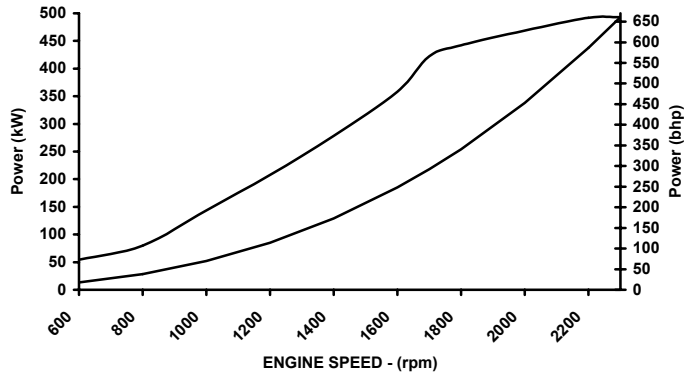
CUMMINS MERCRUISER DIESEL Charleston, SC 29405 Marine Performance Curves	Basic Engine Model: **QSM11-670 HO**	Curve Number: **M-20093**	
	Engine Configuration: **D353013MX03**	CPL Code **8753**	Date: **15-Nov-05**

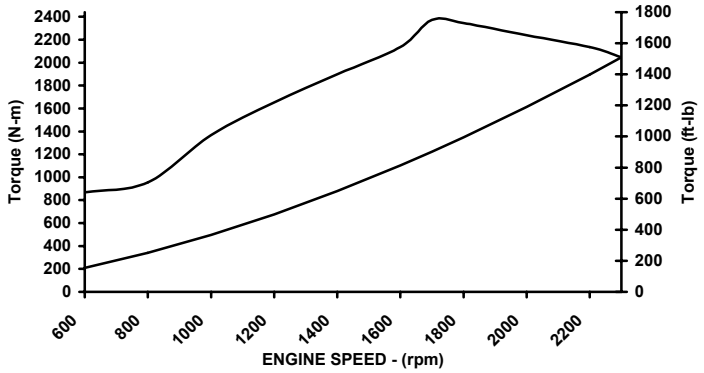
Displacement:	**10.8 liter**	**[661 in^3]**	kW [bhp, mhp] @ rpm	
Bore:	**125 mm**	**[4.92 in]**	Advertised Power:	**493 [661, 670] @ 2300**
Stroke:	**147 mm**	**[5.79 in]**		
Fuel System:	**CELECT**		Aspiration:	**Turbocharged / Sea Water Aftercooled**
Cylinders:	**6**		Rating Type:	**High Output**

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



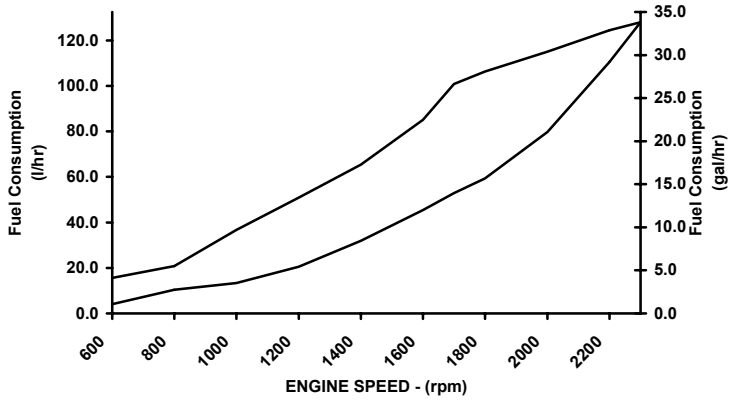
RATED POWER OUTPUT CURVE

rpm	kW	bhp
2300	493	661
2100	480	644
2000	469	629
1800	442	593
1700	423	566
1600	358	480
1400	278	373
1200	208	279
1000	143	192
800	80	107
600	55	73



FULL LOAD TORQUE CURVE

rpm	N-m	ft-lb
2300	2046	1509
2100	2183	1610
2000	2238	1650
1800	2346	1730
1700	2373	1750
1600	2135	1575
1400	1898	1400
1200	1654	1220
1000	1369	1010
800	956	705
600	868	640



FUEL CONSUMPTION - PROP CURVE

rpm	l/hr	gal/hr
2300	127.9	33.8
2100	93.4	24.7
2000	79.7	21.1
1800	59.4	15.7
1700	52.9	14.0
1600	45.5	12.0
1400	32.0	8.5
1200	20.6	5.4
1000	13.3	3.5
800	10.4	2.7
600	4.1	1.1

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 Kiblinger

CHIEF ENGINEER

Marine Engine Performance Data

Curve No.: M-20093
DS-3013
DATE: 15Nov05

General Engine Data

Engine Model		QSM11-670 HO
Rating Type		High Output
Rated Engine Power	kW [bhp]	493 [661]
Rated Engine Speed	rpm	2300
Rated HP Production Tolerance	±%	5
Rated Engine Torque	N•m [ft•lb]	2046 [1509]
Peak Engine Torque @ 1700 rpm	N•m [ft•lb]	2373 [1750]
Brake Mean Effective Pressure	kPa [psi]	2375 [345]
Indicated Mean Effective Pressure	kPa [psi]	2617 [380]
Minimum Idle Speed Setting	rpm	600
Normal Idle Speed Variation	±rpm	10
High Idle Speed Range Minimum	rpm	2340
Maximum	rpm	2360
Maximum Allowable Engine Speed	rpm	2360
Maximum Torque Capacity from Front of Crank[2]	N•m [ft•lb]	0 [0]
Compression Ratio		16.3:1
Piston Speed	m/sec [ft/min]	11.3 [2219]
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]	1188 [2620]
Weight Tolerance (Dry) Engine only - Average	kg [lb]	N.A.

Noise and Vibration

Average Noise Level – Top	(Idle)	dBA @ 1m	92
	(Rated)	dBA @ 1m	112
Average Noise Level – Right Side	(Idle)	dBA @ 1m	92
	(Rated)	dBA @ 1m	111
Average Noise Level – Left Side	(Idle)	dBA @ 1m	92
	(Rated)	dBA @ 1m	112
Average Noise Level – Front	(Idle)	dBA @ 1m	93
	(Rated)	dBA @ 1m	111

Fuel System[1]

Average Fuel Consumption – ISO 8178 E3 Standard Test Cycle	l/hr [gal/hr]	84 [22]
Average Fuel Consumption – ISO 8178 E5 Standard Test Cycle	l/hr [gal/hr]	44 [12]
Fuel Consumption @ Rated Speed	l/hr [gal/hr]	128 [34]
Approximate Fuel Flow to Pump	l/hr [gal/hr]	280 [74]
Maximum Allowable Fuel Supply to Pump Temperature	°C [°F]	60 [140]
Approximate Fuel Flow Return to Tank	l/hr [gal/hr]	154 [41]
Fuel Transfer Pump Pressure Range	kPa [psi]	965-1241 [140-180]
Fuel Rail Pressure Gauge	kPa [psi]	1151 [167]
INSITE	kPa [psi]	N/A

Air System[1]

Intake Manifold Pressure	kPa [in Hg]	284 [84]
Intake Air Flow	l/sec [cfm]	658 [1416]
Heat Rejection to Ambient	kW [Btu/min]	40 [2294]

Exhaust System[1]

Exhaust Gas Flow	l/sec [cfm]	1665 [3528]
Exhaust Gas Temperature Turbine Out	°C [°F]	514 [957]
Manifold	°C [°F]	688 [1270]

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

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

Marine Engine Performance Data

Curve No.: M-20093
DS-3013
DATE: 15Nov05

Emissions (in accordance with ISO 8178 Cycle E3)

NOx (Oxides of Nitrogen)	g/kw·hr [g/hp·hr]	4.604 [3.433]
HC (Hydrocarbons)	g/kw·hr [g/hp·hr]	.186 [.139]
CO (Carbon Monoxide)	g/kw·hr [g/hp·hr]	.414 [.309]
PM (Particulate Matter)	g/kw·hr [g/hp·hr]	.111 [.083]

Emissions (in accordance with ISO 8178 Cycle E5)

NOx (Oxides of Nitrogen)	g/kw·hr [g/hp·hr]	4.637 [3.458]
HC (Hydrocarbons)	g/kw·hr [g/hp·hr]	.226 [.169]
CO (Carbon Monoxide)	g/kw·hr [g/hp·hr]	.478 [.356]
PM (Particulate Matter)	g/kw·hr [g/hp·hr]	.125 [.093]

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]

Sea Water Aftercooled Engine (SWAC)

Coolant Flow to Engine Heat Exchanger	l/min [gal/min]	N.A.
Standard Thermostat Operating Range Start to Open	°C [°F]	71 [160]
Full Open	°C [°F]	80 [175]
Heat Rejection to Engine Coolant[3]	kW [Btu/min]	153 [8707]

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