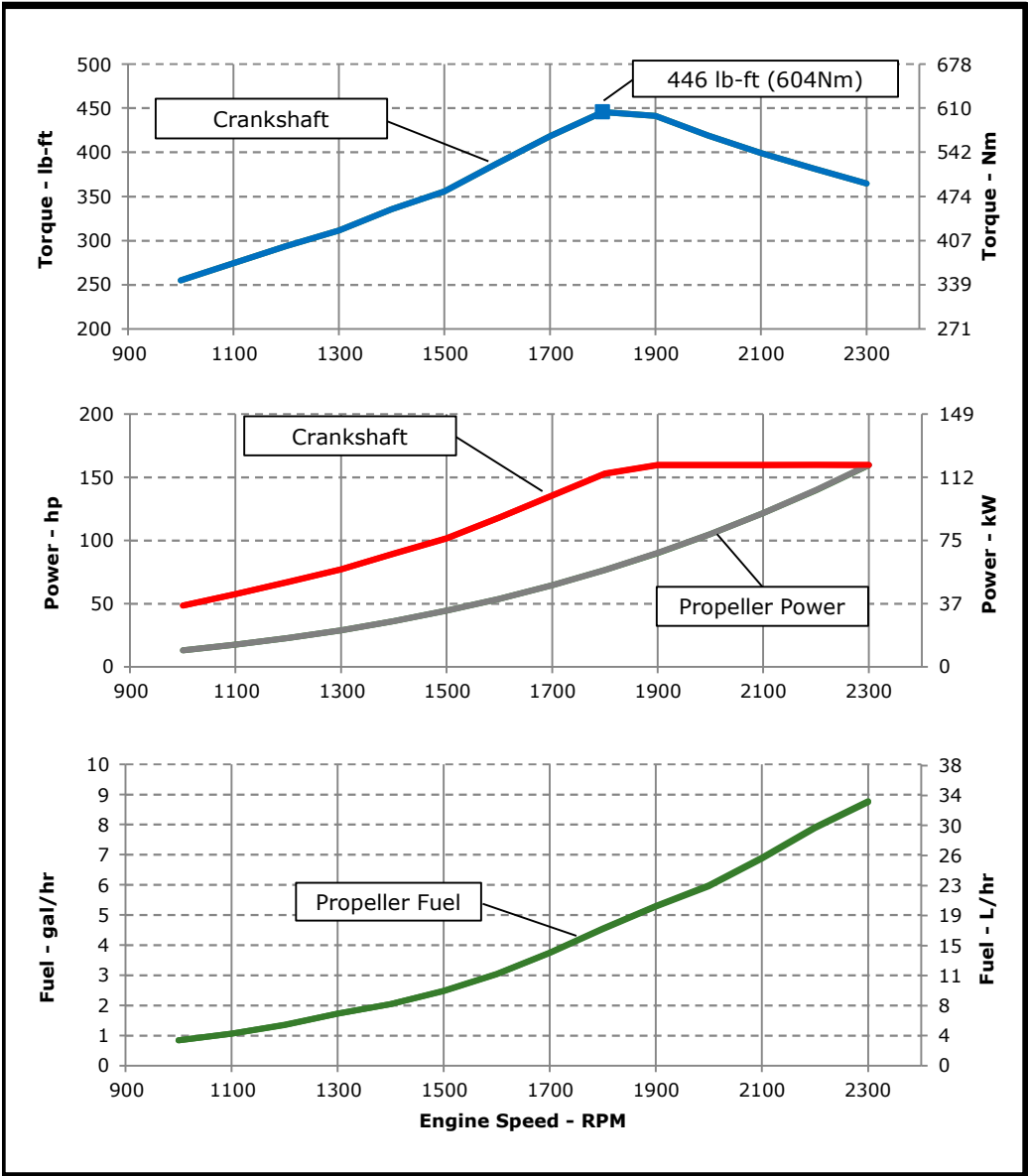




ENGINE PERFORMANCE CURVE

Rating: **M1 - 160hp (119kW) @ 2300 RPM**
 Application: **Marine**

PowerTech™ 4.5L Engine
Model: 4045AFM85



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 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:

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:
<ul style="list-style-type: none"> EPA Marine Tier 3 Commercial (40 CFR 1042) IMO MARPOL Annex VI Exempt (<130 kW) China Stage 2 Commercial Propulsion (GB15097-2016) EU Stage IIIa Inland Waterways (NRMM 97/68/EC, as amended) Recreational Craft Directive 2 (2013/53/EU) 	
Ref: Engine Emission Label	26-Jan-22

Performance Curve: 4045AFM85_A

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**	129 kW	7343 BTU/min
Max. Pressure Drop Across Keel Cooler	40 kPa	5.8 psi
Coolant Flow	198 L/min	52 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	139 BTU/min
Engine Radiated Heat	8 kW	474 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

Performance Curve: 4045AFM85_A

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

Engine Installation Criteria

Fuel System

ECU Description	L14		
Fuel Injection Pump	HPCR		
Governor Type	Electronic		
Volumetric Fuel Consumption	33.2 L/hr	8.8 gal/hr	
Mass Fuel Consumption	28.2 kg/hr	62 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	231 L/min	61 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 19CZ option

Air Intake System

Engine Air Flow	9.39 m ³ /min	331.6 ft ³ /min	
Intake Manifold Pressure	135.4 kPa	19.6 psi	
Manifold Air Temperature	81 °C	178 °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	0.058 m ²	90 in ²	

Performance Data

Rated Power	119 kW	160 hp	
Rated Speed	2300 RPM		
Peak Torque Speed	1800 RPM		
Low Idle Speed	600 RPM		
Rated Torque	494 Nm	364 ft-lb	
Peak Torque	567 Nm	418 ft-lb	
BMEP, Rated	1386 kPa	201 psi	
Rated Pferdestärke (metric hp)	162 ps		
Front Drive Capacity, Intermittent	621 Nm	458 lb-ft	
Front Drive Capacity, Continuous	621 Nm	458 lb-ft	

Exhaust System

Exhaust Flow	22.4 m ³ /min	791 ft ³ /min	
Exhaust Flow @ gas STP	10.1 m ³ /min	357 ft ³ /min	
Exhaust Temperature	441 °C	826 °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	101.6 mm	4.0 in	
Min. Exhaust Pipe Diameter, Wet	114.3 mm	4.5 in	

Performance Curve: 4045AFM85_A

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

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
2300	119	160	494	364	119	160	33.2	8.8	237
2200	119	160	517	381	104	140	29.9	7.9	244
2100	119	160	541	399	91	121	26.1	6.9	245
2000	119	160	568	419	78	105	22.6	6.0	246
1900	119	160	598	441	67	90	20.0	5.3	254
1800	114	153	604	446	57	76	17.2	4.5	256
1700	101	135	567	418	48	64	14.2	3.7	251
1600	88	118	525	387	40	54	11.5	3.0	244
1500	76	102	482	355	33	44	9.4	2.5	242
1400	67	89	455	336	27	36	7.7	2.0	245
1300	57	77	422	311	21	29	6.5	1.7	259
1200	50	67	398	294	17	23	5.1	1.4	258
1100	43	57	372	274	13	17	4.0	1.1	263
1000	36	49	346	255	10	13	3.2	0.8	279

* Theoretical 3.0 exponent propeller curve , measured at flywheel

Performance Curve: 4045AFM85_A

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