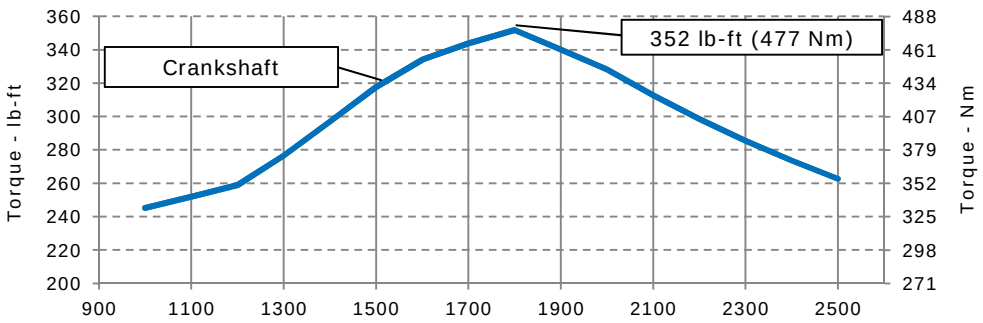
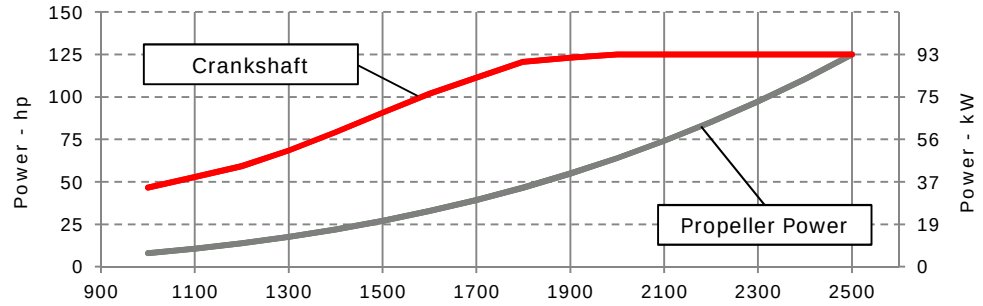
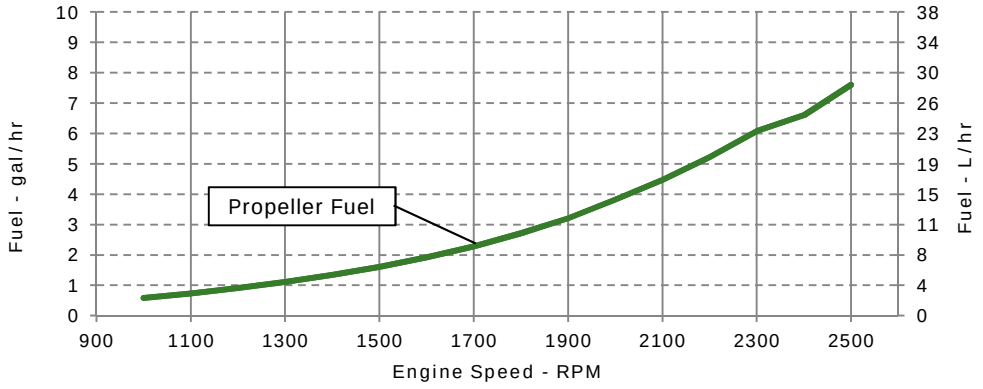
ENGINE PERFORMANCE CURVE

Rating: M2 - 125hp (93kW) @ 2500 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 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 • NRMM (97/68/EC), as amended	Adam Paull
Ref: Engine Emission Label	5-May-14

Performance Curve: 4045TFM85_D

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	1-5-3-6-2-4			
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**	102	kW	5806	BTU/min
Coolant Flow	170	L/min	45	gal/min
Thermostat Start to Open	82	°C	180	°F
Thermostat Fully Open	94	°C	202	°F
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	1.1	kW	60	BTU/min
Engine Radiated Heat	15	kW	829	BTU/min

Physical Data

Length to rear face of block	732	mm	28.8	in
Length maximum	1007	mm	39.6	in
Width maximum	715	mm	28.1	in
Height, crank centerline to top	625	mm	24.6	in
Height, crank centerline to bottom	287	mm	287	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 with 5-G Load	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 °C)	625	amps		
Min. Recommended Battery Capacity, 24V @32 °F (0 °C)	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		
Recommended Starter Cable, 12V 100"	#0			
Recommended Starter Cable, 24V 100"	#4			
Recommended Starter Cable, 12V 200"	#000 or 2#00			
Recommended Starter Cable, 24V 200"	#2			
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

Performance Curve: 4045TFM85_D

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Engine Installation Criteria

Fuel System

ECU Description			L16	
Fuel Injection Pump			HPCR	
Governor Type			Electronic	
Volumetric Fuel Consumption	29.0	L/hr	7.7	gal/hr
Mass Fuel Consumption	24.7	kg/hr	54	lb/hr
Total Fuel Volumetric Flow	80	L/hr	21.1	gal/hr
Total Fuel Mass Flow	68.0	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
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	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 (600rpm)**	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	133	L/min	35	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	9.7	m^3/min	341	ft^3/min
Intake Manifold Pressure	151	kPa	21.9	psi
Manifold Air Temperature	160	°C	320	°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	0.059	m^2	92	in^2

Performance Data

Rated Power	93	kW	125	hp
Rated Speed		2500	RPM	
Peak Torque Speed		1800	RPM	
Low Idle Speed		600	RPM	
Rated Torque	356	Nm	263	ft-lb
Peak Torque	477	Nm	352	ft-lb
BMEP, Rated	994	kPa	144	psi
Rated Pferdestärke (metric hp)		127	ps	
Front Drive Capacity, Intermittent	542	Nm	400	lb-ft
Front Drive Capacity, Continuous	542	Nm	400	lb-ft

Exhaust System

Exhaust Flow	22.5	m^3/min	795	ft^3/min
Exhaust Flow @ gas STP	9.1	m^3/min	320	ft^3/min
Exhaust Temperature	454	°C	849	°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 IITM 15w-40, not applicable with break in oil.

Performance Curve: 4045TFM85_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
2500	93	125	356	263	93	125	29	8	262
2400	93	125	371	274	82	111	25	7	257
2300	93	125	387	285	73	97	23	6	269
2200	93	125	405	298	64	85	20	5	265
2100	93	125	424	313	55	74	17	4	260
2000	93	125	445	328	48	64	14	4	257
1900	92	123	461	340	41	55	12	3	252
1800	90	121	477	352	35	47	10	3	251
1700	83	111	466	344	29	39	9	2	250
1600	76	102	453	334	24	33	7	2	253
1500	68	91	431	318	20	27	6	2	256
1400	59	79	402	297	16	22	5	1	263
1300	51	68	375	277	13	18	4	1	272
1200	44	59	351	259	10	14	3	1	284
1100	39	53	342	252	8	11	3	1	298
1000	35	47	332	245	6	8	2	1	314

* Theoretical 3.0 exponent propeller curve , measured at flywheel

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