



CUMMINS INC.
Columbus, IN 47201
Marine Performance Curves

Basic Engine Model
QSM11-M

Curve Number:
M-20141

Engine Configuration
D353013MX03

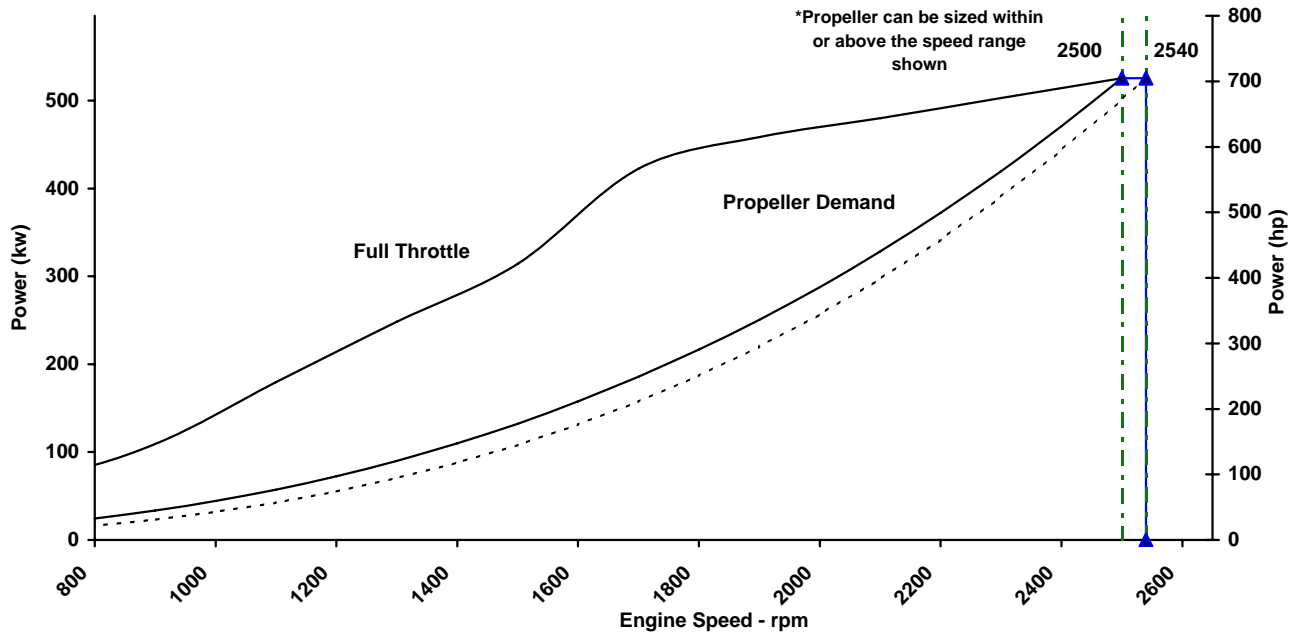
CPL Code:
1794

Date:
12-May-10

Displacement: **10.8 liter** [661 in³]
Bore: **125 mm** [4.92 in]
Stroke: **147 mm** [5.79 in]
Fuel System: **CELECT**
Cylinders: **6**

Rated Power: **526 kw** [705 bhp, 715 mhp]
Rated Speed: **2500 rpm**
Rating Type: **High Output**
Aspiration: **Turbocharged / Sea Water Aftercooled**

CERTIFIED: This diesel engine complies with or is certified to the following agencies requirements:
IMO Tier I - Tier 1 (One) NOx requirements of International Maritime Organization (IMO), MARPOL 73/78 Annex VI, Regulation 13
EPA Tier 2 - Model year requirements of the EPA marine regulation (40CFR94)



Speed	Full Throttle- Power		Full Throttle- Torque		Fuel Cons.- Prop. Curve 2.7 Exp.	
	rpm	kw (hp)	N-m (ft-lb)	L/hr (gal/hr)		
2540	526	(705)	1976	(1458)		
2500	526	(705)	2008	(1481)	142.7	(37.7)
2400	515	(690)	2047	(1510)	124.3	(32.8)
2200	492	(660)	2135	(1575)	94.0	(24.8)
2000	469	(629)	2238	(1650)	70.7	(18.7)
1800	442	(593)	2346	(1730)	53.7	(14.2)
1600	358	(480)	2135	(1575)	40.0	(10.6)
1400	278	(373)	1898	(1400)	27.0	(7.1)
1200	208	(279)	1654	(1220)	18.4	(4.9)
1100	180	(241)	1559	(1150)	15.0	(4.0)
1000	143	(192)	1369	(1010)	12.0	(3.2)
900	109	(147)	1159	(855)	8.9	(2.3)
800	80	(107)	956	(705)	6.3	(1.7)

* Cummins Full Throttle Requirements:

- Engine achieves or exceeds rated rpm at full throttle under any steady operating condition
- Engines in variable displacement boats (such as pushboats, tugboats, net dragners, etc.) achieve no less than 100 rpm below rated speed at full throttle during a dead push or bollard pull
- Engine achieves or exceeds rated rpm when accelerating from idle to full throttle

Rated Conditions: Ratings are based upon ISO 15550 reference conditions; air pressure of 100 kPa [29.612 in Hg], air temperature 25deg. C [77 deg. F] and 30% relative humidity. Power is in accordance with IMCI procedure. Member NMMA. Unless otherwise specified, tolerance on all values is +/-5%.

Full Throttle curve represents power at the crankshaft for mature gross engine performance corrected in accordance with ISO 15550. Propeller Curve represents approximate power demand from a typical propeller. Propeller Shaft Power is approximately 3% less than rated crankshaft power after typical reverse/reduction gear losses and may vary depending on the type of gear or propulsion system used.

Fuel Consumption is based on fuel of 35 deg. API gravity at 16 deg C [60 deg. F] having LHV of 42,780 kJ/kg [18390 Btu/lb] and weighing 838.9 g/liter [7.001 lb/U.S. gal].

High Output (HO): Intended for use in variable load applications where full power is limited to one hour out of every eight hours of operation. Also, reduced power must be at or below 200 rpm of the maximum rated rpm. This power rating is for pleasure/non-revenue generating applications that operate 500 hours per year or less.

CHIEF ENGINEER

Propulsion Marine Engine Performance Data

Curve No. **M-20141**
DS : **3075**
CPL : **1794**
DATE: **12-May-10**

General Engine Data

Engine Model	QSM11-M
Rating Type	High Output
Rated Engine Power	526 [705]
Rated Engine Speed	2500
Rated Power Production Tolerance	5
Rated Engine Torque	2008 [1481]
Peak Engine Torque @ 1700 rpm.....	2373 [1750]
Brake Mean Effective Pressure	2331 [338]
Indicated Mean Effective Pressure.....	2600 [377]
Maximum Allowable Engine Speed	2560
Maximum Torque Capacity from Front of Crank ²	N.A. [N.A.]
Compression Ratio	16.3:1
Piston Speed	12.3 [2411]
Firing Order	1-5-3-6-2-4
Weight (Dry) - Engine Only - Average	N.A. [N.A.]
Weight (Dry) - Engine With Heat Exchanger System - Average.....	1188 [2620]
Weight Tolerance (Dry) Engine Only	N.A.

Governor Settings

High Speed Governor Break Point.....	2540
Minimum Idle Speed Setting	600
Normal Idle Speed Variation	10
High Idle Speed Range Minimum	2540
Maximum	2560

Noise and Vibration

Average Noise Level - Top	(Idle)..	dBa @ 1m	TBD
	(Rated)	dBa @ 1m	TBD
Average Noise Level - Right Side	(Idle)..	dBa @ 1m	TBD
	(Rated)	dBa @ 1m	TBD
Average Noise Level - Left Side	(Idle)..	dBa @ 1m	TBD
	(Rated)	dBa @ 1m	TBD
Average Noise Level - Front	(Idle)..	dBa @ 1m	TBD
	(Rated)	dBa @ 1m	TBD

Fuel System¹

Avg. Fuel Consumption - ISO 8178 E3 Standard Test Cycle	91.7 [24.2]
Avg. Fuel Consumption - ISO 8178 E5 Standard Test Cycle	46.3 [12.2]
Fuel Consumption at Rated Speed	142.7 [37.7]
Approximate Fuel Flow to Pump	302.8 [80.0]
Maximum Allowable Fuel Supply to Pump Temperature	60.0 [140]
Approximate Fuel Flow Return to Tank	160.1 [42.3]
Approximate Fuel Return to Tank Temperature	93.4 [200]
Maximum Heat Rejection to Drain Fuel	4.4 [249]
Fuel Transfer Pump Pressure Range.....	N.A.
Fuel Pressure - Pump Out/Rail . Mechanical Gauge	1151 [167]
INSITE Reading	N.A.

TBD= To Be Determined

N/A = Not Applicable

N.A. = Not Available

- ¹ Unless otherwise specified, all data is at rated power conditions and can vary ± 5%.
- ² No rear loads can be applied when the FPTO is fully loaded. Max PTO torque is contingent on torsional analysis results for the specific drive system. Consult Installation Direction Booklet for Limitations.
- ³ Heat rejection to coolant values are based on 50% water/50% ethylene glycol mix and do NOT include fouling factors. If sourcing your own cooler, a service fouling factor should be applied according to the cooler manufacturer's recommendation.
- ⁴ Consult option notes for flow specifications of optional Cummins seawater pumps, if applicable.
- ⁵ May not be at rated load and speed. Maximum heat rejection may occur at other than rated conditions.

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COLUMBUS, INDIANA

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Propulsion Marine Engine Performance Data

Curve No. **M-20141**
DS : **3075**
CPL : **1794**
DATE: **12-May-10**

Air System¹

Intake Manifold Pressure	kPa [in Hg]	295 [87]
Intake Air Flow	l/sec [cfm]	723 [1533]
Heat Rejection to Ambient	kW [Btu/min]	43 [2446]

Exhaust System¹

Exhaust Gas Flow	l/sec [cfm]	1871 [3964]
Exhaust Gas Temperature (Turbine Out)	°C [°F]	544 [1,010]
Exhaust Gas Temperature (Manifold)	°C [°F]	732 [1349]

Emissions (in accordance with ISO 8178 Cycle E3)

NOx (Oxides of Nitrogen)	g/kw-hr [g/hp-hr]	4.51 [3.36]
HC (Hydrocarbons)	g/kw-hr [g/hp-hr]	0.15 [0.11]
CO (Carbon Monoxide)	g/kw-hr [g/hp-hr]	0.49 [0.37]
PM (Particulate Matter)	g/kw-hr [g/hp-hr]	0.14 [0.10]

Emissions (in accordance with ISO 8178 Cycle E5)

NOx (Oxides of Nitrogen)	g/kw-hr [g/hp-hr]	4.59 [3.42]
HC (Hydrocarbons)	g/kw-hr [g/hp-hr]	0.19 [0.14]
CO (Carbon Monoxide)	g/kw-hr [g/hp-hr]	0.54 [0.40]
PM (Particulate Matter)	g/kw-hr [g/hp-hr]	0.15 [0.11]

Cooling System¹

Sea Water Pump Specifications	MAB 0.08.17-07/16/2001	
Pressure Cap Rating (With Heat Exchanger Option)	kPa [psi]	103 [15]

Engines without Low Temperature Aftercooling (LTA)

Sea Water Aftercooled Engine (SWAC)

Coolant Flow to Engine Heat Exchanger	l/min [gal/min]	N.A. [N.A.]
Standard Thermostat Operating Range (Start to Open)	°C [°F]	71 [160]
Standard Thermostat Operating Range (Full Open)	°C [°F]	80 [175]
Heat Rejection to Engine Coolant ³	kW [Btu/min]	183 [10436]

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