



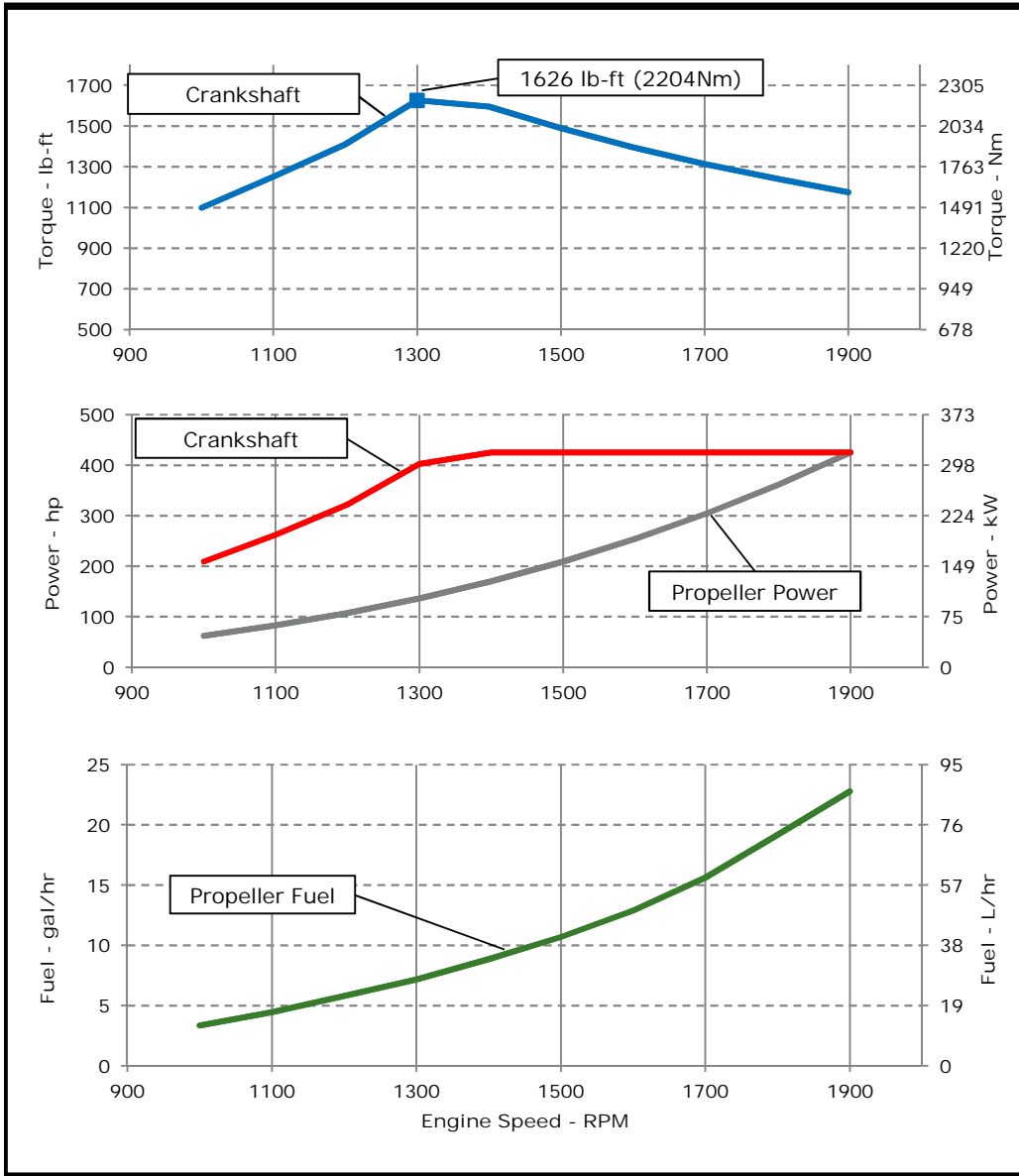
JOHN DEERE

ENGINE PERFORMANCE CURVE

Rating: M2 - 425hp (317kW) @ 1900 RPM
Application: Marine

PowerTech™ 13.5L Engine

Model: 6135AFM85



REFERENCE CONDITIONS

Air Intake Restriction..... 12 in.H₂O (3 kPa)
Exhaust Back Pressure..... 30 in.H₂O (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 Tier II Compliant
- NRMM (97/68/EC), as amended

Ref: Engine Emission Label

Certified by:

10-Oct-16

Performance Curve: 6135AFM85_B

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**	312 kW	17759 BTU/min
Max. Pressure Drop Across Keel Cooler	40 kPa	5.8 psi
Coolant Flow	228 L/min	60 gal/min
Min. Coolant Pump Inlet Pressure	30.3 kPa	4.4 psi
Thermostat Start to Open	72 °C	161 °F
Thermostat Fully Open	82 °C	179 °F
Engine Coolant Capacity, HE	44 L	11.6 gal
Engine Coolant Capacity, KC	42 L	11.1 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
Recommended Fuel Cooler	2 kW	102 BTU/min
Engine Radiated Heat	43 kW	2464 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	1316 mm	51.8 in
Length to rear face of flywheel housing (SAE #1)	1425 mm	56.1 in
Length maximum	1800 mm	70.9 in
Width maximum	1062 mm	41.8 in
Height, crank centerline to top	818 mm	32.2 in
Height, crank centerline to bottom	364 mm	14.3 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 (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	0.0012 ohms
Max. Allowable Start Circuit Resistance, 24V	0.002 ohms
Electrical Component Maximum Temperature Limit	125 °C 257 °F
Maximum ECU Temperature	105 °C 221 °F

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Engine Installation Criteria

Fuel System

ECU Description	L15			
Fuel Injection Pump	Unit Injection			
Governor Type	Electronic			
Volumetric Fuel Consumption	86.2	L/hr	22.8	gal/hr
Mass Fuel Consumption	73.3	kg/hr	162	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	80	°C	176	°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	317	kPa	46	psi
Oil Pressure at Low Idle (600rpm)**	157	kPa	23	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	394	L/min	104	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 1904 option

Air Intake System

Engine Air Flow	32.9	m ³ /min	1163	ft ³ /min
Intake Manifold Pressure	219	kPa	31.8	psi
Manifold Air Temperature	86	°C	194	°F
Maximum Manifold Air Temperature	130	°C	266	°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	0.203	m ²	314	in ²

Performance Data

Rated Power	317	kW	425	hp
Rated Speed	1900 RPM			
Peak Torque Speed	1300 RPM			
Low Idle Speed	600 RPM			
Rated Torque	1593	Nm	1175	ft-lb
Peak Torque	2204	Nm	1626	ft-lb
BMEP, Rated	1483	kPa	215	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	68.2	m ³ /min	2408	ft ³ /min
Exhaust Flow @ gas STP	31.2	m ³ /min	1101	ft ³ /min
Exhaust Temperature	380	°C	716	°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	317	425	1593	1175	317	425	86	23	231
1800	317	425	1682	1241	269	361	73	19	229
1700	317	425	1781	1314	227	304	59	16	221
1600	317	425	1891	1395	189	254	49	13	219
1500	317	425	2018	1488	156	209	40	11	221
1400	317	425	2162	1595	127	170	33	9	224
1300	300	402	2204	1626	102	136	27	7	226
1200	240	322	1911	1409	80	107	22	6	233
1100	195	262	1695	1250	61	82	17	4	233
1000	156	209	1489	1098	46	62	13	3	232

* Theoretical 3.0 exponent propeller curve , measured at flywheel

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