**CUMMINS INC.**  
Columbus, IN  47201

Marine Performance Curves

### Basic Engine Model Curve Number:

<table>
<thead>
<tr>
<th>Engine Configuration</th>
<th>CPL Code:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>D35S013MX03</td>
<td>8753</td>
<td>12-May-10</td>
</tr>
</tbody>
</table>

**Marine Performance Curves**

<table>
<thead>
<tr>
<th>Displacement:</th>
<th>Rated Power:</th>
<th>Rated Speed:</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.8 liter</td>
<td>474 kw</td>
<td>2300 rpm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bore:</th>
<th>Stroke:</th>
<th>Fuel System:</th>
<th>Aspiration:</th>
</tr>
</thead>
<tbody>
<tr>
<td>125 mm</td>
<td>147 mm</td>
<td>CELECT</td>
<td>Turbocharged / Sea Water Aftercooled</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cylinders:</th>
<th>Speed rpm</th>
<th>Power (kw)</th>
<th>Power (hp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>2340</td>
<td>474 (636)</td>
<td>636 bhp, 645 mhp</td>
</tr>
<tr>
<td>2300</td>
<td>474 (636)</td>
<td>1935 (1427)</td>
<td></td>
</tr>
<tr>
<td>2200</td>
<td>469 (629)</td>
<td>2035 (1501)</td>
<td></td>
</tr>
<tr>
<td>2100</td>
<td>462 (620)</td>
<td>2103 (1551)</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>455 (610)</td>
<td>2171 (1601)</td>
<td></td>
</tr>
<tr>
<td>1900</td>
<td>445 (597)</td>
<td>2237 (1650)</td>
<td></td>
</tr>
<tr>
<td>1700</td>
<td>422 (566)</td>
<td>2373 (1750)</td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td>314 (421)</td>
<td>2000 (1475)</td>
<td></td>
</tr>
<tr>
<td>1400</td>
<td>278 (373)</td>
<td>1898 (1400)</td>
<td></td>
</tr>
<tr>
<td>1300</td>
<td>248 (333)</td>
<td>1824 (1345)</td>
<td></td>
</tr>
<tr>
<td>1200</td>
<td>208 (279)</td>
<td>1654 (1220)</td>
<td></td>
</tr>
<tr>
<td>1100</td>
<td>180 (241)</td>
<td>1559 (1150)</td>
<td></td>
</tr>
<tr>
<td>900</td>
<td>109 (147)</td>
<td>1159 (855)</td>
<td></td>
</tr>
<tr>
<td>800</td>
<td>80 (107)</td>
<td>956 (705)</td>
<td></td>
</tr>
</tbody>
</table>

**Fuel Consumption**

- Engine achieves or exceeds rated rpm at full throttle during a dead push or bollard pull
- Engine achieves or exceeds rated rpm when accelerating from idle to full throttle
- Engines in variable displacement boats (such as pushboats, tugboats, net draggers, 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

**Certification:** 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)

**Diagram:**

- 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.

**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 39% relative humidity. Power is in accordance with IMCI procedure. Member NMMA. Unless otherwise specified, tolerance on all values is +/-5%.

**Fuel Consumption:**

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.
Propulsion Marine Engine Performance Data

General Engine Data

Engine Model: QSM11-M
Rating Type: High Output
Rated Engine Power: 474 [636] kW [hp]
Rated Engine Speed: 2300 rpm
Rated Power Production Tolerance: ±5%
Rated Engine Torque: 1969 [1452] N·m [lb·ft]
Peak Engine Torque @ 1700 rpm: 2373 [1750] N·m [lb·ft]
Brake Mean Effective Pressure: 2286 [332] kPa [psi]
Indicated Mean Effective Pressure: 2527 [367] kPa [psi]
Maximum Allowable Engine Speed: 2360 rpm
Maximum Torque Capacity from Front of Crank: 0 [0] N·m [lb·ft]
Compression Ratio: 16.3:1
Piston Speed: 11.3 [2219] m/sec [ft/min]
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] kg [lb]
Weight Tolerance (Dry) Engine Only: 3xStd Dev(±%)

Governor Settings

High Speed Governor Break Point: 2340 rpm
Minimum Idle Speed Setting: 600 rpm
Normal Idle Speed Variation: ±10 rpm
High Idle Speed Range Minimum: 2340 rpm
Maximum: 2360 rpm

Noise and Vibration

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

Fuel System¹

Fuel Consumption at Rated Speed: 127.9 [33.8] l/hr [gal/hr]
Approximate Fuel Flow to Pump: 280.1 [74.0] l/hr [gal/hr]
Maximum Allowable Fuel Supply to Pump Temperature: 60.0 [140] °C [°F]
Approximate Fuel Flow Return to Tank: 152.2 [40.2] l/hr [gal/hr]
Approximate Fuel Return to Tank Temperature: 93.4 [200] °C [°F]
Maximum Heat Rejection to Drain Fuel: 4.2 [237] kW [Btu/min]
Fuel Transfer Pump Pressure Range: N.A.
INSITE Reading: N.A.

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.
### Propulsion Marine Engine Performance Data

**Curve No.** M-20107  
**DS :** 3075  
**CPL :** 8753  
**DATE:** 12-May-10

#### Air System¹
- Intake Manifold Pressure ............................................................... kPa [in Hg] 280 [83]
- Intake Air Flow ................................................................. l/sec [cfm] 678 [1436]
- Heat Rejection to Ambient ....................................................... kW [Btu/min] 38 [2189]

#### Exhaust System¹
- Exhaust Gas Flow ................................................................. l/sec [cfm] 1678 [3556]
- Exhaust Gas Temperature (Turbine Out) ..................................... °C [°F] 507 [943]
- Exhaust Gas Temperature (Manifold) ........................................ °C [°F] 674 [1245]

#### Emissions (in accordance with ISO 8178 Cycle E3)
- NOx (Oxides of Nitrogen) ....................................................... g/kw·hr [g/hp·hr] 4.54 [3.39]
- HC (Hydrocarbons) ................................................................. g/kw·hr [g/hp·hr] 0.20 [0.15]
- CO (Carbon Monoxide) ............................................................. g/kw·hr [g/hp·hr] 0.40 [0.29]
- PM (Particulate Matter) ......................................................... g/kw·hr [g/hp·hr] 0.10 [0.07]

#### Emissions (in accordance with ISO 8178 Cycle E5)
- NOx (Oxides of Nitrogen) ....................................................... g/kw·hr [g/hp·hr] 4.57 [3.41]
- HC (Hydrocarbons) ................................................................. g/kw·hr [g/hp·hr] 0.24 [0.18]
- CO (Carbon Monoxide) ............................................................. g/kw·hr [g/hp·hr] 0.47 [0.35]
- PM (Particulate Matter) ......................................................... g/kw·hr [g/hp·hr] 0.12 [0.09]

#### 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] 424 [112]
  - 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 Coolant³ ........................................ kW [Btu/min] 146 [8300]

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TBD = To Be Determined  
N/A = Not Applicable  
N.A. = Not Available

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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.

CUMMINS ENGINE COMPANY, INC  
COLUMBUS, INDIANA

All Data is Subject to Change Without Notice - Consult the following Cummins intranet site for most recent data: [http://cmdmarine.com/](http://cmdmarine.com/)

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