# Dongfeng Cummins

# Techical Operations

ENGINE MODEL： 4B3.9-G12

CURVE & DATASHEET： FR96598

REV 00 15MAY2018

| Generator Engine Performance Data<br>DONGFENG CUMMINS ENGINE Co.,LTD<br>Xiangfan, Hubei Province, China<br>http://www.dcec.com.cn | Basic Engine Model:<br>**4B3.9-G12**<br>**FR96598** | **FR96598 @ 1500 RPM &1800RPM** | | |
|---|---|---|---|---|
| | | **Configuration**<br>**D381004GX02** | **CPL Code**<br>**CPL: 5357** | **Revision**<br>**2018/5/15** |

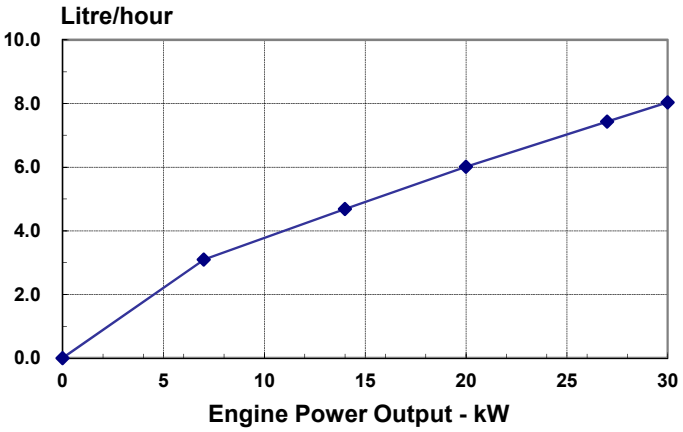
| | | | |
|---|---|---|---|
| Compression Ratio: | **18.0:1** | Aspiration: | **Naturally Aspirated** |
| Bore: | **102 mm** | Displacement: | **3.9 L** |
| Storke: | **120 mm** | No. of Cylinders: | **4** |
| Emission Certification: | | Fuel System: | **WF A/Electronic Governor** |
| Governor Regulation: | **⩽3%** | | |

All data is based on the engine operating with fuel system, water pump, and 14.8 in $H_2O$ (3.7 kPa) inlet air restriction with 5.98 in (152mm) inner diameter, and with 2.95 in Hg (10 kPa) exhaust restriction with 4.02 in (102 mm) inner diameter; not included are alternator, fan, optional equipment and driven components. Coolant flows and heat rejection data based on coolants as 50% ethylene glycol/50% water. All data is subject to change without notice.

| Engine Speed | Standby Power | | Prime Power | | Continuous Power | |
|---|---|---|---|---|---|---|
| RPM | kW | HP | kW | HP | kW | HP |
| 1500 | 30 | 40 | 27 | 36 | TBD | TBD |
| 1800 | 36 | 48 | 33 | 44 | TBD | TBD |

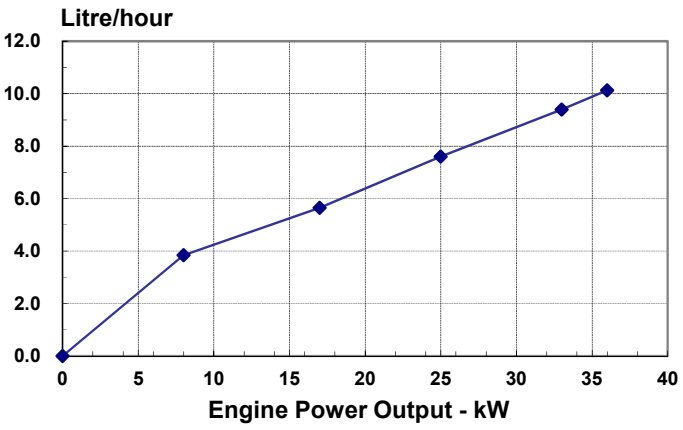
## Engine Performance Data @ 1500 RPM

| OUTPUT POWER | | | FUEL CONSUMPTION | |
|---|---|---|---|---|
| % | kW | HP | g/kW.h | L/h |
| STANDBY POWER | | | | |
| 100 | 30 | 41 | 221 | 8.0 |
| PRIME POWER | | | | |
| 100 | 27 | 37 | 227 | 7.4 |
| 75 | 20 | 28 | 248 | 6.1 |
| 50 | 14 | 18 | 276 | 4.5 |
| 25 | 7 | 9 | 365 | 3.0 |
| CONTINUOUS POWER | | | | |
| TBD | TBD | TBD | TBD | TBD |




## Engine Performance Data @ 1800 RPM

| OUTPUT POWER | | | FUEL CONSUMPTION | |
|---|---|---|---|---|
| % | kW | HP | g/kW.h | L/h |
| STANDBY POWER | | | | |
| 100 | 36 | 49 | 232 | 10.1 |
| PRIME POWER | | | | |
| 100 | 33 | 45 | 235 | 9.4 |
| 75 | 25 | 34 | 251 | 7.5 |
| 50 | 17 | 22 | 274 | 5.5 |
| 25 | 8 | 11 | 396 | 4.0 |
| CONTINUOUS POWER | | | | |
| TBD | TBD | TBD | TBD | TBD |




Curves shown above represent gross engine performance capabilities obtained and corrected in accordance with GB/T18297 conditions of 100kPa (29.61 in. Hg) barometric pressure [80 m (263 ft.) altitude], 25°C (77°F) inlet air temperature, and 1 kPa (0.30 in. Hg) water vapor pressure with No.0 diesel fuel.

# POWER RATING APPLICATION GUIDELINES
# FOR
# GENERATOR DRIVE ENGINES

These guidelines have been formulated 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 applications.

**STANDBY POWER RATING is applicable 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 is 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 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.**

**A 10% overload capability is available for a period 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, that the life of any engine will be reduced by this constant high load operation. Any operation exceeding 750 hours per year at the Prime Power rating should use the Continuous Power rating.**

Above Source From CUMMINS AEB 26.02

## GENERAL ENGINE DATA

| | | |
|---|---|---|
| Approximate Engine Weight (wet) | -kg | 308 |
| Mass Moment of Inertia of Rotating Components (No Flywheel) | -kg·m$^2$ | 0.143 |
| Center of Gravity from Rear Face of Block | -mm | 373 |
| Center of Gravity above Crankshaft Centerline | -mm | 163 |
| Engine Idle Speed | -RPM | 900-1100 |
| Fire Order | | 1-3-4-2 |

## ENGINE MOUNTING

| | | |
|---|---|---|
| Maximum (Static) Bending Moment at Rear Face of Block | -N.m | 1356 |

## EXHAUST SYSTEM

| | | |
|---|---|---|
| Maximum Back Pressure | -kPa | 10 |

## AIR INTAKE SYSTEM

| | | |
|---|---|---|
| Maximum Intake Air Restriction with Heavy Duty Air Cleaner | | |
| — Dirty Element | -kPa | 6.2 |
| — Clean Element | -kPa | 3.7 |

## LUBRICATION SYSTEM

| | | |
|---|---|---|
| Engine Oil Pressure for Engine Protection Devices: | | |
| — Idle Speed(Minimum ) | -kPa | 207 |
| — Governed Speed(Maximum ) | -kPa | 345 |
| Maximum Oil Temperature | -℃ | 121 |
| Minimum Required Lube System Capacity - Sump plus Filters | -litre | 10.9 |

## FUEL SYSTEM

| | | |
|---|---|---|
| Type Injection System | WF A Direct Injection | |
| Maximum Restriction at Lift Pump | -kPa | 13.6 |
| Maximum Fuel Inlet Temperature | -℃ | 70 |
| Total Drain Flow (constant for all loads) | -litre/hr | 30 |

## COOLING SYSTEM

| | | |
|---|---|---|
| Coolant Capacity - Engine Only | -litre | 7.2 |
| Maximum Coolant Friction Head External to Engine -1800 rpm | -kPa | 35 |
| -1500 rpm | -kPa | 28 |
| Maximum Static Head of Coolant Above Engine Crank Centerline | -m | 14 |
| Standard Thermostat (Modulating) Range | -℃ | 83 - 95 |
| Minimum Pressure Cap | -kPa | 69 |
| Maximum Top Tank Temperature for Standby / Prime Power | -℃ | 110 / 104 |

## ELECTRICAL SYSTEM

| | | | |
|---|---|---|---|
| Cranking Motor (Heavy Duty, Positive Engagement)…… | -volt | 12V | 24V |
| Battery Charging System, Negative Ground…… | -ampere | 63 | 40 |
| Maximum Allowable Resistance of Cranking Circuit…… | -ohm | 0.00075 | 0.002 |
| Minimum Recommended Battery Capacity | | | |
| —Cold Soak @ 0 to 32-F (-18 to 0-C)…… | -0°F CCA | 625 | 312 |

Fuel Rating Option used for these Data: FR96598

| | | STANDBY POWER | | PRIME POWER | |
|---|---|---|---|---|---|
| Governed Engine Speed…… | -rpm | 1800 | 1500 | 1800 | 1500 |
| Engine Idle Speed…… | -rpm | 900-1100 | 900-1100 | 900-1100 | 900-1100 |
| Gross Engine Power Output…… | -kW | 36 | 30 | 33 | 27 |
| Piston Speed.....…… | -m/s | 7.2 | 6.0 | 7.2 | 6.0 |
| Friction Horsepower…… | -kW | 8.2 | 8.2 | 8.2 | 8.2 |
| Engine Water Flow to Engine:……..… | -litre/sec. | 2.8 | 2.2 | 2.8 | 2.2 |
| Intake Air Flow…… | -litre/sec. | 43 | 34.5 | 43 | 34.8 |
| Exhaust Gas Flow…… | -litre/sec. | 81.9 | 76.5 | 78.5 | 72.5 |
| Exhaust Gas Temperature……..…… | -℃ | 370 | 420 | 340 | 390 |
| Radiated Heat to Ambient……..…… | -kW | TBD | TBD | TBD | TBD |
| Heat Rejection to Coolant……..…… | -kW | 35 | 29 | 32 | 25.9 |
| Heat Rejection to Fuel…… | -kW | TBD | TBD | TBD | TBD |

ALL DATA CERTIFIED WITHIN 5%

TBD = To Be Decided N/A = Not Applicable N.A. = Not Available

All data is subject to change without notice, sorry for inform.

Dongfeng Cummins Engine Co., Ltd.