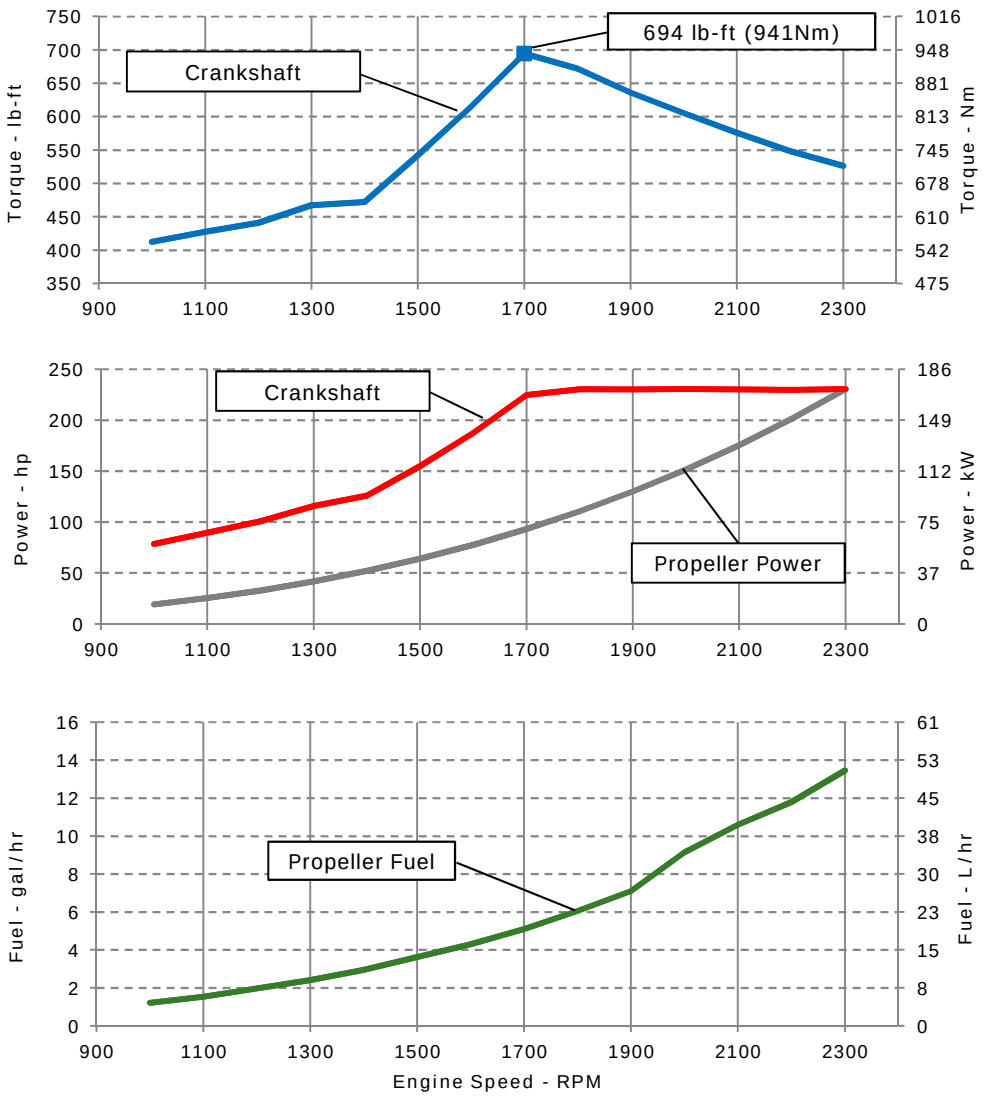
ENGINE PERFORMANCE CURVE

JOHN DEERE

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

PowerTech™ 6.8L Engine

Model: 6068AFM85



REFERENCE CONDITIONS

Air Intake Restriction.....12 in.H_2O (3 kPa)
Exhaust Back Pressure..... 30 in.H_2O (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:	Certified by:
• EPA Commercial Marine Tier 3 • IMO MARPOL Annex VI Tier II Compliant • NRMM (97/68/EC), as amended	
Ref: Engine Emission Label	3-Oct-16

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^3
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
Min. Coolant Pump Inlet Pressure	30.3	kPa	4.4	psi
Thermostat Start to Open	81	°C	178	°F
Thermostat Fully Open	95	°C	203	°F
Engine Coolant Capacity, HE	34	L	9.0	gal
Engine Coolant Capacity, KC	33.5	L	8.8	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	kW	166	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 to rear face of flywheel housing (SAE #2)	1172	mm	46.1	in
Length maximum	1489	mm	58.6	in
Width maximum	862	mm	33.9	in
Height, crank centerline to top	644	mm	25.4	in
Height, crank centerline to bottom	291	mm	11.5	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 (for installations up to 5-G)	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		
Electrical Component Maximum Temperature Limit	125	°C	257	°F
Maximum ECU Temperature	105	°C	221	°F

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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
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	

Seawater Pump System

Seawater Pump Flow	238	L/min	63	gal/min
Max. Suction Lift	3	m	9.8	ft
Max. Outlet Pressure	140	kPa	20	psi
Max. Inlet Restriction	30	kPa	4	psi

Air Intake System

Engine Air Flow	15.8	m^3/min	557	ft^3/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 Air to Engine Inlet	17	°C	30	°F
Max. Air Intake Restriction, Clean Air Cleaner	3	kPa	12	in.H_2O
Max. Air Intake Restriction, Dirty Air Cleaner	6.25	kPa	25	in.H_2O
Min. Ventilation Area	0.097	m^2	150	in^2

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^3/min	1271	ft^3/min
Exhaust Flow @ gas STP	15.3	m^3/min	540	ft^3/min
Exhaust Temperature	424	°C	795	°F
Max. Allowable Exhaust Restriction	7.5	kPa	30	in.H_2O
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

* With clean filters

** With John Deere Plus-50 II™ 15w-40, not applicable with break in oil.

*** With 19BP option

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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	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

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