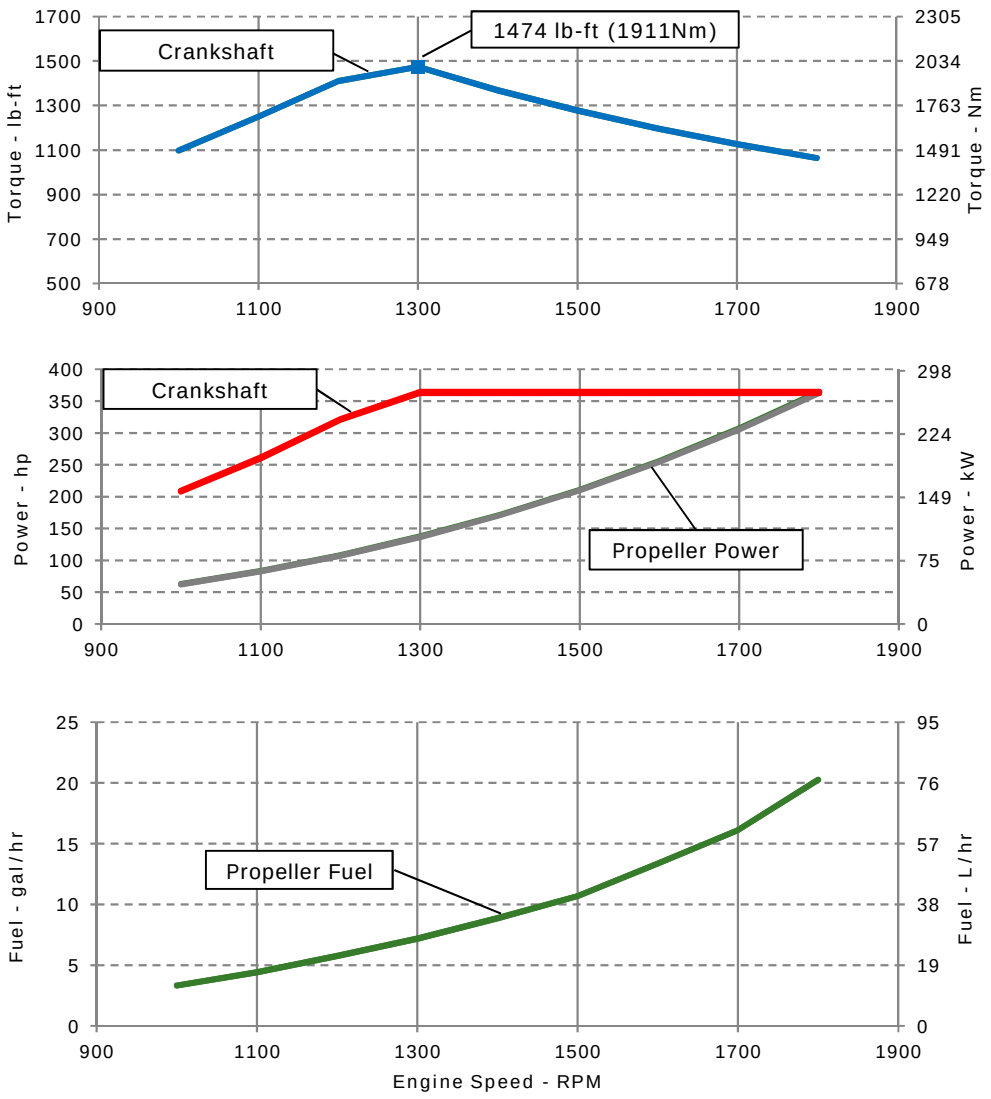
ENGINE PERFORMANCE CURVE

Rating: M1 - 365hp (272kW) @1800 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:

M1: The M1 rating is for marine propulsion applications that may operate up to 24 hours per day at uninterrupted full power and have load factors greater than 65 percent.

Possible applications: Line hauls tugs and towboats, fish and shrimp trawlers/draggers, and displacement hull fishing boats.

Designed/Calibrated to meet:	Certified by:
• EPA Commercial Marine Tier 3 • IMO MARPOL Annex VI Tier II Compliant • NRMM (97/68/EC), as amended	
Ref: Engine Emission Label	10-Oct-16

Performance Curve: 6135AFM85_A

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**	278	kW	15824	BTU/min
Max. Pressure Drop Across Keel Cooler	40	kPa	5.8	psi
Coolant Flow	214	L/min	57	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	97	BTU/min
Engine Radiated Heat	38	kW	2191	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	76.7	L/hr	20.3	gal/hr
Mass Fuel Consumption	65.2	kg/hr	144	lb/hr
Total Fuel Volumetric Flow	159	L/hr	42.0	gal/hr
Total Fuel Mass Flow	135	kg/hr	298	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	401	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

Air Intake System

Engine Air Flow	29.9	m^3/min	1055	ft^3/min
Intake Manifold Pressure	199	kPa	28.9	psi
Manifold Air Temperature	86	°C	187	°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	0.184	m^2	285	in^2

Performance Data

Rated Power	272	kW	365	hp
Rated Speed		1800	RPM	
Peak Torque Speed		1300	RPM	
Low Idle Speed		600	RPM	
Rated Torque	1443	Nm	1064	ft-lb
Peak Torque	1998	Nm	1474	ft-lb
BMEP, Rated	1343	kPa	195	psi
Rated Pferdestärke (metric hp)		370	ps	
Front Drive Capacity, Intermittent	542	Nm	400	lb-ft
Front Drive Capacity, Continuous	542	Nm	400	lb-ft

Exhaust System

Exhaust Flow	63	m^3/min	2211	ft^3/min
Exhaust Flow @ gas STP	28.52	m^3/min	1007	ft^3/min
Exhaust Temperature	382	°C	720	°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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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
1800	272	365	1528	1064	272	365	76.7	20.3	240
1700	272	365	1623	1127	229	307	61.0	16.1	226
1600	272	365	1732	1197	191	256	50.6	13.4	225
1500	272	365	1855	1278	157	211	40.4	10.7	218
1400	272	365	1998	1368	128	172	33.6	8.9	223
1300	272	365	1911	1474	102	137	27.2	7.2	225
1200	240	322	1695	1410	81	108	21.9	5.8	231
1100	195	262	1489	1250	62	83	16.7	4.4	229
1000	156	209	0	1098	47	63	12.6	3.3	229

* Theoretical 3.0 exponent propeller curve , measured at flywheel

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