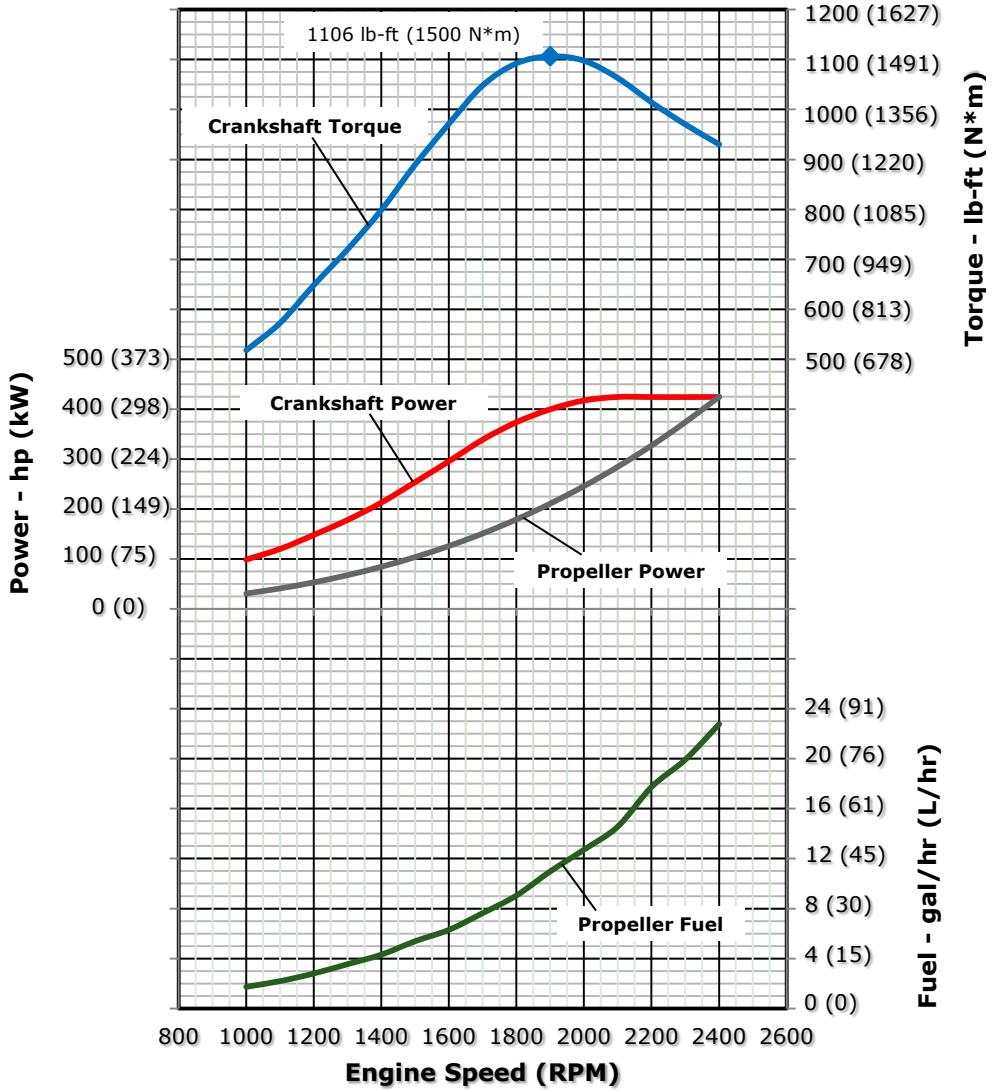
ENGINE PERFORMANCE CURVE

JOHN DEERE

Rating: M4 - 425 (317 kW) @ 2400 RPM
Application: Marine

PowerTech™ 9.0L Engine
Model: 6090AFM75
425 hp @ 2400 RPM
317 kW @ 2400 RPM
See Option Code Table



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:

M4: The M4 rating is for marine propulsion applications that operate up to 800 hours per year and have load factors below 40%. This rating is for applications that use full power for no more than 1 hour out of each 12 hours of operation. The remaining time of operation must be at cruising speeds.

Possible applications: Inshore crew boats, charter fishing boats, pilot boats, dive boats, and planning hull commercial fishing boats.

Designed/Calibrated to meet:	Certified by:
• EPA Commercial Marine Tier 2 • IMO MARPOL Annex VI Compliant • IWT (2004/26/EC) Ref: Engine Emission Label	

Performance Curve: 6090AFM75_D

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

Engine Installation Criteria

General Data

Model	6090AFM75	
Number of Cylinders	6	
Bore	118 mm	4.6 in
Stroke	127 mm	5.0 in
Displacement	9.0 L	549 in^3
Compression Ratio	16.0:1	
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**	329 kW	12978 BTU/min
Max. Pressure Drop Across Keel Cooler	40 kPa	5.8 psi
Coolant Flow	381 L/min	100.6 gal/min
Thermostat Start to Open	82 °C	180 °F
Thermostat Fully Open	94 °C	202 °F
Engine Coolant Capacity, HE	47.5 L	12.5 gal
Engine Coolant Capacity, KC	43.5 L	11.5 gal
Min. Coolant Fill Rate	12 L/min	3 gal/min
Min. Pressure Cap	110 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	TBD kW	TBD BTU/min

Physical Data

Length	1682 mm	66.2 in
Width	938 mm	36.9 in
Height, centerline to top	665 mm	26.2 in
Height, centerline to bottom	319 mm	12.6 in
Weight, with oil, no coolant (includes engine, flywheel housing, flywheel, and electronics)	1011 kg	2229 lb
Center of Gravity Location, X-axis From Rear Face of Block	434 mm	17.8 in
Center of Gravity Location, Y-axis Right of Crankshaft	4.5 mm	0.18 in
Center of Gravity Location, Z-axis Above Crankshaft	106 mm	4.2 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	900 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

* 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

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Engine Installation Criteria

Fuel System

ECU Description	L14	
Fuel Injection Pump	Denso HP4	
Governor Type	Electronic	
Volumetric Fuel Consumption	86 L/hr	22.7 gal/hr
Mass Fuel Consumption	73.1 kg/hr	161 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*	30 kPa	120 in.H_2O
Max. Fuel Inlet Pressure	20 kPa	80 in.H_2O
Max. Fuel Height Above Transfer Pump	2.41 m	7.9 ft
Max Fuel Return Pressure	20 kPa	80 in.H2O
Max. Leak-off Return Height	2.41 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	8.3 mm	0.33 in
Min. Recommended Fuel Line Size	-6	
Primary Fuel Filter	10 mic	
Secondary Fuel Filter	2 mic	

Lubrication System

Oil Pressure at Rated Speed	300 kPa	43.5 psi
Oil Pressure at Low Idle **	130 kPa	18.85 psi
Max. Crankcase Pressure	2 kPa	8 in.H_2O
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.

Air Intake System

Engine Air Flow	25.7 m^3/min	908.3 ft^3/min
Intake Manifold Pressure	223.4 kPa	33.9 psi
Manifold Air Temperature	104 °C	219 °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	0.158 m^2	245 in^2

Performance Data

Rated Power	317 kW	425 hp
Rated Speed	2400 RPM	
Peak Torque Speed	1900 RPM	
Low Idle Speed	650 RPM	
Rated Torque	1261 Nm	930 ft-lb
Peak Torque	1500 Nm	1106 ft-lb
BMEP, Rated	1761 kPa	255 psi
Rated Pferdestärke	431 ps	
Front Drive Capacity, Intermittent	550 Nm	406 lb-ft
Front Drive Capacity, Continuous	468 Nm	348 lb-ft

Exhaust System

Exhaust Flow	62.5 m^3/min	2208 ft^3/min
Exhaust Flow @ gas STP	27.7 m^3/min	978 ft^3/min
Exhaust Temperature	451 °C	844 °F
Max. Allowable Exhaust Restriction	7.5 kPa	30 in.H_2O
Max. Shear on Turbocharger Exhaust Outlet	11 kg	24 lb
Max. Bending Moment on Turbocharger Exhaust Outlet	7 Nm	5.2 lb-ft
Min. Exhaust Pipe Diameter, Dry	127 mm	5 in
Min. Exhaust Pipe Diameter, Wet	139.7 mm	5.5 in

Performance Curve: 6090AFM75_D

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

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
2400	317	425	1261	930	317	425	86	23	231
2300	317	424	1315	970	279	374	76	20	230
2200	317	424	1375	1014	244	327	67	18	234
2100	317	425	1441	1063	212	285	55	15	221
2000	312	418	1488	1097	183	246	48	13	224
1900	298	400	1500	1106	157	211	42	11	225
1800	279	374	1481	1092	134	179	34	9	218
1700	253	339	1421	1048	113	151	29	8	219
1600	221	296	1317	971	94	126	24	6	216
1500	189	254	1206	889	77	104	20	5	224
1400	159	213	1083	799	63	84	16	4	221
1300	133	178	976	720	50	67	13	4	228
1200	110	148	879	648	40	53	11	3	229
1100	89	120	776	572	31	41	8	2	232
1000	74	99	702	518	23	31	7	2	245

*** Theoretical 3.0 exponent propeller curve, measured at flywheel**

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