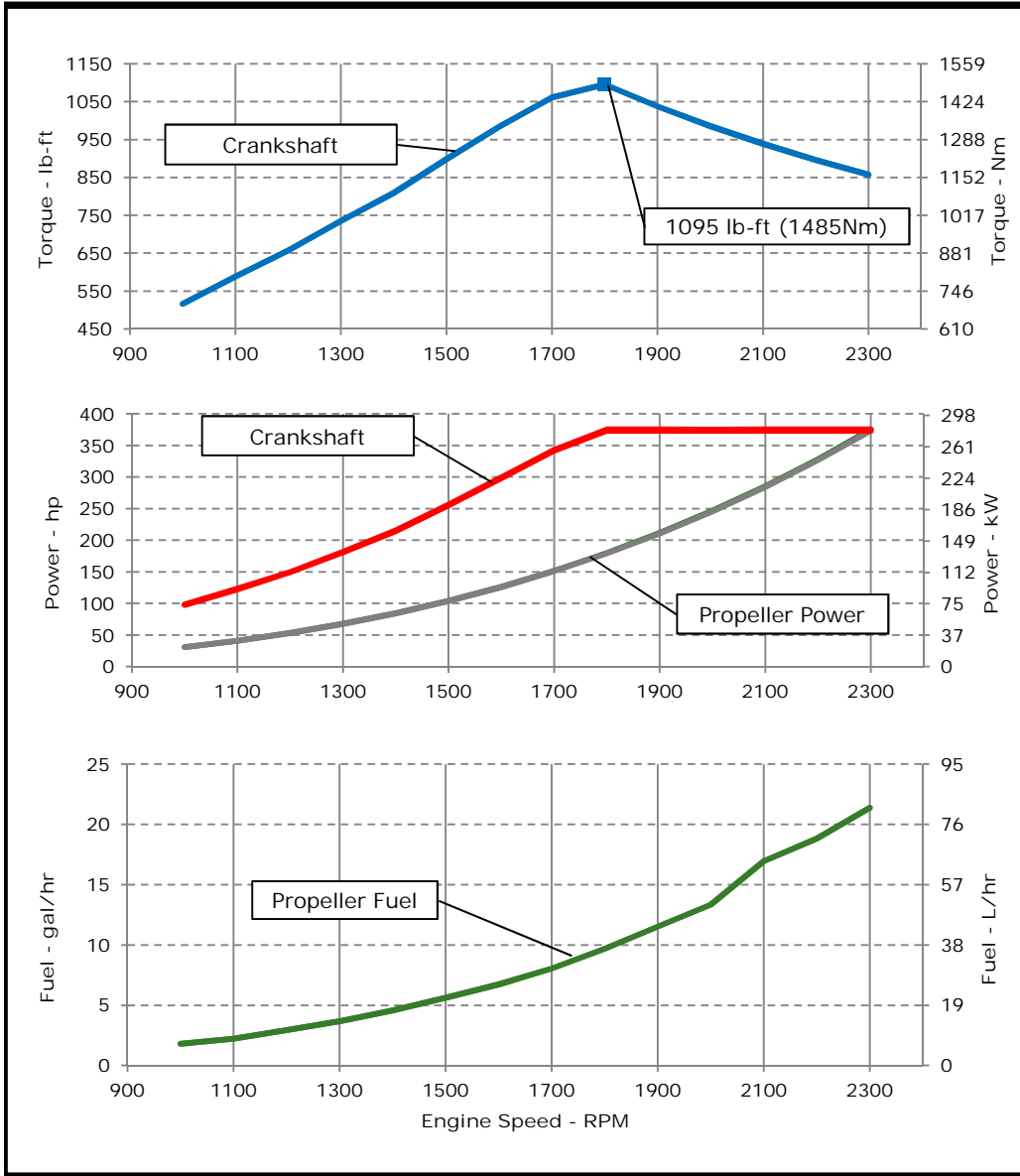




# ENGINE PERFORMANCE CURVE

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

PowerTech™ 9.0L Engine  
 Model: 6090AFM85



### 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.

<b>Designed/Calibrated to meet:</b> <ul style="list-style-type: none"> <li>EPA Commercial Marine Tier 3</li> <li>IMO MARPOL Annex VI Compliant</li> <li>NRMM (97/68/EC), as amended</li> </ul> Ref: Engine Emission Label	<b>Certified by:</b> <div style="text-align: center; font-family: cursive; font-size: 1.2em; margin-top: 10px;"> </div> <div style="text-align: right; font-size: 0.8em;">           9-Mar-14         </div>
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Performance Curve: 6090AFM85\_C

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

# Engine Installation Criteria

## 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 <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	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
Seawater Flow (heat exchanged)	416 L/min	110 gal/min
Thermostat Start to Open	71 °C	155 °F
Thermostat Fully Open	84 °C	182 °F
Engine Coolant Capacity, HE	30 L	7.9 gal
Engine Coolant Capacity, KC	26 L	6.9 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	12 kW	673 BTU/min
Engine Radiated Heat	41 kW	2312 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	938 mm	36.9 in
Height, crank centerline to top	665 mm	26.2 in
Height, crank centerline to bottom	319 mm	319 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 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)	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
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	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
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	8.34	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			

\* 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 <sup>3</sup> /min	934	ft <sup>3</sup> /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.H2O
Max. Air Intake Restriction, Dirty Air Cleaner	6.25	kPa	25	in.H2O
Min. Ventilation Area	0.163	m <sup>2</sup>	252	in <sup>2</sup>

## 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 <sup>3</sup> /min	2066	ft <sup>3</sup> /min
Exhaust Flow @ gas STP	25.0	m <sup>3</sup> /min	883	ft <sup>3</sup> /min
Exhaust Temperature	426	°C	799	°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

Performance Curve: 6090AFM85\_C

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	g/kW-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

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