



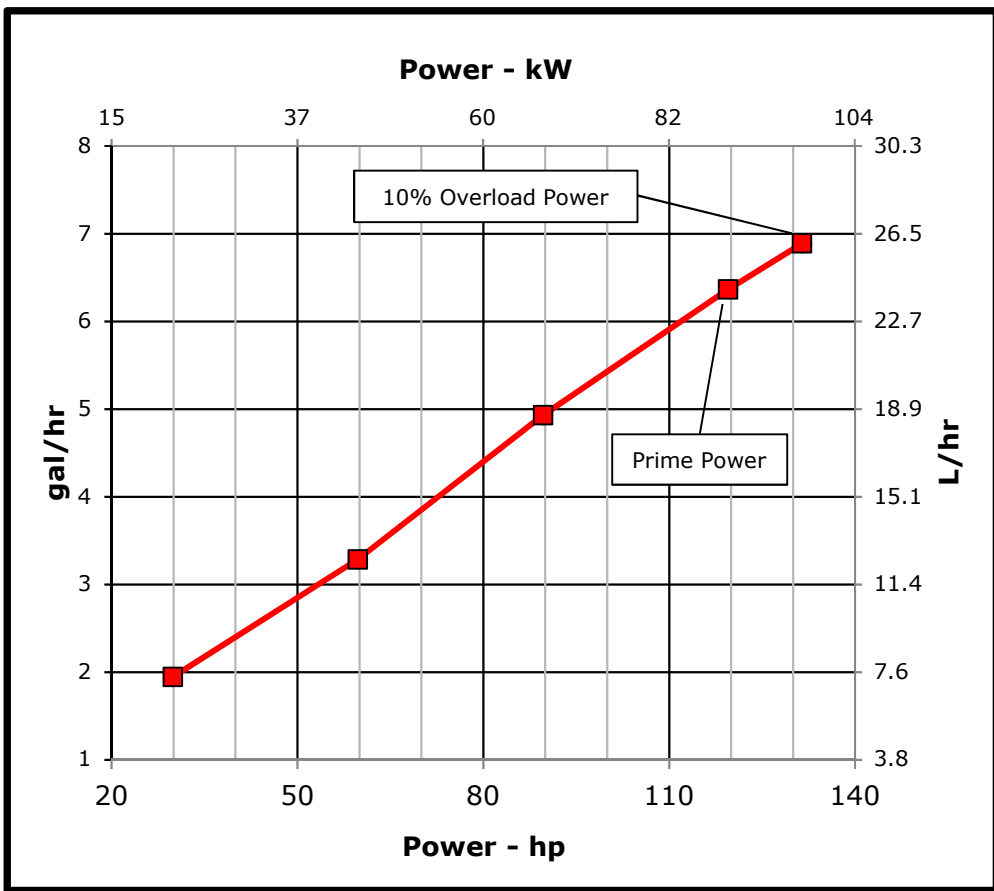
JOHN DEERE

ENGINE PERFORMANCE CURVE

Rating: **50 Hz - 120hp (89kW) @ 1500 RPM**
 Application: **Marine**

PowerTech™ 4.5L Engine
Model: 4045AFM85

Generator Efficiency (%)	Power Factor	Calculated Gen-Set Rating		Prime Power	10% Overload Power
		kWe	kVA	hp (kW)	hp (kW)
88-92	0.8	78-82	98-103	120 (89)	131 (98)



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:

Marine Generator: The Marine generator engine rating is the power available under normal varying electrical load factors for an unlimited number of hours per year in commercial applications. This rating incorporates a 10% overload capability, and conforms to ISO 8528 prime power. Average load over a 24-hour period shall not exceed 67% of the prime rating, of which no more than 2 hours are between 100% and 110% of the prime rating.

Constant speed engines are not certified for constant speed propulsion applications (i.e. variable pitch propeller, hybrid propulsion system).

Possible applications: This rating is used for applications that require constant speed operation in power generation or auxiliary applications such as generators and hydraulic pumps.

Designed/Calibrated to meet:

- IMO MARPOL Annex VI Exempt (<130 kW)
- China Stage 2 Constant Speed Auxiliary (GB15097-2016)

Certified by:

Ref: Engine Emission Label

29-Jun-20

Performance Curve: 4045AFM85_F

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	4.48 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**	103 kW	5863 BTU/min	
Max. Pressure Drop Across Keel Cooler	40 kPa	6 psi	
Coolant Flow	136 L/min	36 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	3 kW	150 BTU/min	
Engine Radiated Heat	6 kW	344 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 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	8.95 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	ohms
Max. Allowable Start Circuit Resistance, 24V	0	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, Prime	24.1 L/hr	6.4 gal/hr	
Mass Fuel Consumption, Prime	20.5 kg/hr	45 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 1500 RPM**	343 kPa	55 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	155 L/min	41 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	5.9 m ³ /min	209 ft ³ /min	
Intake Manifold Pressure	125 kPa	18.1 psi	
Manifold Air Temperature	78 °C	172 °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	0.036 m ²	56 in ²	

Performance Data

Prime Power	89 kW	119 hp	
10% Overload Power	98 kW	131 hp	
Rated Speed	1500	RPM	
Low Idle Speed	1000	RPM	
Prime Torque	567 Nm	418 lb-ft	
BMEP, Prime	1591 kPa	231 psi	
Rated Pferdestärke, Prime (metric hp)	121	ps	
Front Drive Capacity, Intermittent	621 Nm	458 lb-ft	
Front Drive Capacity, Continuous	621 Nm	458 lb-ft	
Friction Power @ Rated Speed	9.3 kW	12 hp	

Exhaust System

Exhaust Flow	14.7 m ³ /min	519 ft ³ /min	
Exhaust Flow @ gas STP	6.23 m ³ /min	220 ft ³ /min	
Exhaust Temperature	488 °C	910.4 °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	114.3 in	

Performance Curve: 4045AFM85_F

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

Engine Installation Criteria

Engine Performance Data Table

Engine Power	Crank Power		Crank Torque		Fuel Consumption		BSFC
	kW	hp	Nm	lb-ft	L/hr	gal/hr	
25%	22	30	142	105	7.4	1.9	281
50%	45	60	284	209	12.4	3.3	237
75%	67	90	426	314	18.7	4.9	237
100%	89	120	567	418	24.1	6.4	230
110%	98	131	624	460	26.1	6.9	226

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