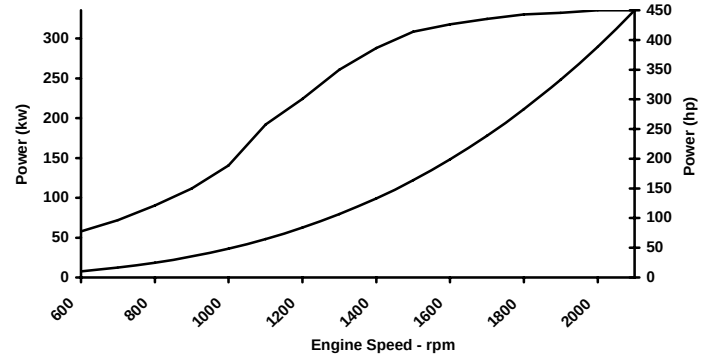
CUMMINS MERCRUISER DIESEL Charleston, SC 29405 Marine Performance Curves	Basic Engine Model QSM11-455 MCD	Curve Number: M-20036	
	Engine Configuration D353021MX03	CPL Code: 8590	Date: 2-Oct-07

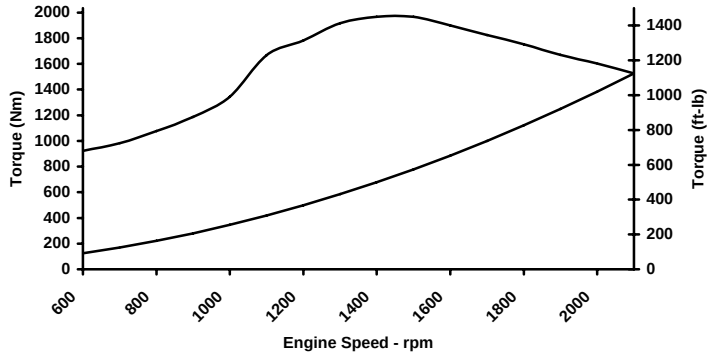
Displacement:	**10.8 liter**	**[660 in^3]**
Bore:	**125 mm**	**[4.92 in]**
Stroke:	**147 mm**	**[5.79 in]**
Fuel System:	**CELECT**	
Cylinders:	**6**	

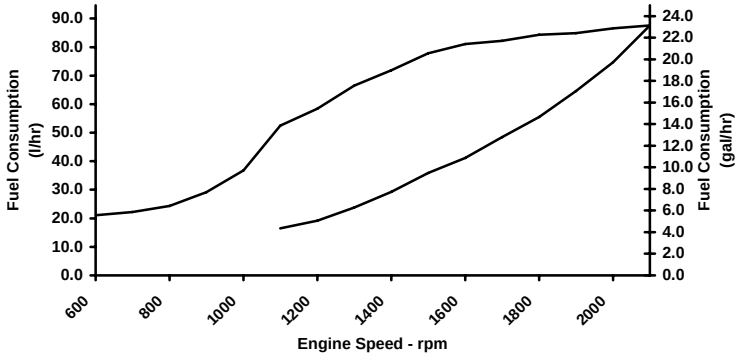
kW [bhp, mhp] @ rpm
Advertised Power: **336 [450, 455] @ 2100**

Aspiration: **Turbocharged/Jacket Water Aftercooled**
Rating Type: **Medium Continuous 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
2100	336	450
1900	332	446
1700	325	435
1600	318	427
1400	288	387
1300	261	350
1200	224	300
1100	192	258
1000	141	188
800	90	121
700	72	97
600	58	78

FULL LOAD TORQUE CURVE

rpm	N-m	ft-lb
2100	1525	1125
1900	1670	1232
1700	1824	1345
1600	1898	1400
1400	1966	1450
1300	1916	1413
1200	1783	1315
1100	1668	1230
1000	1342	990
800	1078	795
600	922	680

FUEL CONSUMPTION - PROP CURVE

rpm	l/hr	gal/hr
2100	87.6	23.1
2000	74.6	19.7
1900	64.6	17.1
1800	55.5	14.7
1700	48.4	12.8
1600	41.1	10.9
1500	35.9	9.5
1400	29.3	7.7
1300	23.7	6.3
1200	19.2	5.1
1100	16.4	4.3

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. F] having LHV of 42,780 kj/kg [18390 Btu/lb] and weighing 838.9 g/liter [7.001 lb/U.S. gal].

Medium Continuous Duty (MCD) Intended for continuous use in variable load applications where full power is limited to six (6) hours out of every twelve (12) hours of operation. Also, reduced power operations 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 applications that operate less than 3,000 hours per year.

CHIEF ENGINEER

Propulsion Marine Engine Performance Data

Curve No.	**M-20036**
DS :	**3021**
CPL :	**8590**
DATE:	**2-Oct-07**

General Engine Data

Engine Model		QSM11-455 MCD
Rating Type		Medium Continuous Duty
Rated Engine Power	kW [hp]	336 [450]
Rated Engine Speed	rpm	2100
Rated Power Production Tolerance	±%	5
Rated Engine Torque	N·m [lb·ft]	1525 [1125]
Peak Engine Torque @ 1500 rpm	N·m [lb·ft]	1966 [1450]
Brake Mean Effective Pressure	kPa [psi]	1771 [257]
Indicated Mean Effective Pressure	kPa [psi]	1985 [288]
Minimum Idle Speed Setting	rpm	600
Normal Idle Speed Variation	rpm	10
High Idle Speed Range Minimum	rpm	2140
Maximum	rpm	2160
Maximum Allowable Engine Speed	rpm	2160
Maximum Torque Capacity from Front of Crank[2]	N·m [lb·ft]	847 [625]
Compression Ratio		15.9:1
Piston Speed	m/sec [ft/min]	10.3 [2026]
Firing Order		1-5-3-6-2-4
Weight (Dry) - Engine Only - Average	kg [lb]	1118 [2464]
Weight (Dry) - Engine With Heat Exchanger System - Average	kg [lb]	1184 [2610]
Weight Tolerance (Dry) Engine Only	3xStd Dev(±%)	N.A.

Noise and Vibration

Average Noise Level - Top	(Idle)	dBA @ 1m	80
	(Rated)	dBA @ 1m	95
Average Noise Level - Right Side	(Idle)	dBA @ 1m	80
	(Rated)	dBA @ 1m	95
Average Noise Level - Left Side	(Idle)	dBA @ 1m	80
	(Rated)	dBA @ 1m	95
Average Noise Level - Front	(Idle)	dBA @ 1m	80
	(Rated)	dBA @ 1m	95

Fuel System[1]

Avg. Fuel Consumption - ISO 8178 E3 Standard Test Cycle	l/hr [gal/hr]	59.3 [16]
Fuel Consumption at Rated Speed	l/hr [gal/hr]	87.6 [23]
Approximate Fuel Flow to Pump	l/hr [gal/hr]	242.3 [64]
Maximum Allowable Fuel Supply to Pump Temperature	°C [°F]	60.0 [140]
Approximate Fuel Flow Return to Tank	l/hr [gal/hr]	154.7 [41]
Approximate Fuel Return to Tank Temperature	°C [°F]	71.2 [160]
Maximum Heat Rejection to Drain Fuel	kW [Btu/min]	2.5 [140]
Fuel Transfer Pump Pressure Range	kPa [psi]	1134-1172 [150 - 170]
Fuel Pressure - Pump Out/Rail ..Mechanical Gauge	kPa [psi]	1103 [160]
INSITE Reading	kPa [psi]	N.A. [N.A.]

Air System[1]

Intake Manifold Pressure	kPa [in Hg]	204 [60]
Intake Air Flow	l/sec [cfm]	445 [942]
Heat Rejection to Ambient	kW [Btu/min]	35 [2008]

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

1 **All Data at Rated Conditions.**
2 **Consult Installation Direction Booklet for Limitations.**
3 **Heat rejection to coolant 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

Propulsion Marine Engine Performance Data

Curve No.	**M-20036**
DS :	**3021**
CPL :	**8590**
DATE:	**2-Oct-07**

Exhaust System[1]	
Exhaust Gas Flow ……l/sec [cfm]	960 [2035]
Exhaust Gas Temperature (Turbine Out) ….°C [°F]	407 [764]
Exhaust Gas Temperature (Manifold) ….°C [°F]	601 [1113]
Emissions (in accordance with ISO 8178 Cycle E3)	
NOx (Oxides of Nitrogen) ……g/kw·hr [g/hp·hr]	6.19 [4.62]
HC (Hydrocarbons) ……g/kw·hr [g/hp·hr]	0.22 [0.16]
CO (Carbon Monoxide) ……g/kw·hr [g/hp·hr]	0.36 [0.27]
PM (Particulate Matter) ……g/kw·hr [g/hp·hr]	0.14 [0.11]
Cooling System[1]	
Sea Water After Cooled Engine	
Sea Water Pump Specifications ……MAB 0.08.17-07/16/2001	
Pressure Cap Rating…….. ……kPa [psi]	103 [15]
Thermostat Operating Range (Start to Open)……..°C [°F]	71 [160]
Thermostat Operating Range(Full Open)…….°C [°F]	80 [175]
Engines with Single Loop Keel Cooling	
Coolant Flow to Keel Cooler (with blocked open thermostat)……l/min [gal/min]	198 [52]
LTA Thermostat Operating Range (Start to Open) ……..°C [°F]	66 [150]
LTA Thermostat Operating Range (Full Open) ……..°C [°F]	80 [175]
Heat Rejection to Engine Coolant[3] ……kW [Btu/min]	309 [17607]
Maximum Coolant Inlet Temperature from LTA Cooler……°C [°F]	54 [130]

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