an integrated vehicle design. That's something John Deere excels at as we design, manufacture, and service the engine, drivetrain, hydraulics, exhaust filter, cooling system, and other vehicle systems as part of a complete package to improve performance, convenience, and value. Finally, cooled EGR is easy to maintain. If it needs service, our customers are backed by the most responsive dealer network in the industry. Our dealers and their service technicians will be highly trained on these new engines and can even help you improve total vehicle efficiency.



## Where can you go for more information?

Go to our Web site for an in-depth look at our IT4 solutions. And of course, you can always see your local John Deere engine distributor or dealer.

[www.JohnDeere.com/tier4](http://www.JohnDeere.com/tier4)

# Conversions

## From English to SI (Metric)

### Torque

$$\text{Nm} = 1.3558 \times \text{lb-ft.}$$

$$\text{lb-ft.} = .73756 \times \text{Nm}$$

$$\text{Nm} = (9549 \times \text{kW})/\text{RPM}$$

$$\text{lb-ft.} = (5252 \times \text{hp})/\text{RPM}$$

### Power

$$\text{hp} = \text{kW} \times 1.341$$

$$\text{kW} = \text{hp} \times .746$$

$$\text{kW} = (\text{torque (Nm)} \times \text{RPM})/9549$$

$$\text{Hp} = (\text{torque (lb-ft.)} \times \text{RPM})/5252$$

Nm = Newton meters

lb-ft. = foot pounds

kW = kilowatts

hp = horsepower

### Torque Rise

% Torque rise = max torque/torque at rated speed

### Power Bulge

Power bulge = maximum power/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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# JOHN DEERE



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