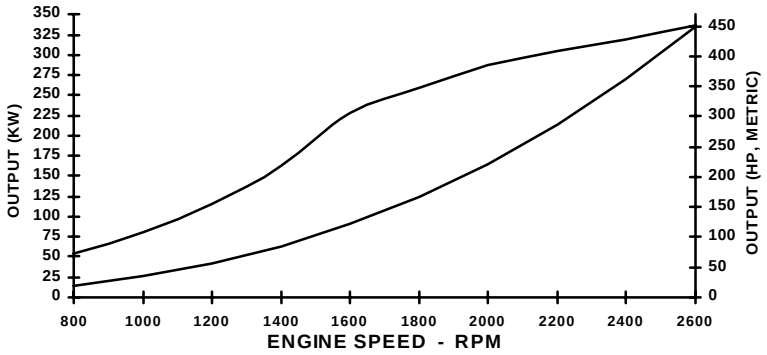
CUMMINS ENGINE COMPANY, INC Columbus, Indiana 47201	Basic Engine Model: **450C (SW)**		Curve Number: **M-90215**	*Marine* *Pg. No.* **6C** **63**
Marine Performance Curve	Engine Configuration: **D413030MX02**	CPL Code: **2172**	Date: **07Dec00**	

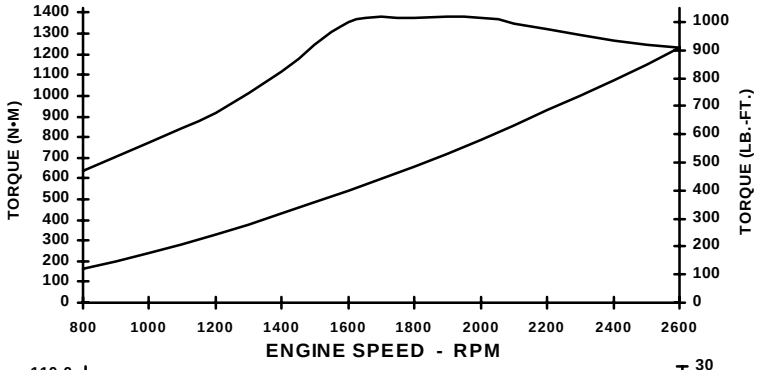
Displacement: **8.3 litre [504.5 in.^{3}]**
Bore: **114 mm [4.49 in.]**
Stroke: **135 mm [5.32 in.]**
Fuel System: **Inline Bosch P7100**
Cylinders: **6**

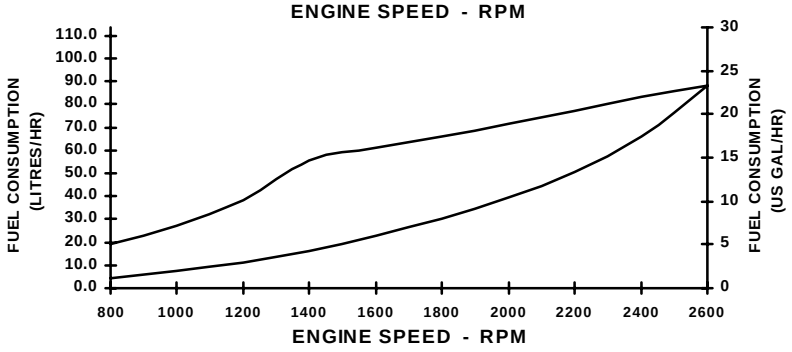
Advertised Power: kW [HP, Metric] @ RPM **321* (450) @ 2600**

Aspiration: **Turbocharged/Sea Water Aftercooled**
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.







RATED POWER OUTPUT CURVE

RPM	kW	HP
2600	321	(450)
2500	321	(450)
2300	318	(427)
2100	305	(409)
1900	288	(386)
1700	260	(349)
1500	227	(305)
1300	164	(219)
1100	116	(155)
900	81	(109)
700	54	(72)

FULL LOAD TORQUE CURVE

RPM	N•m	lb.-ft.
2600	1232	(909)
2500	1232	(909)
2300	1267	(934)
2100	1324	(976)
1900	1375	(1014)
1700	1379	(1017)
1500	1356	(1000)
1300	1115	(822)
1100	919	(678)
900	774	(571)
700	639	(471)

FUEL CONSUMPTION - PROP CURVE

RPM	Litres/hr	Gal/hr
2600	88.0	(23.2)
2500	88.0	(23.2)
2300	65.8	(17.4)
2100	50.8	(13.4)
1900	39.5	(10.4)
1700	30.2	(8.0)
1500	22.7	(6.0)
1300	15.8	(4.2)
1100	10.9	(2.9)
900	7.2	(1.9)
700	4.3	(1.1)

Rating Conditions: Ratings are based upon ISO 8665 and SAE J1228 reference conditions; air pressure of 100 kPa [29.612 in. Hg], air temperature 25°C [77°F], and 30% relative humidity. Power is rated in accordance with IMCI procedures. Member NMMA.

Rated Curves (upper) represent 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° API gravity at 16°C [60°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 or less.

CHIEF ENGINEER

Marine Engine Performance Data

Curve No. M-90215
DS-4961
CPL: 2172
DATE: 07Dec00

General Engine Data

Engine Model		450C (SW)
Rating Type		High Output
Rated Engine Power	kW [HP, Metric]	321 [450]
Rated Engine Speed	RPM	2600
Rated HP Production Tolerance	**%**	**±5**
Rated Engine Torque	N•m [ft/lb]	1232 [909]
Peak Engine Torque @ 1800 RPM	**N•m [ft/lb]**	**1379 [1017]**
Brake Mean Effective Pressure	kPa [PSI]	**1873 [272]**
Minimum Idle Speed Setting	RPM	**600**
Normal Idle Speed Variation	**RPM**	**±50**
High Idle Speed Range - Minimum	RPM	**2920**
High Idle Speed Range - Maximum	RPM	**3020**
Maximum Torque Capacity from Front of Crank[2]	**N•m [ft/lb]**	**N.A.**
Compression Ratio		15.35:1
Piston Speed	m/sec [ft/min.]	11.7 [**2305**]
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]	**855 [1885]**

Fuel System[1]

Approximate Fuel Flow to Pump	litre/hr [GPH]	259 [68]
Maximum Allowable Fuel Supply to Pump Temperature	**°C [°F]**	**60 [140]**
Approximate Fuel Flow Return to Tank	**litre/hr [GPH]**	**171 [45]**
Approximate Fuel Return to Tank Temperature	**°C [°F]**	**N.A.**
Maximum Heat Rejection to Drain Fuel[5]	**kW [BTU/min]**	**N.A.**
Fuel Transfer Pump Pressure Range	kPa [PSI]	124 - 172 [18-25]

Air System[1]

Intake Manifold Pressure	mm Hg [in. Hg]	**1524 [60]**
Intake Air Flow	litre/sec [CFM]	434 [920]
Heat Rejection to Ambient	kW [BTU/min.]	42 [2415]

Exhaust System[1]

Exhaust Gas Flow	litre/sec [CFM]	**991** [2100]
Exhaust Gas Temperature **(Turbine Out)**	°C [°F]	444 [830]
Exhaust Gas Temperature **(Manifold)**	°C [°F]	**N.A.**

Emissions (in accordance with ISO8178 Cycle E3)

NOx (Oxides of Nitrogen)	**g/kw-hr [g/bhp-hr]**	**7.54 [5.62]**
HC (Hydrocarbons)	**g/kw-hr [g/bhp-hr]**	**0.30 [0.22]**
CO (Carbon Monoxide)	**g/kw-hr [g/bhp-hr]**	**0.50 [0.37]**
PM (Particulate Matter)	**g/kw-hr [g/bhp-hr]**	**0.17 [0.13]**

Cooling System[1]

Coolant Flow to Engine Heat Exchanger/Keel Cooler	**litre/min. [GPM]**	322 [85]
Standard Thermostat Operating Range (Min.)	**°C [°F]**	**71 [160]**
Standard Thermostat Operating Range (Max.)	**°C [°F]**	**83 [182]**
Heat Rejection to **Engine** Coolant[3]	kW [BTU/min.]	277 [15,750]
Sea Water Flow **(With Heat Exchanger Option)**[4]	litre/min. [GPM]	238 [63]
Pressure Cap Rating **(With Heat Exchanger Option)**	kPa [PSI]	103 [15]

INSTALLATION DRAWING

Engine Only	3170262

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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COLUMBUS, INDIANA