



**CUMMINS MERCUISER DIESEL**  
**Charleston, SC 29405**  
**Marine Performance Curves**

Basic Engine Model  
**MR704LH**

Engine Configuration  
**D933002MX03**

Curve Number:  
**BC9149**

CPL Code:

Date:  
**20-Oct-06**

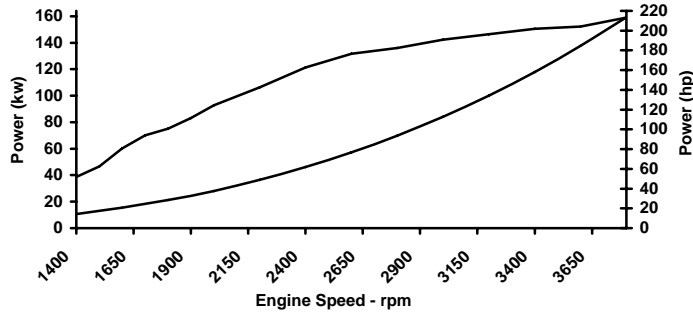
Displacement: **2.8 liter**      **169 in<sup>3</sup>**  
 Bore: **94 mm**      **3.70 in**  
 Stroke: **100 mm**      **3.94 in**  
 Fuel System: **Bosch Common Rail (CRS 2.0)**  
 Cylinders: **4**

kw [bhp, mhp] @ rpm  
 Advertised Power: **154[207] @ 3800**

Aspiration: **Turbocharged/Sea Water Aftercooled**  
 Rating Type: **High Output**

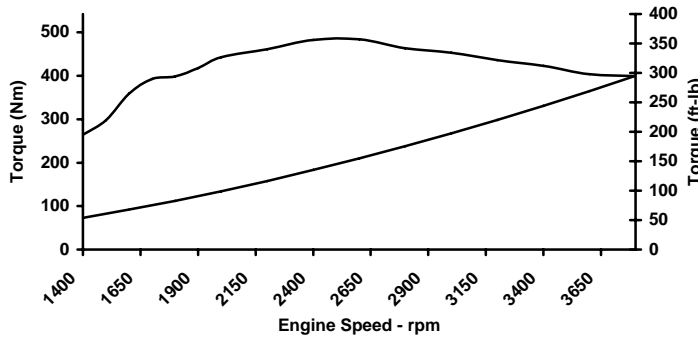
**PRELIMINARY**

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.



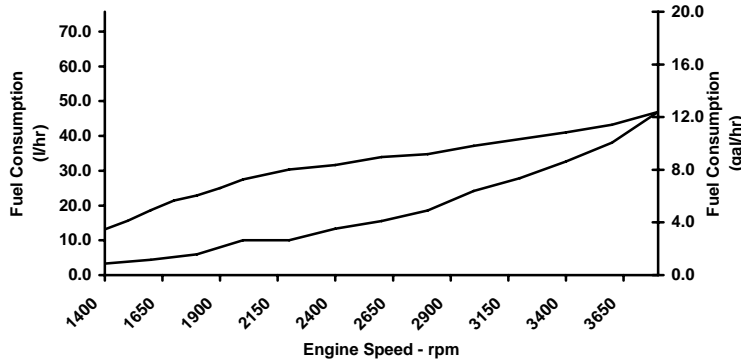
**RATED POWER OUTPUT CURVE**

rpm	kw	bhp
3800	159	213
3600	152	204
3400	151	202
3200	146	196
2800	136	182
2400	121	163
2000	93	124
1800	75	101
1600	60	81
1500	47	63
1400	39	52



**FULL LOAD TORQUE CURVE**

rpm	N-m	ft-lb
3800	399	295
3600	404	298
3400	423	312
3200	437	322
2800	464	342
2400	483	356
2000	443	327
1800	399	294
1600	359	265
1500	298	220
1400	264	195



**FUEL CONSUMPTION - PROP CURVE**

rpm	l/hr	gal/hr
3800	46.9	12.4
3600	38.1	10.1
3400	32.7	8.6
3200	27.8	7.4
2800	18.6	4.9
2400	13.4	3.5
2200	10.0	2.6
2000	10.0	2.6
1800	6.0	1.6
1600	4.4	1.2
1400	3.4	0.9

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.

CHIEF ENGINEER

# Propulsion Marine Engine Performance Data

Curve No.   BC9149  
DS :  
CPL :  
DATE:       20-Oct-06

**PRELIMINARY**

## General Engine Data

Engine Model .....	MR704LH
Rating Type .....	High Output
Rated Engine Power .....	159 [213]
Rated Engine Speed .....	3800
Rated Power Production Tolerance .....	±%       5
Rated Engine Torque .....	400 [295]
Peak Engine Torque @ 2600 rpm .....	484 [357]
Brake Mean Effective Pressure .....	1811 [263]
Indicated Mean Effective Pressure .....	1811 [263]
Minimum Idle Speed Setting .....	700
Normal Idle Speed Variation .....	25
High Idle Speed Range   Minimum .....	3880
Maximum .....	3920
Maximum Allowable Engine Speed .....	3900
Maximum Torque Capacity from Front of Crank <sup>2</sup> .....	0
Compression Ratio .....	17.5:1
Piston Speed .....	12.7 [2493]
Firing Order .....	1-3-4-2
Weight (Dry) - Engine Only - Average .....	[TBD]
Weight (Dry) - Engine With Heat Exchanger System - Average .....	360 [794]
Weight Tolerance (Dry) Engine Only .....	N.A.

## 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 System<sup>1</sup>

Avg. Fuel Consumption - ISO 8178 E3 Standard Test Cycle .....	32.1 [8]
Fuel Consumption at Rated Speed .....	46.9 [12]
Approximate Fuel Flow to Pump .....	[TBD]
Maximum Allowable Fuel Supply to Pump Temperature .....	60.0 [140]
Approximate Fuel Flow Return to Tank .....	[TBD]
Approximate Fuel Return to Tank Temperature       With Cooler.....	41.1 [106]
Maximum Heat Rejection to Drain Fuel .....	[TBD]

TBD= To Be Determined

N/A = Not Applicable

N.A. = Not Available

- <sup>1</sup> All Data at Rated Conditions.
- <sup>2</sup> 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.

CUMMINS ENGINE COMPANY, INC  
COLUMBUS, INDIANA

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<http://www.cummins.com>

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**PRELIMINARY**

**Exhaust System<sup>1</sup>**

Exhaust Gas Flow .....	l/sec [cfm]	[TBD]
Exhaust Gas Temperature (Turbine Out) .....	°C [°F]	[TBD]
Exhaust Gas Temperature (Manifold) .....	°C [°F]	[TBD]

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

NOx (Oxides of Nitrogen) .....	g/kw-hr [g/hp-hr]	4.22 [3.14]
HC (Hydrocarbons) .....	g/kw-hr [g/hp-hr]	0.14 [0.10]
CO (Carbon Monoxide) .....	g/kw-hr [g/hp-hr]	1.52 [1.13]
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]	4.06 [3.03]
HC (Hydrocarbons) .....	g/kw-hr [g/hp-hr]	0.27 [0.20]
CO (Carbon Monoxide) .....	g/kw-hr [g/hp-hr]	1.86 [1.39]
PM (Particulate Matter) .....	g/kw-hr [g/hp-hr]	0.27 [0.20]

**Cooling System<sup>1</sup>**

**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]	80 [176]
Thermostat Operating Range(Full Open).....	°C [°F]	95 [202]

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