

CHONGQING CUMMINS ENGINE PERFORMANCE CURVE

| Engine Model | Curve No. | |
|---------------|-----------|-----------|
| KTA38-D(M) | D(M)-656 | |
| Configuration | CPL Code | Date |
| D233037MX02 | 0852 | 11-Dec-08 |

Displacement: 38L [2300 in.³] kW [HP] @ r/min Bore: 159mm [6.25 in.] Prime Power: 768 [1030] @1800

Stroke: 159mm [6.25 in.]

Fuel System: PT Aspiration: Turbocharged/Aftercooled

Cylinders: 12 Exhaust: Wet

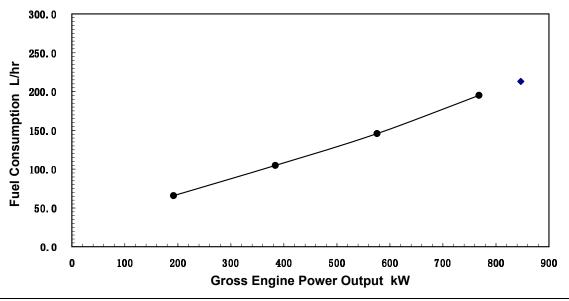
CERTIFIED: This marine diesel engine complies with or is certified to the:

IMO-NOx requirements of the International Maritime Organization (IMO), MARPOL 73/78 Annex VI, Regulation 13

| Engine Speed | Overload Capacity | | Prime Power | |
|--------------|-------------------|------|-------------|------|
| r/min | kW | bhp | kW | bhp |
| 1800 | 847 | 1135 | 768 | 1030 |

Engine Performance Data @ 1800 r/min

| Engine i enemanee Bata & 1000 i/iiiii | | | | | | |
|---------------------------------------|-------------|------|------------------|----------|-------|--------|
| OUTPUT POWER | | | FUEL CONSUMPTION | | | |
| % | kW | bhp | kg/kW.h | lb/bhp.h | l/hr | gal/hr |
| 10% Overload Capacity | | | | | | |
| 110 | 847 | 1135 | 0.214 | 0.350 | 213.0 | 56.0 |
| Prime Pov | Prime Power | | | | | |
| 100 | 768 | 1030 | 0.216 | 0.355 | 195.0 | 51.5 |
| 75 | 576 | 773 | 0.215 | 0.354 | 145.7 | 38.5 |
| 50 | 384 | 515 | 0.232 | 0.382 | 104.8 | 27.7 |
| 25 | 192 | 258 | 0.291 | 0.479 | 65.7 | 17.4 |



Rating Conditions: Ratings are in accordance with ISO-3046 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 GB252 No.0 diesel fuel (No. 2 diesel fuel in U.S.) weight at 0.85 kg/litre (7.1 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.

Operation at Elevated Temperatures for sustained operation above 40°C (104°F), derate 2% per 11°C (1% per 10° **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.



Chongqing Cummins Engine Co. Ltd.

Auxiliary Marine Engine Performance Data

Curve No.:

DS:

D(M)-656

DS-4983

| | DS: CPL: | DS-4983 |
|---|---------------|-------------------|
| | DATE: | 0852 11-Dec-08 |
| General Engine Data ¹ | DAIL. | 11-Dec-00 |
| Engine Model | KTA3 | 8-D(M) |
| Rating Type | | Overload |
| Rated Engine Power | | 1135 [847] |
| Governed Engine Speedrpm | | 1800 |
| Rated HP Production Tolerance | | .000 |
| Rated Engine Torque | | 3313 [4493] |
| Idle Speed Range rpm | | |
| Brake Mean Effective Pressurepsi [kPa] | | 215 [1486] |
| Compression Ratio | | |
| Piston Speed | | |
| Friction Powerhp [kW] | 170 [127] | |
| | | |
| Fuel System ¹ | | |
| Fuel Consumptiongal/hr [l/hr] | | 56 [213] |
| Approximate Fuel Flow to Pumpgal/hr [l/hr] | | 85 [322] |
| Maximum Allowable Fuel Supply to Pump Temperature°F [°C] | | 140 [60] |
| Approximate Fuel Flow Return to Tank gal/hi | | 29 [108] |
| Fuel Rail Pressurepsi [kPa] | 76 [524] | 86 [593] |
| Weight ¹ | | |
| Dry - Engine Onlylb. [kg] | 8714 [3956] | |
| Dry - Engine With Heatexchangerlb. [kg] | | |
| Installation Diagram No | | |
| Hookup Diagram & Drawing, electrical circuit No | | 4061350 |
| | | |
| Air System ¹ | | |
| Intake Manifold Pressurein. Hg [kPa] | | N.A. |
| Intake Air Flowcfm [I/sce] | | 2298 [1085] |
| Heat Rejection to AmbientBTU/min [kW] | 5578 [98] | 6090 [107] |
| Exhaust System ¹ | | |
| Exhaust Gas Flow | 5664 [2674] | 5958 [2813] |
| Exhaust Gas Temperature (Turbine Out)°F [°C] | | 885 [474] |
| Heat Rejection to Exhaust | | 30395 [534] |
| | | |
| Cooling System ¹ | | |
| Coolant Flow to Engine Heat Exchanger/Keel Cooler | | |
| Jacket Water Aftercooled Engines (JWAC) | | |
| Coolant Flow to Main Cooler (with open thermostat)l/min [gal/min] | | |
| Standard Thermostat Operating Range (Min) | | |
| Standard Thermostat Operating Range (Max)°F [°C] | | |
| Heat Rejection to Engine Coolant ³ BTU/min [kW] | 33981 [597] | 37453 [658] |
| Heat Rejection to LTA Coolant ³ | N.A. | |
| Sea Water Flow @ 10 psi Pump Discharge Pressure | | |
| Pressure Cap Rating (With Heat Exchanger Option)psi [kPa] | 7 [50] | |

TBD = To Be Determined

N/A = Not Applicable

N.A. = Not Avaliable

- 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).

CHONGQING CUMMINS ENGINE CO. LTD.

CHONGQING, P.R.CHINA, 400031

All Data is Subject to Change Without Notice - contact CCEC for most recent data .