

F&A RECEIPT 786365  
2012 AUG 14

RECIPROCATING INTERNAL COMBUSTION ENGINES  
AIR GENERAL PERMIT EXAMPLE REGISTRATION WORKSHEET

Facility Identification Number - If known (seven digit number)

N/A

0890438-00

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DIVISION OF AIR  
RESOURCE MANAGEMENT

Registration Type

Check one:

**INITIAL REGISTRATION** - Notification of intent to:

- Construct and operate a proposed new facility.
- Operate an existing permitted facility not currently using an air general permit (e.g., a facility proposing to go from an air operation permit to an air general permit). If the facility currently holds one or more air operation permits, such permit(s) must be surrendered by the owner or operator upon the effective date of this air general permit. (See "Surrender of Existing Air Operation Permit(s)" below.)
- Operates an existing facility not currently permitted or using an air general permit.

**RE-REGISTRATION** (for facilities currently using an air general permit) - Notification of intent to:

- Continue operating the facility after expiration of the current term of air general permit use.
- Continue operating the facility after a change of ownership.
- Make an equipment change requiring re-registration pursuant to Rule 62-210.310(2)(e), F.A.C.
- Any other change not considered an administrative correction under Rule 62-210.310(2)(d), F.A.C.

**Surrender of Existing Air Operation Permit(s) - For Initial Registrations Only, if Applicable**

All existing air operation permits for this facility are hereby surrendered upon the effective date of this air general permit; specifically permit number(s):

N/A - Not a current facility.

**General Facility Information**

**Facility Owner/Company Name** (Name of corporation, agency, or individual owner who or which owns, leases, operates, controls, or supervises the facility.)  
LNG Energy Solutions, LLC

**Site Name** (Name, if any, of the facility site; e.g., Plant A, Metropolis Plant, etc. If more than one facility is owned, a complete registration must be submitted for each.)  
LNG Energy Solutions, LLC to be located near the "Baldwin Gate Metering Station" (o/o by Southern Natural Gas)

**Facility Location** (Physical location of the facility, not necessarily the mailing address.)

Street Address: State Road 200 (US 301) (0.2 miles north of Big Oaks Road)

City: Bryceville, FL

County: Nassau

Zip Code: 32009

**Facility Start-Up Date** (Estimated start-up date of proposed new facility.)(N/A for existing facility.)

In service by September 24, 2012

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# RECIPROCATING INTERNAL COMBUSTION ENGINES

## Air General Permit Example Registration Worksheet

The Department of Environmental Protection ("Department" or "DEP") has established an "air general permit" at Florida Administrative Code ("F.A.C.") Rule 62-210.10(4)(b) for reciprocating internal combustion engines. An air general permit is an authorization by the Department to construct or operate a specific type of air pollutant emitting facility. Use of such authorization by any individual facility does not require action by the Department. The terms and conditions of the air general permit are set forth in the rule, rather than in a separately issued air construction or air operation permit.

If you are the owner or operator of an eligible facility comprising one or more reciprocating internal combustion engines, you may register to use the air general permit at Rule 62-210.310(4)(b), F.A.C., by following the general procedures given at subsections 62-210.310(2) and 62-210.310(3), F.A.C. To register, use the Department's electronic registration system (currently under development) or submit all the information specified in the above rules to either of the following addresses, along with the air general permit registration processing fee (\$100.00), payable to FDEP.

**Regular USPS Mail Delivery**  
Department of Environmental Protection  
Receipts  
Post Office Box 3070  
Tallahassee, Florida 32315-3070

or

**Overnight Delivery (FedEx, UPS, DHL, etc.)**  
Department of Environmental Protection  
3800 Commonwealth Blvd.  
Mail Station 77  
Tallahassee, Florida 32399

If you properly register to use an air general permit, and are not denied use of the air general permit by the Department, you are authorized to construct and operate the facility in accordance with the general terms and conditions of Rule 62-210.310, F.A.C., and the specific terms and conditions of Rule 62-210.310(4)(b), F.A.C. Your facility may vary, so be sure your registration describes the operations at your facility in sufficient detail to demonstrate the facility's eligibility for use of the air general permit and to provide a basis for tracking any future equipment or process changes. Your registration should describe all air pollutant-emitting processes and equipment at the facility, and it should identify any air pollution control measures or equipment used.

The rules do not require any specific format for the registration. This worksheet, however, has been designed to assist owners and operators. Using it as a template for a general permit registration will help ensure that all necessary information is submitted.

Additional information can be found on the Department's air general permit program website ([http://www.floridadep.org/air/emission/air\\_gp.htm](http://www.floridadep.org/air/emission/air_gp.htm)) or by calling the Small Business Environmental Assistance Program Hotline at 1-800-SBAP-HLP (1-800-722-7457).

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FACILITY REGISTRATION  
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**Facility Contact**

<u>Name and Position Title</u> (Plant manager or person to be contacted regarding day-to-day operations at the facility.) Print Name and Title: <u>No on-site personnel. Company Contact: Eric Fischer, Managing Partner</u>		
<u>Facility Contact Telephone Numbers</u> Telephone: <u>N/A</u> Fax: <u>724-746-6725</u> Cell phone: <u>925-766-5813</u> E-mail: <u>eric.fischer@lngenergysolutions.com</u>		
<u>Facility Contact Mailing Address</u> Organization/Firm: <u>LNG Energy Solutions, LLC</u> Mailing Address: <u>171 Hillpointe Drive, Suite 301</u> City: <u>Canonsburg, PA</u> County: <u>Washington</u> Zip Code: <u>15317</u>		

**Correspondence Contact/Representative (to serve as additional Department contact)**

<u>Name and Position Title</u> Print Name and Title: <u>Same as above.</u>		
<u>Correspondence Contact/Representative Telephone Numbers</u> Telephone: <u>Same as above.</u> Fax: _____ Cell phone: _____ E-mail: _____		
<u>Correspondence Contact/Representative Mailing Address</u> Organization/Firm: <u>Same as above.</u> Mailing Address: _____ City: _____ County: _____ Zip Code: _____		

**Government Facility Code (check only one)**

<input type="checkbox"/> Facility not owned or operated by a federal, state, or local government.
<input type="checkbox"/> Facility owned or operated by the federal government.
<input type="checkbox"/> Facility owned or operated by the state.
<input type="checkbox"/> Facility owned or operated by the county.
<input type="checkbox"/> Facility owned or operated by the municipality.
<input type="checkbox"/> Facility owned or operated by a water management district.

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**COMPRESSION IGNITION INTERNAL COMBUSTION ENGINES SUBJECT TO 40 CFR PART 60 SUBPART III:**

Stationary compression ignition internal combustion engines manufactured after April 1, 2006 and are not fire pump engines, or engines that are modified or reconstructed after July 11, 2005, may be subject to 40 CFR Part 60 Subpart III, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.

MANUFACTURER	SERIAL NUMBER/MODEL NUMBER	EMERGENCY ENGINE*	MANUFACTURER CERTIFICATION	DISPLACEMENT (liters per cylinder)
N/A	N/A	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	

\*Emergency engine as defined at 40 C.F.R. Part 60, Subpart III

**SPARK IGNITION INTERNAL COMBUSTION ENGINES SUBJECT TO 40 CFR PART 60 SUBPART JJJ:**

Stationary spark ignition internal combustion engines, greater than or equal to 500 horsepower and manufactured on or after July 1, 2007, less than 500 horsepower and manufactured after July 1, 2008, or engines that begin modification or reconstruction after June 12, 2006 may be subject to 40 CFR Part 60 Subpart JJJ, Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.

MANUFACTURER	SERIAL NUMBER/MODEL NUMBER	EMERGENCY ENGINE**	MANUFACTURER CERTIFICATION	RATED CAPACITY (horsepower)
N/A	N/A	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	

\*\*Emergency engine as defined at 40 C.F.R. Part 60, Subpart JJJ



### **Fuel Consumption**

If this is an **initial registration** for reciprocating internal combustion engine operations, provide an estimate of the total amount of fuel expected to be consumed over a 12-month period. \*

19 MMscf/year (6 month operation) for each engine X 2 engines = 38 MMscf/year

If this is a **re-registration** for reciprocating internal combustion engine operations, provide the highest 12-month total fuel consumption amount, in appropriate units, for the last five years. Indicate the 12-month period over which this fuel consumption occurred.

\***Note:** the general permit limits fuel consumption by all reciprocating internal combustion engines at the facility to 20,000 gallons per year of gasoline, 250,000 gallons per year of diesel fuel, 1.15 million gallons per year of propane, 40 million standard cubic feet per year of natural gas, or an equivalent prorated amount if multiple fuels are used

### **Helpful Definitions**

**“Department” or “DEP”** - The State of Florida Department of Environmental Protection.

**“Emissions Unit”** - Any part or activity of a facility that emits or has the potential to emit any air pollutant.

**“Facility”** - All of the emissions units which are located on one or more contiguous or adjacent properties, and which are under the control of the same person (or persons under common control).

**“Owner” or “Operator”** - Any person or entity who or which owns, leases, operates, controls or supervises an emissions unit or facility.

**Baker**

*Michael Baker Jr., Inc.*

**APPENDIX 2**

*Supporting Emission Calculations*

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MICHAEL BAKER JR. INC.  
1000 BAKER BLVD  
ANN ARBOR MI 48106

**TABLE A-1**  
**4-Stroke Rich-Burn Reciprocating Engines**  
**Maximum Emission Estimates**

Make	Cummins				
Model	GTA28 (spark ignition)				
Fuel	Natural Gas				
Fuel Higher Heating Value (HHV)	1,020 BTU/scf			1,020 BTU/scf	
Ambient Temperature	80 °F			80 °F	
Power Output	450 bhp (mech.)			473 bhp (mech.)	
	336 kW (elec.)			352 kW (elec.)	
Heat Rate at HHV	10,000 BTU/hp-hr			10,000 BTU/hp-hr	
Operating Hours	4,320 hrs/yr				
Fuel Consumption	4,412 scfh			4,632 scfh	
	19.059 MMscf/yr				
Heat Input at HHV	4.50 MMBTU/hr			4.73 MMBTU/hr	
	19,440 MMBTU/yr	Average Hourly	Maximum Annual		Maximum Hourly
NO <sub>x</sub>	2,315.40 lb/MMscf	10.2150 lb/hr	22.0644 tpy	2,315.40 lb/MMscf	10.7258 lb/hr
CO	3,794.40 lb/MMscf	16.7400 lb/hr	36.1584 tpy	3,794.40 lb/MMscf	17.5770 lb/hr
SO <sub>2</sub>	0.60 lb/MMscf	0.0026 lb/hr	0.0057 tpy	0.60 lb/MMscf	0.0028 lb/hr
PM <sub>10/2.5</sub>	19.80 lb/MMscf	0.0873 lb/hr	0.1887 tpy	19.80 lb/MMscf	0.0917 lb/hr
CO <sub>2,e</sub>	125,157.61 lb/MMscf	552.1659 lb/hr	1,192.6784 tpy	125,157.61 lb/MMscf	579.7742 lb/hr
CO <sub>2</sub>	120,160.75 lb/MMscf	530.1210 lb/hr	1,145.0613 tpy	120,160.75 lb/MMscf	556.6270 lb/hr
N <sub>2</sub> O	0.23 lb/MMscf	0.0010 lb/hr	0.0022 tpy	0.23 lb/MMscf	0.0010 lb/hr
TOC (Total)	365.16 lb/MMscf	1.6110 lb/hr	3.4798 tpy	365.16 lb/MMscf	1.6916 lb/hr
Methane	234.60 lb/MMscf	1.0350 lb/hr	2.2356 tpy	234.60 lb/MMscf	1.0868 lb/hr
Ethane	71.81 lb/MMscf	0.3168 lb/hr	0.6843 tpy	71.81 lb/MMscf	0.3326 lb/hr
VOC (Total)	30.19 lb/MMscf	0.1332 lb/hr	0.2877 tpy	30.19 lb/MMscf	0.1399 lb/hr
HAP (Total)	33.07 lb/MMscf	0.1459 lb/hr	0.3151 tpy	33.07 lb/MMscf	0.1532 lb/hr

**NOTES**

- Fuel higher heating value selected to correspond to AP-42 emissions factors.
- CO<sub>2</sub> emission factor based on 40 CFR 98, Subpart C, Table C-1 (1,028 BTU/scf; 53.02 kg/MMBTU => 120,160.75 lb/MMscf).
- N<sub>2</sub>O emission factor based on 40 CFR 98, Subpart C, Table C-2 (1,028 BTU/scf; 0.0001 kg/MMBTU => 0.23 lb/MMscf).
- Manufacturer provided data on power output and heat rate:
- Operating Hours based on 24-hours/day for six (6) months of operation.
- Maximum hourly emissions based on 75% of rated capacity (600bhp)
- Remaining emissions based on data provided in Table 3.2-3 AP-42 (7/00).

Intermittent	
450 hp	
9,000 BTU/scf (LHV)	ASSUMED

Summary of Emissions (tpy)	Engine 1 of 2	Engine 2 of 2	Total
NO <sub>x</sub>	22.0644	22.0644	44.1288
CO	36.1584	36.1584	72.3168
SO <sub>2</sub>	0.0057	0.0057	0.0114
PM <sub>10/2.5</sub>	0.1887	0.1887	0.3773
CO <sub>2,e</sub>	1,192.6784	1,192.6784	2,385.3568
CO <sub>2</sub>	1,145.0613	1,145.0613	2,290.1226
N <sub>2</sub> O	0.0022	0.0022	0.0043
TOC (Total)	3.4798	3.4798	6.9595
Methane	2.2356	2.2356	4.4712
Ethane	0.6843	0.6843	1.3686
VOC (Total)	0.2877	0.2877	0.5754
HAP (Total)	0.3151	0.3151	0.6302

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 PTE Estimates  
 August 2012



**Baker**

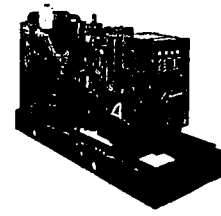
*Michael Baker Jr., Inc.*

**APPENDIX 3**

*Manufacturer Specification Sheet*

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MICHAEL BAKER JR., INC.  
1000 BAKER BLVD  
ANN ARBOR MI 48106

# Gaseous Fuel Generator Set GTA28 CC Engine Series



➤ **Specification Sheet**  
**Model GF GA EPA SI NSPS Compliant Capable**



<b>KW(KVA) @ 0.8 P.F.</b>	
Compression Ratio	60 HZ-1800 RPM
	Standby
8.5:1 (note 1)	450 (562)
8.5:1 (note 2)	280 (350)

Notes:  
1) 54 °C (130 °F) or lower water temperature to the aftercooler  
2) **PROPANE RATING** 54 °C (130 °F) or lower water temperature to the aftercooler  
(per EPA SI NSPS this engine cannot operate for more than 100 hours annually on propane fuel as back up fuel to natural gas)

NOTE: This engine is EPA SI NSPS Compliant Capable

<b>Fuel Application Guide</b>	
Compression Ratio	8.5:1
Dry Processed Natural Gas	Yes
Propane (HD-5)	Yes
All gases such as field gas, digester, and sewage gas will require an analysis of the specified gas and pre-approval from CNGE. Consult your Cummins Distributor for details.	

## Description

The Cummins NPower GF-series commercial generator set is a fully integrated power generation system providing optimum performance, reliability, and versatility for stationary standby or prime power applications.

A primary feature of the GF GenSet is strong motor-starting capability and fast recovery from transient load changes. The torque-matched system includes a heavy-duty Cummins 4-cycle spark ignited engine, an AC alternator with high motor-starting kVA capacity, and an electronic voltage regulator with three phase sensing for precise regulation under steady-state or transient loads. The GF GenSet accepts 100% of the nameplate standby rating in one step. \*

The standard PowerCommand® digital electronic control is an integrated system that combines engine and alternator controls for high reliability and optimum GenSet performance.

Optional weather-protective housings and coolant heaters shield the generator set from extreme operating conditions. Environmental concerns are addressed by low exhaust emission engines, sound-attenuated housings, and exhaust silencers. A wide range of options, accessories, and services are available, allowing configuration to your specific power generation needs.

Every production unit is factory tested at rated load and power factor. This testing includes demonstration of rated power and single-step rated load pickup. Cummins NPower manufacturing facilities include quality standards, emphasizing our commitment to high quality in the design, manufacture, and support of our products. The generator is CSA certified. The PowerCommand control is UL508 Listed.

All Cummins NPower generator sets are backed by a comprehensive warranty program and supported by a worldwide network of 170 distributors and service branches to assist with warranty, service, parts, and planned maintenance support.

## Features

**Cummins Heavy-Duty Engine** - Rugged 4-cycle industrial spark ignited engine 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, fault-clearing short-circuit capability, and class H insulation. The alternator electrical insulation system is UL1446 Recognized.

**Control Systems** - The PowerCommand electronic control is standard equipment and provides total genset system integration, including automatic remote starting/stopping, precise voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection, and NFPA 110 compliance. PowerCommand control is Listed to UL508.

**Cooling System** - Standard cooling package provides reliable running at the rated power level, at up to 100°F ambient temperature.

**Housings** - Optional weather-protective housings are available.

**Certifications** - Generators are designed, manufactured, tested, and certified to relevant UL, NFPA, ISO, IEC, and CSA standards.

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

\*Adequate fuel pressure and volume must be provided. Engines must be equipped with a functioning jacket water heater.



# Generator Set

The general specifications provide representative configuration details. Consult the outline drawing for installation design.

## Specifications – General

See outline drawing for installation design specifications.

<b>Unit Width, in (mm)</b>	80" (2032)	Open Set
<b>Unit Height, in (mm)</b>	93" (2362)	Open Set
<b>Unit Length, in (mm)</b>	167" (4241)	Open Set
<b>Unit Dry Weight, lb (kg)</b>	15462 (7013)	
<b>Rated Speed, rpm</b>	1800	
<b>Voltage Regulation, No Load to Full Load</b>	±1.0%	
<b>Random Voltage Variation</b>	±1.0%	
<b>Frequency Regulation</b>	Isochronous	
<b>Random Frequency Variation</b>	±0.5%	
<b>Radio Frequency Interference</b>	Optional PMG excitation operates in compliance with BS800 and VDE level G and N. Addition of RFI protection kit allows operation per MIL-STD-461 and VDE level K.	

## Rating Definitions

**Standby Rating based on:** Applicable for supplying emergency power for the duration of normal power interruption. No sustained overload capability is available for this rating. (Equivalent to Fuel Stop Power in accordance with ISO3046, AS2789, DIN6271 and BS5514). Nominally rated.

## Site Derating Factors

Engine power available up to 3000' (m) at ambient temperatures up to 104 °F. Above 3000' (m) derate at 4% per 1000 ft (305 m), and 1% per 10 °F (2% per 11 °C) above 104 °F.

1) Data represents gross engine performance capabilities obtained and corrected in accordance with SAEJ1349 conditions of 29.61 in. Hg.(100KPa) barometric pressure [300 ft. (91m) altitude], 77°F (25°C) inlet air temperature, and 0.30 in. Hg.(100KPa) water vapor pressure using dry processed natural gas fuel with 905 BTU per standard cubic foot (33.72 ki/l) lower heating value. Deration may be required due to altitude, temperature or type of fuel. Consult your local Cummins Distributor for details.

### 2) FUEL SYSTEM

Standard Carburetor – IMPCO Make

Low Pressure Dry Processed Natural Gas – ( 905 BTU/ft.<sup>3</sup> L.H.V.)

Running Pressure to Carburetor (After Regulation) – in. H<sub>2</sub>O (mm H<sub>2</sub>O) ..... 5 ~ 7 (127~177)

Running Pressure to Engine Mounted Regulator ~ in. H<sub>2</sub>O (mm H<sub>2</sub>O) ..... 15 ~ 20 (381 ~ 508)

Minimum Gas Supply Pipe Size @ Engine – in. (mm) ..... 2.0 (50.8)

Gas Supply Filter Pressure Rating – PSI (kPa).....100 (690)

The preceding pipe sizes are only suggestions and piping may vary with temperatures, distance from fuel supply and application of local codes. Gas must be available at adequate volume and pressure for engine at the regulator.

# Engine

Cummins heavy-duty spark ignited engines use advanced combustion technology for reliable and stable power, low emissions, and fast response to sudden load changes.

Electronic governing is standard for applications requiring constant (isochronous) frequency regulation such as Uninterruptible Power Supply (UPS) systems, non-linear loads, or sensitive electronic loads. Optional coolant heaters are recommended for all emergency standby installations or for any application requiring fast load acceptance after start-up.

## Specifications – Engine

<b>Base Engine</b>	Cummins Model	GTA28 CC
<b>Displacement in<sup>3</sup> (L)</b>	1710 (28)	
<b>Overspeed Limit, rpm</b>	2100	
<b>Regenerative Power, kW</b>	-	
<b>Cylinder Block Configuration</b>	Cast iron with replaceable wet cylinder liners	
<b>Cranking Current</b>	550 amps at ambient temperature of 32°F (0°C)	
<b>Battery Charging Alternator</b>	37 amps	
<b>Starting Voltage</b>	24-volt, negative ground	
<b>Lube Oil Filter Types</b>	Single spin-on canister-combination full flow with bypass	
<b>Standard Cooling System</b>	104°F (40°C) ambient radiator	

Fuel	STANDBY		
	1/2	3/4	Full
Fuel Consumption (Approximate)			
Load			
kW	<u>225</u>	<u>337</u>	<u>450</u>
CFH	3490	4707	5890
<b>Cooling</b>			
Heat Rejection to Coolant*	27239 BTU/min	479 kW	
Heat Rejection to Room	3022 BTU/min	53 kW	
Coolant Capacity (with radiator)*	45 USG	170 L	
Coolant Flow Rate	200 GPM	757 L/min	
Maximum Coolant Friction Head	5 psi	34 kPa	
Maximum Coolant Static Head	60 ft	18.3 m	
Radiator Fan Load	52.5 hp	39 kW	
<b>Air</b>			
Combustion Air	962 cfm	454 L/sec	
Maximum Air Cleaner Restriction	15 in H2O	381 mm H2O	
Alternator Cooling Air	1770 cfm	50.1 cu m/min	
Radiator Cooling Air	63800 cfm	30110 L/sec	
Maximum Restriction at Radiator Discharge (static)	0.5 in H2O	12.7 mm H2O	
<b>Exhaust</b>			
Gas Flow (Full Load)	3671 cfm	1733 L/sec	
Gas Temperature	1219 °F	659 °C	
Maximum Back Pressure	2 in Hg	50 mm Hg	
<b>Engine</b>			
Gross Engine Power Output	701 bhp	523 kWm	
BMEP	190 psi	1310 kPa	
Piston Speed	1800 ft/min	9.14 m/s	

\* Jacket water only. Contact factory for aftercooler heat rejections, capacity and coolant flows

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 Cummins NPower

## Alternator

Several alternators are available for application flexibility based on the required motor-starting kVA and other requirements. Larger alternator sizes have lower temperature rise for longer life of the alternator insulation system. In addition, larger alternator sizes can provide a cost-effective use of engine power in across-the-line motor-starting applications and can be used to minimize voltage waveform distortion caused by non-linear loads.

Single-bearing alternators couple directly to the engine flywheel with flexible discs for drivetrain reliability and durability. No gear reducers or speed changers are used. Two-thirds pitch windings eliminate third-order harmonic content of the AC voltage waveform and provide the standardization desired for paralleling of generator sets. The standard excitation system is a self (shunt) excited system with the voltage regulator powered directly from the generator set output.

### Alternator Application Notes

**Separately Excited Permanent Magnet Generator (PMG) System** - This option uses an integral PMG to supply power to the voltage regulator. A PMG system generally has better motor-starting performance, lower voltage dip upon load application, and better immunity from problems with harmonics in the main alternator output induced by non-linear loads. This option is recommended for use in applications that have large transient loads, sensitive electronic loads (especially UPS applications), harmonic content, or that require sustained short-circuit current (sustained 3-phase short circuit current at approximately 3 times rated for 10 seconds).

**Alternator Sizes** - On any given model, various alternator sizes are available to meet individual application needs. Alternator sizes are differentiated by maximum winding temperature rise, at the generator set standby or prime rating, when operated in a 40°C ambient environment. Available temperature rises range from 80°C to 150°C. Not all temperature rise selections are available on all models. Lower temperature rise is accomplished using larger alternators at lower current density. Lower temperature rise alternators have higher motor-starting kVA, lower voltage dip upon load application, and they are generally recommended to limit voltage distortion and heating due to harmonics induced by non-linear loads.

**Alternator Space Heater** - is recommended to inhibit condensation.

### Available Output Voltages

#### Three Phase Reconnectable

- 120/208
- 127/220
- 139/240
- 120/240
- 240/416
- 254/440
- 277/480

#### Single Phase Non-Reconnectable

- 120/240

#### Three Phase Non-Reconnectable

- 220/380
- 347/600

# Specifications – Alternator

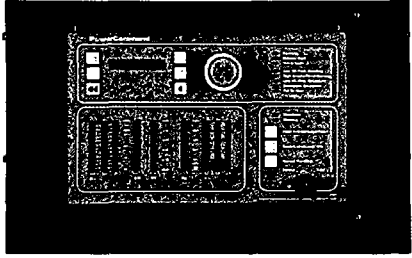
<b>Design</b>	Brushless, 4-pole, drip-proof revolving field
<b>Stator</b>	2/3 pitch
<b>Rotor</b>	Direct-coupled by flexible disc
<b>Insulation System</b>	Class H per NEMA MG1-1.65
<b>Standard Temperature Rise</b>	125°C standby
<b>Exciter Type</b>	PMG
<b>Phase Rotation</b>	A (U), B (V), C (W)
<b>Alternator Cooling</b>	Direct-drive centrifugal blower
<b>AC Waveform Total Harmonic Distortion</b>	<5% total no load to full linear load <3% for any single harmonic
<b>Telephone Influence Factor (TIF)</b>	<50 per NEMA MG1-22.43.
<b>Telephone Harmonic Factor (THF)</b>	<3

	80°C Alternator			105°C Alternator			125°C Alternator			
<b>Voltage Ranges</b>	110/190 thru 139/240 220/380 Thru 277/480 120/240*		347/600	110/190 thru 139/240 220/380 Thru 277/480 120/240		347/600	110/190 Thru 139/240 220/380 Thru 277/480 120/240*	120/208 Thru 139/240 240/416 Thru 277/480 120/240*	277/480	347/600
<b>Motor Starting</b>	<u>Broad Range</u> <u>600 V</u>		<u>Broad Range</u> <u>600V</u>		<u>Broad Range</u> <u>480V</u> <u>600V</u>					
Maximum kVA (90% Sustained Voltage)	2429	2208	2208	1749	2208	1896	1749	1749	1749	
<b>Alternator Data Sheet Numbers</b>	308b	307b	307b	305b	307b	306b	305b	305b	305b	
<b>Full Load Current</b> (Amps @ Standby Rating)	<u>120/208</u> 1561	<u>127/220</u> 1476	<u>139/240</u> 1352	<u>220/380</u> 855	<u>240/416</u> 780	<u>254/440</u> 738	<u>277/480</u> 676	<u>347/600</u> 541		

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 Cummins NPower



# Control System

	<b>PowerCommand Control with AmpSentry™ Protection</b>	
	<ul style="list-style-type: none"> <li>The PowerCommand Control is an integrated generator set control system providing governing, voltage regulation, engine protection, and operator interface functions.</li> <li>PowerCommand Controls include integral AmpSentry protection. AmpSentry provides a full range of alternator protection functions that are matched to the alternator provided.</li> <li>Controls provided include Battery monitoring and testing features, and Smart-Starting control system.</li> <li>InPower PC-based service tool available for detailed diagnostics.</li> <li>Available with Echelon LonWorks™ network interface.</li> <li>NEMA 3R enclosure.</li> <li>Suitable for operation in ambient temperatures from -40C to +70C, and altitudes to 13,000 feet (5000 meters).</li> <li>Prototype tested; UL, CSA, and CE compliant.</li> </ul>	
<b>AmpSentry AC Protection</b>	<b>Engine Protection</b>	<b>Operator Interface</b>
<ul style="list-style-type: none"> <li>Overcurrent and short circuit shutdown</li> <li>Overcurrent warning</li> <li>Single &amp; 3-phase fault regulation</li> <li>Over and under voltage shutdown</li> <li>Over and under frequency shutdown</li> <li>Overload warning with alarm contact</li> <li>Reverse power and reverse Var shutdown</li> <li>Excitation fault</li> </ul>	<ul style="list-style-type: none"> <li>Overspeed shutdown</li> <li>Low oil pressure warning and shutdown</li> <li>High coolant temperature warning and shutdown</li> <li>High oil temperature warning (optional)</li> <li>Low coolant level warning or shutdown</li> <li>Low coolant temperature warning</li> <li>High and low battery voltage warning</li> <li>Weak battery warning</li> <li>Dead battery shutdown</li> <li>Fail to start (overcrank) shutdown</li> <li>Fail to crank shutdown</li> <li>Redundant start disconnect</li> <li>Cranking lockout</li> <li>Sensor failure indication</li> </ul>	<ul style="list-style-type: none"> <li>OFF/MANUAL/AUTO mode switch</li> <li>MANUAL RUN/STOP switch</li> <li>Panel lamp test switch</li> <li>Emergency Stop switch</li> <li>Alpha-numeric display with pushbutton access, for viewing engine and alternator data and providing setup, controls, and adjustments</li> <li>LED lamps indicating genset running, not in auto, common warning, common shutdown</li> <li>(5) configurable LED lamps</li> <li>LED Bargraph AC data display (optional)</li> </ul>
<b>Alternator Data</b>	<b>Engine Data</b>	<b>Other Data</b>
<ul style="list-style-type: none"> <li>Line-to-line and line-to-neutral AC volts</li> <li>3-phase AC current</li> <li>Frequency</li> <li>Total and individual phase kW and kVA</li> </ul>	<ul style="list-style-type: none"> <li>DC voltage</li> <li>Lube oil pressure</li> <li>Coolant temperature</li> <li>Lube oil temperature (optional)</li> </ul>	<ul style="list-style-type: none"> <li>Genset model data</li> <li>Start attempts, starts, running hours</li> <li>KW hours (total and since reset)</li> <li>Fault history</li> <li>Load profile (hours less than 30% and hours more than 90% load)</li> <li>System data display (optional with network and other PowerCommand gensets or transfer switches)</li> </ul>
	<b>Voltage Regulation</b>	<b>Control Functions</b>
	<ul style="list-style-type: none"> <li>Integrated digital electronic voltage regulator</li> <li>3-phase line to neutral sensing</li> <li>PMG (Optional)</li> <li>Single and three phase fault regulation</li> <li>Configurable torque matching</li> </ul>	<ul style="list-style-type: none"> <li>Data logging on faults</li> <li>Fault simulation (requires InPower)</li> <li>Time delay start and cooldown</li> <li>Cycle cranking</li> <li>(4) Configurable customer inputs</li> <li>(4) Configurable customer outputs</li> <li>(8) Configurable network inputs and (16) outputs (with optional network)</li> </ul>
<b>Options</b>		
<input type="checkbox"/> Power Transfer Control <input type="checkbox"/> Analog AC Meter Display <input type="checkbox"/> Thermostatically Controlled Space Heater	<input type="checkbox"/> Key-type mode switch <input type="checkbox"/> Ground fault module <input type="checkbox"/> Engine oil temperature <input type="checkbox"/> Auxiliary Relays (3)	<input type="checkbox"/> Echelon LonWorks interface <input type="checkbox"/> Digital input and output module(s) (loose) <input type="checkbox"/> Remote annunciator (loose)

## Generator Set Options

**Engine**

- 120/240 V, W coolant heaters
- 120/240 V, W lube oil heater
- Electronic governor

**Cooling System**

- Heat exchanger cooling
- Remote radiator cooling

**Fuel System**

- Flexible fuel connector
- Fuel strainer
- Dual fuel systems

**Alternator**

- 105°C rise alternator
- 125°C rise alternator
- 120/240 V, 100 W anti-condensation heater
- Single phase

**Exhaust System**

- GenSet mounted muffler
- Heavy duty exhaust elbow
- Slip on exhaust connection

**Generator Set**

- AC entrance box
- Batteries
- Battery charger
- Export box packaging
- Main line circuit breaker
- PowerCommand Network Communication Module (NCM)
- Stage 1 housing w/silencer
- Stage II housing w/silencer
- Remote annunciator panel
- Spring isolators
- Weather protective enclosure with silencer
- 2 year standby warranty
- 5 year basic power warranty

**Available Products and Services**

A wide range of products and services is available to match your power generation system requirements. Cummins Power Generation products and services include:

- Diesel and Spark-Ignited Generator Sets
- Transfer Switches
- Bypass Switches
- Parallel Load Transfer Equipment
- Digital Paralleling Switchgear
- PowerCommand Network and Software
- Distributor Application Support
- Planned Maintenance Agreements

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## Warranty

All components and subsystems are covered by an express limited one-year warranty. Other optional and extended factory warranties and local distributor maintenance agreements are available. Contact your distributor/dealer for more information.

## Certifications



**CSA** - The generator is CSA certified to product class 4215-01.



**PTS** - The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Products bearing the PTS symbol have been subjected to demanding tests in accordance to NFPA 110 to verify the design integrity and performance under both normal and abnormal operating conditions including short circuit, endurance, temperature rise, torsional vibration, and transient response, including full load pickup.

**See your distributor for more information**



**Cummins NPower LLC**  
875 Lawrence Drive  
DePere, WI 54115  
920.337.9750  
Fax: 920.337.9746  
[www.cumminsnpower.com](http://www.cumminsnpower.com)

Cummins and PowerCommand are registered trademarks of Cummins Inc.  
AmpSentry is a trademark of Cummins Inc.  
LonWorks is a registered trademark of Echelon

**Important: Backfeed to a utility system can cause electrocution and/or property damage. Do not connect generator sets to any building electrical system except through an approved device or after building main switch is open.**

**Baker**

**Michael Baker Jr., Inc.**  
A Unit of Michael Baker Corporation

Airside Business Park  
100 Airside Drive  
Moon Township, PA 15108

OFFICE: 412-269-6300  
FAX: 412-375-3995

August 10, 2012

Via FEDEX

Mr. Dickson Dibble  
Florida Department of Environmental Protection  
3800 Commonwealth Blvd  
Mail Station 77  
Tallahassee, Florida 32399

**RE: RICE Worksheet: 2 Cummins Engines  
LNG Energy Solutions, LLC  
Jacksonville, FL**

**RECEIVED**

**AUG 15 2012**

**DIVISION OF AIR  
RESOURCE MANAGEMENT**

Dear Mr. Dickson Dibble:

On behalf of LNG Energy Solutions, LLC Michael Baker Jr., Inc. (Baker) is submitting to the Florida Department of Environmental Protection (FDEP) the air permit application for the proposed installation of two (2) Cummins Reciprocating Internal Combustion Engine (RICE) to be located at a site in north of Jacksonville, FL. The engines will be utilized for up to six (6) months to drive natural gas compressors.

With an anticipated start date of late September 2012, Baker thanks FDEP in advance for a timely review to meet this timeline need.

Enclosed in this application package you will find the following:

1. The required RICE worksheet;
2. Supporting emission calculations;
3. A manufacturer specification sheet for the engines; and
4. A check in the amount of **\$100.00** made payable to the "FDEP" to cover the permit fee.

The enclosed materials constitute all of the necessary forms and additional information required of a complete application. If you have any questions regarding this application or require any additional information, please feel free to contact me at (412) 375-3064 or via e-mail at [mmyers@mbakercorp.com](mailto:mmyers@mbakercorp.com).

Sincerely,  
**MICHAEL BAKER JR., INC.**



Matthew J. Myers, CHMM, QEP  
Project Manager

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DIVISION OF AIR RESOURCE MANAGEMENT  
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

**Baker**

*Michael Baker Jr., Inc.*  
**APPENDIX 1**

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*RICE Worksheet for 2 Cummins Engines*

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TOP SECRET ACCOUNTING  
MICHAEL BAKER