- ATTACHMENT D -

Power Generation

# Emission Compliance Statement 85GGHG standby

## 60 Hz Spark Ignited Generator Set

**Compliance Information:**

**The engine used in this generator set complies with U.S. EPA emission regulations under the provisions of 40 CFR Part 60 JJJJ and 1048, Stationary Emergency Spark-Ignited emissions limits when tested per ISO 8178 D2.**

| | |
|---|---|
| Engine Manufacturer: | Cummins Inc |
| EPA Certificate Number: | ECEXB06.8GDB-002 |
| Effective Date: | 09/25/2013 |
| Date Issued: | 09/25/2013 |
| EPA Engine Family: | ECEXB06.8GDB |

**Engine Information:**

| | | | |
|---|---|---|---|
| Model: | WSG-1068 | Bore: | 3.55 in. (90.2 mm) |
| Engine Nameplate HP: | 131.6 | | |
| Type: | 4 Cycle, V-10 Cylinder Spark-Ignited | Stroke: | 4.17 in. (105.9 mm) |
| Aspiration: | Turbocharged | Displacement: | 412.5 cu. in. (6.8 liters) |
| Compression Ratio: | 9.0:1 | | |

Emission Control Device: Electronics Air/Fuel Ratio Control, 3-way Catalyst and Closed-loop Breather System

**U.S. Environmental Protection Agency Stationary Emergency SI Emission Limits**

Natural Gas (Grams per HP-Hour)

| COMPONENT | |
|---|---|
| HC* (Hydrocarbons ) | 1.0 |
| NOx (Oxides of Nitrogen) | 2.0 |
| CO (Carbon Monoxide) | 4.0 |

LP (Grams per kW-Hour)

| COMPONENT | |
|---|---|
| HC* + NOx | 2.7 |
| CO | 4.4 |

Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

*HC (Hydrocarbon) value for LPG fuel is Total Unburned Hydrocarbons, for NG it is Non-Methane Hydrocarbon

Power Generation

# Exhaust Emission Data Sheet
# 85GGHG
## 60 Hz Spark Ignited Generator Set
## EPA Emissions

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| | | | |
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| Emission Control Device: | Electronics Air/Fuel Ratio Control, 3-way Catalyst, and Closed-loop Breather System | | |

| | Natural Gas | Propane |
|---|---|---|
| **PERFORMANCE DATA** | **Standby** | **Standby** |
| Genset Rating (kW) @1800 RPM (60 Hz) | 85 | 85 |
| BHP @ 1800 RPM (60 Hz) | 131.6 | 131.6 |
| Fuel Consumption (SCFH) | 1090.1 | 415.0 |
| Air to Fuel Ratio | 17.1 | 15.5 |
| Exhaust Gas Flow (CFM) | 538 | 531 |
| Exhaust Gas Temperature (°F) | 1063 | 1031 |
| **EXHAUST EMISSION DATA** | | |
| HC (Total Unburned Hydrocarbons)* | 251 | 106 |
| NOx (Oxides of Nitrogen as $NO_2$) | 10 | 22 |
| CO (Carbon Monoxide) | 10 | 22 |
| | | Values are ppmvd |
| HC (Total Unburned Hydrocarbons)* | 0.14 | 0.03 |
| NOx (Oxides of Nitrogen as $NO_2$) | 0.02 | 0.02 |
| CO (Carbon Monoxide) | 0.01 | 0.01 |
| | | Values are Grams per HP-Hour |

*HC includes all NMHC, VOC, POC, and ROC constituents (Non-Methane HC, Volatile Organic Compounds, Precursor Organic Compounds, and Reactive Organic Compounds)

## TEST CONDITIONS

Data was recorded during steady-state rated engine speed (± 25 RPM) with full load (±2%). Pressures, temperatures, and emission rates were stabilized.

| | |
|---|---|
| Fuel Specification: | |
| Natural Gas: | Dry gas as received from Supplier (1000 BTU/SCF). |
| Propane: | Meets the requirements for Commercial Grade Propane under the ASTM D1835 Standard Specification for Liquefied Gases |
| Fuel Temperature | 60 ± 9 °F at Flow Transmitter |
| Fuel Pressure | 14.73PSIA ± 0.5 PSIA at Flow Transmitter |
| Intake Air Temperature: | 77 ± 9 °F at inlet |
| Barometric Pressure: | 29.92 in. Hg ± 1 in. Hg |
| Humidity: | NOx measurement corrected to 75 grains $H_2O$/lb dry air |

The NOx, HC, and CO emission data tabulated here were from a single engine under the test conditions shown above. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limit, or with improper maintenance, may results in elevated emission levels.

Generator set data sheet

# EPA Emissions

**Model:** GGHG
**KW rating:** 85 natural gas standby
85 propane standby
**Frequency:** 60
**Fuel type:** Natural gas/propane

| | |
|---|---|
| **Exhaust emission data sheet:** | **EDS-326** |
| **Exhaust emission compliance sheet:** | |
| **Sound performance data sheet:** | **MSP-184** |
| **Cooling performance data sheet:** | |
| **Prototype test summary data sheet:** | **PTS-147** |
| **Standard set-mounted radiator cooling outline:** | **0500-3485** |

## Fuel consumption

| | Natural gas | | | | | | | | Propane | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Standby kW (kVA) | | | | Prime kW (kVA) | | | | Standby kW (kVA) | | | | Prime kW (kVA) | | | |
| **Ratings** | 85 (106) | | | | | | | | 85 (106) | | | | | | | |
| **Load** | **1/4** | **1/2** | **3/4** | **Full** | **1/4** | **1/2** | **3/4** | **Full** | **1/4** | **1/2** | **3/4** | **Full** | **1/4** | **1/2** | **3/4** | **Full** |
| **scfh** | 294 | 491 | 710 | 945 | | | | | 129 | 216 | 310 | 407 | | | | |
| **$m^3/hr$** | 8.3 | 13.9 | 20.1 | 26.8 | | | | | 3.7 | 6.1 | 8.8 | 11.5 | | | | |

## Engine

| | Natural gas | | Propane | |
|---|---|---|---|---|
| | **Standby rating** | **Prime rating** | **Standby rating** | **Prime rating** |
| Engine model | WSG-1068 | | | |
| Configuration | Cast iron, V 10 cylinder | | | |
| Aspiration | Turbocharged | | | |
| Gross engine power output, kWm (bhp) | 131.3 (176.0) | | 122.3 (164.0) | |
| BMEP at rated load, kPa (psi) | 1012.2 (146.8) | | 1012.2 (146.8) | |
| Bore, mm (in) | 90.2 (3.55) | | 90.2 (3.55) | |
| Stroke, mm (in) | 105.9 (4.17) | | 105.9 (4.17) | |
| Rated speed, rpm | 1800 | | 1800 | |
| Piston speed, m/s (ft/min) | 6.4 (1250.0) | | 6.4 (1250.0) | |
| Compression ratio | 9.0:1 | | 9.0:1 | |
| Lube oil capacity, L (qt) | 6.1 (6.5) | | 6.1 (6.5) | |
| Overspeed limit, rpm | 2400 ± 50 | | 2400 ± 50 | |
| Regenerative power, kW | 16.00 | | 16.00 | |

## Fuel flow

| | | | | |
|---|---|---|---|---|
| Minimum operating pressure, kPa (in H2O) | 1.7 (7.0) | | 1.7 (7.0) | |
| Maximum operating pressure, kPa (in H2O) | 3.4 (13.6) | | 3.4 (13.6) | |

| Air | Natural gas | | Propane | |
|---|---|---|---|---|
| | **Standby rating** | **Prime rating** | **Standby rating** | **Prime rating** |
| Combustion air, $m^3$/min (scfm) | 5.6 (197.0) | | 5.0 (175.0) | |
| Maximum air cleaner restriction, kPa (in $H_2O$) | 1.2 (5.0) | | 1.2 (5.0) | |
| Alternator cooling air, $m^3$/min (scfm) | 37.0 (1308.0) | | 37.0 (1308.0) | |

## Exhaust

| | | | | |
|---|---|---|---|---|
| Exhaust flow at rated load, $m^3$/min (cfm) | 17.3 (611.0) | | 15.4 (545.0) | |
| Exhaust temperature, °C (°F) | 573 (1063) | | 555 (1031) | |
| Maximum back pressure, kPa (in $H_2O$) | 6.2 (25.0) | | 6.2 (25.0) | |
| Available back pressure for additional sound attenuation and piping, kPa (in $H_2O$) | 2.5 (10.0) | | 2.5 (10.0) | |

## Standard set-mounted radiator cooling

| | | | | |
|---|---|---|---|---|
| Ambient design, °C (°F) | 40 (104) | | 40 (104) | |
| Fan load, kW (HP) | 7.3 (9.8) | | 7.3 (9.8) | |
| Coolant capacity (with radiator), L (US gal) | 33.1 (8.8) | | 33.0 (8.8) | |
| Coolant system air flow, $m^3$/min (scfm) | 193.1 (6825.0) | | 193.1 (6825.0) | |
| Total heat rejection, MJ/min (Btu/min) | 8.1 (7635.0) | | 8.1 (7635.0) | |
| Maximum cooling air flow static restriction, kPa (in $H_2O$) | 0.124 (0.5) | | 0.124 (0.5) | |

## Weights[2]

| | |
|---|---|
| Unit dry weight kgs (lbs) | 1071 (2362) |
| Unit wet weight kgs (lbs) | 1111 (2450) |

**Notes:**

[1] For non-standard remote installations contact your local Cummins Power Generation representative.

[2] Weights represent a set with standard features. See outline drawing for weights of other configurations.