



CUMMINS INC.  
Columbus, IN 47201  
Marine Performance Curves  
[marine.cummins.com](http://marine.cummins.com)

Basic Engine Model  
**QSM11-455 MCD**  
Engine Configuration  
**D353021MX03**

Curve Number:  
**M-20036**

CPL Code: **8590**  
Date: **11-Dec-12**

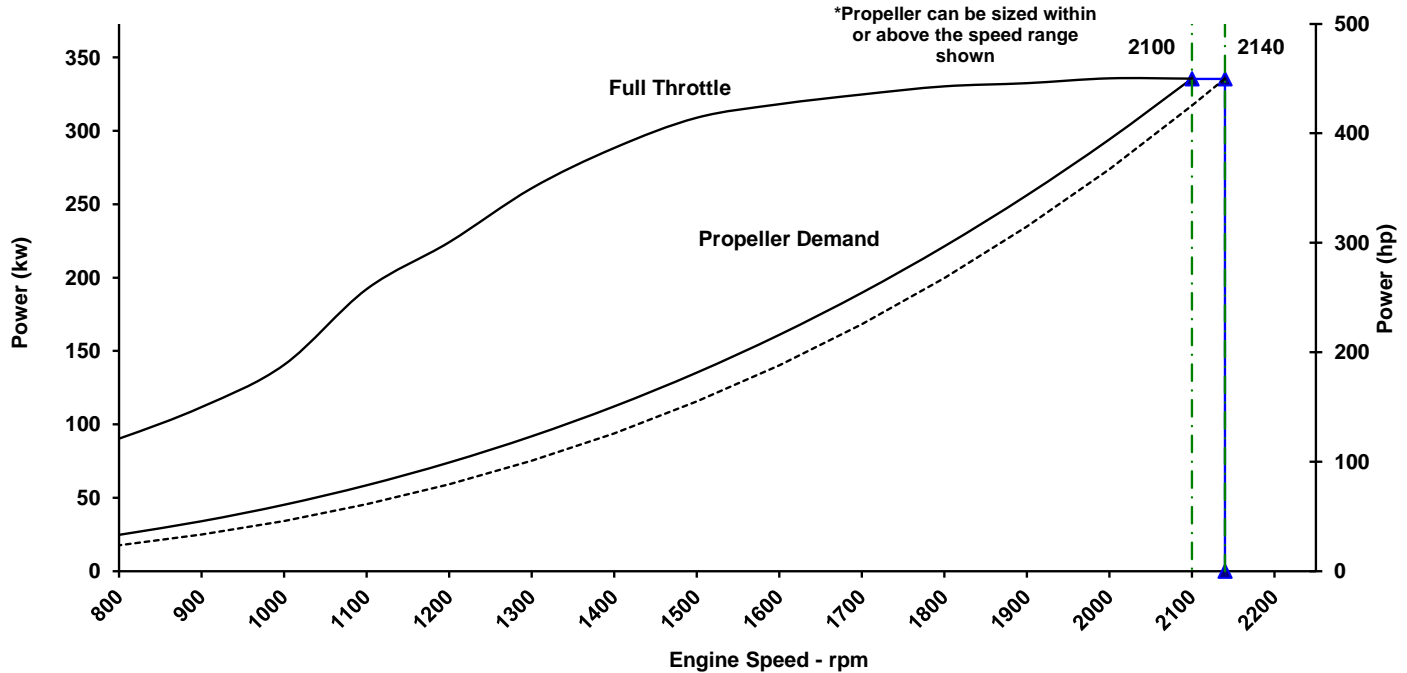
Displacement: **10.8 liter [661 in³]**      Rated Power: **336 kw [450 bhp, 455 mhp]**  
Bore: **125 mm [4.92 in]**      Rated Speed: **2100 rpm**  
Stroke: **147 mm [5.79 in]**      Rating Type: **Medium Continuous Duty**  
Fuel System: **CELECT**      Aspiration: **Turbocharged / Jacket Water Aftercooled**  
Cylinders: **6**

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

EPA Tier 2 - Model year requirements of the EPA marine regulation (40CFR94)

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 2.7 Exp.	
	rpm	kw (hp)	N-m (ft-lb)	L/hr (gal/hr)		
2140	335	(450)	1497	(1104)		
2100	335	(450)	1525	(1125)	87.6	(23.1)
2000	336	(450)	1603	(1182)	74.6	(19.7)
1900	332	(446)	1670	(1232)	64.6	(17.1)
1800	330	(443)	1752	(1292)	55.5	(14.7)
1700	325	(435)	1824	(1345)	48.4	(12.8)
1600	318	(427)	1898	(1400)	41.1	(10.9)
1500	309	(414)	1966	(1450)	35.9	(9.5)
1400	288	(387)	1966	(1450)	29.3	(7.7)
1300	261	(350)	1916	(1413)	23.7	(6.3)
1200	224	(300)	1783	(1315)	19.2	(5.1)
1100	192	(258)	1668	(1230)	16.4	(4.3)

\* 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 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].

Medium Continuous (MCD): Intended for continuous use in variable load applications where full power is limited to six hours out of every twelve hours of operation. Also, reduced power operations must be at or below 200 rpm of the maximum rated rpm. This rating is an ISO 15550 fuel stop power rating and is for applications that operate less than 3,000 hours per year.

*[Signature]*  
CHIEF ENGINEER

# Propulsion Marine Engine Performance Data

**Curve No. M-20036**  
**DS : 3075**  
**CPL : 8590**  
**DATE: 11-Dec-12**

## General Engine Data

Engine Model .....		QSM11-455 MCD
Rating Type .....		Medium Continuous Duty
Rated Engine Power .....	kW [hp]	336 [450]
Rated Engine Speed .....	rpm	2100
Rated Power Production Tolerance .....	±%	5
Rated Engine Torque .....	N·m [lb·ft]	1526 [1125]
Peak Engine Torque @ 1500 rpm.....	N·m [lb·ft]	1966 [1450]
Brake Mean Effective Pressure .....	kPa [psi]	1772 [257]
Indicated Mean Effective Pressure.....	kPa [psi]	1985 [288]
Maximum Allowable Engine Speed .....	rpm	2160
Maximum Torque Capacity from Front of Crank <sup>2</sup> .....	N·m [lb·ft]	847 [625]
Compression Ratio .....		15.9:1
Piston Speed .....	m/sec [ft/min]	10.3 [2026]
Firing Order .....		1-5-3-6-2-4
Weight (Dry) - Engine Only - Average .....	kg [lb]	1118 [2464]
Weight (Dry) - Engine With Heat Exchanger System - Average.....	kg [lb]	1184 [2610]

## Governor Settings

High Speed Governor Break Point.....		rpm	2140
Minimum Idle Speed Setting .....		rpm	600
Normal Idle Speed Variation .....		±rpm	10
High Idle Speed Range   Minimum .....		rpm	2140
Maximum .....		rpm	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 System<sup>1</sup>

Avg. Fuel Consumption - ISO 8178 E3 Standard Test Cycle .....		l/hr [gal/hr]	59.3 [15.7]
Fuel Consumption at Rated Speed .....		l/hr [gal/hr]	87.6 [23.1]
Approximate Fuel Flow to Pump .....		l/hr [gal/hr]	242.3 [64.0]
Maximum Allowable Fuel Supply to Pump Temperature .....		°C [°F]	60.0 [140]
Approximate Fuel Flow Return to Tank .....		l/hr [gal/hr]	154.7 [40.9]
Approximate Fuel Return to Tank Temperature .....		°C [°F]	71.2 [160]
Maximum Heat Rejection to Drain Fuel .....		kW [Btu/min]	2.5 [140]
Fuel Pressure - Pump Out/Rail . Mechanical Gauge .....		kPa [psi]	1103 [160]

TBD= To Be Determined

N/A = Not Applicable

N.A. = Not Available

- <sup>1</sup> Unless otherwise specified, all data is at rated power conditions and can vary ± 5%.
- <sup>2</sup> 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.
- <sup>3</sup> 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.
- <sup>4</sup> Consult option notes for flow specifications of optional Cummins seawater pumps, if applicable.
- <sup>5</sup> May not be at rated load and speed. Maximum heat rejection may occur at other than rated conditions.

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## Air System<sup>1</sup>

Intake Manifold Pressure .....	kPa [in Hg]	204 [60]
Intake Air Flow .....	l/sec [cfm]	445 [942]
Heat Rejection to Ambient .....	kW [Btu/min]	26 [1481]

## Exhaust System<sup>1</sup>

Exhaust Gas Flow .....	l/sec [cfm]	960 [2035]
Exhaust Gas Temperature (Turbine Out) .....	°C [°F]	407 [764]
Exhaust Gas Temperature (Manifold) .....	°C [°F]	601 [1113]

## Emissions (in accordance with ISO 8178 Cycle E3)

NOx (Oxides of Nitrogen) .....	g/kw-hr [g/hp-hr]	6.19 [4.62]
HC (Hydrocarbons) .....	g/kw-hr [g/hp-hr]	0.22 [0.16]
CO (Carbon Monoxide) .....	g/kw-hr [g/hp-hr]	0.36 [0.27]
PM (Particulate Matter) .....	g/kw-hr [g/hp-hr]	0.14 [0.11]

## Cooling System<sup>1</sup>

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]	302 [79.8]
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 <sup>3</sup> .....	kW [Btu/min]	358 [20400]

## Engines with Low Temperature Aftercooling (LTA )

### Single Loop LTA

Coolant Flow to Cooler (with blocked open thermostat).....	l/min [gal/min]	198 [52]
LTA Thermostat Operating Range (Start to Open) .....	°C [°F]	66 [150]
LTA Thermostat Operating Range (Full Open) .....	°C [°F]	80 [175]
Heat Rejection to Engine Coolant <sup>3</sup> .....	kW [Btu/min]	309 [17607]
Maximum Coolant Inlet Temperature from LTA Cooler.....	°C [°F]	54 [130]

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