# CHONGQING CUMMINS ENGINE COMPANY LTD.
# ENGINE PERFORMANCE CURVE

| CONFIGURATION: D233020DX02 | ENGINE MODEL: KTA38-G9A | CURVE NUMBER: FR769 | CPL No.: 636 |
|---|---|---|---|
| | | | DATE: 2022/10/27 |

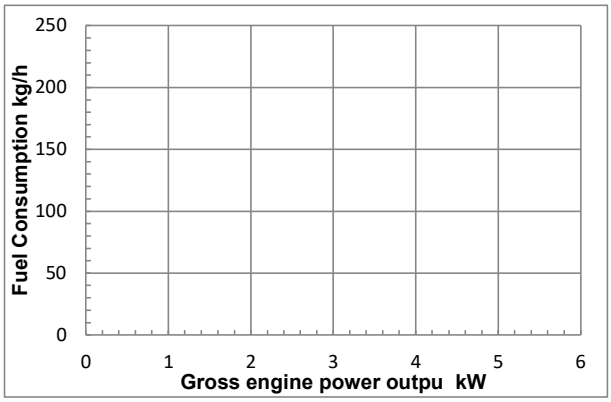
| | | | | | |
|---|---|---|---|---|---|
| Displacemen: | 38 L | (2300in.$^3$) | Aspiration: | Turbocharged , Aftercooled | Rating |
| BoreXStroke: | 159X159mm | (6.25X6.25 in.) | Fuel System: | Cummins PT | Stand by: 1210 kW(1621 HP)@1500 RPM |
| Compress Ratio: | 14.7:1 | | No. of Cylinder: | 12 | Prime: 1100 kW(1474 HP)@1500 RPM |

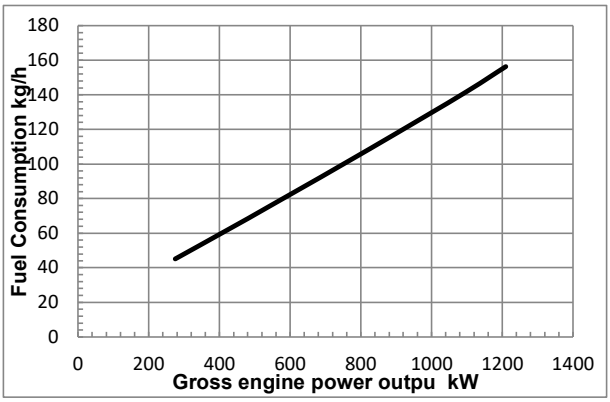
All data is based on the engine operating with fuel system, water pump, and 20 in. $H_2O$(4.98kPa) inlet air restriction with 5.8 in.(147mm) inner diameter, and with 2 in. Hg(7kPa) exhaust restriction with 8 in.(203mm) inner diameter; not included are alternator,fan, optional equipment and driven components. Coolant flows and heat rejection data based on coolant as 50% ethylene glycol/50% water. All data is subject to change without notice.

## GROSS ENGINE POWER OUTPUT

| SPEED rpm | STANDBY POWER | | PRIME POWER | | CONTINUOUS POWER | |
|---|---|---|---|---|---|---|
| | BHP | kW | BHP | kW | BHP | kW |
| 1800 | - | - | - | - | - | - |
| 1500 | 1621 | 1210 | 1474 | 1100 | 1180 | 880 |

## FUEL CONSUMPTION




| OUTPUT POWER | | | CONSUMPTION | | BFSC | |
|---|---|---|---|---|---|---|
| % | BHP | kW | Lb/h | kg/h | g/kW.h | Lb/BHP.h |
| | | | **1800RPM** | | | |
| **STNADBY** | | | | | | |
| 100 | - | - | - | - | - | - |
| **PRIME** | | | | | | |
| 100 | - | - | - | - | - | - |
| 75 | - | - | - | - | - | - |
| 50 | - | - | - | - | - | - |
| 25 | - | - | - | - | - | - |
| | | | **1500RPM** | | | |
| **STANDBY** | | | | | | |
| 100 | 1621 | 1210 | 527 | 239 | 198 | 0.325 |
| **PRIME** | | | | | | |
| 100 | 1474 | 1100 | 478 | 217 | 197 | 0.325 |
| 75 | 1106 | 825 | 359 | 163 | 198 | 0.325 |
| 50 | 737 | 550 | 240 | 109 | 198 | 0.326 |
| 25 | 369 | 275 | 119 | 54 | 196 | 0.323 |
| **CONTINUOUS** | | | | | | |
| 100 | 1180 | 880 | 389 | 176 | 200 | 0.330 |

Curves shown above represent gross engine performance capabilites obtained and corrected in accordance with SAE J1995 conditions of 29.61 in. Hg(100kPa) barometric pressure [300ft.(91m) altitude] 77deg F (25 deg C) inlet temperature, and 0.30 in. Hg(1kPa) water vapor pressure with No. 2 diesel fuel or a fuel corresponding to ASTM D2.

**TECHNICAL DATA DEPT.** **CERTIFIED WITHIN 5%** **CHIEF ENGINEER**

# POWER RATING APPLICATION GUIDELINES FOR GENERATOR DRIVE ENGINES

These guidelines have been foumulated to ensure proper application of generator drive engines in A.C. generator set installations. Generator drive engines are not designed for and shall not be used in variable speed D.C. generator set appliacations.

**STANDBY POWER RATING is appliable for supplying emergency power for the duration of the utility power outage. No overload capability is available for this rating. Under no condition is an engine allowed to operate in parallel with the public utility at the standby Power rating.**

This rating should be applied where reliable utility power is available. A standby rated engine should be sized for a maximum of an 80% average load factor and 200 hours of operation per year. This includes less than 25 hours per year at the Standby Power rating. Standby ratings should never be applied except in true emergency power outages. Negotiated power outages contracted with a utility company are not considered an emergency.

**CONTINUOUS POWER RATING**

Applicable for supplying utility power at a constant 100% load for an unlimited number of hours per year. No overload capability is available for this rating.

**PRIME POWER RATING is applicable for supplying electric power in lieu of commercially purchased power. Prime Power applications must be in the form of one of the following two categories:**

**UNLIMITED TIME RUNNING PRIME POWER**

Prime Power is available for an unli- mited number of hours per year in a variable load application. Variable load shouled not exceed a 70% average of period of 250 hours.

The total operating time at 100% Prime Power shall not exceed 500 hours per year.

A 10% overload capablility is available for aperiod of 1 hour within a 12 hour period of operation. Total operating time at the 10% overload power shall not exceed 25 hours per year.

**LIMITED TIME RUNNING PRIME POWER**

Prime Power is available for a limited number of hours in a non-variable load application. It is intended for use in situations where power outages are contracted, such as in utility power curtailment. Engines may be operated in parallel to the public utility up to 750 hours per year at power levels never to exceed the Prime Power rating. The customer should be aware, however, theat the life of any engine will be reduced by this constant high load operation. Any operation exceeding 750 hours per year at Prime Power rating should use the Continuous Power rating.

**Reference Standards:**

BS-5514 and DIN-6271 standards are based on ISO-3046.

**Operation At Elevated Temperatrue And Altitude:**

The engine may be operated at:

1500RPM up to 1640 ft.(500m) and 104°F (40°C) without power deration.

For sustained operation above these conditions, derate by 4% per 1,000ft. (300m), and 1% per 10°F (2% per 11°C).

# CHONGQING CUMMINS ENGINE COMPANY LTD.
# ENGINE DATA SHEET

**ENGINE MODEL: KTA38-G9A**
**STAND_BY: 1210 kW(1621 HP)@1500 RPM**
**PRIME: 1100 kW(1474 HP)@1500 RPM**
**CONFIGURATION: D233033DX02**

**REFERENCE INFORMATION:**
**CPL NUMBER ..... 636**
**PERFORMANCE CURVE NUMBER..... FR769**
**DATE..... 2022/10/27**

## GENERAL ENGINE DATA

| | | |
|---|---|---|
| Type | 4 Cycle,60° Vee , 12 Cylinder | |
| Aspiration | Turbocharged , Aftercooled | |
| Bore—in.(mm)×stroke—in.(mm) | 6.25×6.25 | (159×159) |
| Displacement—$in^3$(L) | 2300 | (38) |
| Compression Ratio | 14.7:1 | |
| Dry Weight | | |
| Fan Hub to Flywheel Engine —lb(kg) | 8200 | (3719) |
| Wet Weight | | |
| Fan Hub to Flywheel Engine —lb(kg) | 8700 | (3946) |
| Moment of Inertia of Rotating Components (Excluding Flywheel) —$lb_m.ft^2(kg•m^2)$ | 94 | (3.96) |
| ·With FW 6001 Flywheel —$lbm.f^2(tkg•m^2)$ | 248 | (10.45) |
| ·With FW 6011 Flywheel —$lbm.f^2(tkg•m^2)$ | 493 | (20.78) |
| C.G. Distance From Rear Face of Flywheel Housing (FH6024))—in(mm) | 38.6 | (980) |
| C.G. Distance Above Crank Centerline—in(mm) | 11 | (279) |
| Maximum Allowable Static Load for Back-end Main Bearing —lb(kg) | 2000 | (907) |
| Firing Order | 1R-6L-5R-2L-3R-4L-6R-1L-2R-5L-4R-3L | |

## ENGINE MOUNTING

| | | |
|---|---|---|
| Maximum Allowable Bending Moment at Rear Face of Block —lb.ft(N•m) | 3000 | (4067) |

## EXHAUST SYSTEM

| | | |
|---|---|---|
| Maximum Allowable Back Pressure —in.Hg(kPa) | 3 | (10) |

## AIR INDUCTION SYSTEM

| | | |
|---|---|---|
| Maximum Allowable Intake Air Restriction With Heavy Duty Air Cleaner | | |
| Dirty Element —in.$H_2O$(kPa) | 25 | (6.23) |
| Clean Element —in.$H_2O$(kPa) | 15 | (3.73) |

## COOLING SYSTEM

| | | |
|---|---|---|
| Coolant Capacity | | |
| Engine Only —U.S.Gal(L) | 32.7 | (123.8) |
| Minimum Allowable Pressure Cap @ sea level— PSI(kPa) | 10 | (69) |
| Maximum Coolant Friction Heat External to Engine —PSI(kPa) | 5 | (34.5) |
| Maximum Allowable Top Tank Temperature (Stand_by/Prime) —°F(℃) | 220/212 | (104/100) |
| Standard Thermostat (modulating) Range— °F(℃) | 180-200 | (82-93) |
| Maximum Coolant Pressure (Exclusive of Pressure Cap) —PSI(kPa) | 15 | (103) |
| Minimum Coolant Makeup Capacity —U.S.Gal(L) | 6.3 | (23.8) |
| Minimum Allowable Fill Rate —U.S.GPM(L/min) | 5 | (18.9) |
| Minimum Allowable Coolant Expansion Space —% of System Capacity | 5 | |
| Maximum Allowable Deaeration Time —min | 25 | |

## LUBRICATION SYSTEM

| | | |
|---|---|---|
| Oil Pressure | | |
| @ Low idle speed —PSI(kPa) | 20 | (138) |
| @ Rated Speed —PSI(kPa) | 45-65 | (310-448) |
| Oil Flow at Rated Speed —U.S.GPM(L/min) | 124 | (469) |
| Maximum Allowable Oil Temperature —°F(℃) | 250 | (121) |
| By-Pass Filter Capacity | | |
| Spin-on Cartridge Type —U.S.Gal(L) | 2 X 0.7 | (2 X 2.6) |

# CHONGQING CUMMINS ENGINE COMPANY LTD.
# ENGINE DATA SHEET

| | | |
|---|---|---|
| Oil Pan Capacity (Option OP6024) | | |
| High —U.S.Gal(L) | 40.0 | (151) |
| Low —U.S.Gal(L) | 32.0 | (121) |
| Total System Capacity (Excluding By-Pass Filter) —U.S.Gal(L) | 45.7 | (173) |
| Angularty of Standard Oil Pan ( Option OP6024) | | |
| Front Down | 30° | |
| Front Up | 30° | |

**FUEL SYSTEM**

| | | |
|---|---|---|
| Fuel Injection System | Cummins PT | |
| Maximum allowable Restriction to PT Fuel Pump | | |
| With Clean Fuel Filter —in.Hg(kPa) | 4 | (13.5) |
| With Dirty Fuel Filter —in.Hg(kPa) | 8 | (27.1) |
| Maximum Allowable Injector Return Line Restriction | | |
| With Check Valves —in.Hg(kPa) | 6.5 | (22.0) |
| Less Check Valves —in.Hg(kPa) | 2.5 | (8.5) |
| Minimum Allowable Fuel Tank Vent Capability —$ft^3/h$（L/h） (With 2.5 in. Hg (8.4 kPa) or Less Back Pressure) | 15 | (425) |

**ELECTRICAL SYSTEM AND START SYSTEM**

| | |
|---|---|
| Starter (Heavy, Anode)—Volt | 24 |
| Battary Recharge System,Negative ground—A | 35 |
| Maximum Allowable Resistance of Starting Circuit—Ω | 0.002 |
| Minimum Recommended Battary Capacity | |
| ·Cold Soak at 50°F(10℃) or Above—0°F CCA | 1200 |
| ·Cold Soak at 32~50°F(0~10℃) or Above—0°F CCA | 1280 |
| ·Cold Soak at 0~32°F(-18~0℃) or Above—0°F CCA | 1800 |

**PERFORMANCE DATA**

All data is based on the engine operating with fuel system, water pump, lubricating oil pump, air cleaner, and muffler, not included are altemator, compressor, fan, optional equipment and driven components. Data represents gross engine performance capabilities obtained and corrected in accordance with SAE J1349 conditions fo 29.61 in Hg(100 kPa) barometric pressure[300ft. (90 m) altitude], 77°F (25°C) inlet air temperature, and 0.30 in. Hg (1kPa) water vapor pressure with No. 2 diesel fuel or a fuel corresponding to ASTM D2. All data is subject to change without notice.

| | STAND_BY | | PRIME | |
|---|---|---|---|---|
| | 60 Hz | 50 Hz | 60 Hz | 50 Hz |
| Engine Speed r/min | | 1500 | | 1500 |
| Idle Speed r/min | | 650-750 | | 650-750 |
| Gross Power Output BHP(kW) | | 1621 (1210) | | 1474 (1100) |
| Brake Mean Effective Pressure PSI(kPa) | | 369 (2546) | | 336 (2316) |
| Piston Speed ft/min(m/s) | | 1565 (7.95) | | 1565 (7.95) |
| Friction Horsepower BHP(kW) | N/A | 115 (86) | N/A | 115 (86) |
| Intake Air FlowCFM( L/s) | | 3204 (1512) | | 3036 (1433) |
| Exhaust Gas Flow CFM( L/s) | | 8134 (3839) | | 7605 (3589) |
| Exhaust Gas Temperature °F(℃) | | 850 (454) | | 807 (430) |
| Heat Rejection to Ambient BTU/min(kW) | | 9156 (161) | | 8303 (146) |
| Heat Rejection to Coolant BTU/min(kW) | | 38386 (675) | | 34860 (613) |
| Engine Water Flow L/s(U.S.GPM) @ 4psi | | 238 (15) | | 269 (17) |
| Heat Rejection to Exhaust BTU/min(kW) | | 54821 (964) | | 49589 (872) |
| Heat Rejection to LTA BTU/min(kW) | | 15411 (271) | | 15582 (274) |

Engine Model: KTA38-G9A
Data Sheet: FR769
Date: 2022/10/27

**CHONGQING CUMMINS ENGINE CO., LTD.** CHONGQING, CHINA, 400031