



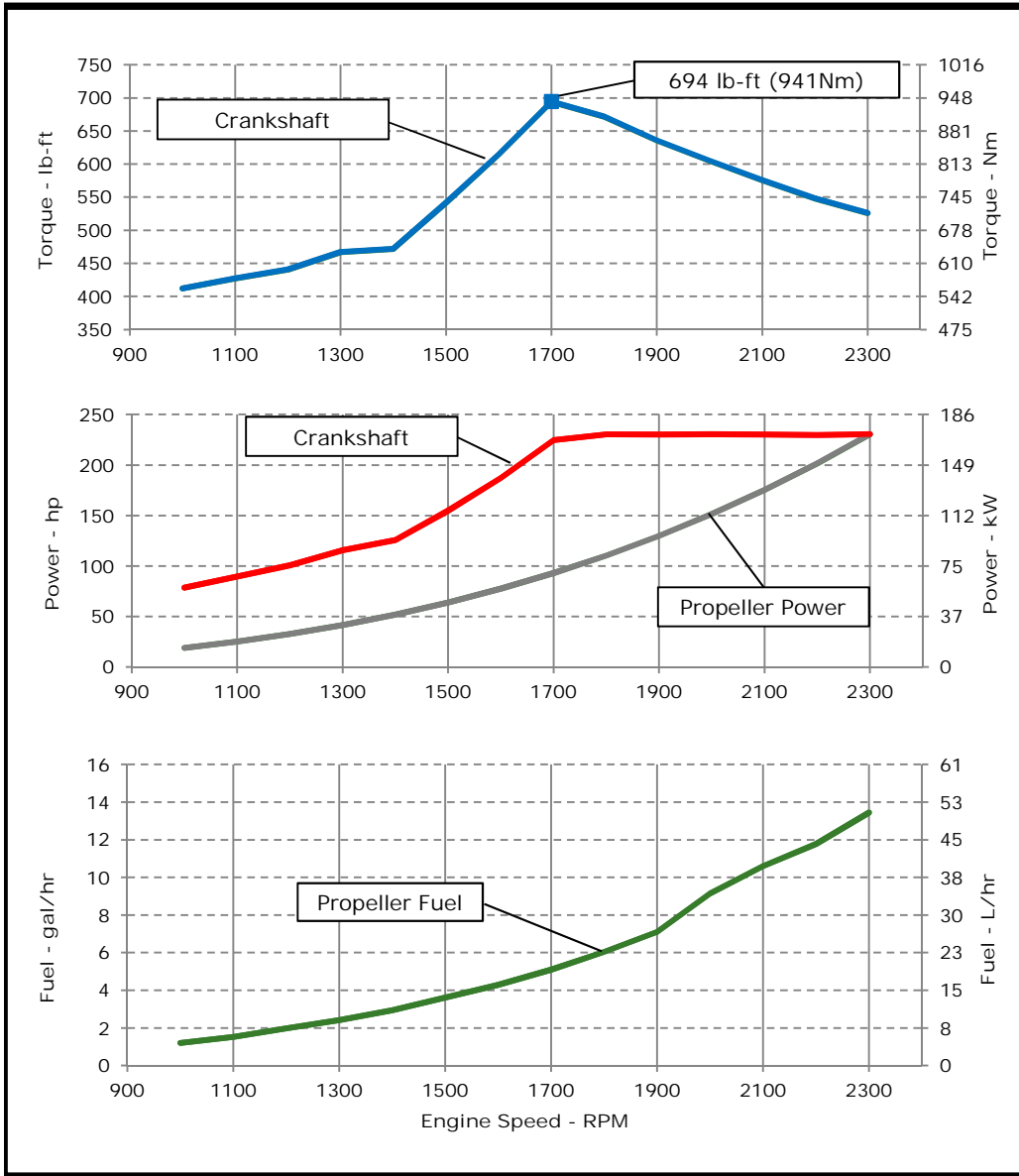
JOHN DEERE

# ENGINE PERFORMANCE CURVE

Rating: M1 - 230hp (172kW) @ 2300 RPM  
Application: Marine

PowerTech™ 6.8L Engine

Model: 6068AFM85



### 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 at uninterrupted full power and have load factors\* greater than 65 percent.

**Possible applications:** Line hauls tugs and towboats, fish and shrimp trawlers/draggers, and displacement hull fishing 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:

25-Feb-13

Performance Curve: 6068AFM85\_A

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

# Engine Installation Criteria

## General Data

Model	6068AFM85		
Number of Cylinders	6		
Bore	107 mm	4.21 in	
Stroke	127 mm	5.00 in	
Displacement	6.8 L	415 in <sup>3</sup>	
Compression Ratio	16.7:1		
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	Engine coolant		
Engine Crankcase Vent System	Closed		

## Cooling System\*

Engine Coolant Heat Rejection**	184 kW	10462 BTU/min
Max. Pressure Drop Across Keel Cooler	40 kPa	5.8 psi
Coolant Flow	248 L/min	66 gal/min
Seawater Flow (heat exchanged)	238 L/min	63 gal/min
Thermostat Start to Open	81 °C	178 °F
Thermostat Fully Open	95 °C	203 °F
Engine Coolant Capacity, HE	L	gal
Engine Coolant Capacity, KC	L	gal
Min. Coolant Fill Rate	12 L/min	3.2 gal/min
Min. Pressure Cap	110.3 kPa	16 psi
Min. Pump Inlet Pressure	30 kPa	4.4 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	1455 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	1034 mm	40.7 in
Length maximum	1333 mm	52.5 in
Width maximum	854 mm	33.6 in
Height, crank centerline to top	646 mm	25.4 in
Height, crank centerline to bottom	290 mm	290 in
Weight, with oil, no coolant (includes engine, flywheel housing, flywheel, and electronics)	787 kg	1735 lb
Center of Gravity Location, X-axis From Rear Face of Block	390 mm	15.3 in
Center of Gravity Location, Y-axis Right of Crankshaft	-14 mm	-0.6 in
Center of Gravity Location, Z-axis Above Crankshaft	186 mm	7.3 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

Performance Curve: 6068AFM85\_A

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

# Engine Installation Criteria

## Fuel System

ECU Description	L14			
Fuel Injection Pump	HPCR			
Governor Type	Electronic			
Volumetric Fuel Consumption	50.9	L/hr	13.4	gal/hr
Mass Fuel Consumption	43.3	kg/hr	95	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	310	kPa	45	psi
Oil Pressure at Low Idle (800rpm)**	150	kPa	22	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			

\* 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	15.8	m <sup>3</sup> /min	557	ft <sup>3</sup> /min
Intake Manifold Pressure	161	kPa	23.4	psi
Manifold Air Temperature	91.2	°C	196	°F
Maximum Manifold Air Temperature	130	°C	266	°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	0.097	m <sup>2</sup>	150	in <sup>2</sup>

## Performance Data

Rated Power	172	kW	230	hp
Rated Speed	2300 RPM			
Peak Torque Speed	1700 RPM			
Low Idle Speed	600 RPM			
Rated Torque	712	Nm	525	ft-lb
Peak Torque	941	Nm	694	ft-lb
BMEP, Rated	1316	kPa	191	psi
Rated Pferdestärke (metric hp)	233 ps			
Front Drive Capacity, Intermittent	907	Nm	669	lb-ft
Front Drive Capacity, Continuous	907	Nm	669	lb-ft

## Exhaust System

Exhaust Flow	36	m <sup>3</sup> /min	1271	ft <sup>3</sup> /min
Exhaust Flow @ gas STP	15.3	m <sup>3</sup> /min	540	ft <sup>3</sup> /min
Exhaust Temperature	424	°C	795	°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	127	mm	5.0	in

Performance Curve: 6068AFM85\_A

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

## 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
2300	172	230	713	526	172	230	50.9	13.4	252
2200	171	230	743	548	150	202	44.6	11.8	252
2100	172	230	780	575	131	175	40.1	10.6	261
2000	172	230	820	605	113	151	34.6	9.1	260
1900	172	230	862	636	97	130	26.9	7.1	236
1800	172	230	911	672	82	110	22.9	6.0	236
1700	167	225	941	694	69	93	19.3	5.1	236
1600	140	187	833	614	58	78	16.3	4.3	239
1500	115	155	735	542	48	64	13.7	3.6	244
1400	94	126	640	472	39	52	11.1	2.9	245
1300	86	116	633	467	31	42	9.1	2.4	250
1200	75	101	597	441	24	33	7.5	2.0	260
1100	67	89	579	427	19	25	5.8	1.5	261
1000	59	78	559	412	14	19	4.6	1.2	275

\* Theoretical 3.0 exponent propeller curve , measured at flywheel

Performance Curve: 6068AFM85\_A

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