



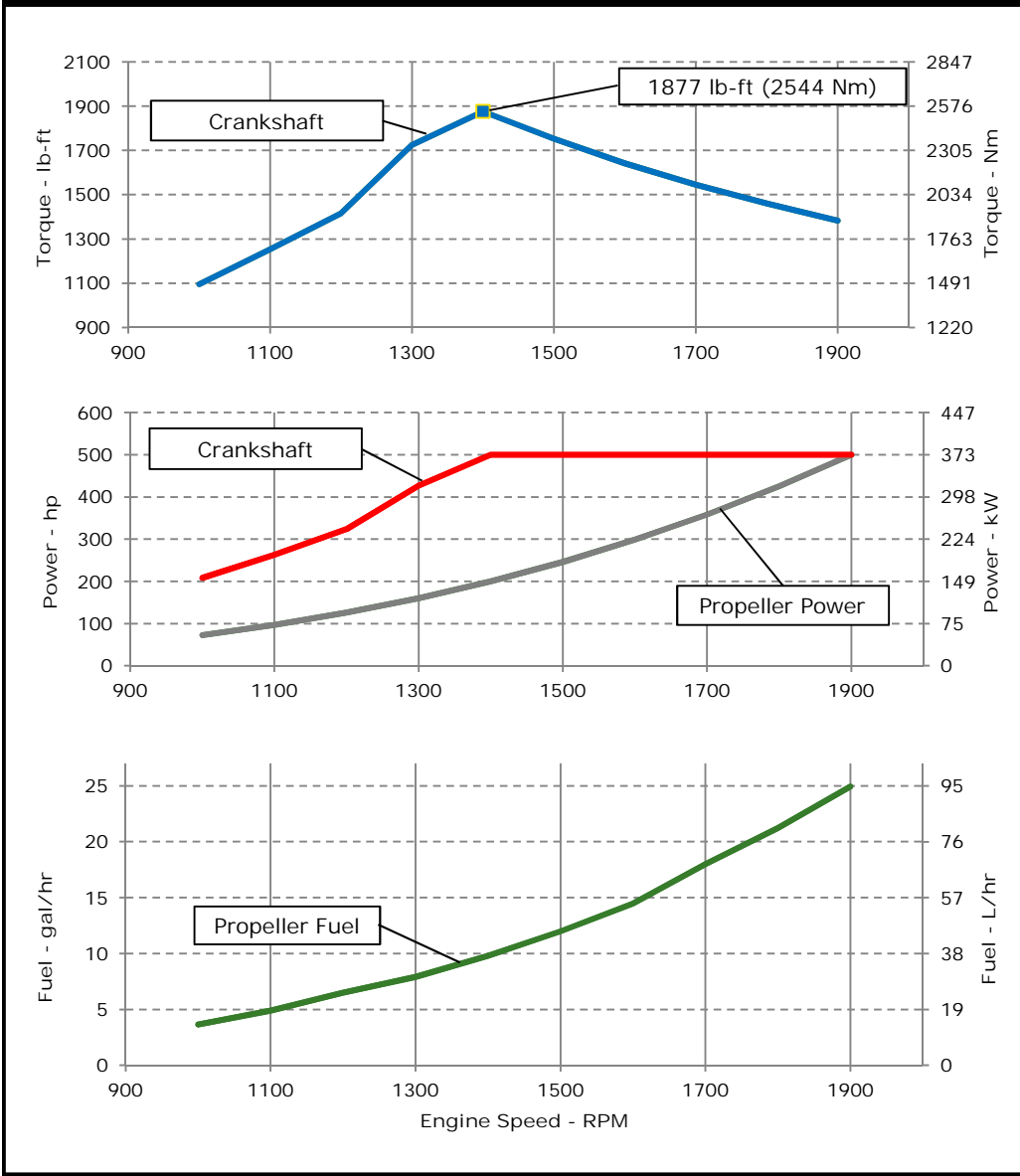
**JOHN DEERE**

**ENGINE PERFORMANCE CURVE**

Rating: M2 - 500hp (373kW) @ 1900 RPM  
 Application: Marine

PowerTech™ 13.5L Engine

Model: 6135SFM85



**REFERENCE CONDITIONS**

Air Intake Restriction..... 12 in.H<sub>2</sub>O (3 kPa)  
 Exhaust Back Pressure..... 30 in.H<sub>2</sub>O (7.5 kPa)

Rated speed and power  
 Gross power guaranteed within ±5% at SAE J1995 and ISO 3046  
 J1995 and ISO 3046 conditions:

- 77 °F (25 °C) air inlet temperature
- 29.31 in.Hg (99 kPa) barometric pressure
- 104 °F (40 °C) fuel inlet temperature
- 0.853 fuel specific gravity @ 60 °F (15.5 °C)

Ambient air temperature is defined to be the temperature of ambient air close to operating vessel that is not influenced in any manner by operating characteristics of the vessel (free field temp).

Conversion factors:

- Power: kW = hp x 0.746
- Fuel: 1 gal = 7.1 lb, 1 L = 0.85 kg
- Torque: N-m = lb-ft x 1.356

All values from currently available data. Subject to manufacturing and measurement variations and to change without notice.  
 Actual performance is subject to application and operation conditions outside of John Deere control.

*Notes:*

**M2:** The M2 rating is for marine propulsion applications that typically operate between 3,000-5,000 hours per year and have load factors up to 65 percent. This rating is for applications that are in continuous use and use full power for no more than 16 hours of each 24 hours of operation. The remaining time of operation is at or below cruising speed.

**Possible applications:** Short-range tugs and towboats long-range ferryboats, large passenger vessels and offshore displacement hull fishing boats

Designed/Calibrated to meet:

- EPA Commercial Marine Tier 3
- IMO MARPOL Annex VI Compliant
- NRMM (97/68/EC), as amended

Ref: Engine Emission Label

Certified by:

Preliminary

Performance Curve: 6135SFM85\_B

All values at rated speed, power, and standard conditions, per SAE J1995 unless otherwise noted.

# Engine Installation Criteria

## General Data

Model	6135SFM85		
Number of Cylinders	6		
Bore	132 mm	5.20	in
Stroke	165 mm	6.50	in
Displacement	13.5 L	824	in <sup>3</sup>
Compression Ratio	16.0:1		
Valves per Cylinder, Intake/Exhaust	2/2		
Combustion System	Direct injection		
Firing Order	1-5-3-6-2-4		
Engine Type	In line, 4 Cycle		
Aspiration	Turbocharged and Aftercooled		
Aftercooling System	Seawater cooled		
Engine Crankcase Vent System	Closed		

## Cooling System\*

Total Engine to Seawater Heat Rejection**	227.2 kW	12932 BTU/min
Aftercooler Heat Rejection	103.8 kW	5908 BTU/min
Coolant Flow	401 L/min	106 gal/min
Thermostat Start to Open	82 °C	180 °F
Thermostat Fully Open	94 °C	202 °F
Min. Coolant Fill Rate	12 L/min	3.2 gal/min
Min. Pressure Cap	110.3 kPa	16 psi
Max. External Coolant Restriction	40 kPa	5.8 psi
Normal Operation Max Top Tank Temperature	100 °C	212 °F
≤ 5% of Total Operating Time Top Tank Temperature	100-105 °C	212-230 °F
Absolute Max Top Tank Temperature	105 °C	221 °F
Recommended Fuel Cooler	13 kW	743 BTU/min
Engine Radiated Heat	47 kW	2697 BTU/min

\* The cooling system should be capable of typical at ambient up to the maximum conditions in which the vessel will operate.

Typical operation is defined as the average load sustainable in the vessel over 10 min.

\*\* Reference 32 °C Sea Water Temperature

## Physical Data

Length to rear face of block	1337 mm	52.6 in
Length maximum	1725 mm	67.9 in
Width maximum	975 mm	38.4 in
Height, crank centerline to top	780 mm	30.7 in
Height, crank centerline to bottom	363 mm	363 in
Weight, with oil, no coolant (includes engine, flywheel housing, flywheel, and electronics)	1426 kg	3143 lb
Center of Gravity Location, X-axis From Rear Face of Block	476 mm	18.7 in
Center of Gravity Location, Y-axis Right of Crankshaft	9 mm	0.4 in
Center of Gravity Location, Z-axis Above Crankshaft	250 mm	9.8 in
Max. Allowable Static Bending Moment At Rear Face of Flywheel Housing with 5-G Load	814 Nm	600 lb-ft
Thrust Bearing Load Limit, Forward Continuous	5.4 kN	1214 lbf
Thrust Bearing Load Limit, Forward Intermittent	8.1 kN	1821 lbf
Thrust Bearing Load Limit, Rearward Continuous	2.5 kN	562 lbf
Thrust Bearing Load Limit, Rearward Intermittent	4 kN	899 lbf

## Electrical System

Min. Recommended Battery Capacity, 12V @32 °F (0 °C)	1900 amps
Min. Recommended Battery Capacity, 24V @32 °F (0 °C)	925 amps
Starter Rolling Current, 12V @32 °F (0 °C)	920 amps
Starter Rolling Current, 24V @32 °F (0 °C)	600 amps
Min. Voltage at ECU during Cranking, 12V	6 volts
Min. Voltage at ECU during Cranking, 24V	10 volts
Max. Allowable Start Circuit Resistance, 12V	0.002 ohms
Max. Allowable Start Circuit Resistance, 24V	0.0012 ohms
Recommended Starter Cable, 12V 100"	#000
Recommended Starter Cable, 24V 100"	#1
Recommended Starter Cable, 12V 200"	2#000
Recommended Starter Cable, 24V 200"	#000
Electrical Component Maximum Temperature Limit	125 °C 257 °F

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# Engine Installation Criteria

## Fuel System

ECU Description	L15			
Fuel Injection Pump	EUI			
Governor Type	Electronic			
Volumetric Fuel Consumption	94.4	L/hr	24.9	gal/hr
Mass Fuel Consumption	80.2	kg/hr	177	lb/hr
Total Fuel Volumetric Flow	270	L/hr	71.3	gal/hr
Total Fuel Mass Flow	230	kg/hr	506	lb/hr
Max. Fuel Inlet Restriction*	20	kPa	80	in.H2O
Max. Fuel Inlet Pressure	20	kPa	80	in.H2O
Max Fuel Return Pressure	20	kPa	80	in.H2O
Max. Fuel Height Above Transfer Pump	2.4	m	7.9	ft
Max. Leak-off Return Height	2.4	m	7.9	ft
Max. Fuel Inlet Height Above Fuel Tank Supply	2.4	m	7.9	ft
Normal Operation Fuel Temperature	40	°C	104	°F
Max. Fuel Inlet Temperature	100	°C	212	°F
Min. Recommended Fuel Line Inside Diameter	8.85	mm	0.35	in
Min. Recommended Fuel Line Size	6 (-) AN			
Primary Fuel Filter	10 mic			
Secondary Fuel Filter	2 mic			

## Lubrication System

Oil Pressure at Rated Speed	260	kPa	38	psi
Oil Pressure at Low Idle (600rpm)**	95	kPa	14	psi
Max. Crankcase Pressure	2	kPa	8	in.H2O
Maximum Installed Angle, Front Down	0 deg			
Maximum Installed Angle, Front Up	12 deg			
Engine Angularity Limits Any Direction, Continuous***	45 deg			
Engine Angularity Limits Any Direction, Intermittent***	N/A deg			

## Seawater Pump System

Seawater Pump Flow	400	L/min	106	gal/min
Max. Suction Lift	3	m	9.8	ft
Max. Outlet Pressure	140	kPa	20	psi
Max. Inlet Restriction	30	kPa	4	psi

\* With clean filters

\*\* With John Deere Plus-50 II™ 15w-40, not applicable with break in oil.

\*\*\* With 1932 option

## Air Intake System

Engine Air Flow	33.6	m <sup>3</sup> /min	###	ft <sup>3</sup> /min
Intake Manifold Pressure	201.3	kPa	29.2	psi
Manifold Air Temperature	52	°C	126	°F
Maximum Manifold Air Temperature	87	°C	189	°F
Max. Allowable Temperature Rise, Ambient	17	°C	30	°F
Air to Engine Inlet				
Max. Air Intake Restriction, Clean Air Cleaner	3	kPa	12	in.H2O
Max. Air Intake Restriction, Dirty Air Cleaner	6.25	kPa	25	in.H2O
Min. Ventilation Area	0.207	m <sup>2</sup>	320	in <sup>2</sup>

## Performance Data

Rated Power	373	kW	500	hp
Rated Speed	1900 RPM			
Peak Torque Speed	1400 RPM			
Low Idle Speed	600 RPM			
Rated Torque	1875	Nm	1383	ft-lb
Peak Torque	2544	Nm	1877	ft-lb
BMEP, Rated	1745	kPa	253	psi
Rated Pferdestärke (metric hp)	431 ps			
Front Drive Capacity, Intermittent	542	Nm	400	lb-ft
Front Drive Capacity, Continuous	542	Nm	400	lb-ft

## Exhaust System

Exhaust Flow	68.8	m <sup>3</sup> /min	2430	ft <sup>3</sup> /min
Exhaust Flow @ gas STP	31.8	m <sup>3</sup> /min	1123	ft <sup>3</sup> /min
Exhaust Temperature	372	°C	702	°F
Max. Allowable Exhaust Restriction	7.5	kPa	30	in.H2O
Max. Shear on Turbocharger Exhaust Outlet	11	kg	24.3	lb
Max. Bending Moment on Turbocharger Exhaust Outlet	7	Nm	15.4	lb-ft
Min. Exhaust Pipe Diameter, Dry	127	mm	5.0	in
Min. Exhaust Pipe Diameter, Wet	139.7	mm	5.5	in

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## Engine Installation Criteria

### Engine Performance Data Table

Engine Speed	Crank Power		Crank Torque		* Prop Power		* Prop Fuel		* Prop BSFC
RPM	kW	hp	Nm	lb-ft	kW	hp	L/hr	gal/hr	g/kW-hr
1900	373	500	1875	1383	373	500	94	25	215
1800	373	500	1979	1460	317	425	80	21	215
1700	373	500	2096	1546	267	358	68	18	217
1600	373	500	2225	1641	223	299	55	14	209
1500	373	500	2375	1752	184	246	45	12	210
1400	373	500	2544	1877	149	200	37	10	211
1300	318	427	2339	1725	119	160	30	8	213
1200	241	324	1920	1416	94	126	25	6	222
1100	196	262	1699	1253	72	97	19	5	217
1000	155	208	1484	1095	54	73	14	4	216

\* Theoretical 3.0 exponent propeller curve , measured at flywheel

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