

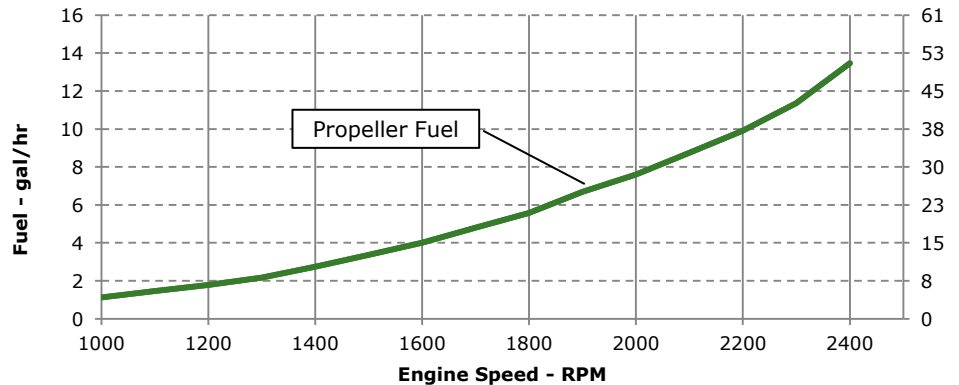
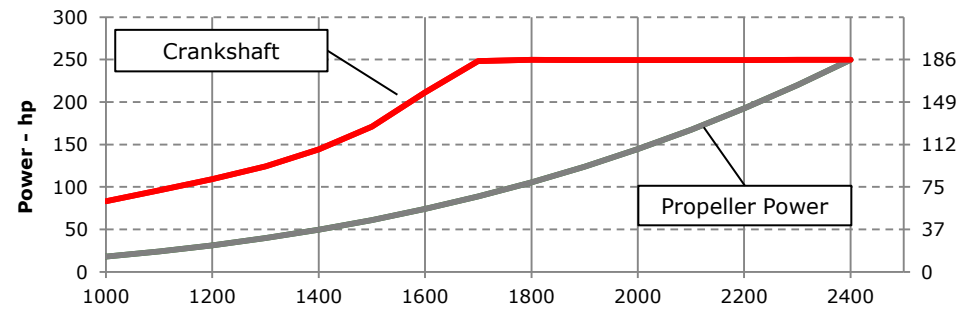
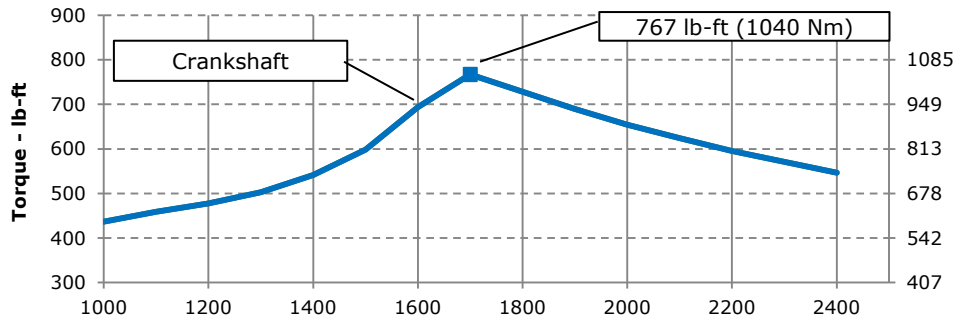


**JOHN DEERE**

**ENGINE PERFORMANCE CURVE**

Rating: **M1 - 249 HP (186 kW) @ 2400 rpm**  
 Application: **Marine**

**PowerTech™ 6.8L Engine**  
**Model: 6068SFM85**



**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:**

**M1:** The M1 rating is for marine propulsion applications that may operate up to 24 hours per day uninterrupted full power. These applications typically operate over 3,000 hours per year and have load factors over 65%. The M1 rating is the ISO 8665 standard power rating and the SAE J1228 crankshaft power rating. Both are defined as the power level at which an engine can run continuously between recommended service intervals.

**Possible applications:** Line haul tugs and towboats, fish and shrimp trawlers/draggers, and displacement hull fishing boats over 18 m (60 ft).

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:

*Adam Paul*

15-Aug-12

Performance Curve: 6068SFM85\_A

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

## Engine Installation Criteria

### General Data

Model	6068SFM85		
Number of Cylinders	6		
Bore	106 mm	4.17	in
Stroke	127 mm	5.00	in
Displacement	6.8 L	415	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**	145.89 kW	8304	BTU/min
Aftercooler Heat Rejection	31.15 kW	1773	BTU/min
Coolant Flow	231 L/min	61	gal/min
Thermostat Start to Open	82 °C	180	°F
Thermostat Fully Open	95 °C	203	°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	10 kW	597	BTU/min
Engine Radiated Heat	26 kW	1457	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	1027 mm	40.4	in
Length maximum	1317 mm	51.9	in
Width maximum	872 mm	34.3	in
Height, crank centerline to top	645 mm	25.4	in
Height, crank centerline to bottom	293 mm	293	in
Weight, with oil, no coolant (includes engine, flywheel housing, flywheel, and electronics)	0 kg	0	lb
Center of Gravity Location, X-axis From Rear Face of Block	0 mm	0.0	in
Center of Gravity Location, Y-axis Right of Crankshaft	0 mm	0.0	in
Center of Gravity Location, Z-axis Above Crankshaft	0 mm	0.0	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"	#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	51	L/hr	13.5	gal/hr
Mass Fuel Consumption	43.4	kg/hr	96	lb/hr
Total Fuel Volumetric Flow	192	L/hr	50.7	gal/hr
Total Fuel Mass Flow	163	kg/hr	360	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	7.46	mm	0.29	in
Min. Recommended Fuel Line Size	5 (-) AN			
Primary Fuel Filter	10 mic			
Secondary Fuel Filter	2 mic			

### Lubrication System

Oil Pressure at Rated Speed	415	kPa	60	psi
Oil Pressure at Low Idle (800rpm)**	180	kPa	26	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***	25 deg			
Engine Angularity Limits Any Direction, Intermittent***	35 deg			

### Seawater Pump System

Seawater Pump Flow	226	L/min	60	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 19BP option

### Air Intake System

Engine Air Flow	15.29	m <sup>3</sup> /min	540.0	ft <sup>3</sup> /min
Intake Manifold Pressure	211	kPa	30.6	psi
Manifold Air Temperature	34	°C	93	°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	0.094	m <sup>2</sup>	146	in <sup>2</sup>

### Performance Data

Rated Power	186	kW	250	hp
Rated Speed	2400 RPM			
Peak Torque Speed	1700 RPM			
Low Idle Speed	600 RPM			
Rated Torque	742	Nm	547	ft-lb
Peak Torque	1040	Nm	767	ft-lb
BMEP, Rated	1371	kPa	199	psi
Rated Pferdestärke (metric hp)	253 ps			
Front Drive Capacity, Intermittent	907	Nm	669	lb-ft
Front Drive Capacity, Continuous	907	Nm	669	lb-ft

### Exhaust System

Exhaust Flow	36.2	m <sup>3</sup> /min	1278	ft <sup>3</sup> /min
Exhaust Flow @ gas STP	16.1	m <sup>3</sup> /min	569	ft <sup>3</sup> /min
Exhaust Temperature	452	°C	846	°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	101.6	mm	4.0	in
Min. Exhaust Pipe Diameter, Wet	114.3	mm	4.5	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
<b>2400</b>	186	250	741	547	186	250	51	13	233
<b>2300</b>	186	250	774	571	164	220	43	11	223
<b>2200</b>	186	249	807	596	143	192	38	10	222
<b>2100</b>	186	249	846	624	125	167	33	9	226
<b>2000</b>	186	249	887	654	108	145	29	8	227
<b>1900</b>	186	249	935	690	92	124	25	7	233
<b>1800</b>	186	250	988	729	79	105	21	6	228
<b>1700</b>	185	248	1040	767	66	89	18	5	234
<b>1600</b>	158	211	941	694	55	74	15	4	234
<b>1500</b>	127	171	811	598	45	61	13	3	238
<b>1400</b>	108	144	734	541	37	50	10	3	239
<b>1300</b>	93	124	681	503	30	40	8	2	237
<b>1200</b>	81	109	647	477	23	31	7	2	245
<b>1100</b>	72	96	622	459	18	24	6	1	262
<b>1000</b>	62	83	592	437	13	18	4	1	268

\* Theoretical 3.0 exponent propeller curve , measured at flywheel

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