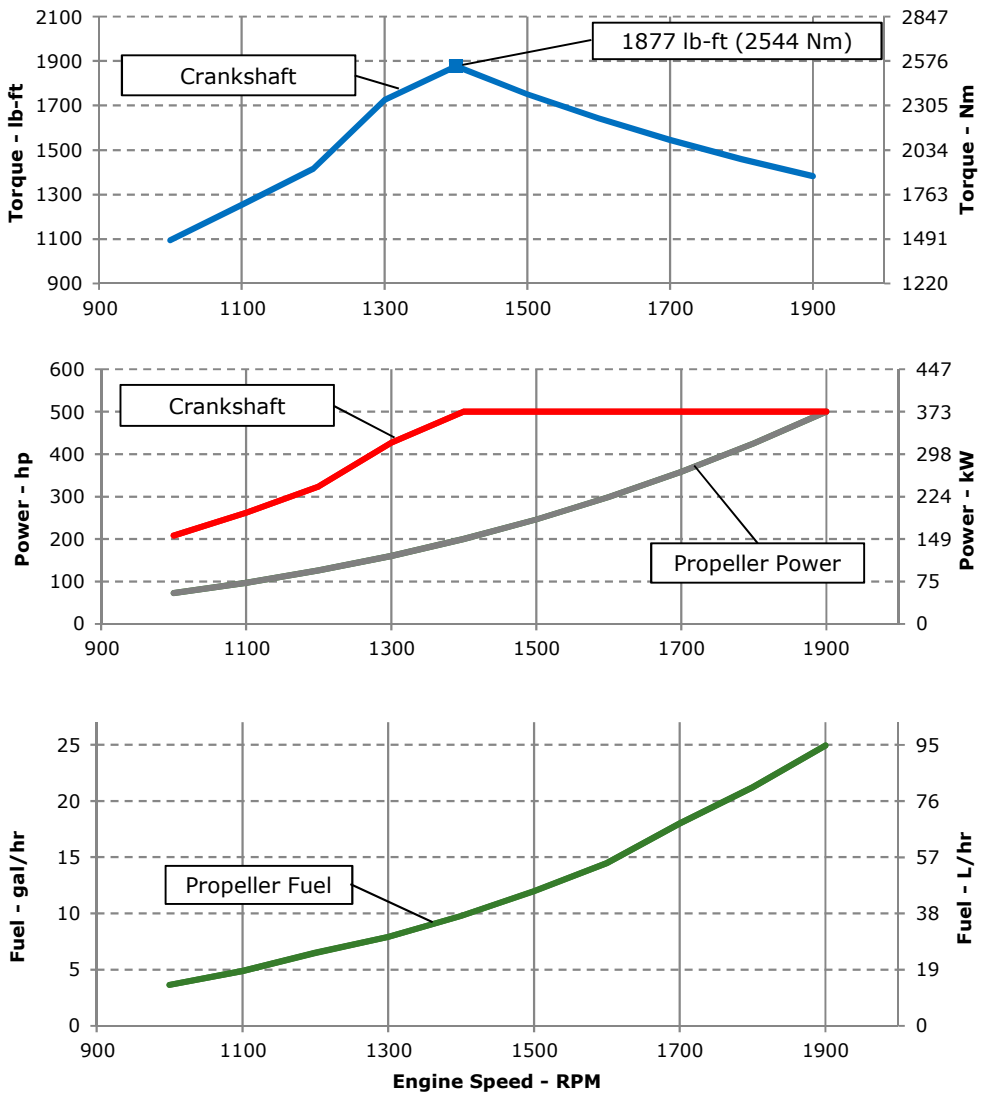
ENGINE PERFORMANCE CURVE

JOHN DEERE

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

PowerTech™ 13.5L Engine
Model: 6135SFM85



REFERENCE CONDITIONS

Air Intake Restriction.....12 in.H_2O (3 kPa)
Exhaust Back Pressure..... 30 in.H_2O (7.5 kPa)

Rated speed and power
Gross power guaranteed within ±5% at ISO 8665/SAE J1228 and ISO 3046/SAE J1995
Test 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.

All pressures shown in gauge pressure

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:	Certified by:
• EPA Marine Tier 3 Commercial (40 CFR 1042) • IMO Tier II Compliant (MARPOL Annex VI) • EU Stage IIIa Inland Waterways (NRMM 97/68/EC, as amended) • Recreational Craft Directive 2 (2013/53/EU)	Scott D. Ochsner
Ref: Engine Emission Label	9-Jun-20

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^3
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*

Jacket Water Heat Rejection**	224.6	kW	12784	BTU/min
Aftercooler Heat Rejection	94.32	kW	5369	BTU/min
Coolant Flow	250	L/min	66	gal/min
Min. Coolant Pump Inlet Pressure	30.3	kPa	4.4	psi
Thermostat Start to Open	82	°C	180	°F
Thermostat Fully Open	92	°C	197	°F
Engine Coolant Capacity, HE	38	L	10	gal
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
Return Fuel Heat Rejection	2	kW	92	BTU/min
Engine Radiated Heat	24	kW	1349	BTU/min

Physical Data

Length to rear face of block	1335	mm	52.6	in
Length to rear face of flywheel housing (SAE #1)	1444	mm	56.8	in
Length maximum	1818	mm	71.6	in
Width maximum	1063	mm	41.9	in
Height, crank centerline to top	812	mm	32.0	in
Height, crank centerline to bottom	364	mm	14.3	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 (for installations up to 5-G)	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		
Electrical Component Maximum Temperature Limit	125	°C	257	°F
Maximum ECU Temperature	105	°C	221	°F

* 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

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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	173	L/hr	45.7	gal/hr
Total Fuel Mass Flow	147	kg/hr	324	lb/hr
Max. Fuel Inlet Restriction*	30	kPa	120	in.H2O
Max. Fuel Inlet Pressure	24	kPa	96	in.H2O
Max Fuel Return Pressure	35	kPa	141	in.H2O
Normal Operation Fuel Temperature	40	°C	104	°F
Max. Fuel Inlet Temperature	100	°C	212	°F
Min. Recommended Fuel Line Inside Diameter	6.79	mm	0.27	in
Min. Recommended Fuel Line Size			5	(-) AN
Primary Fuel Filter			10	mic
Secondary Fuel Filter			2	mic

Lubrication System

Oil Pressure at Rated Speed	280	kPa	41	psi
Oil Pressure at Low Idle (600rpm)**	120	kPa	17	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***			20	deg
Engine Angularity Limits Any Direction, Intermittent***			30	deg

Seawater Pump System

Seawater Pump Flow	375	L/min	99	gal/min
Max. Suction Lift	3	m	9.8	ft
Max. Outlet Pressure	140	kPa	20	psi
Max. Inlet Restriction	30	kPa	4	psi

Air Intake System

Engine Air Flow	33.41	m^3/min	1180	ft^3/min
Intake Manifold Pressure	200.7	kPa	29.1	psi
Manifold Air Temperature	54.12	°C	129	°F
Maximum Manifold Air Temperature	87	°C	189	°F
Max. Allowable Temperature Rise, Ambient Air to Engine Inlet	17	°C	30	°F
Max. Air Intake Restriction, Clean Air Cleaner	3	kPa	12	in.H_2O
Max. Air Intake Restriction, Dirty Air Cleaner	6.25	kPa	25	in.H_2O
Min. Ventilation Area	0.206	m^2	319	in^2

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	70.19	m^3/min	2479	ft^3/min
Exhaust Flow @ gas STP	32.6	m^3/min	1151	ft^3/min
Exhaust Temperature	366	°C	691	°F
Max. Allowable Exhaust Restriction	7.5	kPa	30	in.H_2O
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

* With clean filters

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

*** With 1904 option

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

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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