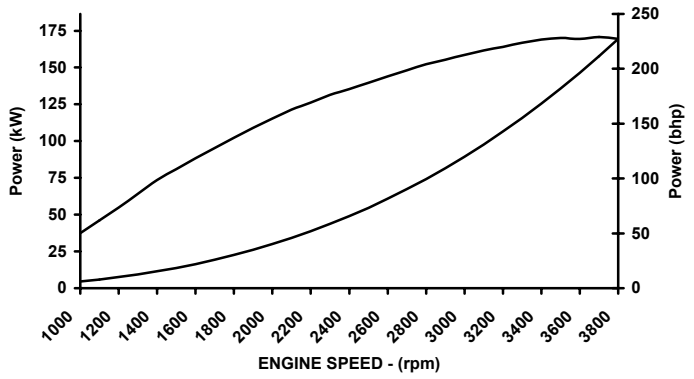
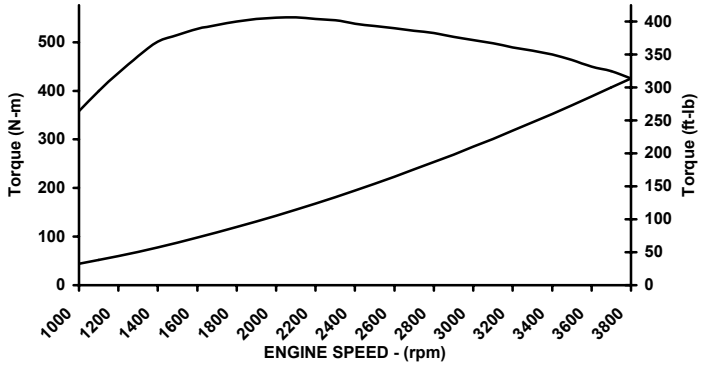
CUMMINS MERCRUISER DIESEL Charleston, SC 29405 Marine Performance Curves	Basic Engine Model: 4.2L MS 230	Curve Number: BC 9115	
	Engine Configuration: D913002MX03	Sterndrive	Date: 15-Oct-04

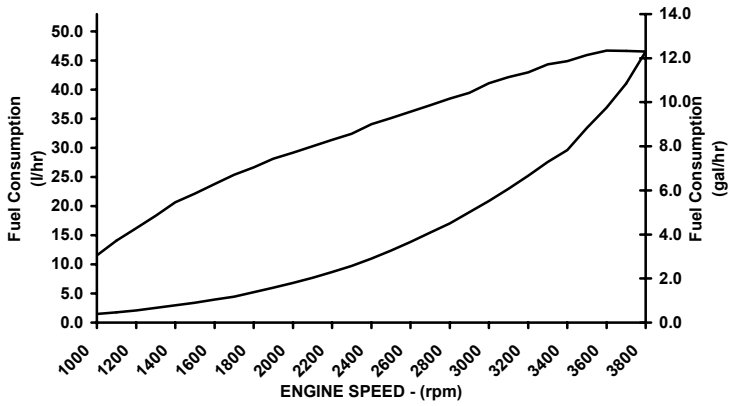
Displacement:	4.2 liter	[254 in^3]		kW [bhp, mhp] @ rpm
Bore:	94 mm	[3.7 in]	Advertised Power:	169 [227, 230] @ 3800
Stroke:	100 mm	[3.94 in]		
Fuel System:	Bosch VP37		Aspiration:	Turbocharged / Sea Water Aftercooled
Cylinders:	6		Rating Type:	High Output

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

Preliminary







RATED POWER OUTPUT CURVE

rpm	kW	bhp
3800	169	227
3600	170	227
3400	169	227
3200	164	220
3000	159	212
2800	152	204
2600	144	193
2400	135	181
2200	126	169
2000	115	155
1800	102	137
1500	81	109
1000	37	50

FULL LOAD TORQUE CURVE

rpm	N-m	ft-lb
3800	426	314
3600	450	332
3400	475	350
3200	489	361
3000	504	372
2800	519	383
2600	529	390
2400	538	397
2200	548	404
2000	550	406
1800	542	400
1500	515	380
1000	358	264

FUEL CONSUMPTION - PROP CURVE

rpm	l/hr	gal/hr
3800	46.6	12.3
3600	36.9	9.8
3400	29.7	7.8
3200	25.2	6.7
3000	20.9	5.5
2800	17.1	4.5
2600	13.9	3.7
2400	11.0	2.9
2200	8.7	2.3
2000	6.8	1.8
1800	5.2	1.4
1500	3.4	0.9
1000	1.5	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. F0 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 Kuhlenbeck

CHIEF ENGINEER

Marine Engine Performance Data

Preliminary

Curve No.: BC9115

DATE: 15Oct04

General Engine Data			
Engine Model			4.2L MS 230
Rating Type			High Output
Rated Engine Power		kW [bhp]	169 [227]
Rated Engine Speed		rpm	3800
Rated HP Production Tolerance		±%	5
Rated Engine Torque		N•m [ft•lb]	426 [314]
Peak Engine Torque @ 2200 rpm		N•m [ft•lb]	548 [404]
Brake Mean Effective Pressure		kPa [psi]	1285 [186]
Indicated Mean Effective Pressure		kPa [psi]	N/A
Minimum Idle Speed Setting		rpm	600
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[2]		N•m [ft•lb]	0
Compression Ratio			17:1
Piston Speed		m/sec [ft/min]	12.7 [2493]
Firing Order			1-5-3-6-2-4
Weight (Dry) Engine With Heat Exchanger System - Average		kg [lb]	460 [1015]
Fuel System[1]			
Fuel Consumption @ Rated Speed		l/hr [gal/hr]	46.6 [12.3]
Approximate Fuel Flow to Pump		l/hr [gal/hr]	N.A.
Maximum Allowable Fuel Supply to Pump Temperature		°C [°F]	60 [140]
Approximate Fuel Flow Return to Tank		l/hr [gal/hr]	N.A.
Approximate Fuel Return to Tank Temperature		°C [°F]	70 [158]
Maximum Heat Rejection to Drain Fuel[5]		kW [Btu/min]	N.A.
Fuel Transfer Pump Pressure Range		kPa [psi]	N.A.
Air System[1]			
Intake Manifold Pressure		kPa [in Hg]	124 [37]
Intake Air Flow		l/sec [cfm]	250 [530]
Heat Rejection to Ambient		kW [Btu/min]	16 [933]
Maximum Air Cleaner Inlet Temperature Rise Over Ambient		°C [°F]	17 [30]
Exhaust System[1]			
Exhaust Gas Flow		l/sec [cfm]	455 [965]
Exhaust Gas Temperature	Turbine Out	°C [°F]	410 [769]
	Manifold	°C [°F]	N.A.
Cooling System[1]			
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]	300 [79]
Standard Thermostat Operating Range	Start to Open	°C [°F]	80 [176]
	Full Open	°C [°F]	95 [202]
Heat Rejection to Engine Coolant[3]		kW [Btu/min]	153 [8710]

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.

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