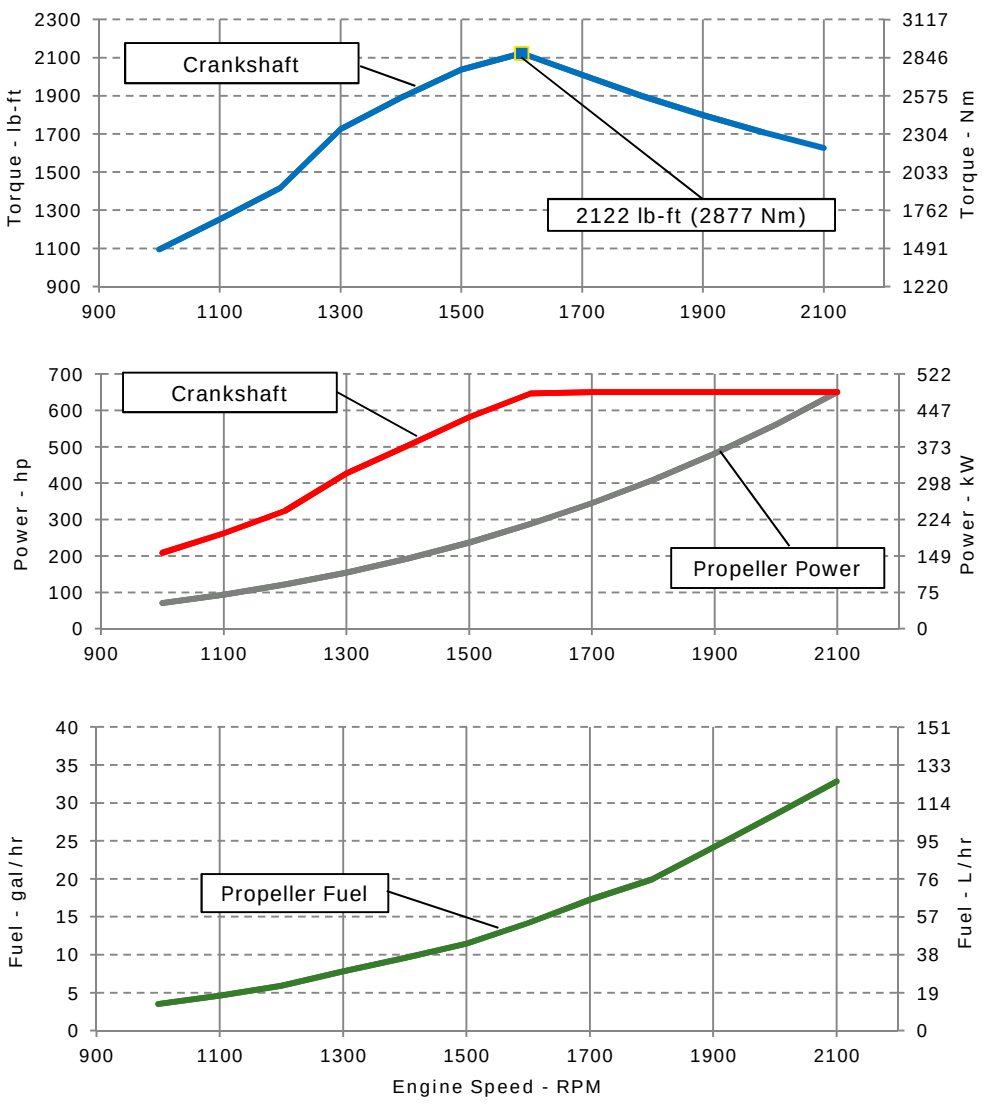
ENGINE PERFORMANCE CURVE

JOHN DEERE

Rating: M4 - 650hp (485kW) @ 2100 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 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:

M4: The M4 rating is for marine propulsion applications that typically operate between 1,000-3,000 hours per year and have load factors below 40 percent. This rating is for applications that use full power no more than 1 hour out of each 12 hours of operation. The remaining time of operation is at or below cruising speed.

Possible applications: Inshore crew boats, charter fishing boats, pilot boats, dive boats, and planning hull commercial fishing boats.

Designed/Calibrated to meet:	Certified by:
• EPA Commercial Marine Tier 3 • IMO MARPOL Annex VI Compliant • NRMM (97/68/EC), as amended Ref: Engine Emission Label	Preliminary

Performance Curve: 6135SFM85_D

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*

Total Engine to Seawater Heat Rejection**	307	kW	17474	BTU/min
Aftercooler Heat Rejection	144.3	kW	8214	BTU/min
Coolant Flow	443	L/min	117	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	11	kW	617	BTU/min
Engine Radiated Heat	62	kW	3551	BTU/min

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

* 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	124	L/hr	32.8	gal/hr
Mass Fuel Consumption	106	kg/hr	233	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	396	L/min	105	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	40.9	m^3/min	1444	ft^3/min
Intake Manifold Pressure	248.4	kPa	36.0	psi
Manifold Air Temperature	59	°C	138	°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	0.252	m^2	390	in^2

Performance Data

Rated Power	485	kW	650	hp
Rated Speed		2100	RPM	
Peak Torque Speed		1600	RPM	
Low Idle Speed		600	RPM	
Rated Torque	2205	Nm	1627	ft-lb
Peak Torque	2877	Nm	2122	ft-lb
BMEP, Rated	2053	kPa	298	psi
Rated Pferdestärke (metric hp)		659	ps	
Front Drive Capacity, Intermittent	542	Nm	400	lb-ft
Front Drive Capacity, Continuous	542	Nm	400	lb-ft

Exhaust System

Exhaust Flow	88.9	m^3/min	3139	ft^3/min
Exhaust Flow @ gas STP	38.7	m^3/min	1367	ft^3/min
Exhaust Temperature	417	°C	783	°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	152.4	mm	6.0	in
Min. Exhaust Pipe Diameter, Wet	203.2	mm	8.0	in

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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
2100	485	650	2205	1626	485	650	124	33	218
2000	485	650	2316	1708	419	562	108	28	219
1900	485	651	2438	1798	359	482	91	24	216
1800	485	650	2573	1898	305	409	75	20	210
1700	485	650	2724	2009	257	345	65	17	216
1600	482	646	2877	2122	214	288	54	14	213
1500	434	582	2763	2038	177	237	43	11	208
1400	375	504	2561	1889	144	193	36	10	214
1300	318	427	2339	1725	115	154	30	8	218
1200	241	324	1920	1416	90	121	22	6	211
1100	196	262	1699	1253	70	93	17	5	213
1000	155	208	1485	1095	52	70	13	4	217

* Theoretical 3.0 exponent propeller curve , measured at flywheel

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