



Cummins Inc.
Columbus, IN 47201
Marine Performance Curves
marine.cummins.com

Basic Engine Model
QSL9-405 MCD
Engine Configuration
D563005MX03

Curve Number:
M-91239
CPL Code: **8419**
Date: **14-Dec-12**

Displacement: **8.9 liter [542 in³]**
Bore: **114 mm [4.49 in]**
Stroke: **145 mm [5.71 in]**
Fuel System: **HPCR**
Cylinders: **6**

Rated Power: **298 kw [400 bhp, 405 mhp]**
Rated Speed: **2100 rpm**
Rating Type: **Medium Continuous Duty**
Aspiration: **Turbocharged / Aftercooled**

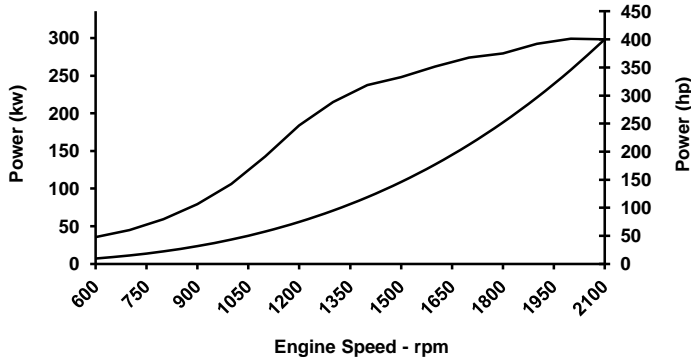
CERTIFIED: This diesel engine complies with or is certified to the following agencies requirements:

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

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

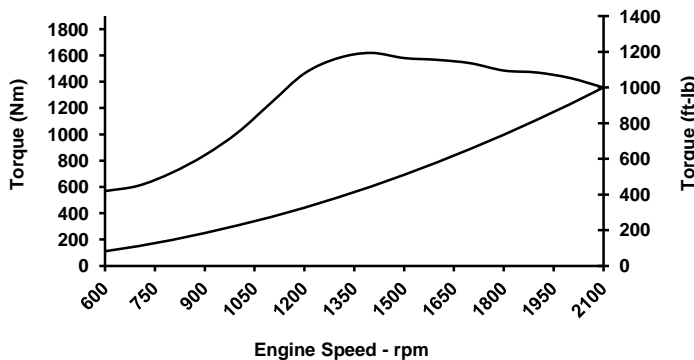
IMO Tier II (Two) NOx requirements of International Maritime Organization (IMO), MARPOL 73/78 Annex VI, Regulation 13

RATED POWER OUTPUT CURVE



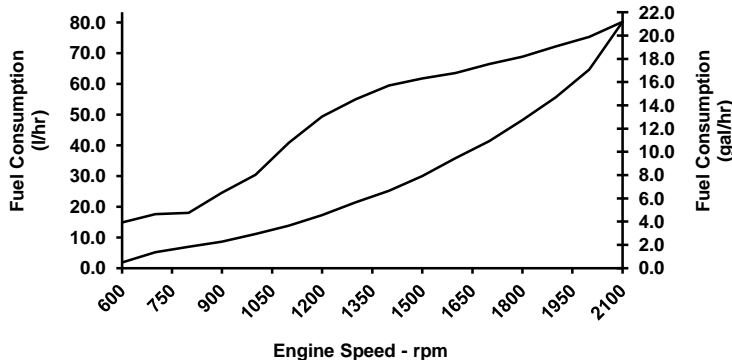
rpm	kw	bhp
2100	298	400
1900	293	392
1700	274	368
1600	262	352
1400	237	318
1300	215	288
1200	184	247
1100	143	192
1000	106	143
800	59	80
700	45	60
600	36	48

FULL LOAD TORQUE CURVE



rpm	N-m	ft-lb
2100	1356	1000
1900	1470	1084
1700	1540	1136
1600	1566	1155
1400	1619	1194
1300	1578	1164
1200	1463	1079
1100	1241	915
1000	1015	749
800	708	522
600	569	420

FUEL CONSUMPTION - PROP CURVE



rpm	l/hr	gal/hr
2100	80.2	21.2
1900	55.6	14.7
1700	41.4	10.9
1600	35.9	9.5
1400	25.1	6.6
1300	21.4	5.7
1200	17.3	4.6
1100	13.8	3.6
1000	11.1	2.9
800	6.9	1.8
600	1.9	0.5

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, all data is at rated power conditions and can vary ± 5%.

Rated Curves (upper) represents rated power at the crankshaft for mature gross engine performance capabilities obtained and corrected in accordance with ISO 15550. Propeller Curve (lower) is based on a typical fixed propeller demand curve using a 2.7 exponent. 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.

Propulsion Marine Engine Performance Data

Curve No. M-91239
DS: 4960
CPL: 8419
DATE: 14-Dec-12

General Engine Data

Engine Model		QSL9-405 MCD
Rating Type		Medium Continuous Duty
Rated Engine Power	kW [hp]	298 [400]
Rated Engine Speed	rpm	2100
Rated Power Production Tolerance	±%	5
Rated Engine Torque	N·m [lb·ft]	1356 [1000]
Peak Engine Torque @ 1400 rpm	N·m [lb·ft]	1619 [1194]
Brake Mean Effective Pressure	kPa [psi]	1919 [278]
Indicated Mean Effective Pressure	kPa [psi]	2132 [309]
Minimum Idle Speed Setting	rpm	600
Normal Idle Speed Variation	rpm	10
High Idle Speed Range Minimum	rpm	2165
Maximum	rpm	2185
Maximum Allowable Engine Speed	rpm	2185
Maximum Torque Capacity from Front of Crank ²	N·m [lb·ft]	705 [520]
Compression Ratio		16.6:1
Piston Speed	m/sec [ft/min]	10.2 [1998]
Firing Order		1-5-3-6-2-4
Weight (Dry) - Engine Only - Average	kg [lb]	901 [1987]
Weight (Dry) - Engine With Heat Exchanger System - Average	kg [lb]	977 [2153]
Weight Tolerance (Dry) Engine Only	3xStd Dev(±%)	N.A.

Noise and Vibration

Average Noise Level - Top	(Idle)	dBA @ 1m	84
	(Rated)	dBA @ 1m	96
Average Noise Level - Right Side	(Idle)	dBA @ 1m	84
	(Rated)	dBA @ 1m	96
Average Noise Level - Left Side	(Idle)	dBA @ 1m	84
	(Rated)	dBA @ 1m	96
Average Noise Level - Front	(Idle)	dBA @ 1m	84
	(Rated)	dBA @ 1m	96

Fuel System¹

Avg. Fuel Consumption - ISO 8178 E3 Standard Test Cycle	l/hr [gal/hr]	53.0 [14.0]
Fuel Consumption at Rated Speed	l/hr [gal/hr]	80.2 [21.2]
Approximate Fuel Flow to Pump	l/hr [gal/hr]	117.3 [31.0]
Maximum Allowable Fuel Supply to Pump Temperature	°C [°F]	60.0 [140]
Approximate Fuel Flow Return to Tank	l/hr [gal/hr]	37.2 [9.8]
Approximate Fuel Return to Tank Temperature	°C [°F]	85.1 [185]
Maximum Heat Rejection to Drain Fuel	kW [Btu/min]	0.9 [49]
Fuel Transfer Pump Pressure Range	kPa [psi]	517.1 [75]
Fuel Pressure - Pump Out/Rail . INSITE Reading	kPa [psi]	139998 [20305]

Air System¹

Intake Manifold Pressure	kPa [in Hg]	177 [52]
Intake Air Flow	l/sec [cfm]	363 [769]
Heat Rejection to Ambient	kW [Btu/min]	79 [4500]

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-91239
DS: 4960
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Exhaust System¹

Exhaust Gas Flow	l/sec [cfm]	831 [1760]
Exhaust Gas Temperature (Turbine Out)	°C [°F]	449 [839]
Exhaust Gas Temperature (Manifold)	°C [°F]	623 [1152]

Emissions (in accordance with ISO 8178 Cycle E3)

NOx (Oxides of Nitrogen)	g/kw-hr [g/hp-hr]	6.36 [4.74]
HC (Hydrocarbons)	g/kw-hr [g/hp-hr]	0.09 [0.07]
CO (Carbon Monoxide)	g/kw-hr [g/hp-hr]	0.58 [0.43]
PM (Particulate Matter)	g/kw-hr [g/hp-hr]	0.10 [0.07]

Cooling System¹

Sea Water After Cooled Engine

Sea Water Pump Specifications	MAB 0.08.17-07/16/2001	
Pressure Cap Rating.....	kPa [psi]	103 [15]
Thermostat Operating Range (Start to Open).....	°C [°F]	71 [160]
Thermostat Operating Range(Full Open).....	°C [°F]	81 [178]

Engines with Single Loop Keel Cooling

Coolant Flow to Keel Cooler (with blocked open thermostat).....	l/min [gal/min]	178 [47]
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 ³	kW [Btu/min]	264 [15000]
Maximum Coolant Inlet Temperature from LTA Cooler.....	°C [°F]	54 [130]

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