

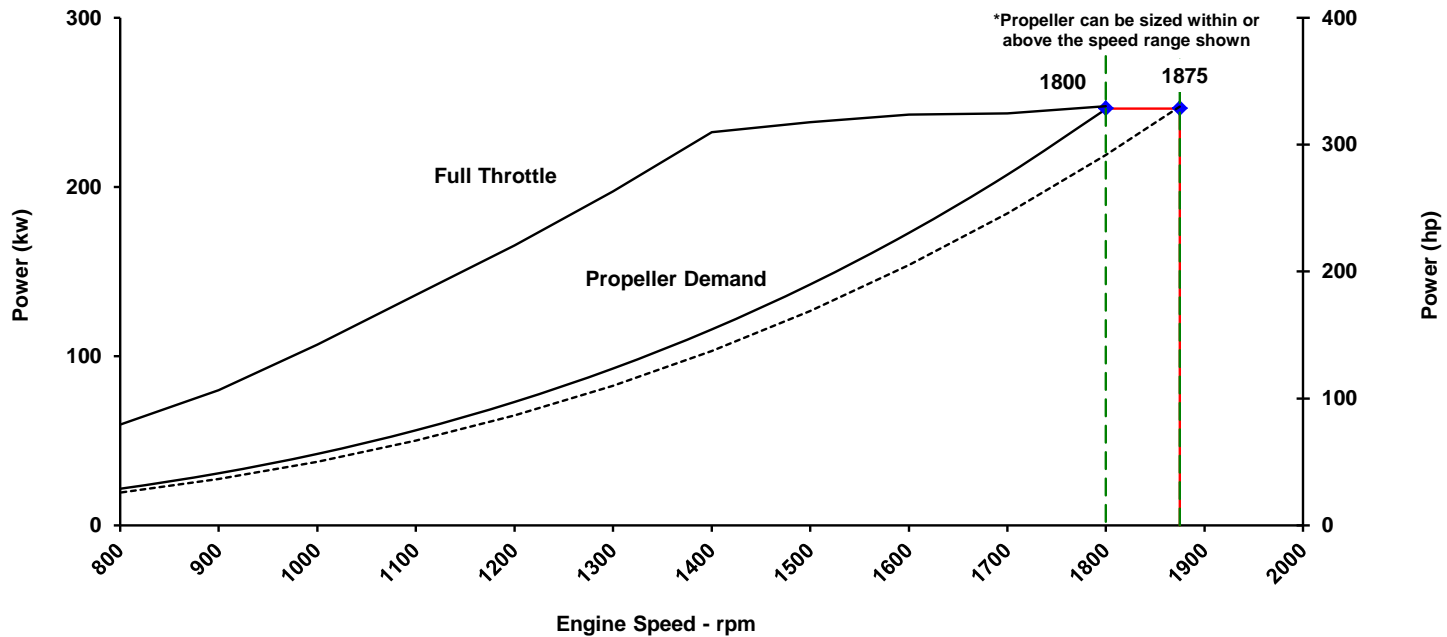


CUMMINS INC.
 Charleston, SC 29405
 Marine Performance Curves
marine.cummins.com

Basic Engine Model QSL	Curve Number: M-94507	
Engine Configuration D563023MX03	CPL Code: 4254	Date: 30-May-14

Displacement: 8.9 liter [542 in ³]	Rated Power: 246 Kw [330 bhp, 335 mhp]
Bore: 114 mm [4.49 in]	Rated Speed: 1800 rpm
Stroke: 145 mm [5.71 in]	Rating Type: Heavy Duty
Cylinders: 6	Aspiration: Turbocharged / Sea Water Aftercooled
Fuel System: Cummins High Pressure Corr	

CERTIFIED: This diesel engine complies with or is certified to the following agencies requirements:
 EPA Tier 3 - Model year requirements of the EPA marine regulation (40CFR1042)
 EU Stage IIIa - EC Nonroad Mobile Machinery Directive (2004/26/EC)
 IMO Tier II (Two) NOx requirements of International Maritime Organization (IMO), MARPOL 73/78 Annex VI, Regulation 13



Speed	Full Throttle				Propeller Demand					
	Power		Torque		Power		Torque		Fuel Consumption	
	kw	(hp)	N-m	(ft-lb)	kw	(hp)	N-m	(ft-lb)	L/hr	(gal/hr)
1875	246	(330)	1255	(925)						
1800	246	(330)	1307	(964)	246	(330.0)	1305	(962.9)	63.2	(16.7)
1700	242	(325)	1360	(1003)	207	(278.0)	1164	(858.9)	53.2	(14.0)
1600	242	(324)	1441	(1063)	173	(231.8)	1031	(760.8)	43.7	(11.5)
1500	237	(318)	1509	(1113)	142	(191.0)	907	(668.7)	36.3	(9.6)
1400	231	(310)	1576	(1162)	116	(155.3)	790	(582.5)	29.8	(7.9)
1300	196	(263)	1442	(1064)	93	(124.3)	681	(502.2)	24.1	(6.4)
1200	164	(221)	1309	(965)	73	(97.8)	580	(427.9)	19.6	(5.2)
1100	135	(182)	1175	(867)	56	(75.3)	488	(359.6)	14.6	(3.9)
1000	106	(143)	1015	(749)	42	(56.6)	403	(297.2)	11.1	(2.9)
900	79	(106)	842	(621)	31	(41.3)	326	(240.7)	8.2	(2.2)
800	59	(80)	708	(522)	22	(29.0)	258	(190.2)	6.0	(1.6)
700	45	(60)	610	(450)	14	(19.4)	197	(145.6)	4.4	(1.2)
600	33	(44)	520	(384)	9	(12.2)	145	(107.0)	3.0	(0.8)

*** Cummins Full Throttle Requirements:**

- Engine achieves or exceeds rated rpm at full throttle under any steady operating condition
- Engine achieves or exceeds rated rpm when accelerating from idle to full throttle

Rated Conditions: Ratings are based upon ISO 15550 reference conditions; air pressure of 100 kPa [29.612 in Hg], air temperature 25deg. C [77 deg. F] and 30% relative humidity. Member NMMA. Unless otherwise specified, tolerance on all values is +/-5%. Values from engine control modules and displayed on instrument panels are not absolute. Tolerance varies, but is generally less than +/-5% when operating within 30% of rated power.

Full Throttle curve represents power at the crankshaft for mature gross engine performance corrected in accordance with ISO 15550. Propeller Curve represents approximate power demand from a typical propeller. 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].

Heavy Duty (HD): Intended for continuous use in variable load applications where full power is limited to eight (8) hours out of every ten (10) hours of operation. Also, reduced power operations must be at or below 200 rpm of the maximum rated rpm. This is an ISO 15550 fuel stop power rating and is for applications that operate 5,000 hours per year or less.

TECHNICAL DATA DEPT.

[Signature]
 CHIEF ENGINEER

Propulsion Marine Engine Performance Data

Curve No. M-94507
 DS: D56-MX-1
 CPL: 4254
 DATE: 30-May-14

General Engine Data

Engine Model	QSL
Rating Type	Heavy Duty
Rated Engine Power	246 [330]
Rated Engine Speed	1800
Rated Power Production Tolerance	±5%
Rated Engine Torque	1305 [963]
Peak Engine Torque @ 1400 rpm.....	1575 [1162]
Brake Mean Effective Pressure	1847 [268]
Indicated Mean Effective Pressure.....	2116 [307]
Maximum Allowable Engine Speed	1900

Maximum Continuous Torque Capacity from Front of Crank Specifications

Maximum Torque Capacity from Front of Crank ²	705 [520]
Compression Ratio	16.6:1
Piston Speed	8.7 [1713]
Firing Order	1-5-3-6-2-4
Weight (Dry) - Engine With Heat Exchanger System - Average.....	977 [2153]

Governor Settings

Default Droop Value.....	Refer to MAB 2.04.00-03/23/2006 for Droop explanation	0%
High Speed Governor Break Point.....	rpm	1875
Minimum Idle Speed Setting	rpm	600
Normal Idle Speed Variation	±rpm	10
High Idle Speed Range Minimum	rpm	1875
High Idle Speed Range Maximum	rpm	1895

Noise and Vibration

Average Noise Level - Top	(Idle)..	dBa @ 1m	84
	(Rated)	dBa @ 1m	96
Average Noise Level - Right Side	(Idle)..	dBa @ 1m	84
	(Rated)	dBa @ 1m	96
Average Noise Level - Left Side	(Idle)..	dBa @ 1m	84
	(Rated)	dBa @ 1m	96
Average Noise Level - Front	(Idle)..	dBa @ 1m	84
	(Rated)	dBa @ 1m	96

Fuel System¹

Avg. Fuel Consumption - ISO 8178 E3 Standard Test Cycle	l/hr [gal/hr]	43.6 [11.5]
Avg. Fuel Consumption - ISO 8178 E5 Standard Test Cycle	l/hr [gal/hr]	0.0 [0.0]
Fuel Consumption at Rated Speed	l/hr [gal/hr]	63.1 [16.7]
Approximate Fuel Flow to Pump	l/hr [gal/hr]	113.6 [30.0]
Maximum Allowable Fuel Supply to Pump Temperature	°C [°F]	60.0 [140]
Approximate Fuel Flow Return to Tank	l/hr [gal/hr]	50.4 [13.3]
Approximate Fuel Return to Tank Temperature	°C [°F]	61.7 [143]
Maximum Heat Rejection to Drain Fuel	kW [Btu/min]	0.5 [29]
Fuel Pressure - Pump Out/Rail . Mechanical Gauge	kPa [psi]	1151 [167]

TBD= To Be Determined

N/A = Not Applicable

N.A. = Not Available

- ¹ Unless otherwise specified, all data is at rated power conditions and can vary ± 5%.
- ² No rear loads can be applied when the FPTO is fully loaded. Max PTO torque is contingent on torsional analysis results for the specific drive system. 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.

CUMMINS INC.
 COLUMBUS, INDIANA

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Propulsion Marine Engine Performance Data

Curve No. M-94507
 DS: D56-MX-1
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Air System¹

Intake Manifold Pressure	kPa [in Hg]	168 [50]
Intake Air Flow	l/sec [cfm]	299 [634]
Heat Rejection to Ambient	kW [Btu/min]	19 [1081.2325]

Exhaust System¹

Exhaust Gas Flow	l/sec [cfm]	670 [1,420]
Exhaust Gas Temperature (Turbine Out)	°C [°F]	433 [810]
Exhaust Gas Temperature (Manifold)	°C [°F]	607 [1,123]

Emissions (in accordance with ISO 8178 Cycle E3)

NOx (Oxides of Nitrogen)	g/kw-hr [g/hp-hr]	5.03 [3.75]
HC (Hydrocarbons)	g/kw-hr [g/hp-hr]	0.20 [0.15]
CO (Carbon Monoxide)	g/kw-hr [g/hp-hr]	0.97 [0.72]
PM (Particulate Matter)	g/kw-hr [g/hp-hr]	0.04 [0.03]
CO ₂ (Carbon dioxide)	g/kw-hr [g/hp-hr]	683.00 [509.31]

Cooling System¹

Sea Water Pump Specifications	MAB 0.08.17-07/16/2001	
Pressure Cap Rating	kPa [psi]	103 [15]
Max. Coolant Outlet Pressure from the Engine.....	kPa [psi]	414 [60]
Max. Pressure Drop Across Any External Cooling System Circuit	kPa [psi]	34 [5]

Engines without Low Temperature Aftercooling (LTA)

Sea Water Aftercooled Engine (SWAC)

Coolant Flow to Engine Heat Exchanger	l/min [gal/min]	N/A [N.A.]
Standard Thermostat Operating Range (Start to Open)	°C [°F]	71 [160]
Standard Thermostat Operating Range (Full Open)	°C [°F]	82 [180]
Heat Rejection to Engine Coolant ³	kW [Btu/min]	N/A [N.A.]

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