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AIR REGULATION

October 5, 2010

Mr. Jeff Koerner, P.E.  
Administrator  
Bureau of Air Regulation – New Source Review  
2600 Blair Stone Road MS 5500  
Tallahassee, Florida 32399-2400

Subject: Solid Waste Authority of Palm Beach County  
North County Resource Recovery Facility (NCRRF)  
Air Construction Permit No. 0990234-012-AC  
New Operations and Maintenance Building Emergency Generator Unit

Dear Mr. Koerner:

The Solid Waste Authority of Palm Beach County (SWA) is nearing completion of the construction of the new landfill operations and maintenance (O&M) building. The construction of this building included the installation of a new emergency generator which was included in the Air Construction Permit No. 0990234-012-AC. The project specifications called for an EPA Tier 3 Certified Caterpillar unit with a 220 brake HP (model TBGZHJ) or equal. In order to prepare the air construction permit application and the required emissions calculations, CDM used the specifications of the Caterpillar unit. The project contractor would then be responsible of purchasing an emergency generator unit that was equal to the Caterpillar unit.

The project contractor selected, purchased and installed a unit manufactured by Cummins with specifications similar to the Caterpillar unit. The Cummins unit is also an EPA Tier 3 Certified unit with a slightly higher brake HP than the Caterpillar unit (250 bhp as compared to 220 bhp). The specifications of Cummins Emergency Generator are included in **Attachment 1** and the corresponding emissions calculations are included in **Attachment 2**.





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The Air Construction Permit (No. 0990234-012-AC) says the following about the engine generator:

“This permit authorizes the construction and installation of the following new emissions unit:

E.U. ID 021

Brief Description: New engine (emergency generator, < 500 hours/year) - ~220 brake horsepower (HP) (125 kilowatts (kW)) manufactured by Caterpillar® (EPA Tier 3 certified), located at the new operations building.

The emergency generator, an engine (EPA Tier 3 certified), must comply with the newly promulgated 40 Code of Federal Regulation (CFR) 63 Subpart ZZZZ, otherwise referred to as the “RICE MACT,” adopted by reference in Rule 62-204.800(11), F.A.C.

The new emergency generator uses low-sulfur diesel fuel, as required by 40 CFR 63 Subpart ZZZZ and 40 CFR 60 Subpart IIII, which reference the requirements in 40 CFR 80.510(a) (40 CFR 60.4207) (adopted by reference in Rule 62-204.800(11) & (8), F.A.C.): “(a) Beginning June 1, 2007. Except as otherwise specifically provided in this subpart, all NRLM (nonroad locomotive or marine) diesel fuel is subject to the following per-gallon standards: (1) Sulfur content. 500 parts per million (ppm) maximum. (2) Cetane index or aromatic content, as follows: (i) A minimum cetane index of 40; or (ii) A maximum aromatic content of 35 volume percent.”

The Cummins emergency engine generator meets all of the permit requirements. Because of the slightly higher horsepower, its maximum potential lb/hr emission rate may be higher, but the lb/hr emission rate is not limited in this permit. The permit does not say “Caterpillar® or equal,” so we understand that an administrative change to the permit might be necessary. SWA and CDM are currently in the process of preparing the Title V Renewal application for the NCRRF, which is due by November 19, 2010. We propose that the renewal application include the specifications and emissions calculations for the Cummins emergency engine generator so that the information in the operations permit can be updated.



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Please contact me at 561-689-3336 if this approach is not acceptable, or if you have any other questions. Thank you.

Very truly yours,

Manuel Hernandez, P.E.  
Florida Professional Engineer No. 59796  
Senior Project Manager  
Camp Dresser & McKee Inc.

MJH/aat

#### Attachments

File: 2678-70826-186

cc: Jonathan K. Holtom, P.E., FDEP  
Scott Sheplak, P.E., FDEP  
Mary Beth Morrison, SWA  
Raul Pellegrino, SWA

ec: Disha Shah, CDM  
Cynthia Hibbard, CDM

## **ATTACHMENTS**

**Attachment 1**

**Generator Specification**

**Model: DSGAB**  
**Frequency: 60**  
**Fuel type: Diesel**  
**KW rating: 125 standby**  
**113 prime**  
**Emissions level: EPA Nonroad Tier 3**

➤ **Generator set data sheet**

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<b>Exhaust emission data sheet:</b>	<b>EDS-1084</b>
<b>Exhaust emission compliance sheet:</b>	<b>EPA-1118</b>
<b>Sound performance data sheet:</b>	<b>MSP-1056</b>
<b>Cooling performance data sheet:</b>	<b>MCP-171</b>
<b>Prototype test summary data sheet:</b>	<b>PTS-285</b>
<b>Standard set-mounted radiator cooling outline:</b>	<b>500-4659</b>
<b>Optional set-mounted radiator cooling outline:</b>	
<b>Optional heat exchanger cooling outline:</b>	
<b>Optional remote radiator cooling outline:</b>	

<b>Fuel consumption</b>	<b>Standby</b>				<b>Prime</b>				<b>Continuous</b>
	<b>kW (kVA)</b>				<b>kW (kVA)</b>				<b>kW (kVA)</b>
<b>Ratings</b>	125 (156)				113 (141)				
<b>Load</b>	<b>1/4</b>	<b>1/2</b>	<b>3/4</b>	<b>Full</b>	<b>1/4</b>	<b>1/2</b>	<b>3/4</b>	<b>Full</b>	<b>Full</b>
<b>US gph</b>	3.38	5.77	7.89	10.00	3.10	5.21	7.32	9.15	
<b>L/hr</b>	12.8	21.9	29.9	37.9	11.7	19.7	27.7	34.7	

<b>Engine</b>	<b>Standby rating</b>	<b>Prime rating</b>	<b>Continuous rating</b>
Engine manufacturer	Cummins		
Engine model	QSB7-G3 NR3		
Configuration	Cast iron, in-line, 6 cylinder		
Aspiration	Turbocharged and air-to-air aftercooled		
Gross engine power output, kWm (bhp)	186 (250)	162 (217)	
BMEP at set rated load, kPa (psi)	1435 (208)	1301 (189)	
Bore, mm (in)	107 (4.21)		
Stroke, mm (in)	124 (4.88)		
Rated speed, rpm	1800		
Piston speed, m/s (ft/min)	7.4 (1464)		
Compression ratio	17.3:1		
Lube oil capacity, L (qt)	17.5 (18.5)		
Overspeed limit, rpm	2100		
Regenerative power, kW	20.4		

<b>Fuel flow</b>	
Maximum fuel flow, L/hr (US gph)	106 (28)
Maximum fuel flow with C174, L/hr (US gph)	
Maximum fuel inlet restriction with clean filter, mm Hg (in Hg)	127 (5)
Maximum return restriction, mm Hg (in Hg)	152 (6)

<b>Air</b>	<b>Standby rating</b>	<b>Prime rating</b>	<b>Continuous rating</b>
Combustion air, m <sup>3</sup> /min (scfm)	13.5 (476)	12.7 (449)	
Maximum air cleaner restriction with clean filter, kPa (in H <sub>2</sub> O)	3.7 (15)		
Alternator cooling air, m <sup>3</sup> /min (cfm)	37.0 (1308)		

### **Exhaust**

Exhaust flow at set rated load, m <sup>3</sup> /min (cfm)	32.0 (1129)	29.7 (1050)	
Exhaust temperature, °C (°F)	466 (871)	454 (850)	
Maximum back pressure, kPa (in H <sub>2</sub> O)	10 (40)		

### **Standard set-mounted radiator cooling**

Ambient design, °C (°F)	54 (129)		
Fan load, kW <sub>m</sub> (HP)	6.5 (8.7)		
Coolant capacity (with radiator), L (US Gal)	23 (6.1)		
Cooling system air flow, m <sup>3</sup> /min (scfm)	324 (11450)		
Total heat rejection, MJ/min (Btu/min)	7.36 (6973)	6.71 (6363)	
Maximum cooling air flow static restriction, kPa (in H <sub>2</sub> O)	0.12 (0.5)		

### **Optional set-mounted radiator cooling**

Ambient design, °C (°F)			
Fan load, kW <sub>m</sub> (HP)			
Coolant capacity (with radiator), L (US Gal.)			
Cooling system air flow, m <sup>3</sup> /min (scfm)			
Total heat rejection, MJ/min (Btu/min)			
Maximum cooling air flow static restriction, kPa (in. H <sub>2</sub> O)			

### **Optional heat exchanger cooling**

Set coolant capacity, L (US Gal.)			
Heat rejected, jacket water circuit, MJ/min (Btu/min)			
Heat rejected, aftercooler circuit, MJ/min (Btu/min)			
Heat rejected, fuel circuit, MJ/min (Btu/min)			
Total heat radiated to room, MJ/min (Btu/min)			
Maximum raw water pressure, jacket water circuit, kPa (psi)			
Maximum raw water pressure, aftercooler circuit, kPa (psi)			
Maximum raw water pressure, fuel circuit, kPa (psi)			
Maximum raw water flow, jacket water circuit, L/min (US Gal/min)			
Maximum raw water flow, aftercooler circuit, L/min (US Gal/min)			
Maximum raw water flow, fuel circuit, L/min (US Gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, jacket water circuit, L/min (US Gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, aftercooler circuit, L/min (US Gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, fuel circuit, L/min (US Gal/min)			
Raw water delta P at min flow, jacket water circuit, kPa (psi)			
Raw water delta P at min flow, aftercooler circuit, kPa (psi)			
Raw water delta P at min flow, fuel circuit, kPa (psi)			
Maximum jacket water outlet temp, °C (°F)			
Maximum aftercooler inlet temp, °C (°F)			
Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C (°F)			

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<b>Optional remote radiator cooling<sup>1</sup></b>	<b>Standby rating</b>	<b>Prime rating</b>	<b>Continuous rating</b>
Set coolant capacity, L (US gal)			
Max flow rate at max friction head, jacket water circuit, L/min (US gal/min)			
Max flow rate at max friction head, aftercooler circuit, L/min (US gal/min)			
Heat rejected, jacket water circuit, MJ/min (Btu/min)			
Heat rejected, aftercooler circuit, MJ/min (Btu/min)			
Heat rejected, fuel circuit, MJ/min (Btu/min)			
Total heat radiated to room, MJ/min (Btu/min)			
Maximum friction head, jacket water circuit, kPa (psi)			
Maximum friction head, aftercooler circuit, kPa (psi)			
Maximum static head, jacket water circuit, m (ft)			
Maximum static head, aftercooler circuit, m (ft)			
Maximum jacket water outlet temp, °C (°F)			
Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C (°F)			
Maximum aftercooler inlet temp, °C (°F)			
Maximum fuel flow, L/hr (US gph)			
Maximum fuel return line restriction, kPa (in Hg)			

<b>Weights<sup>2</sup></b>	
Unit dry weight kgs (lbs.)	
Unit wet weight kgs (lbs.)	1225 (2700)

**Notes:**

<sup>1</sup> For non-standard remote installations contact your local Cummins Power Generation representative.

<sup>2</sup> Weights represent a set with standard features. See outline drawing for weights of other configurations.

**Derating factors**

<b>Standby</b>	Engine power available up to 3048 m (10,000 ft) at ambient temperature up to 50° C (122° F). Consult your Cummins Power Generation distributor for temperature and ambient requirements outside these parameters.
<b>Prime</b>	Engine power available up to 3048 m (10,000 ft) at ambient temperature up to 40° C (104° F) and 2804 m (9200 ft) at 50° C (122° F). Consult your Cummins Power Generation distributor for temperature and ambient requirements outside these parameters.
<b>Continuous</b>	

**Ratings definitions**

<b>Emergency standby power (ESP):</b>	<b>Limited-time running power (LTP):</b>	<b>Prime power (PRP):</b>	<b>Base load (continuous) power (COP):</b>
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.	Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.

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## Alternator data

Three Phase Table <sup>1</sup>		105° C	105° C	105° C	105° C	125° C	125° C	125° C	125° C	125° C	150° C	150° C	150° C
Feature Code		B418	B415	B268	B304	B417	B414	B267	B246	B303	B416	B413	B419
Alternator Data Sheet Number		209	209	211	208	208	208	211	208	208	208	208	208
Voltage Ranges		110/190 Thru 120/208 220/380 Thru 240/416	120/208 Thru 139/240 240/416 Thru 277/480	120/208 Thru 139/240 240/416 Thru 277/480	347/600	110/190 Thru 120/208 220/380 Thru 240/416	120/208 Thru 139/240 240/416 Thru 277/480	120/208 Thru 139/240 240/416 Thru 277/480	139/240 Thru 277/480	347/600	110/190 Thru 120/208 220/380 Thru 240/416	120/208 Thru 139/240 240/416 Thru 277/480	347/600
Surge kW		160	161	163	160	159	159	163	160	160	159	160	160
Motor Starting kVA (at 90% sustained voltage)	Shunt	516	516	672	422	422	422	672	422	422	422	422	422
	PMG	607	607	791	497	497	497	791	497	497	497	497	497

Full Load Current - Amps at Standby Rating	<u>120/208</u>	<u>127/220</u>	<u>139/240</u>	<u>220/380</u>	<u>240/416</u>	<u>254/440</u>	<u>277/480</u>	<u>347/600</u>
	434	411	376	238	217	205	188	151

Single Phase Table		105° C	105° C	105° C	125° C	125° C	125° C	150° C					
Feature Code		B418	B415	B268	B417	B414	B267	B413					
Alternator Data Sheet Number		209	209	211	208	208	211	208					
Voltage Ranges		120/240 <sup>2</sup>	120/240 <sup>2</sup>	120/240 <sup>3</sup>	120/240 <sup>2</sup>	120/240 <sup>2</sup>	120/240 <sup>3</sup>	120/240 <sup>3</sup>					
Surge kW		156	156	159	156	156	159	156					
Motor Starting kVA (at 90% sustained voltage)	Shunt	305	305	395	250	250	395	250					
	PMG	360	360	465	290	290	465	290					

Full Load Current - Amps at Standby Rating	<u>120/240<sup>2</sup></u>	<u>120/240<sup>3</sup></u>
	347	521

<sup>1</sup> Single phase power can be taken from a three phase generator set at up to 2/3 set rated 3-phase kW at 1.0 power factor. Also see Note 3 below.

<sup>2</sup> The broad range alternators can supply single phase output up to 2/3 set rated 3-phase kW at 1.0 power factor.

<sup>3</sup> The extended stack (full single phase output) and 4 lead alternators can supply single phase output up to full set rated 3-phase kW at 1.0 power factor.

## Formulas for calculating full load currents:

### Three phase output

$$\frac{\text{kW} \times 1000}{\text{Voltage} \times 1.73 \times 0.8}$$

### Single phase output

$$\frac{\text{kW} \times \text{Single Phase Factor} \times 1000}{\text{Voltage}}$$

## Cummins Power Generation

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 Minneapolis, MN 55432 USA  
 Telephone: 763 574 5000  
 Fax: 763 574 5298

**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

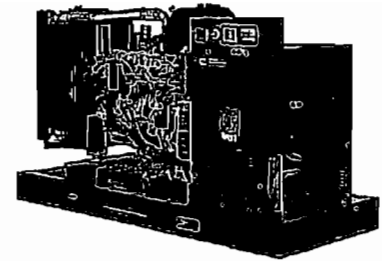
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# Diesel generator set QSB7 series engine EPA emissions



> **Specification sheet**  
100 kW - 150 kW 60 Hz

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## Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.



This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.



The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.



All low voltage models are CSA certified to product class 4215-01.



The generator set is available Listed to UL2200, Stationary Engine Generator Assemblies.

## U.S. EPA

Engine certified to U.S. EPA Nonroad Source Emissions Standards, 40 CFR 89, Tier 3.

## Features

**Cummins® heavy-duty engine** - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Control system** - The PowerCommand® 1.1 electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance. The optional PowerCommand 2.2 control is UL 508 Listed and provides AmpSentry™ protection.

**Cooling system** - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

Model	Standby rating		Prime rating		Continuous rating		Data sheets	
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
<b>DSGAA</b>	100 (125)		90 (113)				D-3349	
<b>DSGAB</b>	125 (156)		113 (141)				D-3350	
<b>DSGAC</b>	150 (188)		135 (169)				D-3351	

## Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 1%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio frequency emissions compliance	Meets requirements of most industrial and commercial applications.

## Engine specifications

Bore	107 mm (4.21 in)
Stroke	124.0 mm (4.88 in)
Displacement	6.69 L (408 in <sup>3</sup> )
Configuration	Cast iron, in-line, 6 cylinder
Battery capacity	1100 amps minimum at ambient temperature of -18 °C to 0 °C (0 °F to 32 °F)
Battery charging alternator	100 amps
Starting voltage	12 volt, negative ground
Fuel system	Direct injection: number 2 diesel fuel, fuel filter, automatic electric fuel shutoff
Fuel filter	Single element, 10 micron filtration, spin-on fuel filter with water separator
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	Spin-on, full flow
Standard cooling system	High ambient radiator

## Alternator specifications

Design	Brushless, 4 pole, drip proof revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible discs
Insulation system	Class H
Standard temperature rise	150 °C standby at 40 °C ambient
Exciter type	Torque match (shunt) standard, PMG optional
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

## Available voltages

### 60 Hz Three phase line-neutral/line-line

• 110/190	• 115/230 Delta	• 127/220	• 240/416
• 110/220	• 120/208	• 139/240	• 255/440
• 115/200	• 120/240 Delta	• 220/380	• 277/480
		• 230/400	• 347/600

### 60 Hz Single phase line-neutral/line-line

• 110/220	• 115/230	• 120/240
-----------	-----------	-----------

\* Note: Consult factory for other voltages.

## Generator set options and accessories

### Engine

- 120 V 150 W lube oil heater
- 120/240 V 1500 W coolant heater

### Fuel System

- 24 hour sub-base tank (dual wall)

### Alternator

- 105 °C rise
- 125 °C rise
- 120 V 100 W anti-condensation heater
- PMG excitation
- Single phase

### Exhaust system

- Heavy duty exhaust elbow
- Slip on exhaust connection

### Generator set

- Battery
- Battery charger
- Enclosure: aluminum, steel, weather protective or sound attenuated
- Main line circuit breaker

- PowerCommand Network Communications Module (NCM)
- Remote annunciator panel
- Spring isolators
- UL 2200 Listed
- 2 year prime power warranty
- 2 year standby power warranty
- 5 year basic power warranty

\* Note: Some options may not be available on all models - consult factory for availability.

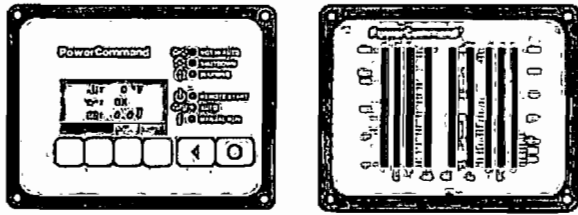
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## Control system PCC 1302



**PowerCommand control** is an integrated generator set control system providing voltage regulation, engine protection, operator interface and isochronous governing (optional). Major features include:

- Battery monitoring and testing features and smart starting control system.
- Standard PCCNet interface to devices such as remote annunciator for NFPA 110 applications.
- Control boards potted for environmental protection.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.

### Operator/display panel

- Manual off switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- LED lamps indicating genset running, not in auto, common warning, common shutdown, manual run mode and remote start
- Suitable for operation in ambient temperatures from -20 °C to +70 °C
- Bargraph display (optional)

### AC protection

- Over current warning and shutdown
- Over and under voltage shutdown
- Over and under frequency shutdown
- Over excitation (loss of sensing) fault
- Field overload

### Engine protection

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High, low and weak battery voltage warning
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown
- Fuel-in-rupture-basin warning or shutdown

### Alternator data

- Line-to-line and Line-to-neutral AC volts
- 3-phase AC current
- Frequency
- Total kVa

### Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Engine speed

### Other data

- Genset model data
- Start attempts, starts, running hours
- Fault history
- RS485 Modbus® interface
- Data logging and fault simulation (requires InPower service tool)

### Digital governing (optional)

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

### Digital voltage regulation

- Integrated digital electronic voltage regulator
- 2-phase line-to-line sensing
- Configurable torque matching

### Control functions

- Time delay start and cooldown
- Cycle cranking
- PCCNet interface
- (2) Configurable inputs
- (2) Configurable outputs
- Remote emergency stop
- Glow plug control (some models)

### Options

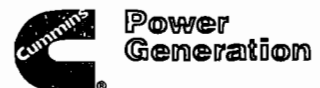
- Auxiliary output relays (2)
- 120/240 V, 100 W anti-condensation heater
- Remote annunciator with (3) configurable inputs and (4) configurable outputs
- PMG alternator excitation
- PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- Auxiliary, configurable signal inputs (8) and configurable relay outputs (8)
- Digital governing
- AC output analog meters (bargraph)
  - Color-coded graphical display of:
    - 3-phase AC voltage
    - 3-phase current
    - Frequency
    - kVa
- Remote operator panel
- PowerCommand 2.2 control with AmpSentry protection

For further detail see document S-1531.

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S-1544g (9/08)



## Ratings definitions

### Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Limited-time running power (LTP):

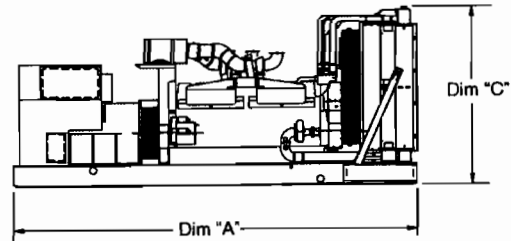
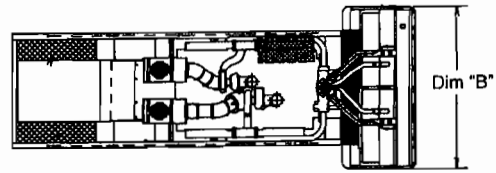
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

### Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

***Do not use for installation design***

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
DSGAA	2656 (104.6)	1100 (43.3)	1549 (61)		1180 (2602)
DSGAB	2656 (104.6)	1100 (43.3)	1549 (61)		1225 (2700)
DSGAC	2656 (104.6)	1100 (43.3)	1549 (61)		1263 (2784)

\* Note: Weights represent a set with standard features. See outline drawings for weights of other configurations.

### Cummins Power Generation

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**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

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**Sound Pressure Level @ 7 meters, dB(A)**

See Notes 1-8 listed below

Configuration		Measurement Location Number								Average
		1	2	3	4	5	6	7	8	
Standard-Unhoused (Note 3)	Infinite Exhaust	84.2	87.7	84.5	85.6	82.2	85.3	86.0	87.7	85.7
F182 - Enclosure-Steel, Weather Protective,with ExhSys	Mounted Muffler	85.1	88.0	87.2	86.8	83.0	87.9	87.7	90.0	87.4
F216- Enclosure-Aluminum,Weather Protective,w/Exh System	Mounted Muffler	85.1	88.0	87.2	86.8	83.0	87.9	87.7	90.0	87.4
F173 - Enclosure-Steel,Sound Att,Level 2,w/Exhaust System	Mounted Muffler	73.0	74.9	73.3	73.6	72.0	74.6	74.5	75.2	74.0
F217- Enclosure-Aluminum,Sound Att,Level 2,w/ExhSystem	Mounted Muffler	75.0	76.9	75.3	75.6	74.0	76.6	76.5	77.2	76.0
F232- Enclosure-Steel,Sound Att,Level 3,w/Exhaust System	Mounted Muffler	68.2	68.6	67.1	70.5	68.8	67.2	68.4	69.3	68.6
F233- Enclosure-Aluminum, Sound Att,Level 3,w/ExhSystem	Mounted Muffler	71.3	70.2	68.6	71.2	67.2	69.7	69.3	70.6	69.9

**Sound Power Level, dB(A)**

See Notes 2-6, 9, 10 listed below

Configuration		Octave Band Center Frequency (Hz)								Overall Sound Power Level
		63	125	250	500	1000	2000	4000	8000	
Standard-Unhoused (Note 3)	Infinite Exhaust	78.0	92.8	106.1	104.1	107.1	106.0	101.1	95.9	112.5
F182 - Enclosure-Steel, Weather Protective,with ExhSys	Mounted Muffler	95.6	101.8	104.6	106.0	110.4	107.6	106.2	101.8	115.0
F216- Enclosure-Aluminum,Weather Protective,w/Exh System	Mounted Muffler	95.6	101.8	104.6	106.0	110.4	107.6	106.2	101.8	115.0
F173 - Enclosure-Steel,Sound Att,Level 2,w/Exhaust System	Mounted Muffler	83.0	89.5	93.9	94.7	97.2	95.8	92.8	87.7	102.6
F217- Enclosure-Aluminum,Sound Att,Level 2,w/ExhSystem	Mounted Muffler	85.0	91.5	95.9	96.7	99.2	97.8	94.8	89.7	104.6
F232- Enclosure-Steel,Sound Att,Level 3,w/Exhaust System	Mounted Muffler	80.7	87.9	89.8	88.5	88.6	88.5	88.2	82.9	96.7
F233- Enclosure-Aluminum, Sound Att,Level 3,w/ExhSystem	Mounted Muffler	77.1	89.6	92.5	88.9	90.3	90.2	89.7	86.7	98.5

**Exhaust Sound Pressure Level @ 1 meter, dB(A)**

Open Exhaust (No Muffler Rated Load)	Octave Band Center Frequency (Hz)								Sound Pressure Level
	63	125	250	500	1000	2000	4000	8000	
	79.8	89.5	97.5	99.3	103.6	108.0	108.0	106.5	113.5

Note:

1. Position 1 faces the engine front. The positions proceed around the generator set in a counter-clockwise direction in 45° increments. All positions are at 7m (23 ft) from the surface of the generator set and 1.2m (48") from floor level.
2. Sound levels are subject to instrumentation, measurement, installation and manufacturing variability.
3. Sound data with remote-cooled generator sets are based on rated loads without cooling fan noise.
4. Sound levels for aluminum enclosures are approximately 2 dB(A)s higher than listed sound levels for steel enclosures.
5. Sound data for generator set with infinite exhaust do not include exhaust noise.
6. Data is based on full rated load with standard radiator-cooling fan package
7. Sound Pressure Levels are measured per ANSI S1.13 and ANSI S12.18, as applicable.
8. Reference sound pressure is 20 µPa.
9. Sound Power Levels per ISO 3744 and ISO 8528-10, as applicable.
10. Reference power = 1 pw (10<sup>-12</sup> W)
11. Exhaust Sound Pressure Levels are per ISO 6798, as applicable.

**Attachment 2**

**SWA Operations and Maintenance Building Emergency  
Generator Unit Emissions Calculations**

## ATTACHMENT 2

### SWA OPERATIONS AND MAINTENANCE BUILDING EMERGENCY GENERATOR UNIT EMISSIONS CALCULATIONS

<b>Cummins Engine</b>	<b>CO</b>	<b>NMHC + NOx</b>	<b>PM</b>	
Emission Factor from 40 CFR 80.112 Tier III table	5	4	0.3	g/Kw-hr
Hours of operation	500	500	500	
Gross engine power output rating	186	186	186	KW
Hourly Emissions	2.05	1.64	0.12	lb/hr
Annual Emissions	0.51	0.41	0.03	tpy
Permit obtained for Caterpillar engine	1.38	1.10	0.08	lb/hr
Permit obtained for Caterpillar engine	0.34	0.28	0.02	tpy