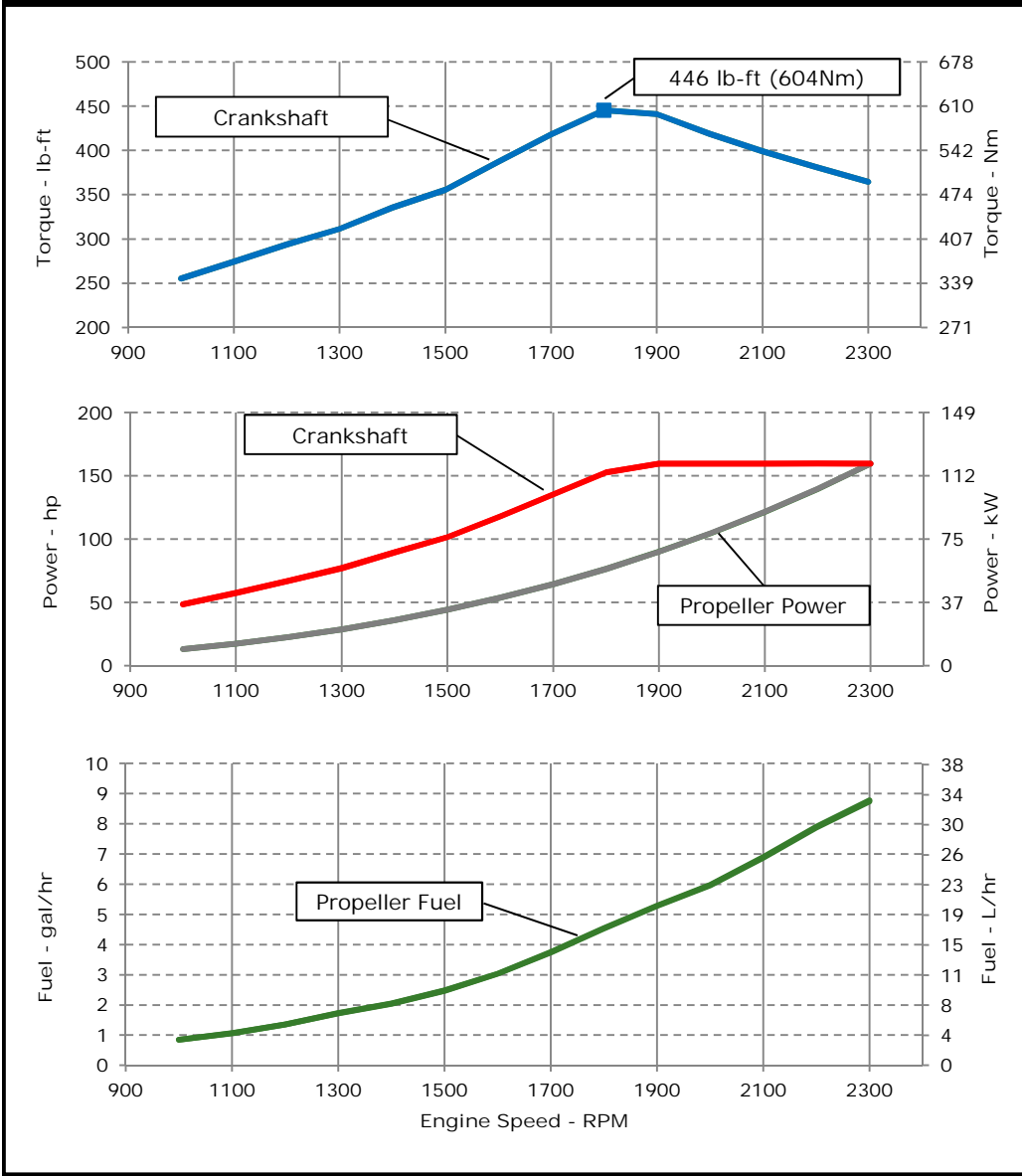




**ENGINE PERFORMANCE CURVE**

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

PowerTech™ 4.5L Engine  
 Model: 4045AFM85



**REFERENCE CONDITIONS**

Air Intake Restriction..... 12 in.H<sub>2</sub>O (3 kPa)  
 Exhaust Back Pressure..... 30 in.H<sub>2</sub>O (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:
<ul style="list-style-type: none"> <li>EPA Commercial Marine Tier 3</li> <li>IMO MARPOL Annex VI Compliant</li> <li>NRMM (97/68/EC), as amended</li> </ul> Ref: Engine Emission Label	

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	273 in <sup>3</sup>	
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
Seawater Flow (heat exchanged)	231 L/min	61 gal/min
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
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	100-110 °C	212-230 °F
Absolute Max Top Tank Temperature	110 °C	230 °F
Recommended Fuel Cooler	9 kW	501 BTU/min
Engine Radiated Heat	17 kW	949 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 maximum	1105 mm	43.5 in
Width maximum	770 mm	30.3 in
Height, crank centerline to top	654 mm	25.7 in
Height, crank centerline to bottom	310 mm	310 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 with 5-G Load	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)	925 amps
Min. Recommended Battery Capacity, 24V @32 °F (0 °C)	625 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
Recommended Starter Cable, 12V 100"	#0
Recommended Starter Cable, 24V 100"	#4
Recommended Starter Cable, 12V 200"	#000 or #20
Recommended Starter Cable, 24V 200"	#2
Electrical Component Maximum Temperature Limit	125 °C 257 °F

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# 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
Max. Fuel Height Above Transfer Pump	2.4	m	7.9	ft
Max. Leak-off Return Height	2.4	m	7.9	ft
Max. Fuel Inlet Height Above Fuel Tank Supply	2.4	m	7.9	ft
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			

\* 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 <sup>3</sup> /min	331.6	ft <sup>3</sup> /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 <sup>2</sup>	90	in <sup>2</sup>

## 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 <sup>3</sup> /min	791	ft <sup>3</sup> /min
Exhaust Flow @ gas STP	10.1	m <sup>3</sup> /min	357	ft <sup>3</sup> /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

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