



CUMMINS MERCRUISER DIESEL
 Charleston, SC 29405
Marine Performance Curves

Basic Engine Model
MR504LH

Curve Number:
BC9144

Engine Configuration
D0D3003MX03

CPL Code:

Date:

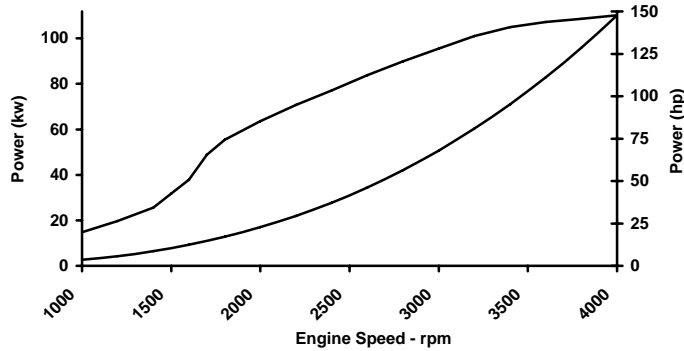
17-Oct-06

Displacement: **2.0 liter 122 in³**
 Bore: **83 mm 3.27 in**
 Stroke: **92 mm 3.62 in**
 Fuel System: **Bosch Common Rail (CRS 2.0)**
 Cylinders: **4**

kW [bhp, mhp] @ rpm
 Advertised Power: **110[148, 150] @ 4000**
 Aspiration: **Turbocharged/Sea Water Aftercooled**
 Rating Type: **High Output**

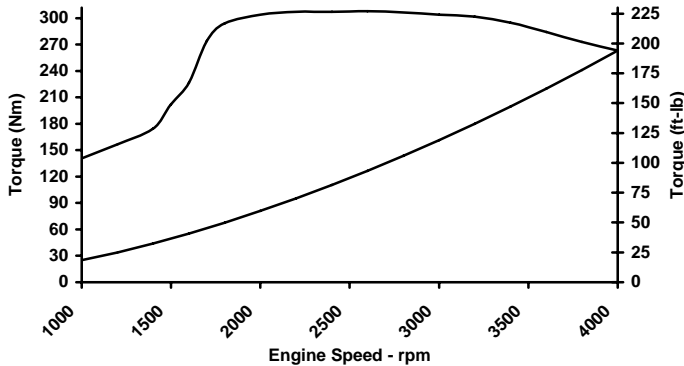
PRELIMINARY

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.



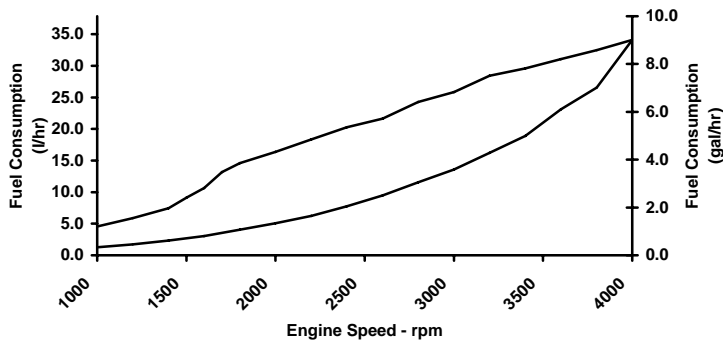
RATED POWER OUTPUT CURVE

rpm	kw	bhp
4000	110	148
3800	109	146
3600	107	144
3400	105	141
3200	101	136
3000	96	128
2600	84	112
2400	77	103
2000	64	85
1600	38	51
1400	26	34
1000	15	20



FULL LOAD TORQUE CURVE

rpm	N-m	ft-lb
4000	263	194
3800	273	201
3600	284	210
3400	295	218
3200	302	222
3000	304	224
2600	308	227
2400	307	226
2000	304	224
1600	226	167
1400	175	129
1000	141	104



FUEL CONSUMPTION - PROP CURVE

rpm	l/hr	gal/hr
4000	34.1	9.0
3800	26.6	7.0
3600	23.1	6.1
3400	18.9	5.0
3200	16.2	4.3
3000	13.6	3.6
2600	9.5	2.5
2400	7.7	2.0
2000	5.1	1.3
1600	3.0	0.8
1400	2.3	0.6
1000	1.2	0.3

Rated Conditions: Ratings are based upon ISO 8665 and SAE J1228 reference conditions; air pressure of 100 kPa [29.612 in Hg], air temperature 25deg. 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].

High Output (HO) Intended for use in variable load applications where full power is limited to one (1) hour out of every eight (8) hours of operation. Also, reduced power must be at or below 200 rpm of the maximum rated rpm. This power rating is for pleasure/non-revenue generating applications that operate 500 hours per year or less.

Propulsion Marine Engine Performance Data

Curve No. BC9144
DS :
CPL :
DATE: 17-Oct-06

PRELIMINARY

General Engine Data

Engine Model	MR504LH	
Rating Type	High Output	
Rated Engine Power	kW [hp]	110 [148]
Rated Engine Speed	rpm	4000
Rated Power Production Tolerance	±%	5
Rated Engine Torque	N·m [lb·ft]	263 [194]
Peak Engine Torque @ 2600 rpm	N·m [lb·ft]	308 [227]
Brake Mean Effective Pressure	kPa [psi]	1660 [241]
Indicated Mean Effective Pressure	kPa [psi]	1660 [241]
Minimum Idle Speed Setting	rpm	700
Normal Idle Speed Variation	rpm	25
High Idle Speed Range Minimum	rpm	4080
Maximum	rpm	4120
Maximum Allowable Engine Speed	rpm	4100
Compression Ratio		17.5:1
Piston Speed	m/sec [ft/min]	12.3 [2415]
Firing Order		1-3-4-2
Weight (Dry) - Engine Only - Average	kg [lb]	[TBD]
Weight (Dry) - Engine With Heat Exchanger System - Average	kg [lb]	250 [551]
Weight Tolerance (Dry) Engine Only	3xStd Dev(±%)	[TBD]

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]	21.5 [6]
Fuel Consumption at Rated Speed	l/hr [gal/hr]	34.1 [9]
Approximate Fuel Flow to Pump	l/hr [gal/hr]	[TBD]
Maximum Allowable Fuel Supply to Pump Temperature	°C [°F]	60.0 [140]
Approximate Fuel Flow Return to Tank	l/hr [gal/hr]	[TBD]
Approximate Fuel Return to Tank Temperature With Cooler.....	°C [°F]	41.1 [106]
Maximum Heat Rejection to Drain Fuel	kW [Btu/min]	[TBD]

Air System¹

Intake Manifold Pressure	kPa [in Hg]	230 [68]
Intake Air Flow	l/sec [cfm]	126 [268]
Heat Rejection to Ambient	kW [Btu/min]	[TBD]

TBD= To Be Determined

N/A = Not Applicable

N.A. = Not Available

- ¹ All Data at Rated Conditions.
- ² 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.

CUMMINS ENGINE COMPANY, INC
COLUMBUS, INDIANA

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<http://www.cummins.com>

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Exhaust System¹

Exhaust Gas Flow	l/sec [cfm]	[TBD]
Exhaust Gas Temperature (Turbine Out)	°C [°F]	608 [1126]
Exhaust Gas Temperature (Manifold)	°C [°F]	749 [1380]

Emissions (in accordance with ISO 8178 Cycle E3)

NOx (Oxides of Nitrogen)	g/kw-hr [g/hp-hr]	5.37 [4.00]
HC (Hydrocarbons)	g/kw-hr [g/hp-hr]	0.14 [0.11]
CO (Carbon Monoxide)	g/kw-hr [g/hp-hr]	1.02 [0.76]
PM (Particulate Matter)	g/kw-hr [g/hp-hr]	[TBD]

Emissions (ISO 8178 Cycle E5 - for Traditional Propulsion Applications)

NOx (Oxides of Nitrogen)	g/kw-hr [g/hp-hr]	5.27 [3.93]
HC (Hydrocarbons)	g/kw-hr [g/hp-hr]	0.27 [0.20]
CO (Carbon Monoxide)	g/kw-hr [g/hp-hr]	1.15 [0.86]
PM (Particulate Matter)	g/kw-hr [g/hp-hr]	0.19 [0.14]

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)

Standard Thermostat Operating Range (Start to Open)	°C [°F]	70 [158]
Standard Thermostat Operating Range (Full Open)	°C [°F]	90 [194]

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