



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

Basic Engine Model:  
**2.8L ES-EJ 200**  
 Engine Configuration:  
**D933001MX03**

Curve Number:  
**BC9110**

Sterndrive  
 Date:  
**15-Oct-04**

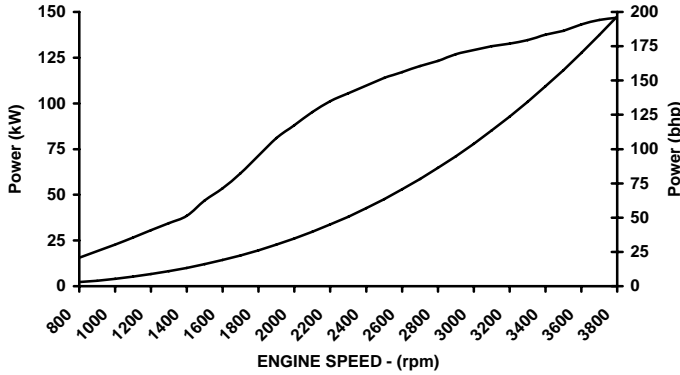
Displacement: **2.8 liter** [169 in<sup>3</sup>]  
 Bore: **94 mm** [3.7 in]  
 Stroke: **100 mm** [3.94 in]  
 Fuel System: **Bosch VP37**  
 Cylinders: **4**

Advertised Power: **147 [197, 200] @ 3800**  
 kW [bhp, mhp] @ rpm

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

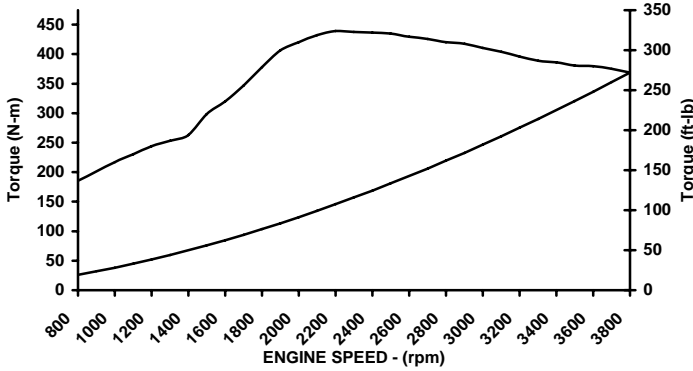
CERTIFIED: This marine diesel engine conforms with the NOx requirements of the International Maritime Organization (IMO), MARPOL 73/78 Annex VI, Regulation 13 as applicable.

**RATED POWER OUTPUT CURVE**



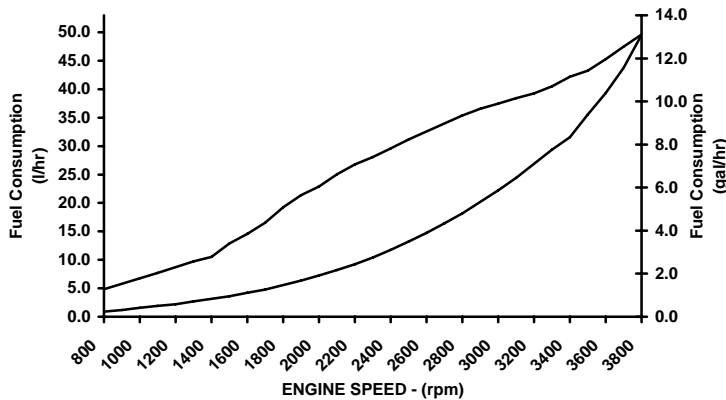
rpm	kW	bhp
3800	147	197
3600	143	192
3400	138	185
3200	133	178
3000	129	173
2800	123	165
2600	117	157
2400	110	147
2200	101	136
2000	88	118
1800	71	96
1500	47	63
1000	23	30

**FULL LOAD TORQUE CURVE**



rpm	N-m	ft-lb
3800	369	272
3600	380	280
3400	386	285
3200	396	292
3000	411	303
2800	420	310
2600	430	317
2400	437	322
2200	439	324
2000	420	310
1800	378	279
1500	298	220
1000	217	160

**FUEL CONSUMPTION - PROP CURVE**



rpm	l/hr	gal/hr
3800	49.6	13.1
3600	39.3	10.4
3400	31.6	8.3
3200	26.9	7.1
3000	22.2	5.9
2800	18.2	4.8
2600	14.8	3.9
2400	11.7	3.1
2200	9.2	2.4
2000	7.2	1.9
1800	5.6	1.5
1500	3.6	1.0
1000	1.6	0.4

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].

**High Output Rating:** This Rating is 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 operations must be at or below 200 RPM of the maximum rated RPM. This rating is for pleasure/non-revenue generating applications that operate 300 hours per year.

*James D. Kahlisch*

CHIEF ENGINEER

# Marine Engine Performance Data

**Curve No.: BC9110**

**DATE: 15Oct04**

## General Engine Data

Engine Model.....	2.8L ES 200
Rating Type .....	High Output
Rated Engine Power..... kW [bhp]	147 [197]
Rated Engine Speed..... rpm	3800
Rated HP Production Tolerance .....	±% 5
Rated Engine Torque..... N•m [ft•lb]	369 [272]
Peak Engine Torque @ 2200 rpm .....	N•m [ft•lb] 439 [324]
Brake Mean Effective Pressure .....	kPa [psi] 1115 [162]
Indicated Mean Effective Pressure .....	kPa [psi] N/A
Minimum Idle Speed Setting..... rpm	700
Normal Idle Speed Variation.....	±rpm 50
High Idle Speed Range	Minimum rpm 4220
	Maximum rpm 4280
Maximum Allowable Engine Speed .....	rpm 4280
Maximum Torque Capacity from Front of Crank <sup>2</sup> .....	N•m [ft•lb] 0
Compression Ratio .....	17:1
Piston Speed .....	m/sec [ft/min] 12.7 [2493]
Firing Order.....	1-3-4-2
Weight (Dry) Engine With Heat Exchanger System - Average.....	kg [lb] 335 [738]

## Fuel System<sup>1</sup>

Fuel Consumption @ Rated Speed.....	l/hr [gal/hr]	49.6 [13.1]
Approximate Fuel Flow to Pump.....	l/hr [gal/hr]	67 [18]
Maximum Allowable Fuel Supply to Pump Temperature.....	°C [°F]	60 [140]
Approximate Fuel Flow Return to Tank.....	l/hr [gal/hr]	18 [5]
Approximate Fuel Return to Tank Temperature .....	°C [°F]	70 [158]
Maximum Heat Rejection to Drain Fuel <sup>5</sup> .....	kW [Btu/min]	1 [77]
Fuel Transfer Pump Pressure Range @ 2500 rpm.....	kPa [psi]	N.A.

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

Intake Manifold Pressure .....	kPa [in Hg]	190 [56]
Intake Air Flow.....	l/sec [cfm]	200 [424]
Heat Rejection to Ambient .....	kW [Btu/min]	23 [1309]
Maximum Air Cleaner Inlet Temperature Rise Over Ambient.....	°C [°F]	17 [30]

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

Exhaust Gas Flow.....	l/sec [cfm]	450 [954]
Exhaust Gas Temperature Turbine Out.....	°C [°F]	550 [1022]
Manifold .....	°C [°F]	N.A.

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

Sea Water Pump Specifications	Restriction.....	kPa [in.Hg]	17 [5]
	Flow .....	l/min [gal/min]	114 [30]
Pressure Cap Rating (With Heat Exchanger Option) .....	kPa [psi]	103 [15]	
Coolant Flow to Engine Heat Exchanger/Keel Cooler .....	l/min [gal/min]	226 [60]	
Standard Thermostat Operating Range Start to Open.....	°C [°F]	80 [176]	
	Full Open .....	°C [°F]	95 [202]
Heat Rejection to Engine Coolant <sup>3</sup> .....	kW [Btu/min]	140 [7970]	

TBD = To Be Decided

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 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

All Data is Subject to Change Without Notice - Consult the following Cummins intranet site for most recent data:

<http://www.cummins.com>