Columbia Pipeline Group

1700 MacCorkle Avenue SE, Charleston, WV 25314
Phone: 304-357-2047 Fax: 304-357-2770
kellytaylor@cpg.com

August 7, 2015

RECEIVED
AUG 18 2015
WV DEP / DIV OF AIR QUALITY

Mr. William F. Durham, Director
WVDEP - Division of Air Quality
601 57th Street SE
Charleston, West Virginia 25304

RE: Class I General Permit G65-C Registration Application
Columbia Gas Transmission, LLC
Charleston Headquarters Building (Plant ID#03-54-039 00154)

Dear Mr. Durham,

Attached is an application for a Class I General Permit G65-C Registration for the Columbia Gas Transmission, LLC – Charleston Headquarters Building, located in Kanawha County, West Virginia. The application is for a new diesel emergency generator that was installed at the building on July 6, 2015. The generator currently permitted under R13-2342 is no longer located at the site; Columbia Gas Transmission requests that this permit be revoked.

Air emissions associated with the generator are less than 6 lbs/hr of any regulated pollutant, and no other sources of emissions are located at the site, which is strictly an office building. This application package includes the general permit registration form, along with all applicable attachments and a check in the amount of $250.00 for application fees.

Should you have any questions or need additional information, please feel free to contact the undersigned at (304) 357-2047 or via email at kellytaylor@cpg.com.

Sincerely,

Kelly D. Taylor

Kelly D. Taylor
Environmental Safety & Sustainability Coordinator

Attachments

Columbia Gas Trans LLC
Charleston
039-00154
G65-C554
John Legg

APPLICATION FOR 45CSR13
EMERGENCY GENERATOR
CLASS I GENERAL PERMIT G65-C

Columbia Gas Transmission LLC
Charleston Headquarters Building
Kanawha County, West Virginia

August 2015

Table of Contents

WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY
601 57th Street, SE
Charleston, WV 25304
Phone: (304) 926-0475 • www.dep.wv.gov/daq

APPLICATION FOR GENERAL PERMIT REGISTRATION

CONSTRUCT, MODIFY, RELOCATE OR ADMINISTRATIVELY UPDATE A STATIONARY SOURCE OF AIR POLLUTANTS

☑ CONSTRUCTION ☐ MODIFICATION ☐ RELOCATION ☐ CLASS I ADMINISTRATIVE UPDATE ☐ CLASS II ADMINISTRATIVE UPDATE

CHECK WHICH TYPE OF GENERAL PERMIT REGISTRATION YOU ARE APPLYING FOR:

- ☐ **G10-D** – Coal Preparation and Handling
- ☐ **G20-B** – Hot Mix Asphalt
- ☐ **G30-D** – Natural Gas Compressor Stations
- ☐ **G33-A** – Spark Ignition Internal Combustion Engines
- ☐ **G35-A** – Natural Gas Compressor Stations (Flare/Glycol Dehydration Unit)
- ☐ **G40-C** – Nonmetallic Minerals Processing
- ☐ **G50-B** – Concrete Batch
- ☐ **G60-C** - Class II Emergency Generator
- ☑ **G65-C** – Class I Emergency Generator
- ☐ **G70-A** – Class II Oil and Natural Gas Production Facility

SECTION I. GENERAL INFORMATION

1. Name of applicant (as registered with the WV Secretary of State's Office): Columbia Gas Transmission, LLC

2. Federal Employer ID No. **(FEIN):** 310802435

3 Applicant's mailing address: 1700 MacCorkle Ave., SE, Charleston, WV 25314

4. Applicant's physical address: 1700 MacCorkle Ave., SE, Charleston, WV 25314

5. If applicant is a subsidiary corporation, please provide the name of parent corporation: Columbia Pipeline Group, Inc.

6. **WV BUSINESS REGISTRATION.** Is the applicant a resident of the State of West Virginia? ☑ **YES** ☐ **NO**

- ➪ IF **YES,** provide a copy of the Certificate of **Incorporation/ Organization / Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A**.
- ➪ IF **NO,** provide a copy of the **Certificate of Authority / Authority of LLC / Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A**.

SECTION II. FACILITY INFORMATION

7. Type of plant or facility (stationary source) to be constructed, modified, relocated or administratively updated (e.g., coal preparation plant, primary crusher, etc.): Office Building

8a. Standard Industrial Classification (SIC) code: 4922 AND 8b. North American Industry System (NAICS) code: 486210

9. DAQ Plant ID No. (for existing facilities only): 03-54-039 00154

10. List all current 45CSR13 and other General Permit numbers associated with this process (for existing facilities only): R13-2342

A: PRIMARY OPERATING SITE INFORMATION

11A. Facility name of primary operating site:	12A. Address of primary operating site:
Charleston Headquarters Building	Mailing: 1700 MacCorkle Ave., SE Physical: 1700 MacCorkle Ave., SE Charleston, WV 25314

13A. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ☑ YES ☐ NO

➪ IF **YES**, please explain: Application is for equipment at the existing Columbia Gas headquarters site which Columbia Gas Transmission, LLC owns and operates.

➪ IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14A. ➪ For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road:

➪ For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

From the city of Charleston, head southwest for 0.4 miles on Dickinson Street, which turns into S. Side Bridge. Turn right onto Creel Ave., then right onto MacCorkle Ave., SE. In 0.2 miles, make a left onto 19th St. SE, then turn left at the 1st cross street toward MacCorkle Ave. In approximately 0.2 miles, the facility will be on the right.

15A. Nearest city or town:	16A. County:	17A. UTM Coordinates:
Charleston	Kanawha	Northing (KM): 4,243.09 Easting (KM): 445.34 Zone: 17

18A. Briefly describe the proposed new operation or change (s) to the facility:	19A. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Installation of one diesel emergency generator.	Latitude: 38.33541 Longitude: -81.62467

B: 1ST ALTERNATE OPERATING SITE INFORMATION (only available for G20, G40, & G50 General Permits)

11B. Name of 1st alternate operating site:	12B. Address of 1st alternate operating site:
	Mailing: Physical:

13B. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ☐ YES ☐ NO

➪ IF **YES**, please explain:

➪ IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14B ➪ For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road.

➪ For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

15B. Nearest city or town:	16B. County:	17B UTM Coordinates: Northing (KM): Easting (KM): Zone:
18B. Briefly describe the proposed new operation or change (s) to the facility:		19B. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: Longitude:

C: 2ND ALTERNATE OPERATING SITE INFORMATION (only available for G20, G40, & G50 General Permits):

11C. Name of 2nd alternate operating site:	12C. Address of 2nd alternate operating site: Mailing: Physical:

13C. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ☐ **YES** ☐ **NO**

➪ IF **YES**, please explain:

➪ IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14C. ➪ For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road:

➪ For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

15C. Nearest city or town:	16C. County:	17C. UTM Coordinates: Northing (KM): Easting (KM): Zone:
18C. Briefly describe the proposed new operation or change (s) to the facility:		19C. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: Longitude:

20. Provide the date of anticipated installation or change ____/____/____ If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: ____/____/____	21. Date of anticipated Start-up if registration is granted ____/____/____

22. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application if other than 8760 hours/year. (Note: anything other than 24/7/52 may result in a restriction to the facility's operation)

Hours per day_____ Days per week _____ Weeks per year _____ Percentage of operation _____

SECTION III. ATTACHMENTS AND SUPPORTING DOCUMENTS

23. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

24. Include a **Table of Contents** as the first page of your application package.

All of the required forms and additional information can be found under the Permitting Section (General Permits) of DAQ's website, or requested by phone.

25. Please check all attachments included with this permit application. Please refer to the appropriate reference document for an explanation of the attachments listed below.

- ☑ ATTACHMENT A : CURRENT BUSINESS CERTIFICATE
- ☑ ATTACHMENT B: PROCESS DESCRIPTION
- ☐ ATTACHMENT C: DESCRIPTION OF FUGITIVE EMISSIONS
- ☑ ATTACHMENT D: PROCESS FLOW DIAGRAM
- ☑ ATTACHMENT E: PLOT PLAN
- ☑ ATTACHMENT F: AREA MAP
- ☑ ATTACHMENT G: EQUIPMENT DATA SHEETS AND REGISTRATION SECTION APPLICABILITY FORM
- ☐ ATTACHMENT H: AIR POLLUTION CONTROL DEVICE SHEETS
- ☑ ATTACHMENT I: EMISSIONS CALCULATIONS
- ☐ ATTACHMENT J: CLASS I LEGAL ADVERTISEMENT
- ☐ ATTACHMENT K: ELECTRONIC SUBMITTAL
- ☑ ATTACHMENT L: GENERAL PERMIT REGISTRATION APPLICATION FEE
- ☐ ATTACHMENT M: SITING CRITERIA WAIVER
- ☐ ATTACHMENT N: MATERIAL SAFETY DATA SHEETS (MSDS)
- ☑ ATTACHMENT O: EMISSIONS SUMMARY SHEETS
- ☐ OTHER SUPPORTING DOCUMENTATION NOT DESCRIBED ABOVE (Equipment Drawings, Aggregation Discussion, etc.)

Please mail an original and two copies of the complete General Permit Registration Application with the signature(s) to the DAQ Permitting Section at the address shown on the front page of this application. Please DO NOT fax permit applications. For questions regarding applications or West Virginia Air Pollution Rules and Regulations, please refer to the website shown on the front page of the application or call the phone number also provided on the front page of the application.

SECTION IV. CERTIFICATION OF INFORMATION

This General Permit Registration Application shall be signed below by a Responsible Official. A Responsible Official is a President, Vice President, Secretary, Treasurer, General Partner, General Manager, a member of a Board of Directors, or Owner, depending on business structure. A business may certify an Authorized Representative who shall have authority to bind the Corporation, Partnership, Limited Liability Company, Association, Joint Venture or Sole Proprietorship. Required records of daily throughput, hours of operation and maintenance, general correspondence, Emission Inventory, Certified Emission Statement, compliance certifications and all required notifications must be signed by a Responsible Official or an Authorized Representative. If a business wishes to certify an Authorized Representative, the official agreement below shall be checked off and the appropriate names and signatures entered. Any administratively incomplete or improperly signed or unsigned Registration Application will be returned to the applicant.

FOR A CORPORATION (domestic or foreign)

☑ I certify that I am a President, Vice President, Secretary, Treasurer or in charge of a principal business function of the corporation

FOR A PARTNERSHIP

☐ I certify that I am a General Partner

FOR A LIMITED LIABILITY COMPANY

☐ I certify that I am a General Partner or General Manager

FOR AN ASSOCIATION

☐ I certify that I am the President or a member of the Board of Directors

FOR A JOINT VENTURE

☐ I certify that I am the President, General Partner or General Manager

FOR A SOLE PROPRIETORSHIP

☐ I certify that I am the Owner and Proprietor

☑ *I hereby certify that* (please print or type) _____

is an Authorized Representative and in that capacity shall represent the interest of the business (e.g., Corporation, Partnership, Limited Liability Company, Association Joint Venture or Sole Proprietorship) and may obligate and legally bind the business. If the business changes its Authorized Representative, a Responsible Official shall notify the Director of the Office of Air Quality immediately, and/or,

I hereby certify that all information contained in this General Permit Registration Application and any supporting documents appended hereto is, to the best of my knowledge, true, accurate and complete, and that all reasonable efforts have been made to provide the most comprehensive information possible

Signature _____
(please use blue ink) Responsible Official Date

Name & Title _____
(please print or type)

Signature _____ August 10 2015
(please use blue ink) Authorized Representative (if applicable) Date

Applicant's Name Brian E Healy

Phone & Fax 304.357.2241 304.357.2438
Phone Fax

Email bhealy@cpg.com

Attachment A

Business Certificate

WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION CERTIFICATE

ISSUED TO:
COLUMBIA GAS TRANSMISSION LLC
5151 SAN FELIPE ST 2500
HOUSTON, TX 77056-3639

BUSINESS REGISTRATION ACCOUNT NUMBER: **1025-1555**

This certificate is issued on: 07/1/2011

This certificate is issued by
the West Virginia State Tax Commissioner
in accordance with Chapter 11, Article 12, of the West Virginia Code

The person or organization identified on this certificate is registered to conduct business in the State of West Virginia at the location above.

This certificate is not transferrable and must be displayed at the location for which issued.

This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them. CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

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Attachment B

Process Description

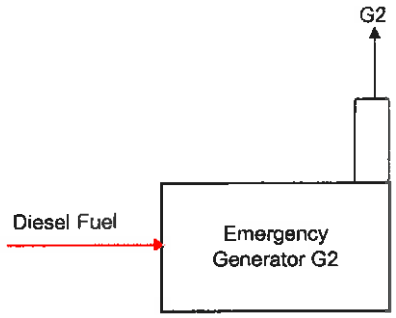
Process Description

Columbia Gas Transmission is applying for a Class I General Permit for a diesel emergency generator that was installed at the Charleston Headquarters Building on July 6, 2015. This emergency generator replaces the one currently permitted under R13-2342. The site is strictly an office building at which no other sources of air emissions are present. The generator will only be used for emergencies and has a potential to emit of less than 6 pounds per hour (lb/hr) of any regulated pollutant.

Attachment D

Process Flow Diagram

ATTACHMENT D
CHARLESTON HEADQUARTERS BUILDING PROCESS FLOW DIAGRAM



Fuel Gas
Emission Stream

Columbia
Pipeline Group

Attachment E

Plot Plan

Easting: 445.34 km Northing: 4,243.09 km	**Attachment E**
Date: August 2015	Plot Plan Charleston Headquarters Building

Attachment F

Area Map

Easting: 445.34 km Northing: 4,243.09 km	**Attachment F**
Date: August 2015	Facility Map Charleston Headquarters Building

Attachment G

Equipment Data Sheets and

Registration Section Applicability Form

General Permit G65-C Registration
Section Applicability Form

General Permit G65-C was developed to allow qualified registrants to seek registration for emergency generator(s).

General Permit G65-C allows the registrant to choose which sections of the permit that they wish to seek registration under. Therefore, please mark which sections that you are applying for registration under. Please keep in mind, that if this registration is approved, the issued registration will state which sections will apply to your affected facility.

Section 5	Reciprocating Internal Combustion Engines (R.I.C.E.)*	☒
Section 6	Tanks	☐
Section 7	Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (40CFR60 Subpart IIII)	☒
Section 8	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (40CFR60 Subpart JJJJ)	☐

* **Affected facilities that are subject to Section 5 may also be subject to Sections 7 or 8. Therefore, if the applicant is seeking registration under both sections, please select both.**

EMERGENCY GENERATOR ENGINE DATA SHEET

Source Identification Number[1]		G2	
Engine Manufacturer and Model		Cummins Inc QSX15-G9	
Manufacturer's Rated bhp/rpm		755 bhp	
Source Status[2]		NS	
Date Installed/Modified/Removed[3]		Installed July 6, 2015	
Engine Manufactured/Reconstruction Date[4]			
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60 Subpart IIII? (Yes or No)[5]		Yes	
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60 Subpart JJJJ? (Yes or No)[6]		No	
Engine, Fuel and Combustion Data	Engine Type[7]	LB4S	
	APCD Type[8]	Not applicable	
	Fuel Type[9]	2FO	
	H_2S (gr/100 scf)	De minimis	
	Operating bhp/rpm	755 bhp, 1800 rpm	
	BSFC (Btu/bhp-hr)	6,242	
	Fuel consumption (gal/hr)	34.4	
	Fuel consumption (gal/yr)	17,200	
	Operation (hrs/yr)	500	
Reference[10]	Potential Emissions[11]	lbs/hr	tons/yr
MD	NO_X	5.15	1.29
MD	CO	0.67	0.17
MD	VOC	1.34	0.33
OT – mass balance	SO_2	0.007	0.002
MD	PM_{10}	0.17	0.04
AP	Formaldehyde	0.0004	0.0001

Attachment I

Emissions Calculations

Columbia Gas Transmission, LLC
Charleston Headquarters Building

Equipment	Cummins Diesel Emergency Generator		
Hours/Year of Operation	500	hours/year	
Maximum Fuel Consumption	34.4	gal/hr	
Maximum Heat Input	4.71	MMBtu/hr	**(0.137 MMBtu/gal of Diesel per AP-42 Appendix A)**
Nominal Power Output	563	kW	
Horsepower at Rated Input	755	hp	**(Based on 1.341 hp/kW)**
Maximum Yearly Fuel Consumption	17,200	gal/yr	
Fuel Sulfur Content	0.0015	% S	

Parameter	Units	NO_x (1,2)	CO (1)	VOC (1,2)	PM (1)	$PM_{10}/PM_{2.5}$ (3)	SO_2 (4)	Pb	Total HAPs
Emission Factors	g/hp-hr	3.10	0.40	0.80	0.080	0.102	0.004	2.55E-05	4.60E-03
Maximum Hourly Emission Rates	lb/hr	5.15	0.67	1.34	0.13	0.17	0.007	4.24E-05	7.65E-03
Potential Annual Emissions	tons/year	1.29	0.166	0.334	0.033	0.042	0.002	1.06E-05	1.91E-03

Notes:

(1) Emission factors for NOx, CO, VOC (as HC), and PM provided by engine manufacturer, based on CARB test results.

(2) Emission factors for NOx calculated as 79.4% of NOx+NMHC total; VOC factor is 20.6% of NOx+NMHC total.

(3) $PM_{10}/PM_{2.5}$ from vendor specification plus condensable PM based on AP-42 Table 3.4-2. g/hp-hr = lb/MMBtu x MMBtu/hr x 453.59 g/lb / hp

(4) SO2 Calculation based on 7.05 lb/gal and specified fuel sulfur content

Hazardous Air Pollutants (HAPs)(6)			
Hazardous Air Pollutant	**Emission Factor (lb/MMBtu)**	**Short-Term Emissions (lb/hr)**	**Long-Term Emissions (lb/yr)**
Acetaldehyde	2.52E-05	1.19E-04	0.059
Acrolein	7.88E-06	3.71E-05	0.019
Benzene	7.76E-04	3.66E-03	1.829
Formaldehyde	7.89E-05	3.72E-04	0.186
Total PAH	2.12E-04	9.99E-04	0.500
Toluene	2.81E-04	1.32E-03	0.662
Xylenes	1.93E-04	9.10E-04	0.455
Arsenic	4.00E-06	1.89E-05	0.009
Beryllium	3.00E-06	1.41E-05	0.007
Cadmium	3.00E-06	1.41E-05	0.007
Chromium	3.00E-06	1.41E-05	0.007
Lead	9.00E-06	4.24E-05	0.021
Manganese	6.00E-06	2.83E-05	0.014
Mercury	3.00E-06	1.41E-05	0.007
Nickel	3.00E-06	1.41E-05	0.007
Selenium	1.50E-05	7.07E-05	0.035

Notes:

(6) Source: Organics from AP-42 Section 3.4 Table 3.4-3 - Dated: 10/96, Metals from AP-42 Section 1.3 Table 1.3-10

Power Generation

2015 EPA Tier 2 Exhaust Emission Compliance Statement 500DFEK Stationary Emergency

60 Hz Diesel Generator Set

Compliance Information:

The engine used in this generator set complies with Tier 2 emissions limit of U.S. EPA New Source Performance Standards for stationary emergency engines under the provisions of 40 CFR 60 Subpart IIII when tested per ISO8178 D2.

Engine Manufacturer:	Cummins Inc
EPA Certificate Number:	FCEXL015.AAJ-011
Effective Date:	08/11/2014
Date Issued:	08/11/2014
EPA Engine Family (Cummins Emissions Family):	FCEXL015.AAJ (J103)

Engine Information:

Model:	QSX / QSX15 / QSX15-G / QSX15-G9	Bore:	5.39 in. (137 mm)
Engine Nameplate HP:	755	Stroke:	6.65 in. (169 mm)
Type:	4 Cycle, In-line, 6 Cylinder Diesel	Displacement:	912 cu. in. (15 liters)
Aspiration:	Turbocharged and CAC	Compression Ratio:	17.0:1
Emission Control Device:	Electronic Control	Exhaust Stack Diameter:	8 in.

Diesel Fuel Emission Limits

D2 Cycle Exhaust Emissions

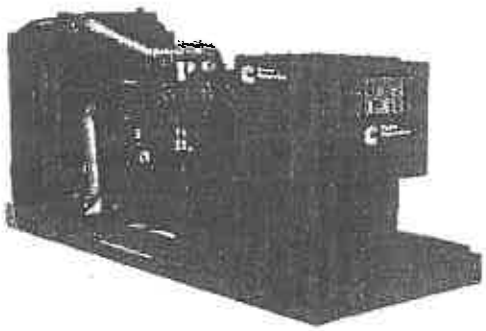
	Grams per BHP-hr			Grams per kWm-hr		
	NOx + NMHC	CO	PM	NOx + NMHC	CO	PM
Test Results - Diesel Fuel (300-4000 ppm Sulfur)	4.3	0.4	0.10	5.7	0.6	0.13
EPA Emissions Limit	4.8	2.6	0.15	6.4	3.5	0.20
Test Results - CARB Diesel Fuel (<15 ppm Sulfur)	3.9	0.4	0.08	5.2	0.6	0.11
CARB Emissions Limit	4.8	2.6	0.15	6.4	3.5	0.20

The CARB emission values are based on CARB approved calculations for converting EPA (500 ppm) fuel to CARB (15 ppm) fuel.
Test Methods: EPA/CARB Nonroad emissions recorded per 40CFR89 (ref. ISO8178-1) and weighted at load points prescribed in Subpart E, Appendix A for Constant Speed Engines (ref. ISO8178-4, D2)
Diesel Fuel Specifications: Cetane Number: 40-48. Reference: ASTM D975 No. 2-D.
Reference Conditions: Air Inlet Temperature: 25°C (77°F), Fuel Inlet Temperature: 40°C (104°F). Barometric Pressure: 100 kPa (29.53 in Hg). Humidity: 10.7 g/kg (75 grains H2O/lb) of dry air; required for NOx correction, Restrictions: Intake Restriction set to a maximum allowable limit for clean filter; Exhaust Back Pressure set to a maximum allowable limit.

Tests conducted using alternate test methods, instrumentation, fuel or reference conditions can yield different results.
Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

Specification sheet

Diesel generator set QSX15 series engine



400 kW - 500 kW standby

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.

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.

Permanent magnet generator (PMG) - Offers enhanced motor starting and fault clearing short-circuit capability.

Control system - The PowerCommand® 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, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

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.

Fuel tanks - Dual wall sub-base fuel tanks are also 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.

	Standby rating		Prime rating		Continuous rating		Data sheets	
Model	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW	60 Hz	50 Hz
DFEJ	450 (563)	400 (500)	410 (513)	364 (455)			D-3400	D-3403
DFEK	500 (625)	440 (550)	455 (569)	400 (500)			D-3401	D-3404

Our energy working for you.™

©2014 Cummins Power Generation Inc. | S-1502 (7/14)

Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio frequency emissions compliance	IEC 801.2, Level 4 electrostatic discharge IEC 801.3; Level 3 radiated susceptibility

Engine specifications

Design	Turbocharged with air-to-air charge air cooling
Bore	136.9 mm (5.39 in)
Stroke	168.9 mm (6.65 in)
Displacement	14.9 L (912.0 in³)
Configuration	Cast iron with replaceable wet liners, in-line 6 cylinder
Battery capacity	900 amps minimum at ambient temperature of 0 °C (32 °F)
Battery charging alternator	35 amps
Starting voltage	24 volt, negative ground
Fuel system	Full authority electronic (FAE) Cummins HPI-TP
Fuel filter	[redacted]
Air cleaner type	[redacted]
Lube oil filter type(s)	Single spin-on combination full flow and bypass filters
Standard cooling system	40 °C (104 °F) 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	125 °C standby at 40 °C ambient
Exciter type	PMG (Permanent magnet generator)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower
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 line-neutral/line-line			
• 110/190	• 110/220	• 115/200	• 115/230
• 120/208	• 127/220	• 139/240	• 220/380
• 230/400	• 240/416	• 255/440	• 277/480
• 347/600			

50 Hz line-neutral/line-line			
• 110/190	• 110/220	• 115/200	• 115/230
• 120/208	• 127/220	• 139/240	• 220/380
• 230/400	• 240/415	• 255/440	

Note: Consult factory for other voltages.

Generator set options and accessories

Engine
- ☐ 208/240/480 V thermostatically controlled coolant heater for ambient above 4.5 °C (40 °F)
- ☒ 208/240/480 V thermostatically controlled coolant heater for ambient below 4.5 °C (40 °F)
- ☐ 120 V 300 W lube oil heater
- ☐ Heavy duty air cleaner with safety element

Alternator
- ☐ 80 °C rise
- ☐ 105 °C rise
- ☐ 150 °C rise
- ☐ 120/240 V 300 W anti-condensation heater

Exhaust System
- ☐ Critical grade exhaust silencer
- ☐ Exhaust packages
- ☐ Industrial grade exhaust silencer
- ☐ Residential grade exhaust silencer

Fuel system
- ☐ 1022 L (270 gal) sub-base tank
- ☐ 1136 L (300 gal) sub-base tank
- ☐ 1514 L (400 gal) sub-base tank
- ☐ 1893 L (500 gal) sub-base tank
- ☐ 2271 L (600 gal) sub-base tank
- ☐ 2498 L (660 gal) sub-base tank
- ☒ 3216 L (850 gal) sub-base tank
- ☐ 6435 L (1700 gal) sub-base tank
- ☐ 9558 L (2525 gal) sub-base tank

Cooling system
- ☐ High ambient 50 °C radiator

Control panel
- ☐ 120/240 V 100 W control anti-condensation heater
- ☐ Ground fault indication
- ☐ Power transfer control
- ☐ Remote fault signal package
- ☒ Run relay package

Generator set
- ☐ AC entrance box
- ☒ Battery
- ☒ Battery charger
- ☐ Export box packaging
- ☒ UL 2200 Listed
- ☒ Main line circuit breaker
- ☐ Paralleling accessories
- ☒ Remote annunciator panel
- ☐ Spring isolators
- ☒ Enclosure: aluminum, steel, weather-protective or sound attenuated
- ☒ 2 year standby power warranty
- ☐ 2 year prime power warranty
- ☐ 5 year basic power warranty
- ☐ 10 year major components warranty

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

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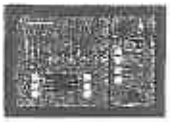
Control system PCC2100 or PCC3201



PowerCommand control is an integrated generator set control system providing governing, voltage regulation, engine protection and operator interface functions. Major features include:

- Integral AmpSentry™ Protective Relay providing a full range of alternator protection functions that are matched to the alternator provided.
- Battery monitoring and testing features and smart starting control system.
- Three phase sensing, full wave rectified voltage regulation system, with a PWM output for stable operation with all load types.
- Standard PCCNet™ and optional Echelon® LonWorks® network interface.
- 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

- Off/manual/auto mode switch
- Manual run/stop switch
- Panel lamp test switch
- Emergency stop switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments
- LED lamps indicating genset running, not in auto, common warning, common shutdown
- Configurable for local language

Engine protection

- Overspeed shut down
- Low oil pressure warning and shut down
- High coolant temperature warning and shut down
- High oil temperature warning (some models)
- Low coolant level warning or shut down
- Low coolant temperature warning
- High and low battery voltage warning
- Weak battery warning
- Dead battery shut down
- Fail to start (overcrank) shut down
- Fail to crank shut down
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication

Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Lube oil temperature (some models)
- Engine speed

AmpSentry AC protection

- Over current and short-circuit shut down
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shut down
- Over and under frequency shut down
- Overload warning with alarm contact
- Reverse power and reverse Var shut down
- Excitation fault

Alternator data

- Line-to-line and line-to-neutral AC volts
- Three phase AC current
- Frequency
- Total and individual phase power factor, kW and kVA

Other data

- Genset model data
- Start attempts, starts, running hours
- kW hours (total and since reset)
- Fault history

Governing

- Digital electronic isochronous governor
- Temperature dynamic governing
- Smart idle speed mode
- Glow plug control (some models)

Voltage regulation

- Digital PWM electronic voltage regulation
- Three phase line-to-neutral sensing
- Suitable for PMG or shunt excitation
- Single and three phase fault regulation
- Configurable torque matching

Control functions

- Data logging on faults
- Fault simulation (requires InPower)
- Time delay start and cooldown
- Cycle cranking
- Configurable customer inputs (4)
- Configurable customer outputs (4)
- Configurable network inputs (8) and outputs (16) (with optional network)
- Remote emergency stop

Paralleling (Option)

- Active digital phase lock loop synchronizer
- Isochronous kW and kVar load sharing controls
- kW import/export and kVar/PF control for utility (mains) paralleling

Options

- ☐ PCC 3201 paralleling control
- ☒ LED bargraph AC data display
- ☐ Thermostatically controlled space heater
- ☐ Key-type mode switch
- ☐ Ground fault module
- ☒ Auxiliary relays (8)
- ☒ Echelon LonWorks interface
- ☒ Modion Gateway to convert to Modbus (loose)
- ☐ PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- ☐ Digital input and output module(s) (loose)
- ☒ Remote annunciator (loose)

For further detail on PCC 2100 see document S-1409.
For further detail on PCC 3201 see document S-1444.

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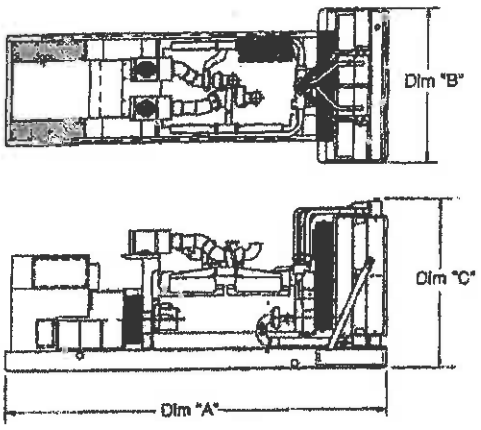
Emergency standby power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

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)
DFEJ	3864 (152.1)	1524 (60.0)	1812 (71.3)	4082 (9000)	4218 (9300)
DFEK	3864 (152.1)	1524 (60.0)	1812 (71.3)	4309 (9500)	4445 (9800)

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

Codes and standards

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

ISO 9001	This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.	UL	The generator set is available listed to UL 2200, Stationary Engine Generator Assemblies for all 60 Hz low voltage models. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage. Circuit breaker assemblies are UL 489 Listed for 100% continuous operation and also UL 869A Listed Service Equipment.
	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.	U.S. EPA	Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards, 40 CFR 60 subpart IIII Tier 2 exhaust emission levels. U.S. applications must be applied per this EPA regulation.
CSA	All low voltage models are CSA certified to product class 4215-01.	International Building Code	The generator set package is available certified for seismic application in accordance with the following International Building Code: IBC2000, IBC2003, IBC2006, IBC2009 and IBC2012.

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.

North America
1400 73rd Avenue N.E.
Minneapolis, MN 55432
USA
Phone 763 574 5000
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S-1582h (9/14)

Power Generation

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Generator set data sheet

Power Generation

Model: DFEK
Frequency: 60
Fuel type: Diesel
KW rating: 500 standby
455 prime
Emissions level: EPA NSPS Stationary Emergency Tier 2

Exhaust emission data sheet:	EDS-173
Exhaust emission compliance sheet:	EPA-1005
Sound performance data sheet:	MSP-177
Cooling performance data sheet:	MCP-105
Prototype test summary data sheet:	PTS-145
Standard set-mounted radiator cooling outline:	0500-3326
Optional set-mounted radiator cooling outline:	
Optional heat exchanger cooling outline:	
Optional remote radiator cooling outline:	

Fuel consumption

	Standby kW (kVA)				Prime kW (kVA)				Continuous kW (kVA)
Ratings	500 (625)				455 (569)				
Load	1/4	1/2	3/4	Full	1/4	1/2	3/4	Full	Full
US gph	11.6	18.8	25.7	34.4	10.9	17.6	23.7	30.4	
L/hr	44	71	97	130	41	67	90	115	

Engine

	Standby rating	Prime rating	Continuous rating
Engine manufacturer	Cummins Inc.		
Engine model	QSX15-G9		
Configuration	Cast Iron with replaceable wet cylinder liners, In-line 6 cylinder		
Aspiration	Turbocharged with air-to-air charge air cooling		
Gross engine power output, kWm (bhp)	568.0 (765.0)	507.3 (680.0)	
BMEP at set rated load, kPa (psi)	2433.9 (353.0)	2213.2 (321.0)	
Bore, mm (in)	136.9 (5.39)		
Stroke, mm (in)	168.9 (6.65)		
Rated speed, rpm	1800		
Piston speed, m/s (ft/min)	10.1 (1995.0)		
Compression ratio	17.0:1		
Lube oil capacity, L (qt)	83.3 (88.0)		
Overspeed limit, rpm	2150 ± 50		
Regenerative power, kW	52.00		

Fuel flow

Fuel flow at rated load, L/hr (US gph)	423.9 (112.0)
Maximum inlet restriction, mm Hg (in Hg)	127.0 (5.0)
Maximum return restriction, mm Hg (in Hg)	165.1 (6.5)

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Air

	Standby rating	Prime rating	Continuous rating
Combustion air, m3/min (scfm)	41.6 (1470.0)	38.8 (1370.0)	
Maximum air cleaner restriction, kPa (in H2O)	6.2 (25.0)		
Alternator cooling air, m3/min (scfm)	62.0 (2190.0)		

Exhaust

Exhaust flow at set rated load, m^3/min (cfm)	102.8 (3625.0)	88.7 (3135.0)	
Exhaust temperature, ° C (° F)	482.8 (901.0)	466.7 (872.0)	
Maximum back pressure, kPa (in H_2O)	10.2 (41.0)		

Standard set-mounted radiator cooling

Ambient design, ° C (° F)	40 (104)		
Fan load, kW_m (HP)	19 (25.5)		
Coolant capacity (with radiator), L (US Gal)	57.9 (15.3)		
Cooling system air flow, m^3/min (scfm)	707.5 (25000.0)		
Total heat rejection, MJ/min (Btu/min)	19.6 (18485.0)	17.7 (16680.0)	
Maximum cooling air flow static restriction, kPa (in H_2O)	0.12 (0.5)		

Optional set-mounted radiator cooling

Ambient design, °C (°F)	50 (122)		
Fan load, kW_m (HP)	19 (25.5)		
Coolant capacity (with radiator), L (US gal)	57.9 (15.3)		
Cooling system air flow, m^3/min (scfm)	707.5 (25000.0)		
Total heat rejection, MJ/min (Btu/min)	19.6 (18485.0)	17.7 (16680.0)	
Maximum cooling air flow static restriction, kPa (in H_2O)	0.12 (0.5)		

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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Optional remote radiator cooling[1]	Standby rating	Prime rating	Continuous rating
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)			

Weights[2]

Unit dry weight kgs (lbs)	4309 (9500)
Unit wet weight kgs (lbs)	4445 (9800)

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.

Derating factors

Standby	Genset may be operated up to 640 m (2100 ft) and 40 °C (104 °F) without power deration. For sustained operation above these conditions up to 1150 m (3770 ft), derate by 3.8% per 305 m (1000 ft), and 6.1% per 10 °C (3.4% per 10 °F). Above 1150 m (3770 ft) up to 1680 m (5510 ft), derate 6.3% total for 1150 m (3770 ft) plus 1.6% per 305 m (1000 ft) over 1150 m (3770 ft) and 3.8% per 10 °C (2.2% per 10 °F). Above 1680 m (5510 ft), up to 3000 m (9840 ft), derate 9.0% total for 1680 m (5510 ft) plus 3.7% per 305 m (1000 ft) and 5.7% per 10 °C (3.2% per 10 °F). Above 3000 m (9840 ft), derate 24.8% total for 3000 m (9840 ft) plus 1.8% per 305 m (1000 ft) above 3000 m (9840 ft) and 10% per 10 °C (5.6% per 10 °F).
Prime	Genset may be operated up to 640 m (2100 ft) and 40 °C (104 °F) without power deration. For sustained operation above these conditions up to 1150 m (3770 ft), derate by 3.8% per 305 m (1000 ft), and 6.1% per 10 °C (3.4% per 10 °F). Above 1150 m (3770 ft) up to 1680 m (5510 ft), derate 6.3% total for 1150 m (3770 ft) plus 1.6% per 305 m (1000 ft) over 1150 m (3770 ft) and 3.8% per 10 °C (2.2% per 10 °F). Above 1680 m (5510 ft), up to 3000 m (9840 ft), derate 9.0% total for 1680 m (5510 ft) plus 3.7% per 305 m (1000 ft) and 5.7% per 10 °C (3.2% per 10 °F). Above 3000 m (9840 ft), derate 24.8% total for 3000 m (9840 ft) plus 1.8% per 305 m (1000 ft) above 3000 m (9840 ft) and 10% per 10 °C (5.6% per 10 °F).
Continuous	

Ratings definitions

Emergency standby power (ESP):	Limited-time running power (LTP):	Prime power (PRP):	Base load (continuous) power (COP):
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'	105 °C	105 °C	105 °C	125 °C	125 °C	125 °C	125 °C	125 °C	150 °C	150 °C	150 °C	150 °C
Feature Code	B262	B301	B252	B258	B252	B414	B248	B300	B426	B413	B424	B419
Alternator Data Sheet Number										307	305	306
Voltage Ranges										120/208 Thru 139/240 240/416 Thru 277/480	277/480	347/600
Surge kW										514	512	515
Motor Starting kVA (at 90% sustained voltage)												
										2208	1749	1898
Full Load Current Amps at Standby Rating	110/190 1901	120/208 1737	110/220 1842	115/230 1571	139/240 1505	220/380 951	230/400 903	240/416 868	255/440 821	277/480 753	347/600 602	

REFER TO ALTERNATOR DATA SHEET FOR PROJECT SPECIFIC ALTERNATOR PERFORMANCE INFORMATION.

Note:
' Single phase power can be taken from a three phase generator set at up to 40% of the generator set nameplate kW rating at unity power factor.

Formulas for calculating full load currents:

Three phase output:

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

Single phase output

$$\frac{kW \times SinglePhaseFactor \times 1000}{Voltage}$$

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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Minneapolis, MN 55432
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Phone 763 574 5000
Fax 763 574 5298

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D-3401c (12/12)

Power Generation

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Power Generation

ALTERNATOR DATA SHEET

Frame Size HC5D

CHARACTERISTICS

WEIGHTS:

Wound Stator Assembly:	1433 lb	650 kg
Rotor Assembly:	1190 lb	536 kg
Complete Assembly:	3090 lb	1392 kg

MAXIMUM SPEED: 2250 rpm

EXCITATION CURRENT:

Full Load	1.72	Amps
No Load	0.40	Amps

INSULATION SYSTEM: Class H Throughout

3 Ø RATINGS (0.8 power factor) (Based on specific temperature rise at 40°C ambient temperature)		**60 Hz** (winding no)				**50 Hz** (winding no)		
		110/190 220/380 (311/312)	120/208 240/416 (311/312)	139/240 277/480 (311/312)	347/600 (07/17)	110/190 220/380 (311/312)	120/208 240/415 (311/312)	127/220 254/440 (311/312)
150°C Rise Ratings	kW	428	470	540	540	412	412	412
	kVA	535	588	675	515	515	515	515
125°C Rise Ratings	kW	420	460	515	515	400	400	400
	kVA	525	575	644	644	500	500	500
105°C Rise Ratings	kW	376	415	470	470	360	360	360
	kVA	470	519	588	588	450	450	450
80°C Rise Ratings	kW	328	360	412	412	312	312	312
	kVA	410	450	515	515	390	390	390

REACTANCES (per unit ± 10%) (Based on full load at 125C Rise Rating)	110/190 220/380	120/208 240/416	139/240 277/480	347/600	110/190 220/380	120/208 240/415	127/220 254/440
Synchronous	3.85	3.52	2.96	2.96	3.02	2.53	2.25
Transient	0.18	0.17	0.14	0.14	0.16	0.14	0.12
Subtransient	0.13	0.12	0.10	0.10	0.11	0.10	0.08
Negative Sequence	0.25	0.23	0.19	0.19	0.19	0.16	0.14
Zero Sequence	0.11	0.10	0.09	0.09	0.09	0.08	0.07

MOTOR STARTING	Broad Range	600	Broad Range
Maximum kVA (90% Sustained Voltage)	1896	1896	1443

TIME CONSTANTS (Sec)	Broad Range	600	Broad Range
Transient	0.080	0.080	0.080
Subtransient	0.012	0.012	0.012
Open Circuit	2.200	2.200	2.200
DC	0.018	0.018	0.018

WINDINGS (@20°C)	Broad Range	600	Broad Range
Stator Resistance (Ohms per phase)	0.0116	0.0158	0.0116
Rotor Resistance (Ohms)	1.7700	1.7700	1.7700
Number of Leads	12	6	12

Single phase power can be taken up to 40% of 3 phase- ratings

Attachment L

General Permit Registration

Application Fee

COLUMBIA GAS TRANSMISSION LLC
PO BOX 30130
COLLEGE STATION, TX 77842

S 000295 T1C9APN1 000295 E

00000295 01 FP 0.471 01 TR 00007 T1C9APN1 000000 001144

WEST VIRGINIA DEPARTMENT OF ENVIRON
ENVIRONMENTAL PROTECTION
C*O Columbia Pipeline Group
ATTN: Michelle Barton
1700 Maccorkle Ave SE
Charleston, WV 25314

PAGE: 1

PAYMENT SUMMARY

VENDOR NO: 2000001195
VOUCHER NO: 0351142630
PHONE NUMBER: 877-629-6286
VOUCHER DATE: 08/12/15

REF. DOC.	REFERENCE NUMBER	REF. DATE	DOCUMENT AMOUNT	DISCOUNT/ADJ AMOUNT	NET AMOUNT
SELLER INVCE	5017602	08/10/15	250.00	0.00	250.00
		TOTALS:	250.00	0.00	250.00

(Detach Here)

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COLUMBIA GAS TRANSMISSION LLC
PO BOX 30130
COLLEGE STATION, TX 77842

60-160/433

CHECK DATE: 08/12/2015
CHECK NUMBER: 0351142630

PAY...TWO HUNDRED FIFTY DOLLARS 00 CENTS

VALID FOR 180 DAYS

$*******250.00

TO THE ORDER OF:
WEST VIRGINIA DEPARTMENT OF ENVIRON
ENVIRONMENTAL PROTECTION
C*O Columbia Pipeline Group
ATTN: Michelle Barton
1700 Maccorkle Ave SE
Charleston, WV 25314

Dean G. Bruso

THE BANK OF NEW YORK MELLON
PITTSBURGH, PENNSYLVANIA

⑈0351142630⑈ ⑆043301601⑆ 113⑈2005⑈

EMERGENCY GENERATOR EMISSION SUMMARY SHEET FOR CRITERIA POLLUTANTS

Emergency Generator Location: Charleston Headquarters Building						Registration Number (Agency Use) G65-C				
	Potential Emissions (lbs/hr)					Potential Emissions (tons/yr)				
Source ID No.	NO_X	CO	VOC	SO_2	PM_{10}	NO_X	CO	VOC	SO_2	PM_{10}
G2	5.15	0.67	1.34	0.007	0.17	1.29	0.17	0.33	0.002	0.04
Total	5.15	0.67	1.34	0.007	0.17	1.29	0.17	0.33	0.002	0.04

EMERGENCY GENERATOR EMISSION SUMMARY SHEET FOR HAZARDOUS/TOXIC POLLUTANTS

Emergency Generator Location: Charleston Headquarters Building

Registration Number (Agency Use) G65-C

	Potential Emissions (lbs/hr)						Potential Emissions (tons/yr)					
Source ID No.	Benzene	Ethyl-benzene	Toluene	Xylenes	n-Hexane	Formalde-hyde	Benzene	Ethyl-benzene	Toluene	Xylenes	n-Hexane	Formalde-hyde
G2	0.004	-	0.0013	0.001	-	0.0004	0.001	-	0.0003	0.0002	-	0.0001
Total	0.004	-	0.0013	0.001	-	0.0004	0.001	-	0.0003	0.0002	-	0.0001