

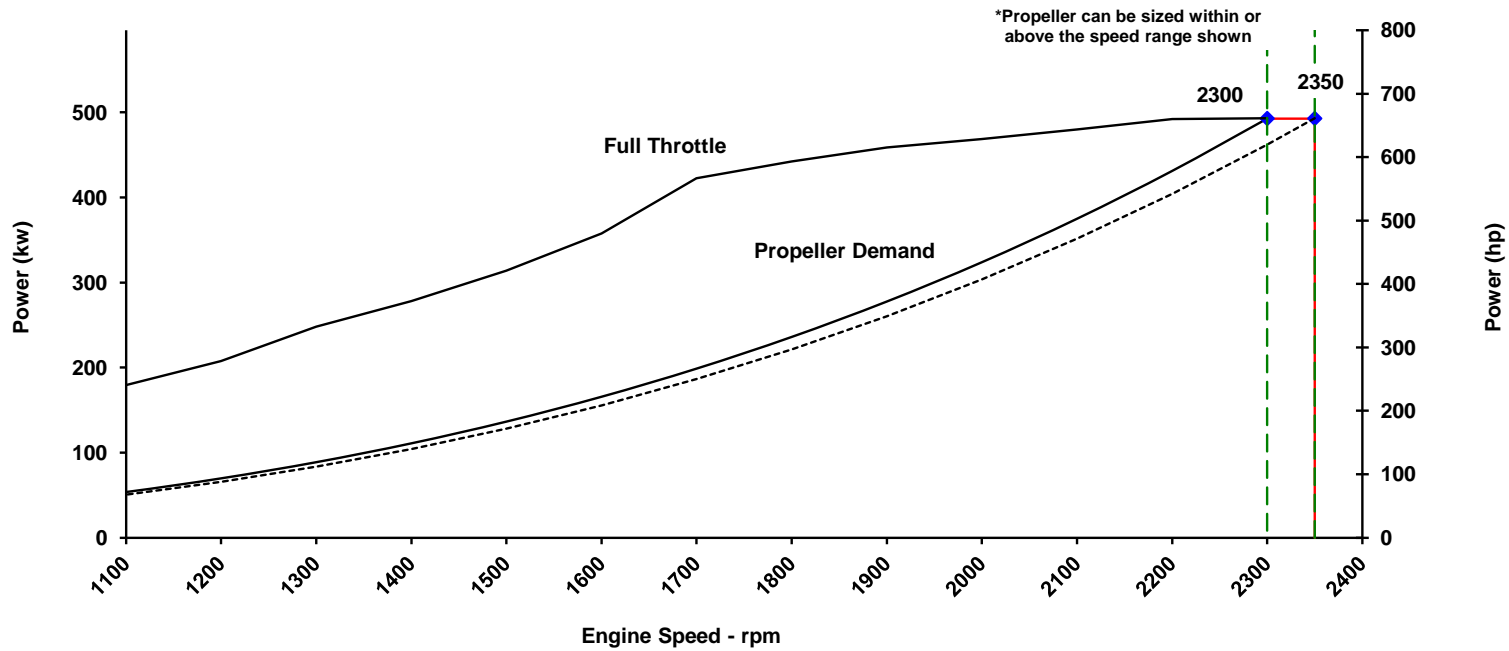


CUMMINS INC.
 Charleston, SC 29405
 Marine Performance Curves
marine.cummins.com

Basic Engine Model QSM11-M	Curve Number: M20575	
Engine Configuration D353013MX03	CPL Code: 1794	Date: 5-Aug-13

Displacement: 10.8 liter [661 in³]	Rated Power: 493 Kw [661 bhp, 670 mhp]
Bore: 125 mm [4.92 in]	Rated Speed: 2300 rpm
Stroke: 147 mm [5.79 in]	Rating Type: Government Service
Cylinders: 6	Aspiration: Turbocharged / Sea Water Aftercooled
Fuel System: CELECT	

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



Speed rpm	Full Throttle				Propeller Demand					
	Power		Torque		Power		Torque		Fuel Consumption	
	kw	(hp)	N·m	(ft·lb)	kw	(hp)	N·m	(ft·lb)	L/hr	(gal/hr)
2350	493	(661)	2003	(1477)						
2300	493	(661)	2046	(1509)	493	(661.0)	2046	(1,509.4)	128.1	(33.9)
2200	492	(660)	2135	(1575)	431	(578.5)	1872	(1,381.0)	107.2	(28.3)
2100	480	(644)	2183	(1610)	375	(503.1)	1706	(1,258.3)	91.0	(24.0)
2000	469	(629)	2238	(1650)	324	(434.6)	1547	(1,141.3)	77.7	(20.5)
1900	459	(615)	2305	(1700)	278	(372.6)	1397	(1,030.0)	66.6	(17.6)
1800	442	(593)	2346	(1730)	236	(316.8)	1253	(924.5)	56.9	(15.0)
1700	422	(566)	2373	(1750)	199	(266.9)	1118	(824.6)	48.4	(12.8)
1600	358	(480)	2135	(1575)	166	(222.5)	990	(730.4)	41.1	(10.9)
1500	314	(421)	2000	(1475)	137	(183.4)	870	(642.0)	34.3	(9.1)
1400	278	(373)	1898	(1400)	111	(149.1)	758	(559.2)	28.0	(7.4)
1300	248	(333)	1824	(1345)	89	(119.4)	654	(482.2)	22.6	(6.0)
1200	208	(279)	1654	(1220)	70	(93.9)	557	(410.9)	18.1	(4.8)
1100	180	(241)	1559	(1150)	54	(72.3)	468	(345.2)	14.3	(3.8)
1000	143	(192)	1369	(1010)	41	(54.3)	387	(285.3)	11.1	(2.9)
900	109	(147)	1159	(855)	30	(39.6)	313	(231.1)	8.6	(2.3)
800	80	(107)	956	(705)	21	(27.8)	248	(182.6)	6.6	(1.7)
700	70	(94)	956	(705)	14	(18.6)	190	(139.8)	4.9	(1.3)
600	55	(73)	868	(640)	9	(11.7)	139	(102.7)	3.5	(0.9)

*** Cummins Full Throttle Requirements:**

- Engine achieves or exceeds rated rpm at full throttle under any steady operating condition
- 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. Member NMMA. Unless otherwise specified, tolerance on all values is +/-5%. Values from engine control modules and displayed on instrument panels are not absolute. Tolerance varies, but is generally less than +/-5% when operating within 30% of rated power.

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].

Government Service (GS): 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 only for use in National, State or Local government non-revenue producing applications.

[Signature]
 CHIEF ENGINEER

Propulsion Marine Engine Performance Data

Curve No. M20575
 DS: DS3021
 CPL: 1794
 DATE: 5-Aug-13

General Engine Data

Engine Model		QSM11-M
Rating Type		Government Service
Rated Engine Power	kW [hp]	493 [661]
Rated Engine Speed	rpm	2300
Rated Power Production Tolerance	±%	5
Rated Engine Torque	N·m [lb·ft]	2046 [1509]
Peak Engine Torque @ 1500 rpm.....	N·m [lb·ft]	2373 [1750]
Brake Mean Effective Pressure	kPa [psi]	2376 [345]
Indicated Mean Effective Pressure.....	kPa [psi]	2610 [379]
Maximum Allowable Engine Speed	rpm	2360

Maximum Continuous Torque Capacity from Front of Crank Specifications

Maximum Torque Capacity from Front of Crank ²	N·m [lb·ft]	0 [0]
Compression Ratio		16.3:1
Piston Speed	m/sec [ft/min]	11.3 [2219]
Firing Order		1-5-3-6-2-4
Weight (Dry) - Engine With Heat Exchanger System - Average.....	kg [lb]	1188 [2620]

Governor Settings

Default Droop Value.....	Refer to MAB 2.04.00-03/23/2006 for Droop explanation	0%
High Speed Governor Break Point.....	rpm	2350
Minimum Idle Speed Setting	rpm	600
Normal Idle Speed Variation	±rpm	10
High Idle Speed Range Minimum	rpm	2350
Maximum	rpm	2370

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	l/hr [gal/hr]	83.9 [22.2]
Fuel Consumption at Rated Speed	l/hr [gal/hr]	897.1 [237.0]
Approximate Fuel Flow to Pump	l/hr [gal/hr]	280.1 [74.0]
Maximum Allowable Fuel Supply to Pump Temperature	°C [°F]	60.0 [140]
Approximate Fuel Flow Return to Tank	l/hr [gal/hr]	159.0 [42.0]
Approximate Fuel Return to Tank Temperature	°C [°F]	93.4 [200]
Maximum Heat Rejection to Drain Fuel	kW [Btu/min]	4.3 [247]
Fuel Pressure - Pump Out/Rail . Mechanical Gauge	kPa [psi]	1151 [167]

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.

CUMMINS INC.
 COLUMBUS, INDIANA

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Propulsion Marine Engine Performance Data

Curve No. M20575
 DS: DS3021
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Air System¹

Intake Manifold PressurekPa [in Hg]	284 [84]
Intake Air Flowl/sec [cfm]	668 [1416]
Heat Rejection to Ambient .....	.....kW [Btu/min]	38 [2189]

Exhaust System¹

Exhaust Gas Flow .....	.....l/sec [cfm]	1665 [3,528]
Exhaust Gas Temperature (Turbine Out) .....	.....°C [°F]	514 [957]
Exhaust Gas Temperature (Manifold) .....	.....°C [°F]	688 [1,270]

Emissions (in accordance with ISO 8178 Cycle E3)

NO _x (Oxides of Nitrogen) .....	.....g/kw-hr [g/hp-hr]	3.95 [2.95]
HC (Hydrocarbons) .....	.....g/kw-hr [g/hp-hr]	0.20 [0.15]
CO (Carbon Monoxide) .....	.....g/kw-hr [g/hp-hr]	0.61 [0.45]
PM (Particulate Matter) .....	.....g/kw-hr [g/hp-hr]	0.09 [0.07]
CO ₂ (Carbon dioxide) .....	.....g/kw-hr [g/hp-hr]	629.00 [469.05]

Cooling System¹

Sea Water Pump Specifications .....	.....MAB 0.08.17-07/16/2001	
Pressure Cap RatingkPa [psi]	103 [15]
Max. Coolant Outlet Pressure from the Engine.....kPa [psi]	414 [60]

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