



CUMMINS INC.
Columbus, IN 47201
Marine Performance Curves
marine.cummins.com

Basic Engine Model

QSM11-405 HD

Engine Configuration

D353021MX03

Curve Number:

M-20776

CPL Code:

4334

Date:

27-Oct-16

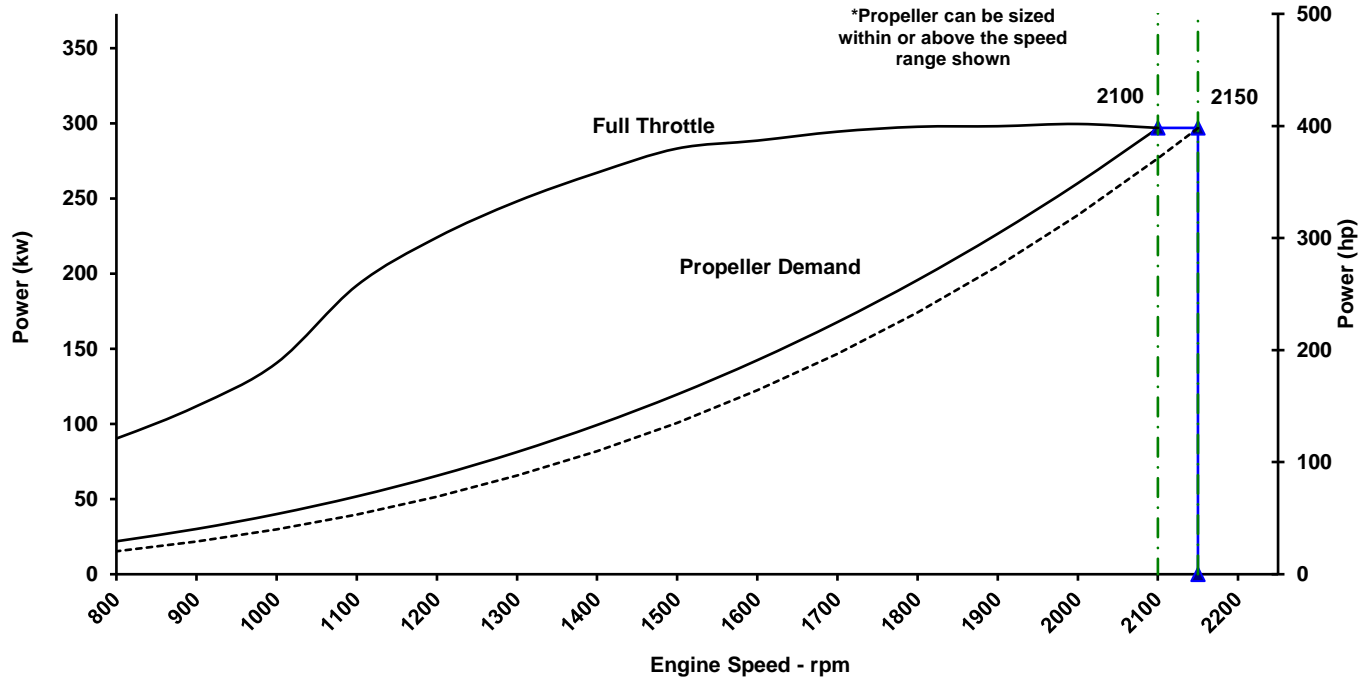
Displacement: **10.8 liter [661 in³]** Rated Power: **297 kw [398 bhp, 405 mhp]**
 Bore: **125 mm [4.92 in]** Rated Speed: **2100 rpm**
 Stroke: **147 mm [5.79 in]** Rating Type: **Heavy Duty**
 Fuel System: **CELECT** Aspiration: **Turbocharged / Sea Water Aftercooled**
 Cylinders: **6**

CERTIFIED: This diesel engine complies with or is certified to the following agencies requirements:

EPA Tier 3 - Model year requirements of the EPA marine regulation (40CFR1042)

EU Stage IIIa - EC Nonroad Mobile Machinery Directive (2004/26/EC)

IMO Tier II - Tier 2 (Two) NOx requirements of International Maritime Organization (IMO), MARPOL 73/78 Annex VI, Regulation 13



| Speed | Full Throttle- Power | | Full Throttle- Torque | | Fuel Cons.- Prop. Curve 3.0 Exp. | |
|-------|----------------------|---------|-----------------------|---------------|----------------------------------|--------|
| | rpm | kw (hp) | N·m (ft·lb) | L/hr (gal/hr) | | |
| 2150 | 297 | (398) | 1319 | (973) | | |
| 2100 | 297 | (398) | 1350 | (996) | 80.6 | (21.3) |
| 2000 | 300 | (402) | 1430 | (1055) | 67.8 | (17.9) |
| 1900 | 298 | (400) | 1498 | (1105) | 58.7 | (15.5) |
| 1800 | 298 | (399) | 1580 | (1165) | 49.4 | (13.1) |
| 1700 | 294 | (395) | 1654 | (1220) | 40.8 | (10.8) |
| 1600 | 289 | (387) | 1722 | (1270) | 34.2 | (9.0) |
| 1500 | 283 | (380) | 1803 | (1330) | 28.4 | (7.5) |
| 1400 | 267 | (358) | 1822 | (1344) | 23.4 | (6.2) |
| 1300 | 248 | (333) | 1822 | (1344) | 19.0 | (5.0) |
| 1200 | 224 | (300) | 1783 | (1315) | 15.2 | (4.0) |
| 1100 | 192 | (258) | 1668 | (1230) | 12.3 | (3.3) |

* 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 druggers, 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].

Heavy Duty (HD): Intended for continuous use in variable load applications where full power is limited to eight (8) hours out of every ten (10) hours of operation. Also, reduced power operations must be at or below 200 rpm of the maximum rated rpm. This is an ISO 15550 fuel stop power rating and is for applications that operate 5,000 hours per year or less.

TECHNICAL DEPT.

CHIEF ENGINEER

Propulsion Marine Engine Performance Data

Curve No. M-20776
DS : 3075
CPL : 4334
DATE: 27-Oct-16

General Engine Data

| | |
|---|--------------|
| Engine Model | QSM11-405 HD |
| Rating Type | Heavy Duty |
| Rated Engine PowerkW [hp] | 297 [398] |
| Rated Engine Speedrpm | 2100 |
| Rated Power Production Tolerance±% | 5 |
| Rated Engine TorqueN·m [lb·ft] | 1350 [995] |
| Peak Engine Torque @ 1300 rpm.....N·m [lb·ft] | 1822 [1344] |
| Brake Mean Effective PressurekPa [psi] | 1567 [227] |
| Indicated Mean Effective Pressure.....kPa [psi] | 1781 [258] |
| Maximum Allowable Engine Speedrpm | 2160 |
| Maximum Torque Capacity from Front of Crank ²N·m [lb·ft] | 847 [625] |
| Compression Ratio | 15.9:1 |
| Piston Speedm/sec [ft/min] | 10.3 [2026] |
| Firing Order | 1-5-3-6-2-4 |
| Weight (Dry) - Engine Only - Averagekg [lb] | 1118 [2464] |
| Weight (Dry) - Engine With Heat Exchanger System - Average.....kg [lb] | 1184 [2610] |

Governor Settings

| | |
|---|------|
| High Speed Governor Break Point.....rpm | 2150 |
| Minimum Idle Speed Settingrpm | 600 |
| Normal Idle Speed Variation±rpm | 10 |
| High Idle Speed Range Minimumrpm | 2140 |
| Maximumrpm | 2160 |

Noise and Vibration

| | | |
|----------------------------------|----------------------|----|
| Average Noise Level - Top | (Idle).....dBA @ 1m | 80 |
| | (Rated).....dBA @ 1m | 95 |
| Average Noise Level - Right Side | (Idle).....dBA @ 1m | 80 |
| | (Rated).....dBA @ 1m | 95 |
| Average Noise Level - Left Side | (Idle).....dBA @ 1m | 80 |
| | (Rated).....dBA @ 1m | 95 |
| Average Noise Level - Front | (Idle).....dBA @ 1m | 80 |
| | (Rated).....dBA @ 1m | 95 |

Fuel System¹

| | |
|--|--------------|
| Avg. Fuel Consumption - ISO 8178 E3 Standard Test Cyclel/hr [gal/hr] | 54.3 [14.4] |
| Fuel Consumption at Rated Speedl/hr [gal/hr] | 80.6 [21.3] |
| Approximate Fuel Flow to Pumpl/hr [gal/hr] | 242.3 [64.0] |
| Maximum Allowable Fuel Supply to Pump Temperature°C [°F] | 60.0 [140] |
| Approximate Fuel Flow Return to Tankl/hr [gal/hr] | 161.7 [42.7] |
| Approximate Fuel Return to Tank Temperature°C [°F] | 71.2 [160] |
| Maximum Heat Rejection to Drain FuelkW [Btu/min] | 2.6 [147] |
| Fuel Pressure - Pump Out/Rail . Mechanical GaugekPa [psi] | 1103 [160] |

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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Propulsion Marine Engine Performance Data

Curve No. M-20776
 DS : 3075
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Air System¹

| | | |
|---------------------------------|--------------|-----------|
| Intake Manifold Pressure | kPa [in Hg] | 149 [44] |
| Intake Air Flow | l/sec [cfm] | 387 [820] |
| Heat Rejection to Ambient | kW [Btu/min] | 23 [1287] |

Exhaust System¹

| | | |
|---|-------------|------------|
| Exhaust Gas Flow | l/sec [cfm] | 897 [1900] |
| Exhaust Gas Temperature (Turbine Out) | °C [°F] | 348 [658] |
| Exhaust Gas Temperature (Manifold) | °C [°F] | 513 [955] |

Emissions (in accordance with ISO 8178 Cycle E3)

| | | |
|--|-------------------|-------------|
| NO _x (Oxides of Nitrogen) | g/kw·hr [g/hp·hr] | 4.48 [3.34] |
| HC (Hydrocarbons) | g/kw·hr [g/hp·hr] | 0.30 [0.22] |
| CO (Carbon Monoxide) | g/kw·hr [g/hp·hr] | 0.44 [0.33] |
| PM (Particulate Matter) | g/kw·hr [g/hp·hr] | 0.03 [0.02] |

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] | 238 [62.9] |
| 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] | 311 [17700] |

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