



CUMMINS MERCURISER DIESEL
 Charleston, SC 29405
 Marine Performance Curves

Basic Engine Model:
QSB5.9-230 HD
 Engine Configuration:
D403075MX03

Curve Number:
M-91367

CPL Code	Date:
8464	15-Oct-04

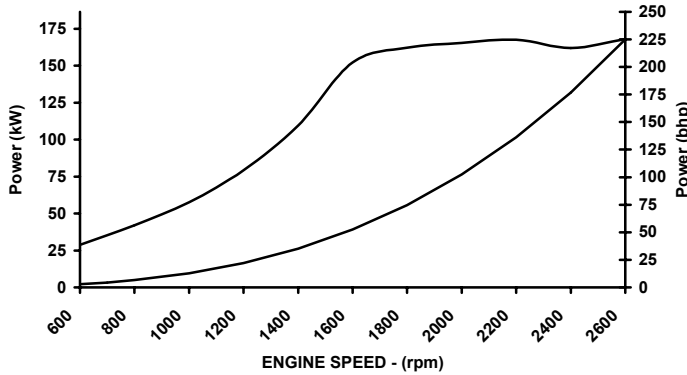
Displacement: **5.9 liter [359 in³]**
 Bore: **102 mm [4.02 in]**
 Stroke: **120 mm [4.72 in]**
 Fuel System: **HPCR**
 Cylinders: **6**

Advertised Power: **168 [225, 230] @ 2600**
 kW [bhp, mhp] @ rpm

Aspiration: **Turbocharged / Sea Water Aftercooled**
 Rating Type: **Heavy Duty**

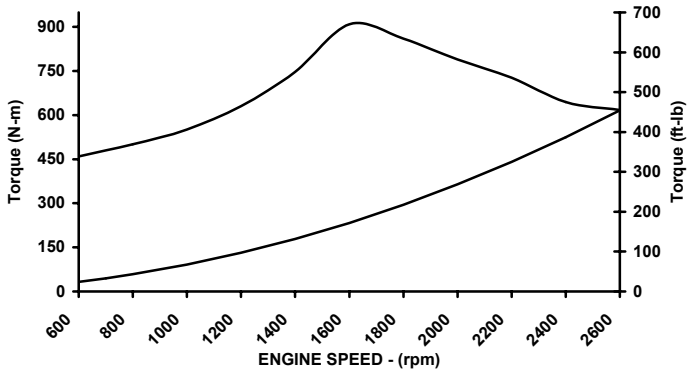
CERTIFIED: This marine diesel engine is certified to the model year requirements of EPA Marine Tier 2 per 40 CFR 94 and conforms with the NOx requirements of the International Maritime Organization (IMO), MARPOL 73/78 Annex VI, Regulation 13 as applicable.

RATED POWER OUTPUT CURVE



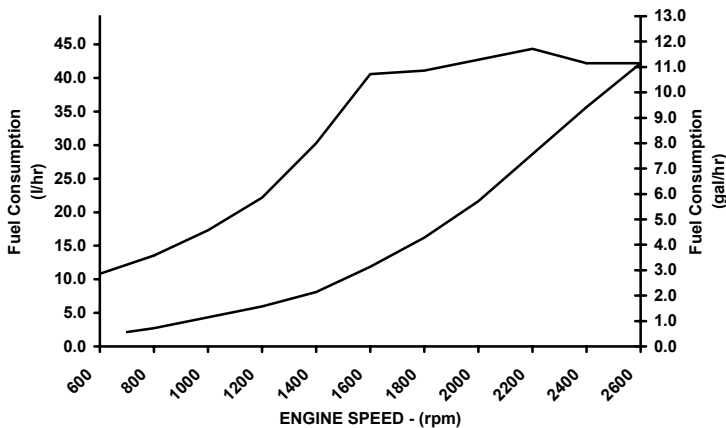
rpm	kW	bhp
2600	168	225
2400	162	217
2200	167	225
2000	165	222
1800	162	217
1600	152	204
1400	110	147
1200	79	106
1000	58	77
800	42	56
600	29	39

FULL LOAD TORQUE CURVE



rpm	N-m	ft-lb
2600	617	455
2400	644	475
2200	727	536
2000	789	582
1800	860	634
1600	908	670
1400	747	551
1200	630	465
1000	550	406
800	500	369
600	460	339

FUEL CONSUMPTION - PROP CURVE



rpm	l/hr	gal/hr
2600	42.2	11.1
2400	35.7	9.4
2200	28.7	7.6
2000	21.6	5.7
1800	16.2	4.3
1600	11.9	3.1
1400	8.1	2.1
1200	5.9	1.6
1000	4.3	1.1
800	2.7	0.7

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 3.0 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].

Heavy Duty Rating: This power rating is intended for continuous use in variable load applications where full power is limited to eight (8) hours out of ten (10) hours of operation. 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 less than 5,000 hours per year.

[Signature]
 CHIEF ENGINEER

Marine Engine Performance Data

Curve No.: M-91367
DS-3075
DATE: 15Oct04

General Engine Data

Engine Model.....		QSB5.9-230 HD
Rating Type		Heavy Duty
Rated Engine Power..... kW [bhp]		168 [225]
Rated Engine Speed..... rpm		2600
Rated HP Production Tolerance	±%	5
Rated Engine Torque..... N•m [ft•lb]		616 [455]
Peak Engine Torque @ 1600 rpm	N•m [ft•lb]	908 [670]
Brake Mean Effective Pressure	kPa [psi]	1316 [191]
Indicated Mean Effective Pressure	kPa [psi]	N/A
Minimum Idle Speed Setting..... rpm		600
Normal Idle Speed Variation.....	±rpm	10
High Idle Speed Range Minimum	rpm	2665
Maximum	rpm	2685
Maximum Allowable Engine Speed	rpm	2685
Maximum Torque Capacity from Front of Crank ²	N•m [ft•lb]	633 [467]
Compression Ratio		17.2:1
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]	612 [1350]
Weight Tolerance (Dry) Engine only - Average.....	kg [lb]	N.A.

Noise and Vibration

Average Noise Level – Top	(Idle).....	dBA @ 1m	74
	(Rated).....	dBA @ 1m	TBD
Average Noise Level – Right Side	(Idle).....	dBA @ 1m	74
	(Rated).....	dBA @ 1m	TBD
Average Noise Level – Left Side	(Idle).....	dBA @ 1m	74
	(Rated).....	dBA @ 1m	TBD
Average Noise Level – Front	(Idle).....	dBA @ 1m	74
	(Rated).....	dBA @ 1m	TBD

Fuel System¹

Average Fuel Consumption – ISO 8178 E3 Standard Test Cycle.....		l/hr [gal/hr]	29.6 [7.8]
Fuel Consumption @ Rated Speed.....		l/hr [gal/hr]	42 [11]
Approximate Fuel Flow to Pump.....		l/hr [gal/hr]	189 [50]
Maximum Allowable Fuel Supply to Pump Temperature.....		°C [°F]	60 [140]
Approximate Fuel Flow Return to Tank.....		l/hr [gal/hr]	147 [39]
Approximate Fuel Return to Tank Temperature		°C [°F]	66 [150]
Maximum Heat Rejection to Drain Fuel ⁵		kW [Btu/min]	2 [110]
Fuel Transfer Pump Pressure Range.....		kPa [psi]	76 [11]
Fuel Rail Pressure Gauge.....		kPa [psi]	N.A.
INSITE.....		kPa [psi]	135,000 [19,580]

Air System¹

Intake Manifold Pressure		kPa [in Hg]	120 [35]
Intake Air Flow.....		l/sec [cfm]	228 [483]
Heat Rejection to Ambient		kW [Btu/min]	26 [1460]
Maximum Air Cleaner Inlet Temperature Rise Over Ambient.....		°C [°F]	17 [30]

Exhaust System¹

Exhaust Gas Flow.....		l/sec [cfm]	465 [985]
Exhaust Gas Temperature Turbine Out.....		°C [°F]	381 [718]
Manifold		°C [°F]	489 [912]

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

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<http://www.cummins.com>

Marine Engine Performance Data

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DATE: 15Oct04

Emissions (in accordance with ISO 8178 Cycle E3)

NOx (Oxides of Nitrogen)	g/kw-hr [g/hp-hr]	6.205 [4.627]
HC (Hydrocarbons).....	g/kw-hr [g/hp-hr]	0.113 [0.084]
CO (Carbon Monoxide).....	g/kw-hr [g/hp-hr]	0.253 [0.189]
PM (Particulate Matter).....	g/kw-hr [g/hp-hr]	0.089 [0.066]

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]	238 [63]
Standard Thermostat Operating Range	Start to Open.....	74 [165]
	Full Open	85 [185]
Heat Rejection to Engine Coolant ³	kW [Btu/min]	129 [7370]

Single Loop Low Temperature Aftercooling (if applicable)

Coolant Flow to Engine Heat Exchanger/Keel Cooler	l/min [gal/min]	238 [63]
LTA Thermostat Operating Range	Start to Open.....	66 [150]
	Full Open	80 [175]
Heat Rejection to LTA Coolant ³	kW [Btu/min]	142 [8110]

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