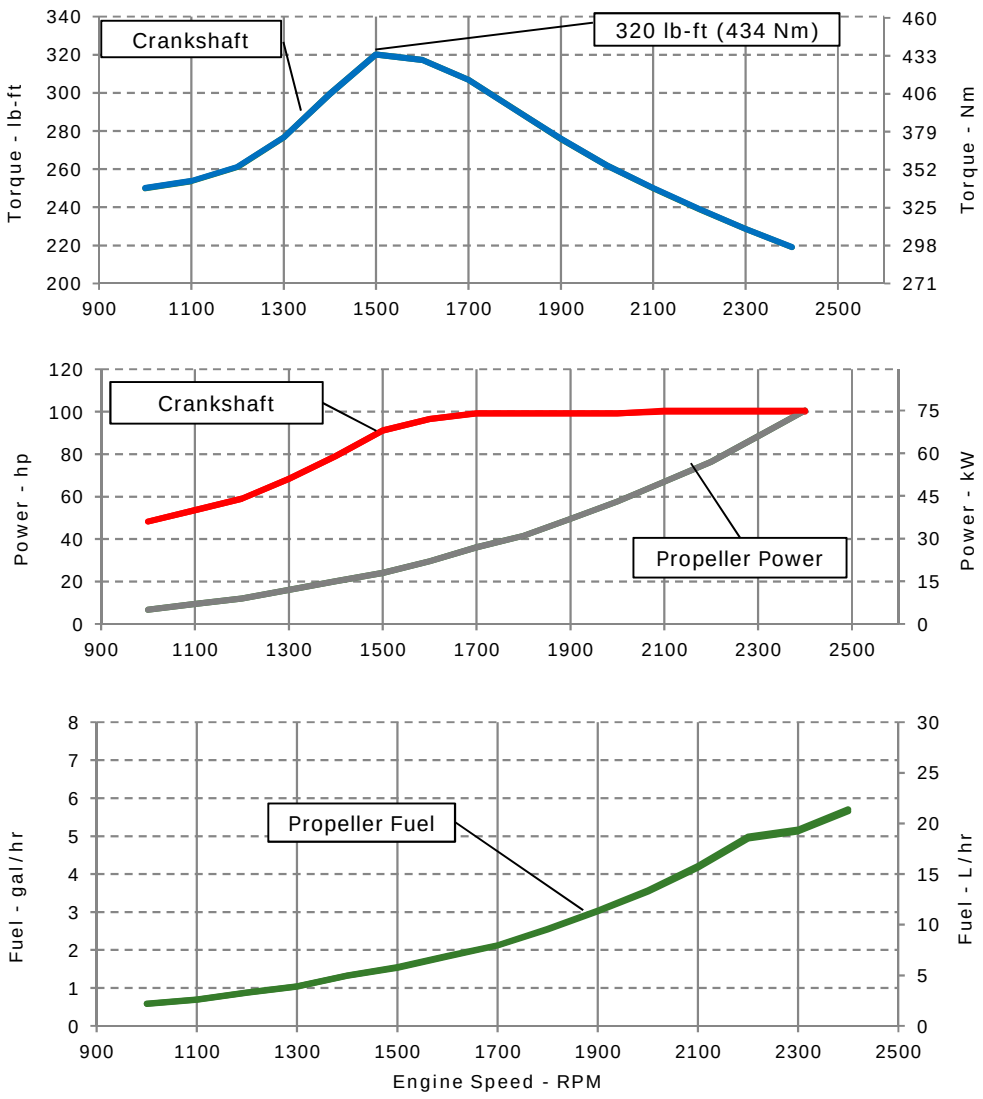
ENGINE PERFORMANCE CURVE

Rating: M1 - 100hp (75kW) @2400 RPM
Application: Marine

PowerTech™ 4.5L Engine
Model: 4045TFM85



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 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:

M1: The M1 rating is for marine propulsion applications that may operate up to 24 hours per day 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 Marine Tier 3 Commercial (40 CFR 1042) • IMO Exempt (<130 kW) • EU Stage IIIa Inland Waterways (NRMM 97/68/EC, as amended) • Recreational Craft Directive 2 (2013/53/EU)	
Ref: Engine Emission Label	29-Oct-18

Performance Curve: 4045TFM85_C

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

Engine Installation Criteria

General Data

Model	4045TFM85			
Number of Cylinders	4			
Bore	106	mm	4.17	in
Stroke	127	mm	5.00	in
Displacement	4.5	L	275	in^3
Compression Ratio	19.0:1			
Valves per Cylinder, Intake/Exhaust	1/1			
Combustion System	Direct injection			
Firing Order	1-3-4-2			
Engine Type	In line, 4 Cycle			
Aspiration	Turbocharged			
Aftercooling System	None			
Engine Crankcase Vent System	None, Offered as Accessory			

Cooling System*

Total Engine to Seawater Heat Rejection**	70	kW	3984	BTU/min
Coolant Flow	160	L/min	42	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	14	L	3.7	gal
Engine Coolant Capacity, KC	17	L	4.5	gal
Min. Coolant Fill Rate	12	L/min	3.2	gal/min
Min. Pressure Cap	69	kPa	10	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	174	BTU/min
Engine Radiated Heat	11	kW	626	BTU/min

Physical Data

Length to rear face of block	739	mm	29.1	in
Length to rear face of flywheel housing (SAE #3)	877	mm	34.5	in
Length maximum	1020	mm	40.2	in
Width maximum	808	mm	31.8	in
Height, crank centerline to top	625	mm	24.6	in
Height, crank centerline to bottom	287	mm	11.3	in
Weight, with oil, no coolant (includes engine, flywheel housing, flywheel, and electronics)	507	kg	1117	lb
Center of Gravity Location, X-axis From Rear Face of Block	250	mm	9.8	in
Center of Gravity Location, Y-axis Right of Crankshaft	-3.7	mm	-0.1	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	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 °(			625	amps
Min. Recommended Battery Capacity, 24V @32 °F (0 °(			500	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

* 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			L16	
Fuel Injection Pump			HPCR	
Governor Type			Electronic	
Volumetric Fuel Consumption	21.5	L/hr	5.7	gal/hr
Mass Fuel Consumption	18.3	kg/hr	40	lb/hr
Total Fuel Volumetric Flow	79	L/hr	20.9	gal/hr
Total Fuel Mass Flow	67.2	kg/hr	148	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	4.78	mm	0.19	in
Min. Recommended Fuel Line Size			4	(-) AN
Primary Fuel Filter			10	mic
Secondary Fuel Filter			2	mic

Lubrication System

Oil Pressure at Rated Speed	330	kPa	48	psi
Oil Pressure at Low Idle (800rpm)**	200	kPa	29	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***			30	deg
Engine Angularity Limits Any Direction, Intermittent***			45	deg

Seawater Pump System

Seawater Pump Flow	127	L/min	34	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	7.4	m^3/min	261.3	ft^3/min
Intake Manifold Pressure	83	kPa	12.0	psi
Manifold Air Temperature	110	°C	230	°F
Maximum Manifold Air Temperature	185	°C	365	°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	0.046	m^2	71	in^2

Performance Data

Rated Power	75	kW	101	hp
Rated Speed		2400	RPM	
Peak Torque Speed		1500	RPM	
Low Idle Speed		600	RPM	
Rated Torque	297	Nm	219	ft-lb
Peak Torque	434	Nm	320	ft-lb
BMEP, Rated	829	kPa	120	psi
Rated Pferdestärke (metric hp)		101	ps	
Front Drive Capacity, Intermittent	542	Nm	400	lb-ft
Front Drive Capacity, Continuous	542	Nm	400	lb-ft

Exhaust System

Exhaust Flow	16	m^3/min	565	ft^3/min
Exhaust Flow @ gas STP	7.1	m^3/min	251	ft^3/min
Exhaust Temperature	398	°C	748	°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	76.2	mm	3.0	in
Min. Exhaust Pipe Diameter, Wet	88.9	mm	3.5	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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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	75	100	297	219	75	101	21.4	5.7	244
2300	75	100	310	229	66	89	19.4	5.1	251
2200	75	100	324	239	57	76	18.7	4.9	277
2100	75	100	339	250	50	67	15.8	4.2	270
2000	74	99	355	262	43	58	13.4	3.5	265
1900	74	99	374	276	37	50	11.4	3.0	262
1800	74	99	395	291	31	42	9.6	2.5	259
1700	74	99	416	307	27	36	8.0	2.1	256
1600	72	97	430	317	22	30	6.9	1.8	267
1500	68	91	434	320	18	24	5.8	1.5	269
1400	59	79	406	299	15	20	5.0	1.3	284
1300	51	68	375	277	12	16	3.9	1.0	281
1200	44	59	354	261	9	12	3.3	0.9	302
1100	40	54	344	254	7	9	2.6	0.7	306
1000	36	48	339	250	5	7	2.2	0.6	355

* Theoretical 3.0 exponent propeller curve , measured at flywheel

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