



CUMMINS MERCURISER DIESEL
 Charleston, SC 29405
 Marine Performance Curves

Basic Engine Model:
QSL9 - 405 MCD
 Engine Configuration:
D563005MX03

Curve Number:
M-91239

CPL Code: **8419**
 Date: **3-Jan-07**

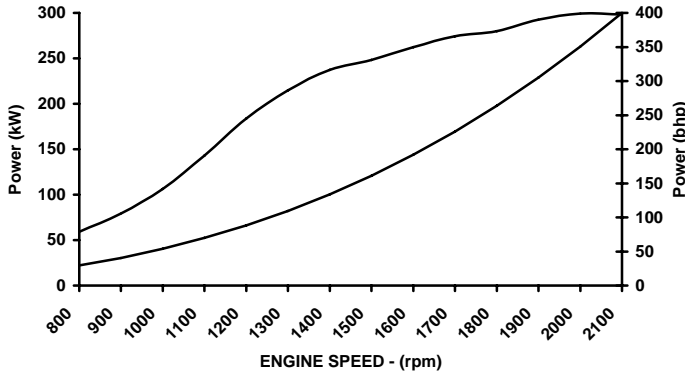
Displacement: **8.9 liter** [542 in³]
 Bore: **114 mm** [4.49 in]
 Stroke: **145 mm** [5.71 in]
 Fuel System: **HPCR**
 Cylinders: **6**

Advertised Power: **298 [400, 405] @ 2100**
 kW [bhp, mhp] @ rpm

Aspiration: **Turbocharged / Sea Water Aftercooled**
 Rating Type: **Medium Continuous Duty**

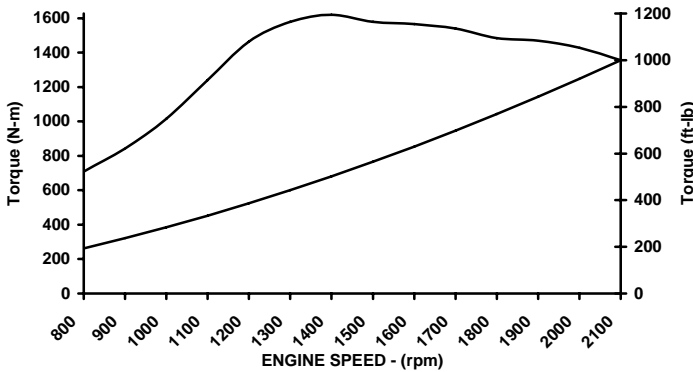
CERTIFIED: This marine diesel engine is certified to the model year requirements of EPA Marine Tier 2 per 40 CFR 94 and conforms with the NOx requirements of the International Maritime Organization (IMO), MARPOL 73/78 Annex VI, Regulation 13 as applicable.

RATED POWER OUTPUT CURVE



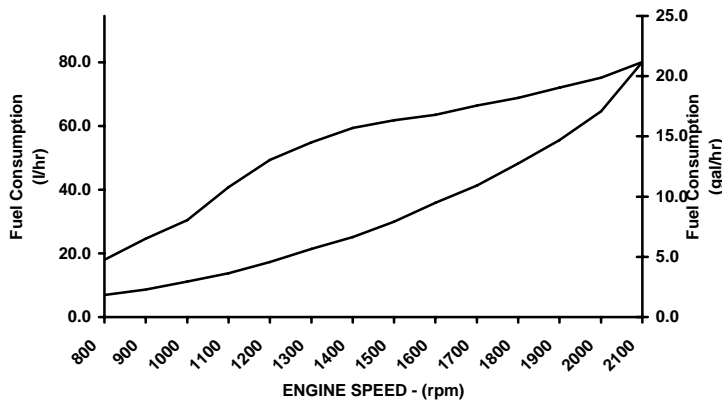
rpm	kW	bhp
2100	298	400
2000	299	401
1900	293	392
1800	280	375
1700	274	368
1600	262	352
1500	248	333
1400	237	318
1300	215	288
1200	184	247
1100	143	192
1000	106	143
900	79	106

FULL LOAD TORQUE CURVE



rpm	N-m	ft-lb
2100	1356	1000
2000	1428	1053
1900	1470	1084
1800	1485	1095
1700	1540	1136
1600	1566	1155
1500	1580	1165
1400	1619	1194
1300	1578	1164
1200	1463	1079
1100	1241	915
1000	1015	749
900	842	621

FUEL CONSUMPTION - PROP CURVE



rpm	l/hr	gal/hr
2100	80.2	21.2
2000	64.7	17.1
1900	55.6	14.7
1800	48.2	12.7
1700	41.4	10.9
1600	35.9	9.5
1500	30.0	7.9
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
900	8.7	2.3

Rated Conditions: Ratings are based upon ISO 8665 and SAE J1228 reference conditions; air pressure of 100 kPa [29.612 in Hg], air temperature 25 deg. C [77 deg. F] and 30% relative humidity. Power is in accordance with IMCI procedure. Member NMMA.

Rated Curves (upper) represents rated power at the crankshaft for mature gross engine performance capabilities obtained and corrected in accordance with ISO 3046. 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 Rating: This power rating is intended for continuous use in variable load applications where full power is limited to six (6) hours out of every twelve (12) hours of operation. Also, reduced power operations must be at or below 200 RPM of the maximum rated RPM. This is an ISO 3046 Fuel Stop Power Rating and is for applications that operate 3,000 hours per year or less.

James D. Kehl

CHIEF ENGINEER

Marine Engine Performance Data

Curve No.: M-91239
DS-3038
DATE: 3Jan07

General Engine Data

Engine Model.....		QSL9 – 405MCD
Rating Type		Medium Cont. Duty
Rated Engine Power..... kW [bhp]		298 [400]
Rated Engine Speed..... rpm		2100
Rated HP Production Tolerance ±%		5
Rated Engine Torque..... N•m [ft•lb]		1356 [1000]
Peak Engine Torque @ 1400 rpm N•m [ft•lb]		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 [ft•lb]		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 - Average..... kg [lb]		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

Average Fuel Consumption – ISO 8178 E3Standard Test Cycle.....	l/hr [gal/hr]	53.05 [14]
Fuel Consumption @ Rated Speed.....	l/hr [gal/hr]	80 [21.2]
Approximate Fuel Flow to Pump.....	l/hr [gal/hr]	117 [31]
Maximum Allowable Fuel Supply to Pump Temperature.....	°C [°F]	60 [140]
Approximate Fuel Flow Return to Tank	l/hr [gal/hr]	37 [10]
Approximate Fuel Return to Tank Temperature	Without Cooler..... °C [°F]	85.1 [185]
	With Cooler..... °C [°F]	40 [104]
Maximum Heat Rejection to Drain Fuel ⁵	kW [Btu/min]	1 [49]
Fuel Transfer Pump Pressure Range.....	kPa [psi]	517 [75]
Fuel Rail Pressure	INSITE.....	kPa [psi] 139,998 [20,305]

Air System¹

Intake Manifold Pressure	kPa [in Hg]	177 [52.2]
Intake Air Flow.....	l/sec [cfm]	363 [769]
Heat Rejection to Ambient	kW [Btu/min]	79 [4500]
Maximum Air Cleaner Inlet Temperature Rise Over Ambient.....	°C [°F]	17 [30]

Exhaust System¹

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

BD = To Be Decided

N/A = Not Applicable

N.A. = Not Available

¹All Data at Rated Conditions

²Consult Installation Direction Booklet for Limitations

³Heat rejection 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.

⁴Consult option notes for flow specifications of optional Cummins seawater pumps, if applicable.

⁵May not be at rated load and speed. Maximum heat rejection may occur at other than rated conditions.

CUMMINS ENGINE COMPANY, INC.
 COLUMBUS, INDIANA

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Marine Engine Performance Data

Curve No.: M-91239
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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 [0.066]
CO (Carbon Monoxide).....	g/kw-hr [g/hp-hr]	0.58 [0.433]
PM (Particulate Matter).....	g/kw-hr [g/hp-hr]	0.10 [0.072]

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 with Standard Aftercooling

Coolant Flow to Engine Heat Exchanger/Keel Cooler	l/min [gal/min]	416 [110]
Standard Thermostat Operating Range	Start to Open.....°C [°F]	71 [160]
	Full Open	81 [178]
Heat Rejection to Engine Coolant ³	kW [Btu/min]	211 [12000]

Single Loop Low Temperature Aftercooling

Coolant Flow to LTA Heat Exchanger/Keel Cooler	l/min [gal/min]	178 [47]
LTA Thermostat Operating Range	Start to Open.....°C [°F]	66 [150]
	Full Open	80 [175]
Heat Rejection to LTA Coolant ³	kW [Btu/min]	264 [15,000]

TBD = To Be Decided

N/A = Not Applicable

N.A. = Not Available

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