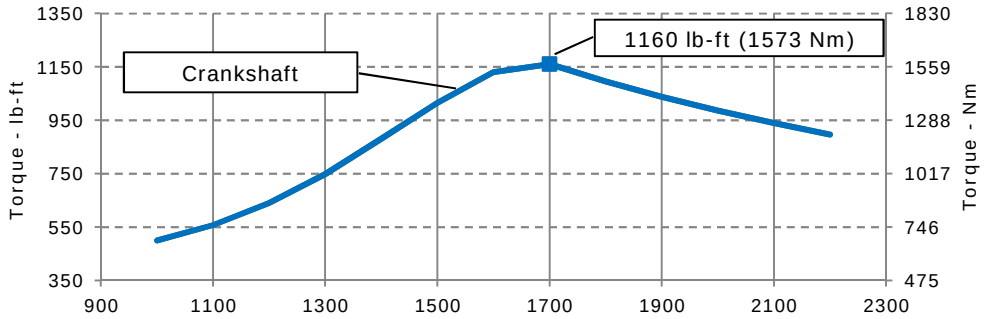
ENGINE PERFORMANCE CURVE

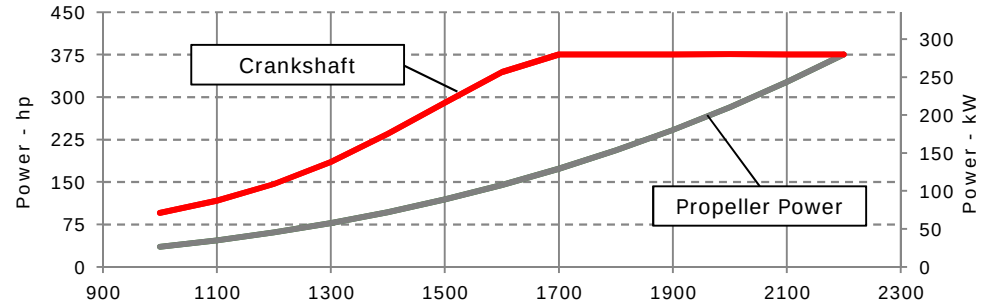
JOHN DEERE

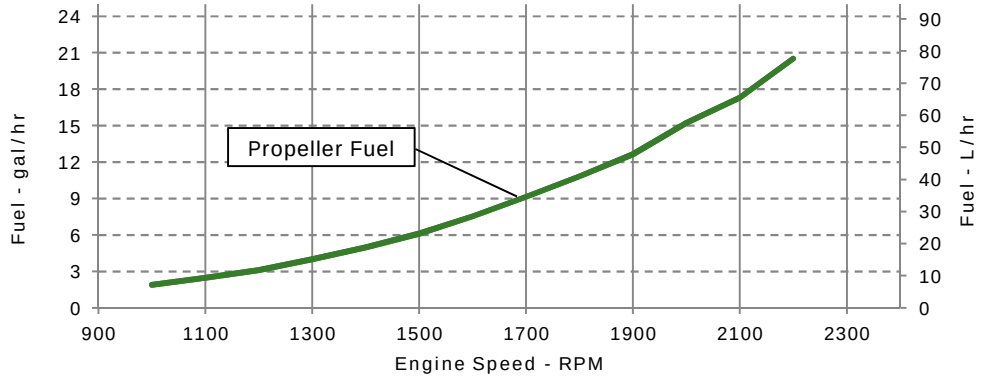
Rating: M2 - 375hp (280kW) @ 2200 RPM
Application Marine

PowerTech™ 9.0L Engine

Model: 6090SFM85







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:

M2: The M2 rating is for marine propulsion applications that typically operate between 3,000-5,000 hours per year and have load factors up to 65 percent. This rating is for applications that are in continuous use and use full power for no more than 16 hours of each 24 hours of operation. The remaining time of operation is at or below cruising speed.

Possible applications: Short-range tugs and towboats long-range ferryboats, large passenger vessels and offshore 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	4-Oct-16

Performance Curve: 6090SFM85_B

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

Engine Installation Criteria

General Data

Model	6090SFM85			
Number of Cylinders	6			
Bore	118.4	mm	4.66	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	Seawater cooled			
Engine Crankcase Vent System	Closed			

Cooling System*

Jacket Water Heat Rejection**	211	kW	12010	BTU/min
Aftercooler Heat Rejection	76.1	kW	4332	BTU/min
Coolant Flow	317	L/min	84	gal/min
Min. Coolant Pump Inlet Pressure	30.3	kPa	4.4	psi
Thermostat Start to Open	82	°C	180	°F
Thermostat Fully Open	94	°C	202	°F
Engine Coolant Capacity, HE	38	L	10	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	3.6	kW	204	BTU/min
Engine Radiated Heat	39	kW	2220	BTU/min

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	974	mm	38.3	in
Height, crank centerline to top	664	mm	26.1	in
Height, crank centerline to bottom	319	mm	12.6	in
Weight, with oil, no coolant (includes engine, flywheel housing, flywheel, and electronics)	1056	kg	2327	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)	500	amps		
Starter Rolling Current, 24V @32 °F (0 °C)	300	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

* 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	HPCR			
Governor Type	Electronic			
Volumetric Fuel Consumption	77.7	L/hr	20.5	gal/hr
Mass Fuel Consumption	66	kg/hr	146	lb/hr
Total Fuel Volumetric Flow	251	L/hr	66.3	gal/hr
Total Fuel Mass Flow	213	kg/hr	470	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	8.53	mm	0.34	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	270	kPa	39	psi
Oil Pressure at Low Idle (650rpm)**	145	kPa	21	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	371	L/min	98	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	26.5	m^3/min	935.8	ft^3/min
Intake Manifold Pressure	209	kPa	30.3	psi
Manifold Air Temperature	38	°C	100	°F
Maximum Manifold Air Temperature	67	°C	153	°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	0.163	m^2	253	in^2
Max. CAC Delta Pressure	11.1	kPa	44.6	in.H2O

Performance Data

Rated Power	280	kW	375	hp
Rated Speed	2200	RPM		
Peak Torque Speed	1700	RPM		
Low Idle Speed	650	RPM		
Rated Torque	1215	Nm	896	ft-lb
Peak Torque	1573	Nm	1160	ft-lb
BMEP, Rated	1697	kPa	246	psi
Rated Pferdestärke (metric hp)	329	ps		
Front Drive Capacity, Intermittent	955	Nm	704	lb-ft
Front Drive Capacity, Continuous	955	Nm	704	lb-ft

Exhaust System

Exhaust Flow	55.5	m^3/min	1960	ft^3/min
Exhaust Flow @ gas STP	25.4	m^3/min	897	ft^3/min
Exhaust Temperature	369.6	°C	697	°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	114.3	mm	4.5	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 1932 option

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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
2200	280	375	1215	896	280	375	78	21	236
2100	280	375	1273	939	243	326	65	17	229
2000	280	376	1337	986	210	282	58	15	233
1900	280	375	1407	1038	180	242	48	13	225
1800	280	375	1485	1095	153	206	41	11	227
1700	280	375	1573	1160	129	173	35	9	228
1600	257	344	1532	1130	108	144	29	8	225
1500	216	290	1375	1014	89	119	23	6	221
1400	175	235	1195	881	72	97	19	5	222
1300	138	185	1014	748	58	77	15	4	222
1200	109	146	868	640	45	61	12	3	220
1100	87	117	755	557	35	47	9	2	226
1000	71	95	678	500	26	35	7	2	230

* Theoretical 3.0 exponent propeller curve , measured at flywheel

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