



**ENGINE PERFORMANCE CURVE**

Rating: M2 - 85 hp (63 kW) @ 2500 rpm  
 M1 - 75 hp (56 kW) @ 2400 rpm

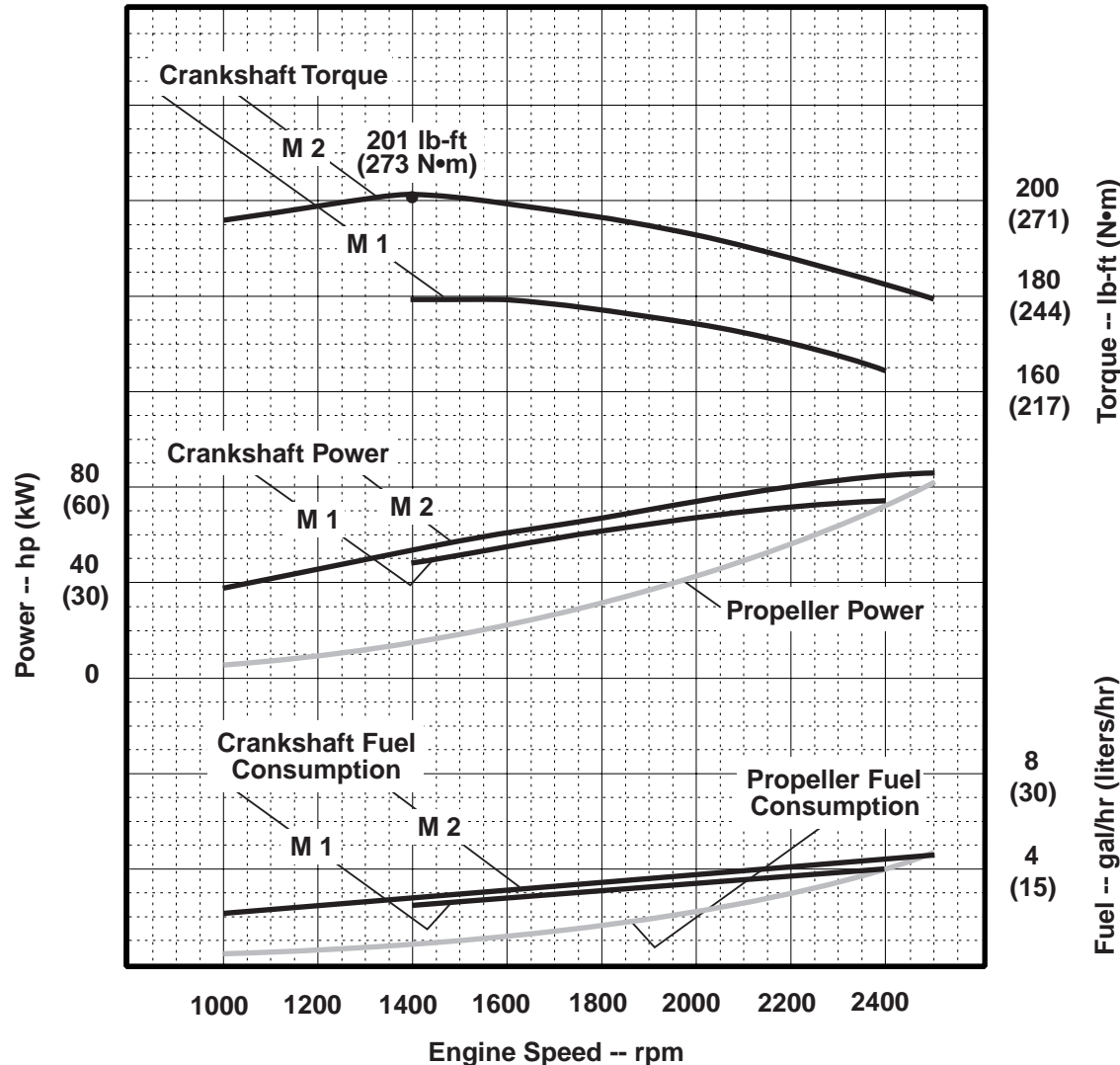
Application: Marine

**POWERTECH 4.5 L Engine**

Model: **4045DFM50**

[Option 16HR / 16HS]\*

(Propeller Shaft Power Based on 97% Marine Gear Efficiency)



Air Intake Restriction ..... 12 in.H<sub>2</sub>O (3 kPa)  
 Exhaust Back Pressure ..... 30 in.H<sub>2</sub>O (7.5 kPa)

Gross power guaranteed within + or - 5% at SAE J1995 and ISO 3046 conditions:

- 77 °F (25 °C) air inlet temperature
- 29.31 in.Hg (99 kPa) barometer
- 104 °F (40 °C) fuel inlet temperature
- 0.853 fuel specific gravity @ 60 °F (15.5 °C)

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 are from currently available data and are subject to change without notice.

Notes:

Tier-1 Emission Certifications:

Certified by:

**NONE**  
 Ref: Engine Emission Label

*Neal Cooper*  
 16 July 99

\* Revised Data

Curve: 4045DFM5085\* ..... Sheet 1 of 2  
 July 1999

## Common Specifications:

### General Data

Model ..... 4045DFM50  
 Number of Cylinders ..... 4  
 Bore and Stroke--in.(mm) ..... 4.19 x 5.00 (106 x 127)  
 Displacement--in<sup>3</sup> (L) .....276 (4.5)  
 Compression Ratio ..... 17.6:1  
 Valves per Cylinder -- Intake / Exhaust..... 1 / 1  
 Firing Order..... 1-3-4-2\*  
 Combustion System..... Direct Injection  
 Engine Type..... In-line, 4-Cycle  
 Aspiration..... Natural

### Physical Data

(Includes Engine, Flywheel Housing, Flywheel & Electrics)  
 Length--in.(mm) .....35\* (885)\*  
 Width--in.(mm) .....28 (713)  
 Height--in.(mm) .....36 (911)  
 Weight, dry--lb (kg).....961 (437)  
 Center of Gravity Location  
     From Rear Face of Block (X-axis)--in.(mm) .... 10.6 (270)  
     Right of Crankshaft (Y-axis)--in.(mm)..... 7.4 (189)  
     Above Crankshaft (Z-axis)--in.(mm).....16.8 (428)  
 Max. Allow. Static Bending Moment at Rear Face  
     of Flywhl Hsg w/5-G Load--lb-ft (N•m) .....600 (814)  
 Thrust Bearing Load Limit (Forward)--lb (N) .....900 (4003)  
 Maximum Installed Angle  
     Front Up--degrees..... 15  
     Front Down--degrees ..... 0

### Fuel System

Fuel Injection Pump .....Stanadyne DB-2  
 Governor Type ..... Mechanical  
 Governor Regulation--percent ..... 7 to 10  
 Fuel Consumption--gal/hr (L/hr).....4.4 (16.6)  
 Total Fuel Flow--gal/hr (L/hr) .....32 (123)  
 Maximum Leak Off Line Pressure--psi (kPa) .....2 (14)  
 Max. Fuel Transfer Pump Suction Lift--ft (m) fuel .....3 (0.9)  
 Max. Fuel Height Above Transfer Pump--ft (m) .....4.5 (1.4)  
 Fuel Filter Size @98% Efficiency--Micron..... 8

## Engine Specification Data

### Lubrication System

Oil Pressure @ Rated Speed--psi (kPa)..... 50 (345)  
 Oil Pressure @ Low Idle--psi (kPa) ..... 15 (105)  
 Oil Temperature in Pan--°F (°C) ..... 239 (115)  
 Oil Pan Capacity, High--qt (L) ..... 8 (7.5)  
 Oil Pan Capacity, Low--qt (L)..... 7 (6.5)  
 Total Oil Capacity with Filters--qt (L).....9 (8.5)  
 Operational Angularity Limit - Any--degrees..... 30  
 Maximum Crankshaft Pressure--in. H<sub>2</sub>O (kPa)..... 2 (0.5)  
 Engine Crankcase Vent System .....Open

### Exhaust System

Exhaust Temperature--°F (°C) ..... 898 (481)  
 Exhaust Gas Flow--ft<sup>3</sup>/min (m<sup>3</sup>/min) ..... 425 (12)  
 Maximum Back Pressure--in. H<sub>2</sub>O (kPa) ..... 30 (7.5)  
 Recommended Minimum Exhaust Outlet Size--in.(mm)  
     Dry ..... 2.5 (65)  
     Wet..... 3.0 (75)

### Cooling System

Engine Heat Rejection--BTU/min (kW) ..... 3225 (56.5)  
 Engine Radiated Heat--BTU/min (kW)..... 470 (8.3)  
 Coolant Flow--gal/min (L/min)..... 47\* (178)\*  
 Minimum Coolant Fill Rate--gal/min (L/min) ..... 3 (11)  
 Thermostat Start to Open--°F (°C)..... 176 (80)  
 Thermostat Fully Open--°F (°C).....201 (94)  
 Maximum Top Tank Temperature--°F (°C) ..... 212 (100)  
 Minimum Water-to-Boil Temperature--°F (°C)..... 86 (30)  
 Recommended Pressure Cap--psi (kPa)..... 7 (48)  
 Max. Water Pump Inlet Restriction--in. H<sub>2</sub>O (kPa).. 40 (10)  
 Max. Pressure Drop Across Keel Cooler--psi (kPa) .. 6 (41)  
 Engine Coolant Capacity--qt (L) ..... 14 (13)

### Sea Water System

Sea Water Pump Flow--gal/min (L/min)..... 31 (118)  
 Maximum Inlet Restriction--in. H<sub>2</sub>O (kPa) ..... 120 (30)  
 Maximum Outlet Pressure--psi (kPa)..... 10 (69)  
 Maximum Suction Lift--ft (m)..... 10 (3)

### Air System

Minimum Ventilation Area--in<sup>2</sup> (m<sup>2</sup>) ..... 47 (0.03)  
 Maximum Allowable Air Temperature Rise  
     Ambient to Engine Inlet--°F (°C) ..... 31 (17)  
 Engine Air Flow--ft<sup>3</sup>/min (m<sup>3</sup>/min) ..... 175 (4.9)  
 Intake Manifold Pressure--psi (kPa) ..... Ambient  
 Maximum Air Intake Restriction  
     Dirty Air Cleaner--in. H<sub>2</sub>O (kPa) ..... 25 (6.3)  
     Clean Air Cleaner--in. H<sub>2</sub>O (kPa) ..... 12 (3.0)

### Electrical System

**12 Volt 24 Volt**

Recommended Battery Capacity  
     Cold Cranking Amps @ 32 °F (0 °C)--amp..640 ..... 570  
 Max. Starting Circuit Resistance--Ohms.....0.0012 ... 0.002  
 Starter Rolling Current @ 32 °F (0 °C)--amp...780 ..... 600

### Performance Data

Rated Power--hp (kW) ..... 85 (63)  
 Rated Power (Metric) Fuel @ 77 °F (25 °C)--PS ..... 86  
 Rated Speed--rpm ..... 2500  
 Rated Torque--lb-ft (N•m)..... 179 (242)  
 Peak Torque--lb-ft (N•m) ..... 201 (273)  
 Peak Torque Speed--rpm..... 1400  
 Torque Rise--percent ..... 13  
 Low Idle Speed--rpm ..... 700  
 BMEP--psi (kPa) ..... 97 (674)

### Fuel Consumption for Typical Propeller Curve

Engine rpm	Crank Power hp (kW)	Crank Torque lb-ft (N•m)	Prop Power hp (kW)	Prop Fuel gal/hr(L/hr)
2500	85 (63.4)	179 (242)	82 (61)	4.6 (17.3)
2400	83 (62.1)	182 (247)	73 (54)	4.0 (15.0)
2200	79 (58.9)	188 (256)	56 (42)	3.0 (11.3)
2000	74 (54.9)	193 (262)	42 (31)	2.2 (8.5)
1800	67 (50.3)	197 (267)	31 (23)	1.7 (6.3)
1600	61 (45.2)	199 (270)	22 (16)	1.2 (4.6)
1400	53 (39.6)	201 (273)	14 (11)	0.9 (3.3)
1200	45 (33.8)	198 (269)	9 (7)	0.6 (2.2)
1000	37 (27.9)	196 (266)	5 (4)	0.4 (1.4)

Data based on keel-cooled engine.  
 All values at rated speed and power with standard options unless otherwise noted.

\* Revised Data  
 Curve: 4045DFM5085\* ..... Sheet 2 of 2  
 July 1999