

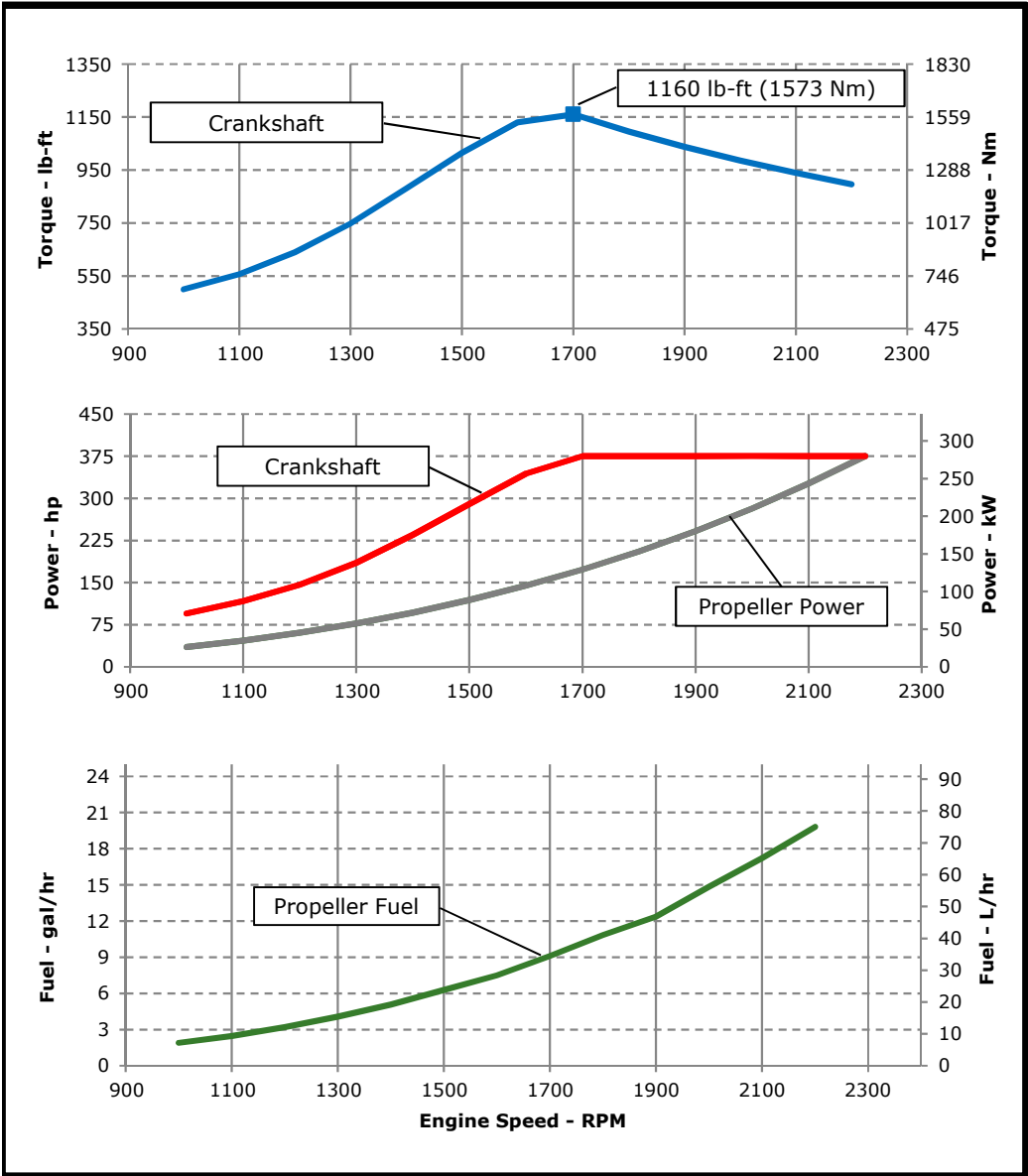


**JOHN DEERE**

**ENGINE PERFORMANCE CURVE**

Rating: **M2 - 375hp (280kW) @ 2200 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:**  
**M2:** The M2 rating is for marine propulsion applications that typically operate between 3,000-5,000 hours per year and have load factors up to 65 percent. This rating is for applications that are in continuous use and use full power for no more than 16 hours of each 24 hours of operation. The remaining time of operation is at or below cruising speed.

**Possible applications:** Short-range tugs and towboats long-range ferryboats,

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>	 9-Jun-20
Ref: Engine Emission Label	
Performance Curve: 6090SFM85_B	

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**	211 kW	12010 BTU/min
Aftercooler Heat Rejection	76.1 kW	4332 BTU/min
Coolant Flow	317 L/min	84 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	3.6 kW	207 BTU/min
Engine Radiated Heat	19 kW	1072 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	75	L/hr	19.8	gal/hr
Mass Fuel Consumption	63.8	kg/hr	141	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	371	L/min	98	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	26.5	m <sup>3</sup> /min	935.8	ft <sup>3</sup> /min
Intake Manifold Pressure	186.9	kPa	27.1	psi
Manifold Air Temperature	38	°C	100	°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	0.163	m <sup>2</sup>	253	in <sup>2</sup>
Max. CAC Delta Pressure	11.1	kPa	44.6	in.H2O

### Performance Data

Rated Power	280	kW	375	hp
Rated Speed	2200 RPM			
Peak Torque Speed	1700 RPM			
Low Idle Speed	650 RPM			
Rated Torque	1215	Nm	896	ft-lb
Peak Torque	1573	Nm	1160	ft-lb
BMEP, Rated	1697	kPa	246	psi
Rated Pferdestärke (metric hp)	329 ps			
Front Drive Capacity, Intermittent	955	Nm	704	lb-ft
Front Drive Capacity, Continuous	955	Nm	704	lb-ft

### Exhaust System

Exhaust Flow	55.5	m <sup>3</sup> /min	1960	ft <sup>3</sup> /min
Exhaust Flow @ gas STP	25.4	m <sup>3</sup> /min	897	ft <sup>3</sup> /min
Exhaust Temperature	369.6	°C	697	°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	114.3	mm	4.5	in
Min. Exhaust Pipe Diameter, Wet	127	mm	5.0	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>2200</b>	280	375	1215	896	280	375	75	20	228
<b>2100</b>	280	375	1273	939	243	326	65	17	227
<b>2000</b>	280	376	1337	986	210	282	56	15	227
<b>1900</b>	280	375	1407	1038	180	242	47	12	221
<b>1800</b>	280	375	1485	1095	153	206	41	11	228
<b>1700</b>	280	375	1573	1160	129	173	34	9	227
<b>1600</b>	257	344	1532	1130	108	144	28	8	224
<b>1500</b>	216	290	1375	1014	89	119	24	6	228
<b>1400</b>	175	235	1195	881	72	97	19	5	226
<b>1300</b>	138	185	1014	748	58	77	15	4	228
<b>1200</b>	109	146	868	640	45	61	12	3	226
<b>1100</b>	87	117	755	557	35	47	9	2	227
<b>1000</b>	71	95	678	500	26	35	7	2	233

\* Theoretical 3.0 exponent propeller curve , measured at flywheel

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