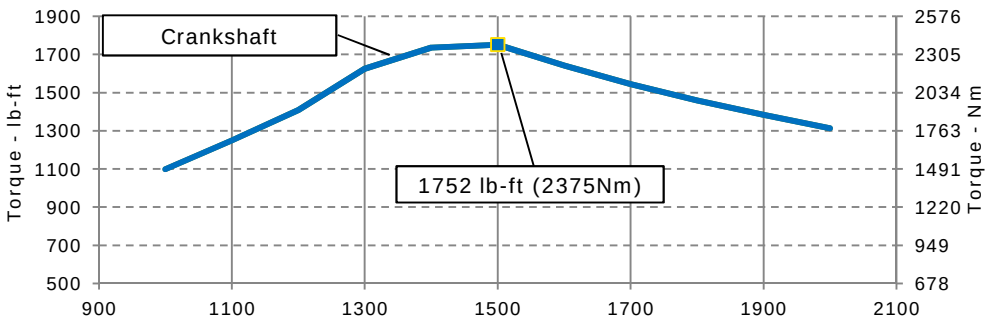
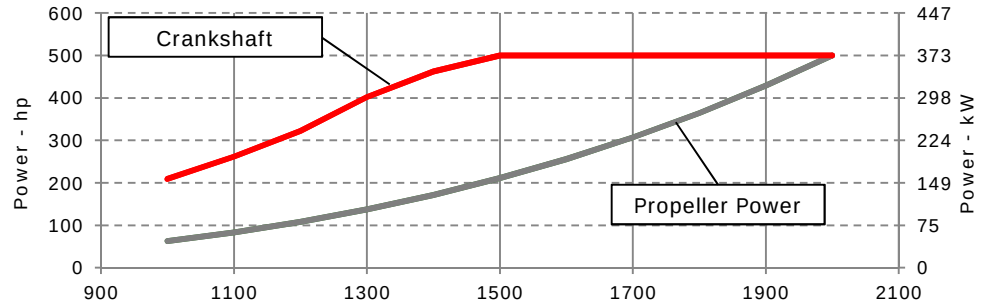
ENGINE PERFORMANCE CURVE

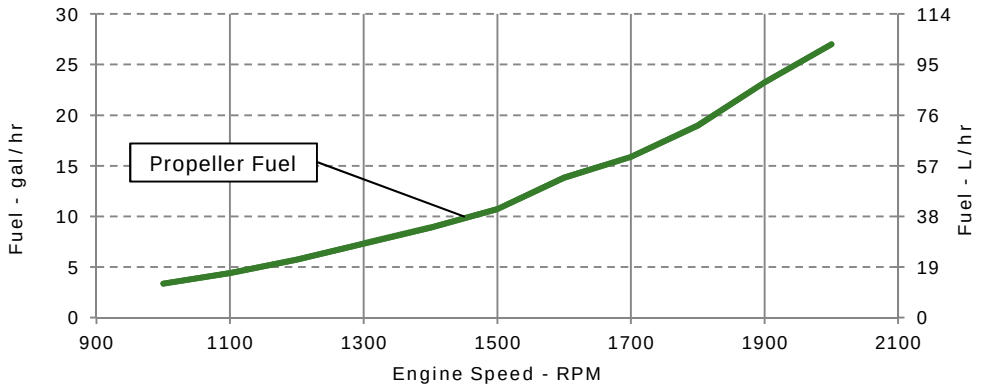
JOHN DEERE

Rating: M3 - 500hp (373kW) @ 2000 RPM
Application: Marine

PowerTech™ 13.5L Engine
Model: 6135AFM85







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:

M3: The M3 rating is for marine propulsion applications that typically operate between 2,000-4,000 hours per year and have load factors up to 50 percent. This rating is for applications that use full power for no more than 4 hours out of each 12 hours of operation. The remaining time of operation is at or below cruising speed.

Possible applications: Coastal fishing boats offshore crew boats, research boats. Short range ferryboats and dinner cruise 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: 6135AFM85_C

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

Engine Installation Criteria

General Data

Model	6135AFM85			
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	Engine coolant			
Engine Crankcase Vent System	Closed			

Cooling System*

Engine Coolant Heat Rejection**	369	kW	21020	BTU/min
Max. Pressure Drop Across Keel Cooler	40	kPa	5.8	psi
Coolant Flow	360	L/min	95	gal/min
Seawater Flow (heat exchanged)	394	L/min	104	gal/min
Thermostat Start to Open	72	°C	161	°F
Thermostat Fully Open	83	°C	182	°F
Engine Coolant Capacity, HE	43	L	11.4	gal
Engine Coolant Capacity, KC	38	L	10.0	gal
Min. Coolant Fill Rate	12	L/min	3.2	gal/min
Min. Pressure Cap	110.3	kPa	16	psi
Min. Pump Inlet Pressure	30	kPa	4.4	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	23	kW	1333	BTU/min
Engine Radiated Heat	51	kW	2920	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	1075	mm	42.3	in
Height, crank centerline to top	806	mm	31.7	in
Height, crank centerline to bottom	360	mm	360	in
Weight, with oil, no coolant (includes engine, flywheel housing, flywheel, and electronics)	1410	kg	3108	lb
Center of Gravity Location, X-axis From Rear Face of Block	516	mm	20.3	in
Center of Gravity Location, Y-axis Right of Crankshaft	5	mm	0.2	in
Center of Gravity Location, Z-axis Above Crankshaft	239	mm	9.4	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	0.0012	ohms		
Max. Allowable Start Circuit Resistance, 24V	0.002	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		Unit Injection		
Governor Type		Electronic		
Volumetric Fuel Consumption	102	L/hr	27.0	gal/hr
Mass Fuel Consumption	86.9	kg/hr	192	lb/hr
Total Fuel Volumetric Flow	417	L/hr	110.2	gal/hr
Total Fuel Mass Flow	354	kg/hr	781	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
Max. Fuel Height Above Transfer Pump	2.88	m	9.4	ft
Max. Leak-off Return Height	2.88	m	9.4	ft
Max. Fuel Inlet Height Above Fuel Tank Supply	2.88	m	9.4	ft
Normal Operation Fuel Temperature	40	°C	104	°F
Max. Fuel Inlet Temperature	80	°C	176	°F
Min. Recommended Fuel Line Inside Diameter	11	mm	0.43	in
Min. Recommended Fuel Line Size		7	(-) AN	
Primary Fuel Filter		10	mic	
Secondary Fuel Filter		2	mic	

Lubrication System

Oil Pressure at Rated Speed	285	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	

* With clean filters

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

*** With 19BP option

Air Intake System

Engine Air Flow	35	m^3/min	1243	ft^3/min
Intake Manifold Pressure	236	kPa	34.2	psi
Manifold Air Temperature	97	°C	207	°F
Maximum Manifold Air Temperature	130	°C	266	°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	0.217	m^2	336	in^2

Performance Data

Rated Power	373	kW	500	hp
Rated Speed		2000	RPM	
Peak Torque Speed		1500	RPM	
Low Idle Speed		600	RPM	
Rated Torque	1781	Nm	1314	ft-lb
Peak Torque	2375	Nm	1752	ft-lb
BMEP, Rated	1658	kPa	240	psi
Rated Pferdestärke (metric hp)		507	ps	
Front Drive Capacity, Intermittent	542	Nm	400	lb-ft
Front Drive Capacity, Continuous	542	Nm	400	lb-ft

Exhaust System

Exhaust Flow	76	m^3/min	2677	ft^3/min
Exhaust Flow @ gas STP	33.3	m^3/min	1176	ft^3/min
Exhaust Temperature	405	°C	761	°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	139.7	mm	5.5	in
Min. Exhaust Pipe Diameter, Wet	152.4	mm	6.0	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
2000	373	500	1781	1314	373	500	102	27	233
1900	373	500	1875	1383	320	429	88	23	234
1800	373	500	1979	1460	272	365	72	19	224
1700	373	500	2095	1545	229	307	60	16	223
1600	373	500	2226	1642	191	256	52	14	233
1500	373	500	2375	1752	157	211	41	11	219
1400	345	463	2353	1735	128	172	34	9	224
1300	300	402	2204	1626	102	137	28	7	229
1200	240	322	1911	1409	81	108	22	6	230
1100	195	262	1695	1250	62	83	17	4	228
1000	156	209	1489	1098	47	63	13	3	232

* Theoretical 3.0 exponent propeller curve , measured at flywheel

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