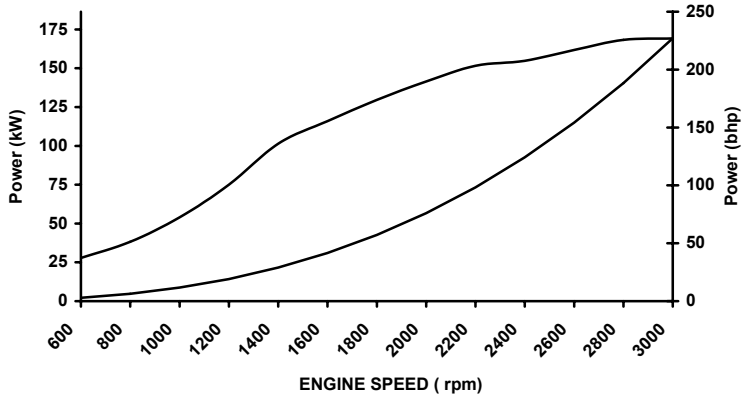
CUMMINS MERCRUISER DIESEL Charleston, SC 29405 Marine Performance Curves	Basic Engine Model: QSB5.9-230 INT	Curve Number: M-92009	
	Engine Configuration: D403075MX03	CPL Code: 8464	Date: 1-Jan-06

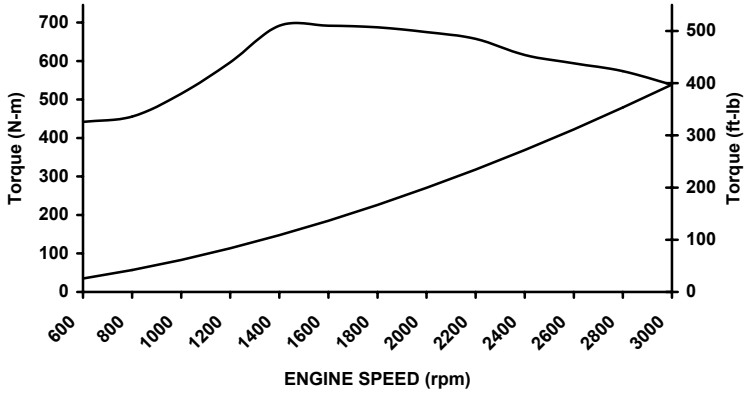
Displacement: **5.9 liter** **[359 in^3]**
Bore: **102 mm** **[4.02 in]**
Stroke: **120 mm** **[4.72 in]**
Fuel System: **HPCR**
Cylinders: **6**

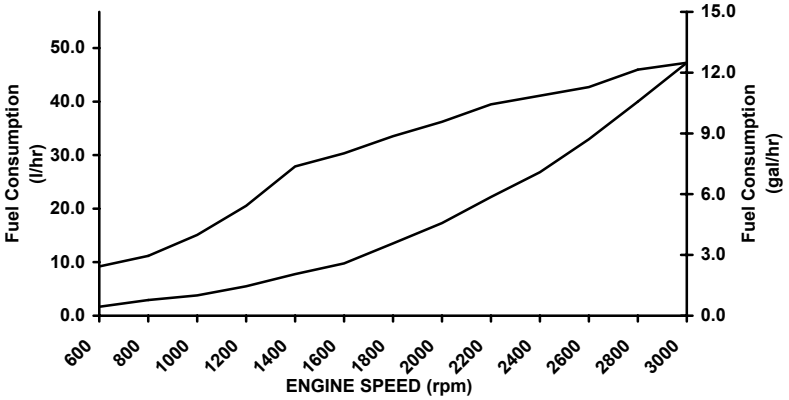
kW [bhp, mhp] @ rpm
Advertised Power: **169 [227, 230] @ 3000**

Aspiration: **Turbocharged/Sea Water Aftercooled**
Rating Type: **Intermittent**

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
3000	169	227
2800	168	226
2600	162	217
2400	155	207
2200	152	203
2000	141	190
1800	130	174
1600	116	155
1400	101	136
1200	75	101
1000	54	72
800	38	51
600	28	37

FULL LOAD TORQUE CURVE

rpm	N-m	ft-lb
3000	538	397
2800	574	423
2600	594	438
2400	616	454
2200	658	485
2000	675	498
1800	687	507
1600	691	510
1400	691	510
1200	597	440
1000	515	380
800	456	336
600	442	326

FUEL CONSUMPTION - PROP CURVE

rpm	l/hr	gal/hr
3000	47.3	12.5
2800	40.0	10.6
2600	33.0	8.7
2400	26.8	7.1
2200	22.2	5.9
2000	17.3	4.6
1800	13.5	3.6
1600	9.8	2.6
1400	7.8	2.1
1200	5.5	1.5
1000	3.8	1.0
800	2.9	0.8
600	1.7	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 25deg. C [77 deg. F] and 30% relative humidy. 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. F0 having LHV of 42,780 kj/kg [18390 Btu/lb] and weighing 838.9 g/liter [7.001 lb/U.s. gal].

Intermittent Rating: This power rating is intended for intermittent use in variable load application where full power is limited to two (2) hours out of every eight (8) hours of operation. Also, reduced power operation must be at or below 200 RPM of the maximum rated RPM. This rating is an ISO 3046 fuel stop power rating and is for application that operate less than 1,500 hours per year.

James D Kuhlenbeck
CHIEF ENGINEER

Marine Engine Performance Data

Curve No.: M-92009
DS-3075
DATE: 1Jan06

General Engine Data

Engine Model		QSB5.9-230 INT
Rating Type		Intermittent
Rated Engine Power	kW [bhp]	169 [227]
Rated Engine Speed	rpm	3000
Rated HP Production Tolerance	±%	5
Rated Engine Torque	N•m [ft•lb]	539 [397]
Peak Engine Torque @ 1400 rpm	N•m [ft•lb]	691 [510]
Brake Mean Effective Pressure	kPa [psi]	1151 [167]
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	3065
Maximum	rpm	3085
Maximum Allowable Engine Speed	rpm	3085
Maximum Torque Capacity from Front of Crank[2]	N•m [ft•lb]	271 [200]
Compression Ratio		17.2:1
Piston Speed	m/sec [ft/min]	12 [2360]
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	76
	(Rated)	dBA @ 1m	96
Average Noise Level – Right Side	(Idle)	dBA @ 1m	76
	(Rated)	dBA @ 1m	101
Average Noise Level – Left Side	(Idle)	dBA @ 1m	77
	(Rated)	dBA @ 1m	105
Average Noise Level – Front	(Idle)	dBA @ 1m	76
	(Rated)	dBA @ 1m	100

Fuel System[1]

Average Fuel Consumption – ISO 8178 E3 Standard Test Cycle	l/hr [gal/hr]	30.8 [8.1]
Fuel Consumption @ Rated Speed	l/hr [gal/hr]	47.3 [12.5]
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]	142 [38]
Approximate Fuel Return to Tank Temperature	°C [°F]	66 [150]
Maximum Heat Rejection to Drain Fuel[5]	kW [Btu/min]	2 [109]
Fuel Transfer Pump Pressure Range	kPa [psi]	76 [11]
Fuel Rail Pressure Gauge	kPa [psi]	N.A.
INSITE	kPa [psi]	139,033 [20,165]

Air System[1]

Intake Manifold Pressure	kPa [in Hg]	149 [43.9]
Intake Air Flow	l/sec [cfm]	271 [575]
Heat Rejection to Ambient	kW [Btu/min]	26 [1460]
Maximum Air Cleaner Inlet Temperature Rise Over Ambient	°C [°F]	17 [30]

Exhaust System[1]

Exhaust Gas Flow		l/sec [cfm]	602 [1275]
Exhaust Gas Temperature	Turbine Out	°C [°F]	366 [690]
	Manifold	°C [°F]	491 [915]

TBD = To Be Decided **N/A = Not Applicable** **N.A. = Not Available**

[1]All Data at Rated Conditions
[2]Consult Installation Direction Booklet for Limitations
[3]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.
[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

Marine Engine Performance Data

Curve No.: M-92009
DS-3075
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Emissions (in accordance with ISO 8178 Cycle E3)

NOx (Oxides of Nitrogen)	g/kw·hr [g/hp·hr]	5.43 [4.052]
HC (Hydrocarbons)	g/kw·hr [g/hp·hr]	0.15 [0.112]
CO (Carbon Monoxide)	g/kw·hr [g/hp·hr]	N.A.
PM (Particulate Matter)	g/kw·hr [g/hp·hr]	N.A.

Cooling System[1]

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)

Coolant Flow to Engine Heat Exchanger	l/min [gal/min]	254 [67]
Standard Thermostat Operating Range Start to Open	°C [°F]	74 [165]
Full Open	°C [°F]	85 [185]
Heat Rejection to Engine Coolant[3]	kW [Btu/min]	129 [7370]

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