



**JOHN DEERE**

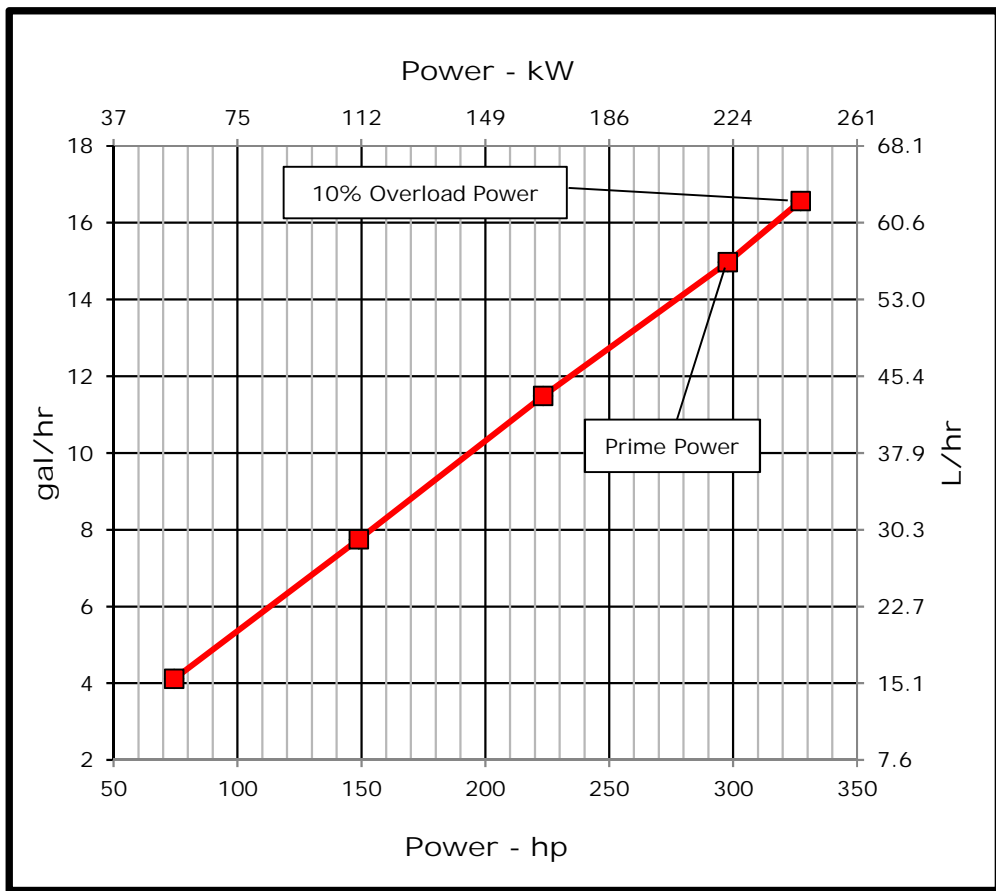
**ENGINE PERFORMANCE CURVE**

Rating: 50 Hz - 298hp (222kW) @ 1500 RPM  
 Application: Marine

PowerTech™ 9.0L Engine

Model: 6090SFM85

Generator Efficiency (%)	Power Factor	Calculated Gen-Set Rating		Prime Power	10% Overload Power
		kWe	kVA	hp (kW)	hp (kW)
88-92	0.8	195-204	244-255	298 (222)	327 (244)



**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 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 Tier II Compliant (MARPOL Annex VI)

Ref: Engine Emission Label

Certified by:

30-Oct-18

Performance Curve: 6090SFM85\_G

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

# Engine Installation Criteria

## General Data

Model	6090SFM85		
Number of Cylinders	6		
Bore	118.4 mm	4.66 in	
Stroke	136 mm	5.35 in	
Displacement	9 L	549 in <sup>3</sup>	
Compression Ratio	16.3:1		
Valves per Cylinder, Intake/Exhaust	2/2		
Combustion System	Direct injection		
Firing Order	1-5-3-6-2-4		
Engine Type	In line, 4 Cycle		
Aspiration	Turbocharged and Aftercooled		
Aftercooling System	Seawater cooled		
Engine Crankcase Vent System	Closed		

## Cooling System\*

Jacket Water Heat Rejection**	233.7 kW	13302 BTU/min	
Aftercooler Heat Rejection	34.92 kW	1988 BTU/min	
Coolant Flow	243 L/min	64 gal/min	
Min. Coolant Pump Inlet Pressure	30.3 kPa	4.4 psi	
Thermostat Start to Open	82 °C	180 °F	
Thermostat Fully Open	94 °C	202 °F	
Engine Coolant Capacity, HE	38 L	10 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	3.4 kW	193 BTU/min	
Engine Radiated Heat	28 kW	1619 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	1297 mm	51.1 in
Length to rear face of flywheel housing (SAE #2)	1415 mm	55.7 in
Length maximum	1685 mm	66.3 in
Width maximum	953 mm	37.5 in
Height, crank centerline to top	664 mm	26.1 in
Height, crank centerline to bottom	319 mm	12.6 in
Weight, with oil, no coolant (includes engine, flywheel housing, flywheel, and electronics)	1056 kg	2327 lb
Center of Gravity Location, X-axis From Rear Face of Block	408 mm	16.1 in
Center of Gravity Location, Y-axis Right of Crankshaft	-38 mm	-1.5 in
Center of Gravity Location, Z-axis Above Crankshaft	200 mm	7.87 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	8.6 kN	1933 lbf
Thrust Bearing Load Limit, Forward Intermittent	13 kN	2923 lbf
Thrust Bearing Load Limit, Rearward Continuous	4 kN	899 lbf
Thrust Bearing Load Limit, Rearward Intermittent	6 kN	1349 lbf

## Electrical System

Min. Recommended Battery Capacity, 12V @32 °F (0 °C)	1100	amps
Min. Recommended Battery Capacity, 24V @32 °F (0 °C)	750	amps
Starter Rolling Current, 12V @32 °F (0 °C)	500	amps
Starter Rolling Current, 24V @32 °F (0 °C)	300	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	56.7 L/hr	15.0 gal/hr	
Mass Fuel Consumption, Prime	48.2 kg/hr	106 lb/hr	
Total Fuel Volumetric Flow	221 L/hr	58.4 gal/hr	
Total Fuel Mass Flow	188 kg/hr	414 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	8 mm	0.32 in	
Min. Recommended Fuel Line Size	6 (-) AN		
Primary Fuel Filter	10 mic		
Secondary Fuel Filter	2 mic		

## Lubrication System

Oil Pressure at 1500 RPM**	222 kPa	35 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***	20 deg		
Engine Angularity Limits Any Direction, Intermittent***	30 deg		

## Seawater Pump System

Seawater Pump Flow	295 L/min	78 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 1932 option

## Air Intake System

Engine Air Flow	14.8 m <sup>3</sup> /min	522 ft <sup>3</sup> /min	
Intake Manifold Pressure	152 kPa	22.0 psi	
Manifold Air Temperature	37 °C	99 °F	
Maximum Manifold Air Temperature	67 °C	152.6 °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.H2O	
Max. Air Intake Restriction, Dirty Air Cleaner	6.25 kPa	25 in.H2O	
Min. Ventilation Area	0.091 m <sup>2</sup>	141 in <sup>2</sup>	

## Performance Data

Prime Power	222 kW	297 hp	
10% Overload Power	244 kW	327 hp	
Rated Speed	1500 RPM		
Low Idle Speed	1000 RPM		
Prime Torque	1412 Nm	1042 lb-ft	
BMEP, Prime	1972 kPa	286 psi	
Rated Pferdestärke, Prime (metric hp)	302 ps		
Front Drive Capacity, Intermittent	955 Nm	704 lb-ft	
Front Drive Capacity, Continuous	955 Nm	704 lb-ft	
Software and Label Convertible to 50 Hz?	YES		
Friction Power @ Rated Speed	16.6 kW	22.2 hp	

## Exhaust System

Exhaust Flow	36.4 m <sup>3</sup> /min	1285 ft <sup>3</sup> /min	
Exhaust Flow @ gas STP	14.3 m <sup>3</sup> /min	505 ft <sup>3</sup> /min	
Exhaust Temperature	477 °C	890.6 °F	
Max. Allowable Exhaust Restriction <sup>+</sup>	7.5 kPa	60 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	127.0 in	

<sup>+</sup> Exhaust system restriction should be limited to 7.5 kPa. When an exhaust aftertreatment system is installed, the maximum design restriction is 15 kPa. Restriction over 7.5 kPa will result in diminished performance. Restriction over 15 kPa may cause engine damage

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## 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%	56	74	353	261	15.6	4.1	238
50%	111	149	707	521	29.3	7.7	224
75%	167	223	1060	782	43.5	11.5	222
100%	222	298	1413	1042	56.7	15.0	217
110%	244	327	1553	1146	62.7	16.6	218

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