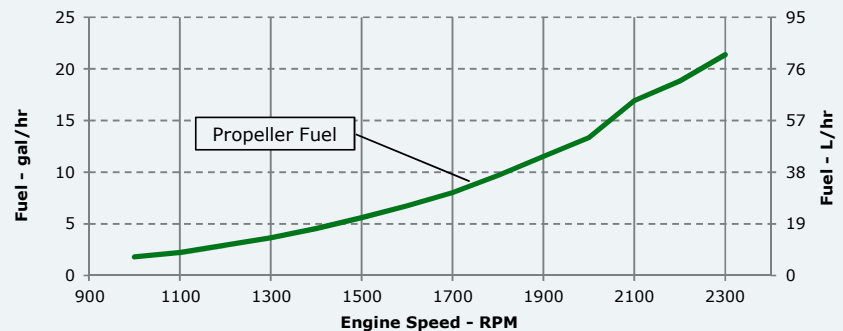
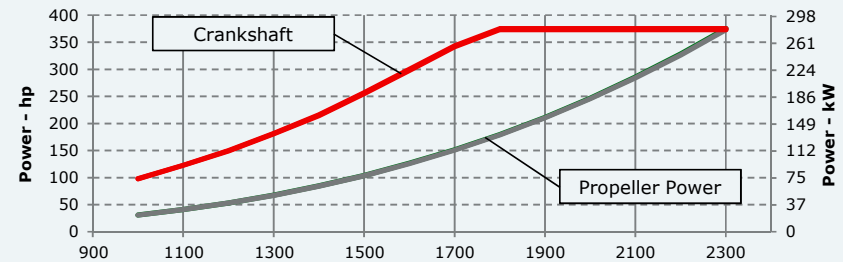
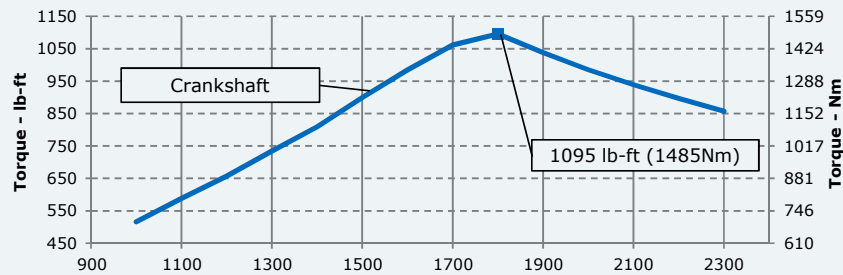


JOHN DEERE POWERTECH™ 9.0L ENGINE

MODEL: 6090AFM85

NOGVA

Rating: **M3 - 375hp (280kW) @ 2300 RPM**
Application: **Marine**



REFERENCE CONDITIONS

Air Intake Restriction.....12 in.H₂O (3 kPa)
Exhaust Back Pressure..... 30 in.H₂O (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:

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 Marine Tier 3 Commercial (40 CFR 1042)
- IMO Tier II Compliant (MARPOL Annex VI)
- EU Stage IIIa Inland Waterways (NRRM 97/68/EC, as amended)
- Recreational Craft Directive 2 (2013/53/EU)

Ref: Engine Emission Label

Certified by:

9-Jun-20

Performance Curve: 6090AFM85_C

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

MODEL: 6090AFM85

General Data

Model	6090AFM85		
Number of Cylinders	6		
Bore	118 mm	4.65 in	
Stroke	136 mm	5.35 in	
Displacement	9.0 L	549 in ³	
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	Engine coolant		
Engine Crankcase Vent System	Closed		

Cooling System*

Engine Coolant Heat Rejection**	298 kW	16962 BTU/min
Max. Pressure Drop Across Keel Cooler	40 kPa	5.8 psi
Coolant Flow	346 L/min	91 gal/min
Min. Coolant Pump Inlet Pressure	30.3 kPa	4.4 psi
Thermostat Start to Open	71 °C	160 °F
Thermostat Fully Open	83 °C	182 °F
Engine Coolant Capacity, HE	42 L	11.1 gal
Engine Coolant Capacity, KC	40 L	10.6 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	187 BTU/min
Engine Radiated Heat	20 kW	1156 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	1027 mm	40.4 in
Height, crank centerline to top	665 mm	26.2 in
Height, crank centerline to bottom	319 mm	12.6 in
Weight, with oil, no coolant (includes engine, flywheel housing, flywheel, and electronics)	1055 kg	2325 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)	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	0.0012 ohms
Max. Allowable Start Circuit Resistance, 24V	0.002 ohms
Electrical Component Maximum Temperature Limit	125 °C 257 °F
Maximum ECU Temperature	105 °C 221 °F

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MODEL: 6090AFM85

Fuel System

ECU Description	L14		
Fuel Injection Pump	Denso HP4		
Governor Type	Electronic		
Volumetric Fuel Consumption	80.9 L/hr	21.4 gal/hr	
Mass Fuel Consumption	68.8 kg/hr	152 lb/hr	
Total Fuel Volumetric Flow	240 L/hr	63.4 gal/hr	
Total Fuel Mass Flow	204 kg/hr	450 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	8.34 mm	0.33 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	300 kPa	44 psi	
Oil Pressure at Low Idle (650rpm)**	141 kPa	20 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	416 L/min	110 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 m ³ /min	934 ft ³ /min	
Intake Manifold Pressure	242 kPa	35.1 psi	
Manifold Air Temperature	96 °C	205 °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.H ₂ O	
Max. Air Intake Restriction, Dirty Air Cleaner	6.25 kPa	25 in.H ₂ O	
Min. Ventilation Area	0.163 m ²	252 in ²	

Performance Data

Rated Power	280 kW	375 hp	
Rated Speed	2300 RPM		
Peak Torque Speed	1800 RPM		
Low Idle Speed	650 RPM		
Rated Torque	1162 Nm	857 ft-lb	
Peak Torque	1485 Nm	1095 ft-lb	
BMEP, Rated	1622 kPa	235 psi	
Rated Pferdestärke (metric hp)	381 ps		
Front Drive Capacity, Intermittent	955 Nm	704 lb-ft	
Front Drive Capacity, Continuous	955 Nm	704 lb-ft	

Exhaust System

Exhaust Flow	59 m ³ /min	2066 ft ³ /min	
Exhaust Flow @ gas STP	25.0 m ³ /min	883 ft ³ /min	
Exhaust Temperature	426 °C	799 °F	
Max. Allowable Exhaust Restriction	7.5 kPa	30 in.H ₂ O	
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	

Performance Curve: 6090AFM85_C

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

MODEL: 6090AFM85

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	280	375	1162	857	280	375	81	21	246
2200	280	375	1215	896	245	328	71	19	247
2100	280	375	1273	939	213	286	64	17	256
2000	280	375	1336	985	184	247	50	13	233
1900	280	375	1407	1038	158	212	44	12	235
1800	280	375	1485	1095	134	180	37	10	232
1700	256	343	1439	1061	113	152	30	8	229
1600	224	300	1334	984	94	126	26	7	230
1500	191	257	1218	898	78	104	21	6	232
1400	161	216	1097	809	63	85	17	5	232
1300	136	182	996	735	51	68	14	4	233
1200	112	150	890	657	40	53	11	3	238
1100	92	123	797	588	31	41	8	2	234
1000	73	98	700	516	23	31	7	2	252

* Theoretical 3.0 exponent propeller curve , measured at flywheel

Performance Curve: 6090AFM85_C

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