

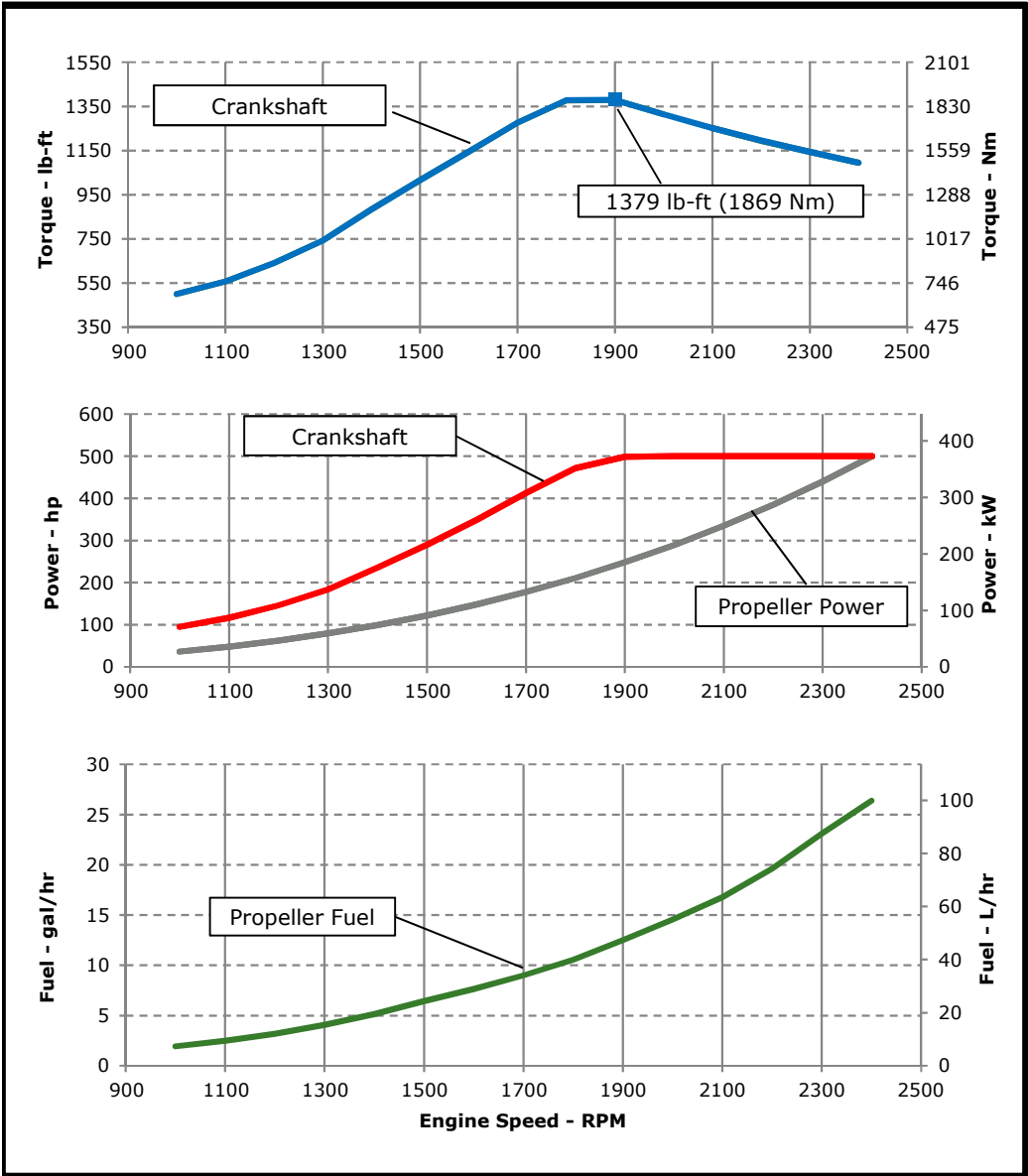


**JOHN DEERE**

**ENGINE PERFORMANCE CURVE**

Rating: **M4 - 500hp (373kW) @ 2400 RPM**  
 Application: **Marine**

**PowerTech™ 9.0L Engine**  
**Model: 6090SFM85**



**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:**

**M4:** The **M4** rating is for marine propulsion applications that typically operate between 1,000-3,000 hours per year and have load factors below 40 percent. This rating is for applications that use full power no more than 1 hour out of each 12 hours of operation. The remaining time of operation is at or below cruising speed.

**Possible applications:** Inshore crew boats, charter fishing boats, pilot boats, dive boats, and planning hull commercial fishing boats.

Designed/Calibrated to meet:	Certified by:
<ul style="list-style-type: none"> <li>EPA Marine Tier 3 Commercial (40 CFR 1042)</li> <li>IMO Tier II Compliant (MARPOL Annex VI)</li> <li>EU Stage IIIa Inland Waterways (NRMM 97/68/EC, as amended)</li> <li>Recreational Craft Directive 2 (2013/53/EU)</li> </ul>	
Ref: Engine Emission Label	9-Jun-20

Performance Curve: 6090SFM85\_D

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	9.0 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**	271 kW	15425 BTU/min
Aftercooler Heat Rejection	109.56 kW	6236 BTU/min
Coolant Flow	398 L/min	105 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	3.1 kW	178 BTU/min
Engine Radiated Heat	25 kW	1427 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	1712 mm	67.4 in
Width maximum	974 mm	38.3 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	7.9 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	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	0.002 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

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## Engine Installation Criteria

### Fuel System

ECU Description	L14			
Fuel Injection Pump	HPCR			
Governor Type	Electronic			
Volumetric Fuel Consumption	99.9	L/hr	26.4	gal/hr
Mass Fuel Consumption	84.9	kg/hr	187	lb/hr
Total Fuel Volumetric Flow	251	L/hr	66.3	gal/hr
Total Fuel Mass Flow	213	kg/hr	470	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	8.53	mm	0.34	in
Min. Recommended Fuel Line Size	6 (-) AN			
Primary Fuel Filter	10 mic			
Secondary Fuel Filter	2 mic			

### Lubrication System

Oil Pressure at Rated Speed	270	kPa	39	psi
Oil Pressure at Low Idle (650rpm)**	145	kPa	21	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	375	L/min	99	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	32.6	m <sup>3</sup> /min	1151	ft <sup>3</sup> /min
Intake Manifold Pressure	242	kPa	35.1	psi
Manifold Air Temperature	45	°C	113	°F
Maximum Manifold Air Temperature	67	°C	153	°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	0.201	m <sup>2</sup>	311	in <sup>2</sup>
Max. CAC Delta Pressure	14.9	kPa	59.8	in.H2O

### Performance Data

Rated Power	373	kW	500	hp
Rated Speed	2400 RPM			
Peak Torque Speed	1900 RPM			
Low Idle Speed	650 RPM			
Rated Torque	1484	Nm	1095	ft-lb
Peak Torque	1869	Nm	1379	ft-lb
BMEP, Rated	2072	kPa	300	psi
Rated Pferdestärke (metric hp)	507 ps			
Front Drive Capacity, Intermittent	955	Nm	704	lb-ft
Front Drive Capacity, Continuous	955	Nm	704	lb-ft

### Exhaust System

Exhaust Flow	71.7	m <sup>3</sup> /min	2532	ft <sup>3</sup> /min
Exhaust Flow @ gas STP	31.2	m <sup>3</sup> /min	1102	ft <sup>3</sup> /min
Exhaust Temperature	414	°C	777	°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	139.7	mm	5.5	in
Min. Exhaust Pipe Diameter, Wet	152.4	mm	6.0	in

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## 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
<b>2400</b>	373	500	1484	1095	373	500	100	26	228
<b>2300</b>	373	501	1550	1143	328	440	87	23	226
<b>2200</b>	373	500	1619	1194	287	385	74	20	220
<b>2100</b>	373	500	1696	1251	250	335	64	17	216
<b>2000</b>	373	500	1780	1313	216	289	55	15	217
<b>1900</b>	372	499	1869	1379	185	248	47	12	217
<b>1800</b>	352	472	1867	1377	157	211	40	11	216
<b>1700</b>	308	413	1730	1276	133	178	34	9	218
<b>1600</b>	260	349	1553	1145	111	148	29	8	223
<b>1500</b>	216	290	1376	1015	91	122	24	6	228
<b>1400</b>	176	235	1197	883	74	99	20	5	224
<b>1300</b>	137	184	1007	743	59	79	15	4	221
<b>1200</b>	109	146	868	640	47	63	12	3	220
<b>1100</b>	87	117	755	557	36	48	9	3	224
<b>1000</b>	71	95	678	500	27	36	7	2	231

\* Theoretical 3.0 exponent propeller curve , measured at flywheel

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