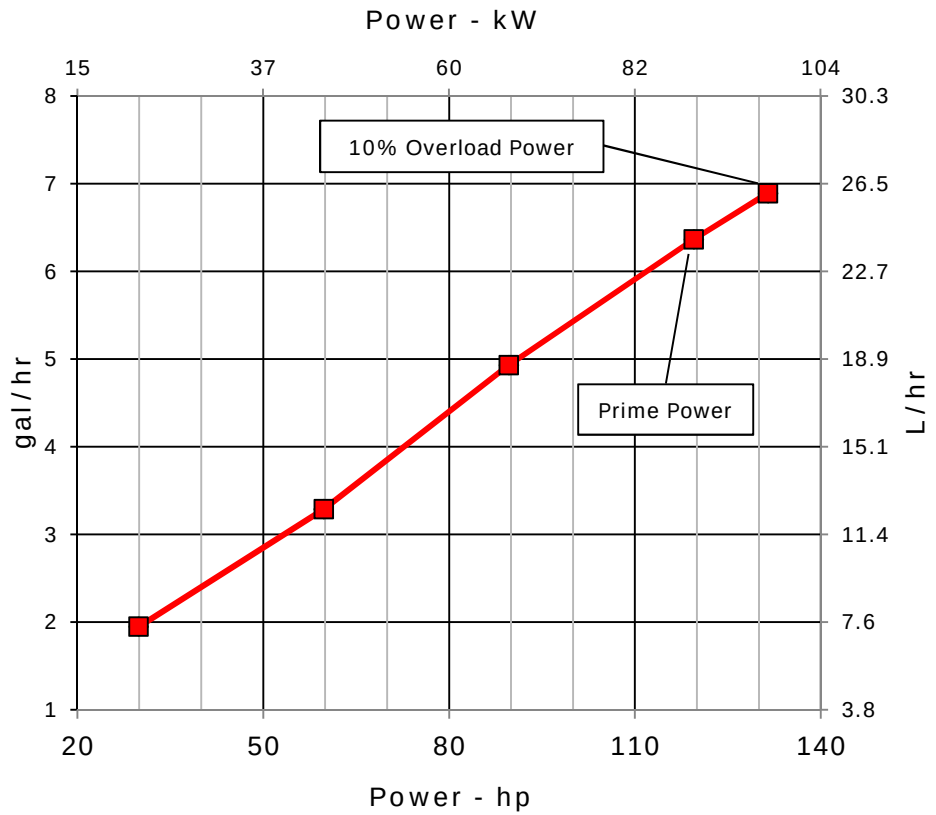
ENGINE PERFORMANCE CURVE

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

PowerTech™ 4.5L Engine
Model: 4045AFM85

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



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:

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.

The marine generator rating is restricted to generator applications only. The criteria used to establish marine generator application ratings are the same used to establish industrial prime power generator application ratings

Designed/Calibrated to meet:	Certified by:
• IMO MARPOL Annex VI Compliant Ref: Engine Emission Label	Adam Paull

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	273	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
Seawater Flow (heat exchanged)	155	L/min	41	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	539	BTU/min
Engine Radiated Heat	12	kW	689	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	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 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 2#0	
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, 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
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 1500 RPM**	343	kPa	55	psi
Max. Crankcase Pressure	2	kPa	8	in.H_2O
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	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 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	0.036	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		1500	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
Software and Label Convertible to 50 Hz?		YES		

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.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	101.6	mm	4.0	in
Min. Exhaust Pipe Diameter, Wet	114.3	mm	114.3	in

Performance Curve: 4045AFM85_F

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Engine Performance Data Table

Engine Power	Crank Power		Crank Torque		Fuel Consumption		BSFC
	kW	hp	Nm	lb-ft	L/hr	gal/hr	g/kW-hr
25%	22.3	29.9	141.8	104.6	7.4	1.9	281.2
50%	44.6	59.8	283.7	209.2	12.4	3.3	237.2
75%	66.8	89.6	425.5	313.9	18.7	4.9	237.2
100%	89.1	119.5	567.4	418.5	24.1	6.4	229.7
110%	98.0	131.5	624.1	460.3	26.1	6.9	226.1

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