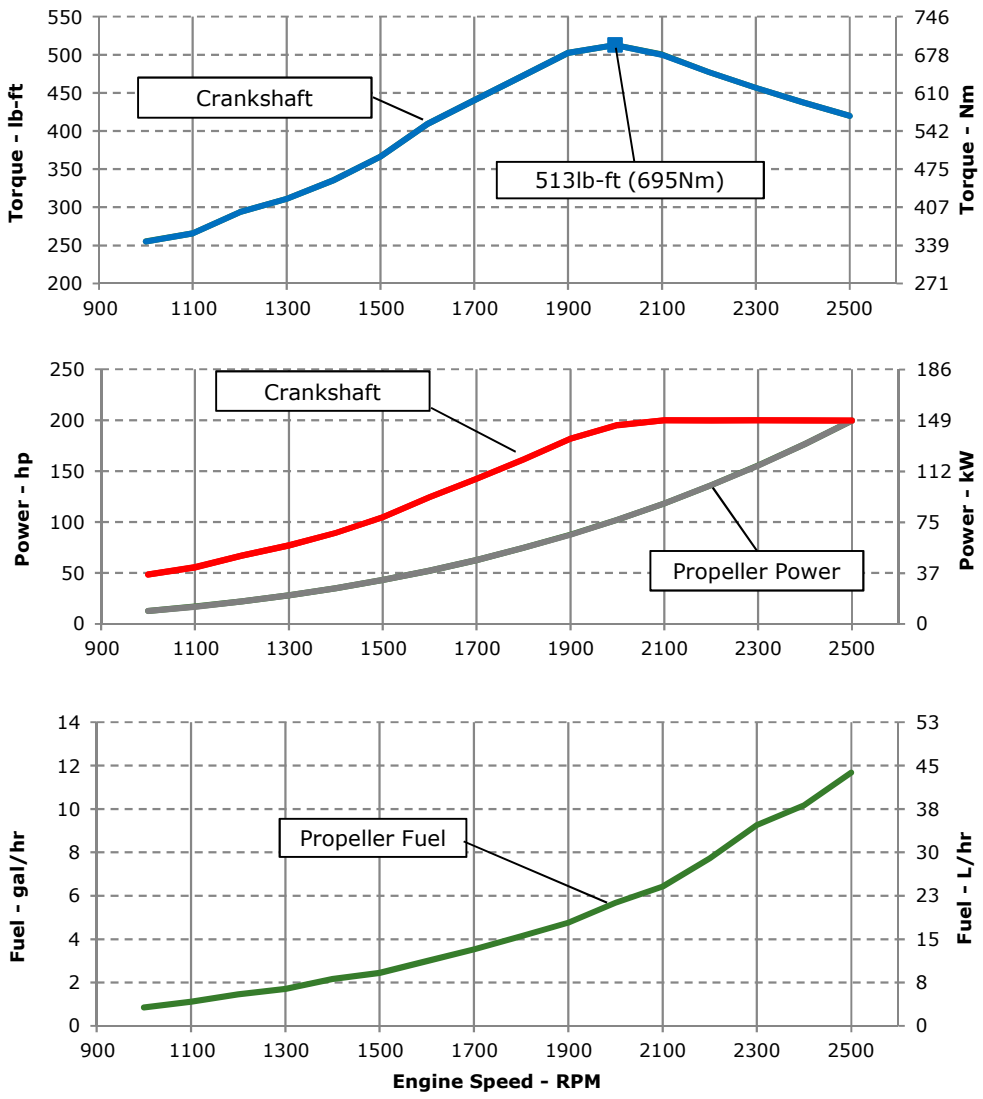
ENGINE PERFORMANCE CURVE

JOHN DEERE

Rating: **M3 - 200hp (149kW) @ 2500 RPM**
Application: **Marine**

PowerTech™ 4.5L Engine
Model: 4045AFM85



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:

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 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 Ochoner
Ref: Engine Emission Label	29-Jun-20

Performance Curve: 4045AFM85_C

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

Engine Installation Criteria

General Data

Model	4045AFM85			
Number of Cylinders	4			
Bore	107	mm	4.21	in
Stroke	127	mm	5.00	in
Displacement	4.5	L	275	in^3
Compression Ratio	16.7:1			
Valves per Cylinder, Intake/Exhaust	2/2			
Combustion System	Direct injection			
Firing Order	1-3-4-2			
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**	160	kW	9107	BTU/min
Max. Pressure Drop Across Keel Cooler	40	kPa	5.8	psi
Coolant Flow	215	L/min	57	gal/min
Min. Coolant Pump Inlet Pressure	30.3	kPa	4.4	psi
Thermostat Start to Open	71	°C	160	°F
Thermostat Fully Open	83	°C	182	°F
Engine Coolant Capacity, HE	17	L	4.4	gal
Engine Coolant Capacity, KC	20	L	5.2	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	100-110	°C	212-230	°F
Absolute Max Top Tank Temperature	110	°C	230	°F
Recommended Fuel Cooler	2	kW	126	BTU/min
Engine Radiated Heat	11	kW	631	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	752	mm	29.6	in
Length to rear face of flywheel housing (SAE #3)	890	mm	35.0	in
Length maximum	1105	mm	43.5	in
Width maximum	864	mm	34.0	in
Height, crank centerline to top	654	mm	25.7	in
Height, crank centerline to bottom	310	mm	12.2	in
Weight, with oil, no coolant (includes engine, flywheel housing, flywheel, and electronics)	578	kg	1274	lb
Center of Gravity Location, X-axis From Rear Face of Block	273	mm	10.8	in
Center of Gravity Location, Y-axis Right of Crankshaft	4.78	mm	0.2	in
Center of Gravity Location, Z-axis Above Crankshaft	227	mm	8.9	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	2.2	kN	495	lbf
Thrust Bearing Load Limit, Forward Intermittent	4	kN	899	lbf
Thrust Bearing Load Limit, Rearward Continuous	1	kN	225	lbf
Thrust Bearing Load Limit, Rearward Intermittent	2	kN	450	lbf

Electrical System

Min. Recommended Battery Capacity, 12V @32 °F (0 °C)	625	amps		
Min. Recommended Battery Capacity, 24V @32 °F (0 °C)	500	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

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Engine Installation Criteria

Fuel System

ECU Description			L14	
Fuel Injection Pump			HPCR	
Governor Type			Electronic	
Volumetric Fuel Consumption	44.2	L/hr	11.7	gal/hr
Mass Fuel Consumption	37.6	kg/hr	83	lb/hr
Total Fuel Volumetric Flow	152	L/hr	40.0	gal/hr
Total Fuel Mass Flow	129	kg/hr	284	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
Normal Operation Fuel Temperature	40	°C	104	°F
Max. Fuel Inlet Temperature	100	°C	212	°F
Min. Recommended Fuel Line Inside Diameter	6.63	mm	0.26	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	436	kPa	63	psi
Oil Pressure at Low Idle (800rpm)**	213	kPa	31	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***			35	deg
Engine Angularity Limits Any Direction, Intermittent***			45	deg

Seawater Pump System

Seawater Pump Flow	238	L/min	63	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	14.18	m^3/min	500.8	ft^3/min
Intake Manifold Pressure	224.7	kPa	32.6	psi
Manifold Air Temperature	100	°C	212	°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	0.087	m^2	135	in^2

Performance Data

Rated Power	149	kW	200	hp
Rated Speed		2500	RPM	
Peak Torque Speed		2000	RPM	
Low Idle Speed		600	RPM	
Rated Torque	569	Nm	420	ft-lb
Peak Torque	681	Nm	502	ft-lb
BMEP, Rated	1596	kPa	231	psi
Rated Pferdestärke (metric hp)		203	ps	
Front Drive Capacity, Intermittent	621	Nm	458	lb-ft
Front Drive Capacity, Continuous	621	Nm	458	lb-ft

Exhaust System

Exhaust Flow	31.4	m^3/min	1109	ft^3/min
Exhaust Flow @ gas STP	14.5	m^3/min	512	ft^3/min
Exhaust Temperature	423	°C	793	°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	114.3	mm	4.5	in
Min. Exhaust Pipe Diameter, Wet	127	mm	5.0	in

* With clean filters

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

*** With 19CZ 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
2500	149	200	569	420	149	200	44	12	252
2400	149	200	593	437	132	177	39	10	248
2300	149	200	619	457	116	156	35	9	257
2200	149	200	647	477	102	136	29	8	245
2100	149	200	678	500	88	118	24	6	234
2000	146	195	695	513	76	102	21	6	239
1900	135	182	681	502	65	88	18	5	234
1800	120	162	639	471	56	75	16	4	239
1700	106	143	597	440	47	63	13	4	242
1600	93	125	555	409	39	52	11	3	247
1500	78	105	497	367	32	43	9	2	244
1400	67	89	455	335	26	35	8	2	266
1300	57	77	422	311	21	28	6	2	263
1200	50	67	398	294	16	22	6	1	285
1100	42	56	360	266	13	17	4	1	282
1000	36	49	346	255	10	13	3	1	288

*** Theoretical 3.0 exponent propeller curve , measured at flywheel**

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