



CUMMINS ENGINE COMPANY, INC
Columbus, Indiana 47201

Marine Performance Curve

Basic Engine Model:
220B

Curve Number:
M-90760

Marine
Pg. No.
B
33

Engine Configuration:
D402013MX02

CPL Code:
2891

Date:
07Dec00

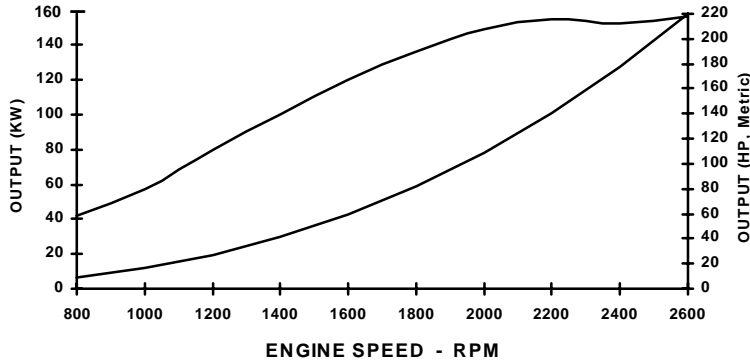
Displacement: **5.9 litre [359 in.³]**
Bore: **102 mm [4.02 in.]**
Stroke: **120 mm [4.72]**
Fuel System: **Lucas CAV**
Cylinders: **6**

Advertised Power: **kW [HP, Metric] @ RPM**
157* [220] @ 2600

Aspiration: **Turbocharged**
Rating Type: **High Output**

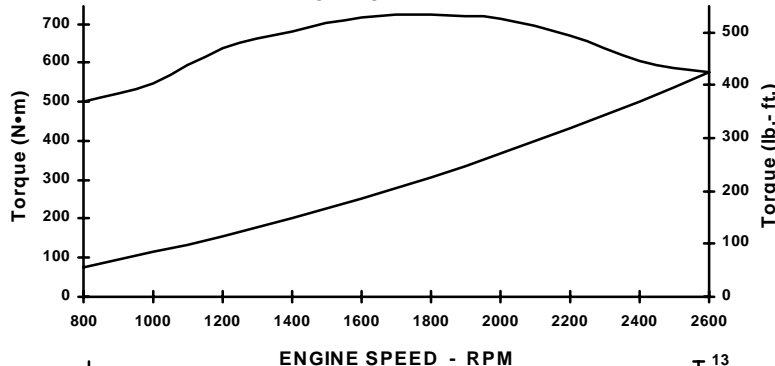
CERTIFIED: This marine diesel engine conforms with the NOx requirements of the International Maritime Organization (IMO), MARPOL 73/78 Annex VI, Regulation 13 as applicable.

RATED POWER OUTPUT CURVE



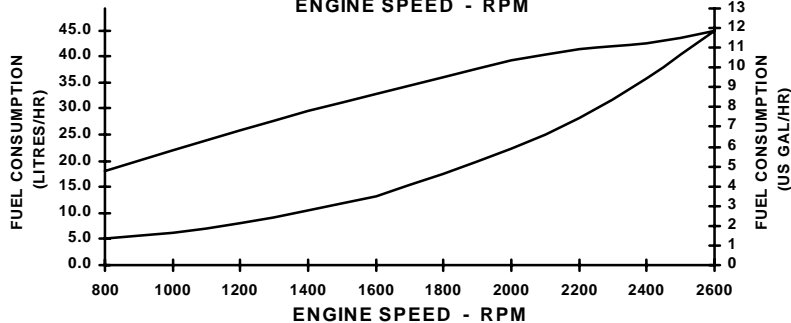
RPM	kW	HP
2600	157	(220)
2400	152	(204)
2200	155	(207)
2000	149	(200)
1800	137	(183)
1600	121	(161)
1400	100	(134)
1200	80	(107)
1000	57	(77)
800	42	(56)

FULL LOAD TORQUE CURVE



RPM	N·m	lb.-ft.
2600	575	(424)
2400	606	(447)
2200	671	(495)
2000	712	(525)
1800	724	(534)
1600	719	(530)
1400	679	(501)
1200	636	(469)
1000	547	(403)
800	500	(369)

FUEL CONSUMPTION - PROP CURVE



RPM	Litres/hr	Gal/hr
2600	44.9	(11.9)
2400	35.7	(9.4)
2200	28.2	(7.4)
2000	22.2	(5.9)
1800	17.4	(4.6)
1600	13.2	(3.5)
1400	10.4	(2.7)
1200	8.0	(2.1)
1000	6.3	(1.7)
800	5.1	(1.3)

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

Rated Curves (upper) represent rated power at the crankshaft. 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° API gravity at 16°C [60°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 or less.

CHIEF ENGINEER

General Engine Data

Engine Model.....	220B
Rating Type.....	High Output
Rated Engine Power	157 [220]
Rated Engine Speed.....	2600
Rated HP Production Tolerance	% ±5
Rated Engine Torque	N•m [ft/lb] 575 [424]
Peak Engine Torque @ 1700 RPM	N•m [ft/lb] 719 [530]
Brake Mean Effective Pressure	kPa [PSI] 1287 [187]
Minimum Idle Speed Setting	RPM 700
Normal Idle Speed Variation	RPM ±50
High Idle Speed Range - Minimum	RPM 2808
High Idle Speed Range - Maximum	RPM 2912
Maximum Torque Capacity from Front of Crank ²	N•m [ft/lb] N.A.
Compression Ratio	16.5:1
Piston Speed.....	m/sec [ft/min.] 10.4 [2045]
Firing Order.....	1-5-3-6-2-4
Weight (Dry) Engine Only - Average	kg [lb] N/A
Weight (Dry) Engine With Heat Exchanger System - Average	kg [lb] 508 [1120]

Fuel System¹

Approximate Fuel Flow to Pump	litre/hr [GPH] 53 [14]
Maximum Allowable Fuel Supply to Pump Temperature	°C [°F] 60 [140]
Approximate Fuel Flow Return to Tank	litre/hr [GPH] 8 [2]
Approximate Fuel Return to Tank Temperature	°C [°F] N.A.
Maximum Heat Rejection to Drain Fuel⁵	kW [BTU/min] N.A.
Fuel Transfer Pump Pressure.....	kPa [PSI] 34 [5]

Air System¹

Intake Manifold Pressure	mm Hg [in. Hg] 1321 [52]
Intake Air Flow	litre/sec [CFM] 236 [500]
Heat Rejection to Ambient	kW [BTU/min.] 21 [1200]

Exhaust System¹

Exhaust Gas Flow.....	litre/sec [CFM] 543 [1150]
Exhaust Gas Temperature (Turbine Out).....	°C [°F] 438 [820]
Exhaust Gas Temperature (Manifold).....	°C [°F] 155 [310]

Emissions (in accordance with ISO8178 Cycle E3)

NOx (Oxides of Nitrogen).....	g/kw-hr [g/bhp-hr] 8.23 [6.14]
HC (Hydrocarbons).....	g/kw-hr [g/bhp-hr] 0.78 [0.58]
CO (Carbon Monoxide).....	g/kw-hr [g/bhp-hr] 1.84 [1.37]
PM (Particulate Matter).....	g/kw-hr [g/bhp-hr] N.A.

Cooling System¹

Coolant Flow to Engine Heat Exchanger/Keel Cooler.....	litre/min. [GPM] 174 [46]
Standard Thermostat Operating Range (Min.)	°C [°F] 83 [181]
Standard Thermostat Operating Range (Max.)	°C [°F] 95 [203]
Heat Rejection to Engine Coolant ³	kW [BTU/min.] 139 [7,900]
Sea Water Flow (With Heat Exchanger Option) ⁴	litre/min. [GPM] 83 [22]
Pressure Cap Rating (With Heat Exchanger Option).....	kPa [PSI] 103 [15]

INSTALLATION DRAWINGS

With Twin Disc MG 502-1 Marine Gear	3884426-A
With Twin Disc MG 5011-A Marine Gear.....	3884826
With ZF IRM-220A Marine Gear	3884425-A

TBD = 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

All Data is Subject to Change Without Notice - consult the following Cummins intranet site for most recent data:
<http://www.cummins.com>