

### ENGINE PERFORMANCE CURVE

Rating: M1 - 100hp (75kW) @ 2400 RPM Application: Marine PowerTech<sup>™</sup> 4.5L Engine Model: 4045TFM85



# Engine Installation Criteria

# <u>General Data</u>

Model	4045TFM85				
Number of Cylinders			4		
Bore	106	mm	4.17	in	
Stroke	127	mm	5.00	in	
Displacement	4.5	L	275	in <sup>3</sup>	
Compression Ratio		19	.0:1		
Valves per Cylinder, Intake/Exhaust		1	/1		
Combustion System		Direct	injection		
Firing Order		1-5-3	8-6-2-4		
Engine Type		In line,	4 Cycle		
Aspiration		Turbo	charged		
Aftercooling System		N	one		
Engine Crankcase Vent System	None,	Offere	d as Acces	ssory	
Cooling System*					
Total Engine to Segwater Heat Rejection**	70	k\//	308/	BTI I/min	
Coolant Flow	160	L/min	12	gal/min	
Thermostat Start to Open	82	°C	180	°F	
Thermostat Fully Open	02 Q/	°C	202	°F	
Min. Coolant Fill Rate	12	I /min	3.2	dal/min	
Min. Pressure Can	69	kPa	10	nsi	
Max External Coolant Restriction	40	kPa	5.8	nsi	
Normal Operation Max Top Tank Temperature	+0 +0	°C	212	°F	
< 5% of Total Operating Time Top	, 100		212	-	
Tank Temperature	100-110	°C	212-230	°F	
Absolute Max Top Tank Temperature	110	°C	230	°F	
Recommended Fuel Cooler	1.2	kŴ	68	BTU/min	
Engine Radiated Heat	11	kW	614	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 $^\circ F$ (0 $^\circ C$	) 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

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 $^{\star}$  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

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

Engine Performance Curves

#### Fuel System

ECU Description	L16				
Fuel Injection Pump	np HPCR				
Governor Type		Elec	tronic		
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	
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	۴F	
Max. Fuel Inlet Temperature	100	°C	212	۴F	
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, Intermitten	nt***	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

#### \* With clean filters

\*\* With John Deere Plus-50 IITM 15w-40, not applicable with break in oil.

#### Air Intake System

Engine Air Flow	7.4	m³/min	263	ft <sup>3</sup> /min
Intake Manifold Pressure	83	kPa	12.1	psi
Manifold Air Temperature	110	°C	230	°F
Maximum Manifold Air Temperature	185	°C	365	۴F
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	m²	71	in <sup>2</sup>
Performance Data Rated Power	75	kW	100	hp
Rated Speed		2400	RPM	
Peak Torque Speed		1500	RPM	
Low Idle Speed		600	RPM	

297

434

829

542

542

Nm

Nm

kPa

Nm

Nm

101

219 ft-lb

320 ft-lb

400 lb-ft

400 lb-ft

psi

120

ps

# Front Drive Capacity, Continuous Exhaust System

Rated Pferdestärke (metric hp)

Front Drive Capacity, Intermittent

Rated Torque

Peak Torque

BMEP, Rated

Exhaust Flow	16.0	m³/min	565	ft <sup>3</sup> /min
Exhaust Flow @ gas STP	7.1	m³/min	250	ft <sup>3</sup> /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

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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	100	21.4	5.7	244
2300	75	100	310	228	66	88	19.4	5.1	251
2200	75	100	324	239	57	77	18.7	4.9	277
2100	75	100	339	250	50	67	15.8	4.2	270
2000	74	100	355	262	43	58	13.4	3.5	265
1900	74	100	374	276	37	50	11.4	3.0	262
1800	74	100	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	80	406	299	15	20	5.0	1.3	284
1300	51	69	375	277	12	16	3.9	1.0	281
1200	44	60	354	261	9	12	3.3	0.9	302
1100	40	53	344	254	7	10	2.6	0.7	306
1000	36	48	339	250	5	7	2.2	0.6	355

# Engine Performance Data Table

\* Theoretical 3.0 exponent propeller curve , measured at flywheel

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