



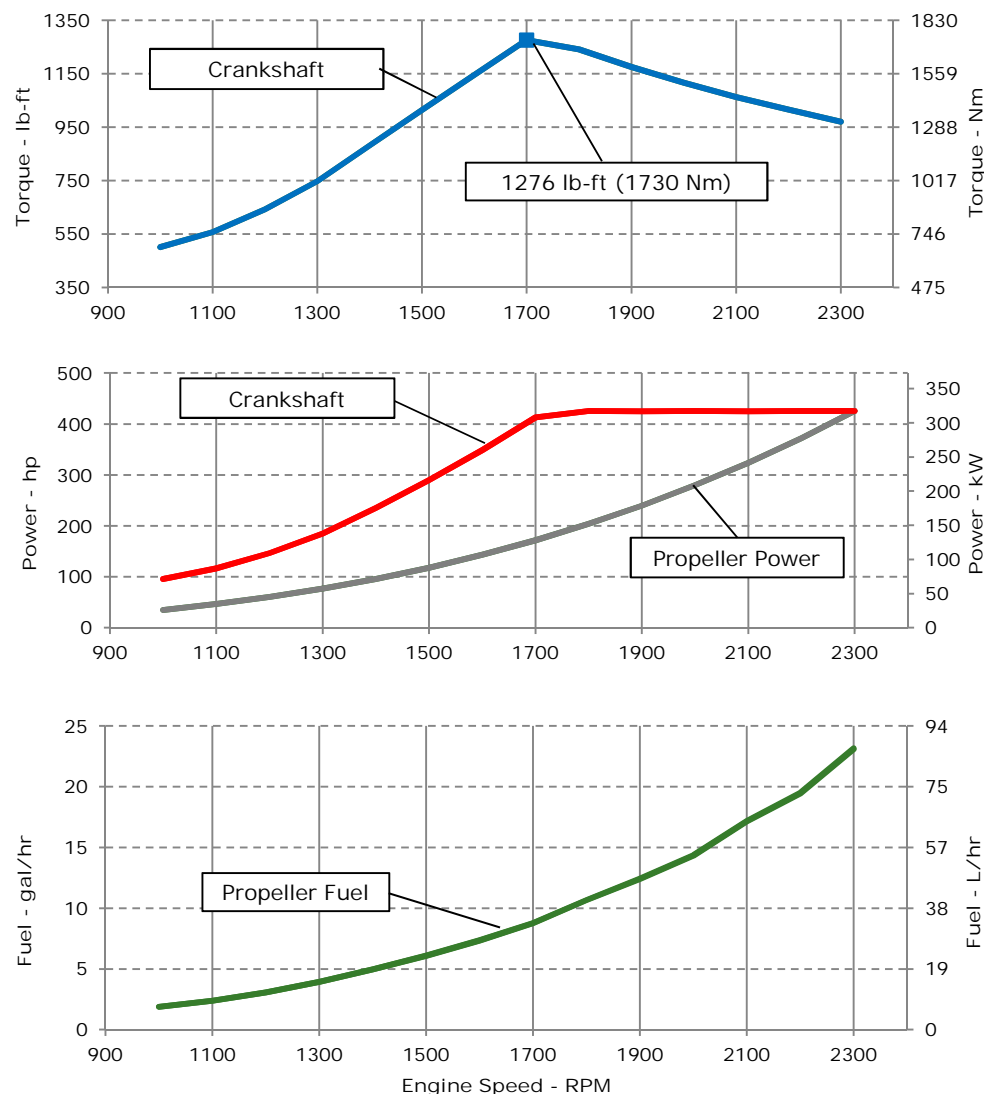
JOHN DEERE

## ENGINE PERFORMANCE CURVE

Rating: M3 - 425hp (317kW) @ 2300 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 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:

**M3:** The M3 rating is for marine propulsion applications that typically operate between 2,000-4,000 hours per year and have load factors up to 50 percent. This rating is for applications that use full power for no more than 4 hours out of each 12 hours of operation. The remaining time of operation is at or below cruising speed.

**Possible applications:** Coastal fishing boats offshore crew boats, research boats. Short range ferryboats and dinner cruise boats.

Designed/Calibrated to meet:

- EPA Commercial Marine Tier 3
- IMO MARPOL Annex VI Compliant
- NRMM (97/68/EC), as amended

Ref: Engine Emission Label

Certified by:

9-Mar-14

Performance Curve: 6090SFM85\_C

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\*

Total Engine to Seawater Heat Rejection**	248	kW	14116	BTU/min
Aftercooler Heat Rejection	90	kW	5123	BTU/min
Coolant Flow	329	L/min	87	gal/min
Thermostat Start to Open	82	°C	180	°F
Thermostat Fully Open	94	°C	202	°F
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	12	kW	693	BTU/min
Engine Radiated Heat	44	kW	2498	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	1293	mm	50.9	in
Length maximum	1714	mm	67.5	in
Width maximum	975	mm	38.4	in
Height, crank centerline to top	662	mm	26.1	in
Height, crank centerline to bottom	320	mm	320	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 with 5-G Load	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
Recommended Starter Cable, 12V 100"	#00	
Recommended Starter Cable, 24V 100"	#2	
Recommended Starter Cable, 12V 200"	#0000 or 2#00	
Recommended Starter Cable, 24V 200"	#0	
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	87.4	L/hr	23.1	gal/hr
Mass Fuel Consumption	74.3	kg/hr	164	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
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	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	29.24	m³/min	###	ft³/min
Intake Manifold Pressure	231	kPa	33.5	psi
Manifold Air Temperature	42	°C	108	°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	0.18	m²	279	in²

## Performance Data

Rated Power	317	kW	425	hp
Rated Speed	2300	RPM		
Peak Torque Speed	1700	RPM		
Low Idle Speed	650	RPM		
Rated Torque	1316	Nm	971	ft-lb
Peak Torque	1730	Nm	1276	ft-lb
BMEP, Rated	1838	kPa	266	psi
Rated Pferdestärke (metric hp)	431	ps		
Front Drive Capacity, Intermittent	955	Nm	704	lb-ft
Front Drive Capacity, Continuous	955	Nm	704	lb-ft

## Exhaust System

Exhaust Flow	61	m³/min	2154	ft³/min
Exhaust Flow @ gas STP	27.9	m³/min	985	ft³/min
Exhaust Temperature	382	°C	720	°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	127	mm	5.0	in
Min. Exhaust Pipe Diameter, Wet	139.7	mm	5.5	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	g/kW-hr
2300	317	425	1316	971	317	425	87	23	234
2200	317	425	1377	1015	277	372	74	19	225
2100	317	425	1441	1063	241	324	65	17	228
2000	317	425	1514	1117	208	280	54	14	221
1900	317	425	1593	1175	179	240	47	12	223
1800	317	425	1682	1241	152	204	40	11	225
1700	308	413	1730	1276	128	172	33	9	220
1600	260	349	1553	1146	107	143	28	7	221
1500	216	290	1375	1014	88	118	23	6	222
1400	175	235	1195	881	72	96	19	5	223
1300	138	185	1013	747	57	77	15	4	221
1200	109	147	870	641	45	60	12	3	218
1100	87	117	755	557	35	47	9	2	221
1000	71	95	679	501	26	35	7	2	231

\* Theoretical 3.0 exponent propeller curve , measured at flywheel

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