



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

Basic Engine Model:
QSK60-D(M)

Curve Number:
FR-6440a

Engine Configuration:
D593005MX03

CPL Code:
8456

Date:
17-Oct-12

Displacement: **60 liter [3673 in³]**
 Bore: **159 mm [6.25 in]**
 Stroke: **190 mm [7.48 in]**
 Cylinders: **16**
 Fuel System: **Direct Injection Cummins HPI-PT**

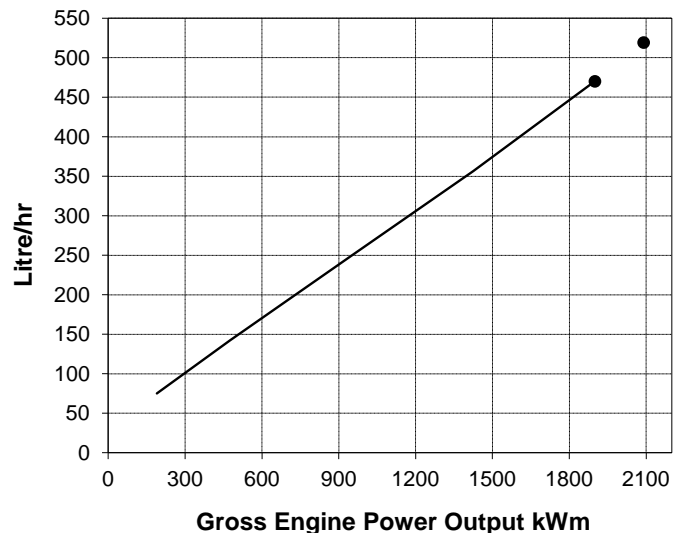
Advertised Power: **kW [hp] @ rpm**
1900[2547]@1800
 Aspiration: **Turbocharged/Low Temperature Aftercooled**
 Exhaust Type: **Dry**

CERTIFIED: This marine diesel engine complies with or is certified to the:
 IMO Tier I (One) NOx requirements of International Maritime Organization (IMO), MARPOL 73/78 Annex VI, Regulation 13

Engine Speed	Overload Capacity		Prime Power		Continuous Power	
	kWm	BHP	kWm	BHP	kWm	BHP
RPM						
1800	2090	2802	1900	2547	N/A	N/A

Engine Performance Data @ 1800 rpm

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	BHP	kg/kWh	Lb/ BHP h	Liter/ hour	U.S. Gal/ hour
10% OVERLOAD CAPACITY						
110%	2090	2802	0.211	0.343	519.2	137.2
PRIME POWER						
100%	1900	2547	0.210	0.341	470.1	124.2
75%	1425	1910	0.213	0.345	356.5	94.2
50%	950	1274	0.223	0.363	249.7	66.0
25%	475	637	0.255	0.414	142.5	37.6
10%	190	255	0.335	0.544	75.0	19.8
CONTINUOUS POWER						
80%		N/A				



Rating Conditions: Ratings are in accordance with ISO 15550 and ISO 8528-5 reference conditions; air pressure at 100 kPa (29.61 in Hg), air temperature 25°C (77°F), and 30% relative humidity. The fuel consumption data is based on No. 2 diesel fuel weight at 0.85 kg/liter (7.001 lb/U.S. gal).

Power output curves are based on the engine operating with fuel system, water pump, and lubricating oil pump; not included are battery charging alternator, fan, optional equipment, and driven components.

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.

Unless otherwise specified, tolerance on all values is +/-5%.

Prime Power Rating is applicable for supplying continual electrical power at varied load. The following are the Prime Rating parameters:

- * Prime Power is available for an unlimited number of hours per year in a variable load application. Variable load should not exceed a 70% average of the Prime Power rating during any operating period of 250 hours.
- * The total operating time at 100% Prime Power shall not exceed 500 hours per year.
- * There is a 10% overload capability for a period of 1 hour within a 12 hour period of operation. Total operating time at 10% overload shall not exceed 25 hours per year.

TECHNICAL DATA DEPT.

Scott T. Holt
 CHIEF ENGINEER

Auxiliary Marine Engine Performance Data

Curve No. **FR-6440a**
DS : **3003**
CPL : **8456**
DATE: **17-Oct-12**

General Engine Data

Engine Model	QSK60-D(M)			
Rating Type	Prime Power		Overload	
Rated Engine Power	1900	[2547]	2090	[2802]
Governed Engine Speed	1800			
Rated HP Production Tolerance				0/6
Rated Engine Torque	10076	[7432]	11084	[8176]
Low Idle Speed Range Minimum	700			
Maximum	900			
Maximum Torque Capacity from Front of Crank ²	[N.A.]			
Brake Mean Effective Pressure	2104	[305]	2314	[336]
Compression Ratio	14.5:1			
Piston Speed	11	[2244]		
Firing Order	1R-1L-3R-3L-2R-2L-5R-4L-8R-8L-6R-6L-7R-7L-4R-5L			
Motoring Power	207	[277]		
Steady State Stability Band at Constant Load	0.3			
Weight Dry - Engine Only	8255	[18200]		

Noise and Vibration

Average Noise Level - Top	(Idle)	dBa @ 1m	N.A.
	(Rated)	dBa @ 1m	107
Average Noise Level - Right Side	(Idle)	dBa @ 1m	N.A.
	(Rated)	dBa @ 1m	107
Average Noise Level - Left Side	(Idle)	dBa @ 1m	N.A.
	(Rated)	dBa @ 1m	106

Fuel System¹

Approximate Fuel Flow to Pump	1699.6	[449.0]	1699.6	[449.0]
Maximum Allowable Fuel Supply to Pump Temperature	71	[160]	71	[160]
Approximate Fuel Flow Return to Tank	1229.6	[324.8]	1180.5	[311.8]
Approximate Fuel Return to Tank Temperature	71	[160]	71	[160]
Maximum Heat Rejection to Drain Fuel	21	[1200]	21	[1200]
Fuel Rail Pressure	985	[143]	1120	[162]
Average Fuel Consumption- Emissions ISO 8178 D2 Test Cycle.....	237.7	[62.8]		

Air System¹

Intake Manifold Pressure	276	[81.5]	292	[86.1]
Intake Air Flow	2765	[5859]	2938	[6226]
Heat Rejection to Ambient	108	[6132]	119	[6746]

Exhaust System¹

Exhaust Gas Flow	5992	[12697]	6371	[13499]
Exhaust Gas Temperature (Turbine Out)	425	[797]	440	[824]
Exhaust Gas Temperature (Manifold)	580	[1076]	620	[1148]
Heat Rejection to Exhaust	1466	[83423]	1565	[89058]

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

All Data is Subject to Change Without Notice - Consult the following Cummins Website for most recent data:

<http://marine.cummins.com>

Auxiliary Marine Engine Performance Data

Curve No.	FR-6440a
DS :	3003
CPL :	8456
DATE:	17-Oct-12

Emissions (in accordance with ISO 8178 Cycle D2)

NOx (Oxides of Nitrogen)	g/kw-hr [g/bhp-hr]	7.824	[5.834]	
HC (Hydrocarbons)	g/kw-hr [g/bhp-hr]	0.268	[0.200]	
CO (Carbon Monoxide)	g/kw-hr [g/bhp-hr]	0.385	[0.287]	
PM (Particulate Matter)	g/kw-hr [g/bhp-hr]	N.A.		

Emissions (in accordance with ISO 8178 Cycle E2)

NOx (Oxides of Nitrogen)	g/kw-hr [g/bhp-hr]	8.385	[6.253]	
HC (Hydrocarbons)	g/kw-hr [g/bhp-hr]	0.180	[0.134]	
CO (Carbon Monoxide)	g/kw-hr [g/bhp-hr]	0.291	[0.217]	
PM (Particulate Matter)	g/kw-hr [g/bhp-hr]	N.A.		

Cooling System¹

Sea Water Pump Specifications	MAB 0.08.17-07/16/2001			
Pressure Cap Rating (With Heat Exchanger Option)	kPa [psi]	103	[15]	

Two Loop Low Temperature Aftercooling (LTA)

Main Engine Circuit

Coolant Flow to Main Cooler (with open thermostat).....	l/min [gal/min]	946	[250]	
Standard Thermostat Operating Range	Start to open.....	82	[180]	
	Full open.....	95	[202]	
Heat Rejection to Engine Coolant ³	kW [Btu/min]	586	[33377]	645 [36714]

Aftercooler (LTA) Circuit

Coolant Flow to LTA Cooler (with open thermostat).....	l/min [gal/min]	511	[135]	
LTA Thermostat Operating Range	Start to open.....	46	[115]	
	Full open.....	57	[135]	
Heat Rejection to Engine Coolant ³	kW [Btu/min]	496	[28243]	546 [31067]
Maximum Coolant Inlet Temperature from LTA Cooler				
For Keel Cooled.....	°C [°F]	49	[120]	
For Radiator @ 35° C [95° F] Ambient Air.....	°C [°F]	49	[120]	
For Radiator @ 50° C [122° F] Ambient Air.....	°C [°F]	68	[155]	

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

All Data is Subject to Change Without Notice - Consult the following Cummins Website for most recent data:

<http://marine.cummins.com>