



4755 Ogletown-Stanton Road
Newark, DE 19718

May 21, 2020

Mr. Joe Koetas
State of Delaware - DNREC
Division of Air Quality
State Street Commons
100 W. Water Street, Suite 6A
Dover, DE 19904

Re: ChristianaCare
Cogeneration Permit Application

Dear Mr. Koetas:

We are enclosing an electronic copy of the air permit application for replacement of the engine in our existing power cogeneration unit. Checks in the amounts of \$325 and \$265 are being transmitted separately as required for the advertisement fee and permit fee, respectively.

We understand that a modified NOx permit limit is necessary to simplify the permitting process. Currently, we have a NOx permit limit of 40 tons/year combined for boilers 1 through 3 and 14.74 tons/year for boiler 4. ChristianaCare is agreeable to adjusting the NOx permit to 40 tons/year combined for boilers 1 through 4.

Should you need additional information, please don't hesitate to contact Mr. Jeff Krebs of my staff at JKrebs@Christianacare.org or at (302) 733-3788.

Sincerely,

A handwritten signature in black ink, appearing to read "R. Mulrooney", written over a horizontal line.

Robert A. Mulrooney, P.E.
Senior Vice-President, Facilities and Services

RAM/bl

Cc: Brian Lyncha, P.E. – Duffield Associates, Inc. (w/attach)



DNREC – Division of Air Quality
Application to Construct, Operate, or Modify
Stationary Sources

Form AQM-1
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Administrative Information

One original and one copy of All Application Forms Should Be Mailed To:
Division of Air Quality
100 West Water Street, Suite 6A
Dover, DE 19904

All Checks Should Be Made Payable To:
State of Delaware

<u>Company and Site Information</u>	
1.	Company Name: Christiana Care Health Services
2.	Company Mailing Address: 4755 Ogletown - Stanton Road City: Newark State: Delaware Zip Code: 19718
3.	Site Name: Christiana Hospital
4.	Site Mailing Address: NA <i>(if different from above)</i> City: NA State: NA Zip Code: NA
5.	Physical Location of Site: NA <i>(if different from above)</i> City: NA State: NA Zip Code: NA
6.	Site Billing Address: NA <i>(if different from above)</i> City: NA State: NA Zip Code: NA
7.	Air Quality Management Facility ID Number: 1000300080
8.	Site NAICS Code): 622110 <i>(list all that apply)</i>
9.	Site SIC Code: 8062 <i>(list all that apply)</i>
10.	Site Location Coordinates: Latitude: 39 ° 41' 11" Longitude: -75 ° 40' 09"
11.	Is the Facility New or Existing? <input type="checkbox"/> NEW <input checked="" type="checkbox"/> EXISTING
<i>If the Facility is an Existing Facility, Complete the Rest of Question 11. If Not, Proceed to Question 12.</i>	
11.1.	Does the Facility Have Active Air Permits? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
12.	Is this Application For New Equipment or a Modification to Existing Equipment? <input type="checkbox"/> New Equipment <input checked="" type="checkbox"/> Modification of Existing Equipment <input type="checkbox"/> Other (Specify):
<i>If the application is for the modification of existing equipment, complete the rest of Question 12. If not, proceed to Question 13.</i>	



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Company and Site Information

12.1. Does the Equipment Have an Active Air Permit? ☒ YES ☐ NO

If the equipment has an active air permit, complete the rest of Question 12. If not, proceed to Question 13.

12.2. Permit Number of Existing Equipment: **APC-2014/0083-OPERATION**
(MNSR)(NOxRACT)(NSPS)(FE)

13. Status of Equipment Being Applied For: ☒ Natural Minor Source
☐ Synthetic Minor Source
☐ Major Source
☐ Federally Enforceable Restrictions

14. Facility Status: ☐ Natural Minor Facility ☐ Synthetic Minor Facility ☒ Major Facility

If the facility is a Major Source, complete the rest of Question 14. If not, proceed to Question 15.

14.1. Responsible Official Name: **Robert A. Mulrooney, MBA, P.E.**

14.2. Responsible Official Title: **Sr. VP Facilities and Services**

Contact Information

15. Name of Owner or Facility Manager: **Jeffrey G. Krebs**

16. Title of Owner or Facility Manager: **Mechanical Engineering Manager**

17. Permit Contact Name: **Charles C. Anderson**

18. Permit Contact Title: **Power Plant Supervisor**

19. Permit Contact Telephone Number: **(302) 733-3910**

20. Permit Contact Fax Number: **(302) 733-2057**

21. Permit Contact E-Mail Address: **chanderson@christianacare.org**

22. Billing Contact Name: **Theresa Romanowski**

23. Billing Contact Title: **Administrative Assistant**

24. Billing Contact Telephone Number: **(302) 733-3777**

25. Billing Contact Fax Number: **(302) 733-3742**

26. Billing Contact E-Mail Address: **tromanowski@christianacare.org**

Proposed Construction and Operating Schedule

27. When Will the Proposed Construction/Installation/Modification Occur: **06/01/2020**

28. Proposed Operating Schedule: **24 hours/day 7 days/week 52 weeks/year**

28.1. Is There Any Additional Information Regarding the Operating Schedule? ☐ YES ☒ NO

If YES, complete the rest of Question 28. If NO, proceed to Question 29.



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Proposed Construction and Operating Schedule

28.2. Describe the Additional Information:

Coastal Zone Information

29. Is the Facility Located in the Coastal Zone? ☐ YES ☒ NO

If the facility is located in the Coastal Zone complete the rest of Question 29. If not, proceed to Question 30.

29.1. Is a Coastal Zone Permit Required for Construction or Operation of the Source Being Applied for? ☐ YES ☐ NO

Attach a copy of the Coastal Zone Determination if it has not been previously submitted

If a Coastal Zone Permit is required complete the rest of Question 29. If not, proceed to Question 30.

29.2. Has a Coastal Zone Permit Been Issued? ☐ YES ☐ NO

Attach a copy of the Coastal Zone Permit if it has not been previously submitted

Local Zoning Information

30. Parcel Zoning: **NA**

Attach Proof of Local Zoning if it has not been previously submitted

Application Information

31. Is the Appropriate Application Fee Attached? ☒ YES ☐ NO

32. Is the Advertising Fee Attached? ☒ YES ☐ NO

For help determining your application and advertising fees see:

<http://www.dnrec.state.de.us/DNREC2000/Library/Fees/DE%20Permit%20Fees.htm>

Attach the appropriate fees. Note that your Application will not be considered complete if the appropriate fees are not included.

33. Is a Cover Letter Describing the Process Attached? ☒ YES ☐ NO

Attach a brief cover letter describing your Application.

If the Facility is a New Facility complete Question 34. If not, proceed to Question 35.

34. Is a Copy of the Applicant Background Information Questionnaire on Record at the Department? ☐ YES ☐ NO

If NO, complete the rest of Question 34. If YES, process to Question 35.

34.1 Is a Copy of the Applicant Background Information Questionnaire Attached? ☐ YES ☐ NO

For a copy of the Applicant Background Information Questionnaire see

<http://www.dnrec.delaware.gov/services/Documents/Chapter79Form.pdf>

Attach a copy of the Applicant Background Information Questionnaire if applicable.

35. Check Which Application Forms are Attached:



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Application Information

- | | | | | | | |
|---|----------------------------------|-----------------------------------|-----------------------------------|----------------------------------|---|--------------------------------|
| <input checked="" type="checkbox"/> AQM-1 | <input type="checkbox"/> AQM-3.4 | <input type="checkbox"/> AQM-3.9 | <input type="checkbox"/> AQM-3.14 | <input type="checkbox"/> AQM-4.4 | <input checked="" type="checkbox"/> AQM-4.9 | <input type="checkbox"/> AQM-6 |
| <input checked="" type="checkbox"/> AQM-2 | <input type="checkbox"/> AQM-3.5 | <input type="checkbox"/> AQM-3.10 | <input type="checkbox"/> AQM-3.15 | <input type="checkbox"/> AQM-4.5 | <input type="checkbox"/> AQM-4.10 | |
| <input type="checkbox"/> AQM-3.1 | <input type="checkbox"/> AQM-3.6 | <input type="checkbox"/> AQM-3.11 | <input type="checkbox"/> AQM-4.1 | <input type="checkbox"/> AQM-4.6 | <input type="checkbox"/> AQM-4.11 | |
| <input type="checkbox"/> AQM-3.2 | <input type="checkbox"/> AQM-3.7 | <input type="checkbox"/> AQM-3.12 | <input type="checkbox"/> AQM-4.2 | <input type="checkbox"/> AQM-4.7 | <input type="checkbox"/> AQM-4.12 | |
| <input checked="" type="checkbox"/> AQM-3.3 | <input type="checkbox"/> AQM-3.8 | <input type="checkbox"/> AQM-3.13 | <input type="checkbox"/> AQM-4.3 | <input type="checkbox"/> AQM-4.8 | <input checked="" type="checkbox"/> AQM-5 | |

36. Check Which Documents are Attached:

- | | |
|---|---|
| <input type="checkbox"/> Coastal Zone Determination | <input type="checkbox"/> Claim of Confidentiality |
| <input type="checkbox"/> Coastal Zone Permit | <input checked="" type="checkbox"/> Manufacturer Specification(s) |
| <input type="checkbox"/> Proof of Local Zoning | <input type="checkbox"/> Material Safety Data Sheets (MSDSs) |
| <input checked="" type="checkbox"/> Application Fee | <input checked="" type="checkbox"/> Supporting Calculations |
| <input checked="" type="checkbox"/> Advertising Fee | <input type="checkbox"/> Descriptive Cover Letter |
| <input type="checkbox"/> Applicant Background Information Questionnaire | <input type="checkbox"/> Other (Specify): |

Confidentiality Information

37. Do You Consider Any of the Information Submitted With this Application Confidential? ☐ YES ☒ NO

For help on how to submit a confidentiality claim see

<http://regulations.delaware.gov/register/december2011/final/15%20DE%20Reg%20864%2012-01-11.htm>


If a Claim of Confidentiality is made it MUST meet the requirements of Section 6 of DNREC's Freedom of Information ("FOIA") Regulation at the time the Application is submitted.

Signature Block

I, the undersigned, hereby certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all of its attachments as to the truth, accuracy, and completeness of this information. I certify based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete. By signing this form, I certify that I have not changed, altered, or deleted any portions of this application. I acknowledge that I cannot commence construction, alteration, modification or initiate operation until I receive written approval (i.e. permit, registration, or exemption letter) from the Department. I acknowledge that I may be required to perform testing of the equipment to receive construction or operation approval, and that if I do not receive approval to construct or operate that I may appeal the decision.

Robert A. Mulrooney, MBA, P.E.

Owner or Operator


Signature of Owner or Operator

5/21/2020
Date

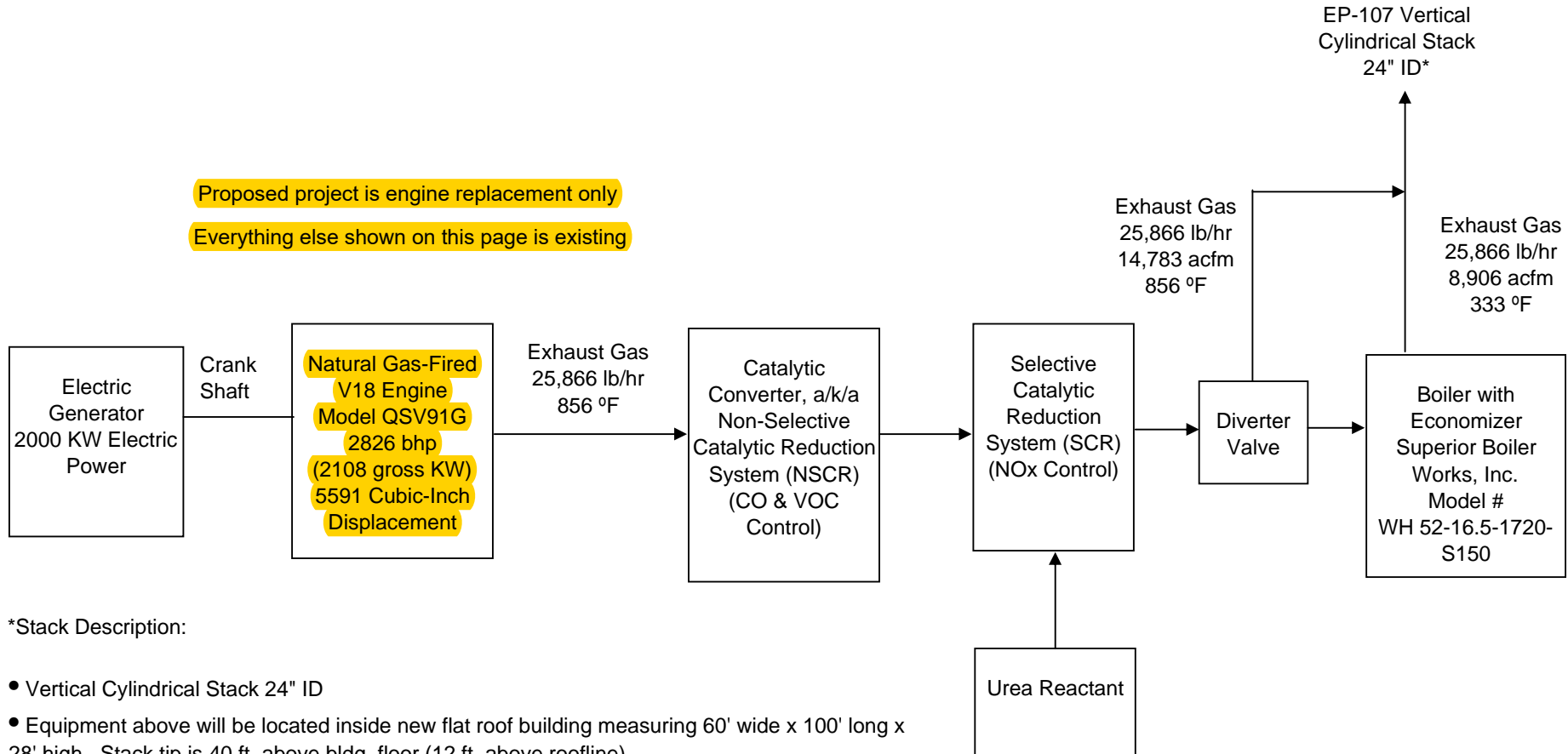
One Original and One Copy of All Application Forms Should Be Mailed To:
Division of Air Quality
100 W. Water Street, Suite 6A
Dover, Delaware 19904

All Checks Should Be Made Payable To:
State of Delaware

Block Flow Diagram
Substitute for DNREC Form AQM-2
Proposed New Christiana Care Cogeneration System

Proposed project is engine replacement only

Everything else shown on this page is existing



***Stack Description:**

- Vertical Cylindrical Stack 24" ID
- Equipment above will be located inside new flat roof building measuring 60' wide x 100' long x 28' high. Stack tip is 40 ft. above bldg. floor (12 ft. above roofline)
- Stack tip is 740 ft. from nearest property boundary.
- Diverter Valve normally directs flue gas to the Boiler, which cools exhaust gas to 333 °F; when the valve diverts gas flow past the Boiler and directly to the stack, stack tip gas temp. increases to 856 °F, and volume flow increases from 8,906 to 14,783 acfm.



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Form AQM-3.3
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Generator/Engine Application

If you are using this form electronically, press F1 at any time for help

<u>General Information</u>	
1.	Facility Name: Christiana Hospital
2.	Equipment ID: 107
3.	Manufacturer: Cummins
4.	Model: Generator model C2000 N6C, engine model QSV91G
5.	Serial Number: 66304608 (engine)
6.	Maximum Power Rating of Engine: 2826 horsepower
7.	Standby Power Rating of Generator: 2000 kilowatt
8.	Date of Manufacture: 2020
9.	Installation Date: June 2020
10.	Is the Equipment Being Applied For a Generator or an Engine? <input checked="" type="checkbox"/> Generator <input type="checkbox"/> Engine
<i>If the equipment is a Generator, complete the rest of Question 10. If not, proceed to Question 11.</i>	
10.1.	Is the Generator Existing or New? <input checked="" type="checkbox"/> Existing <input type="checkbox"/> New
10.2.	Will the Generator Be Classified as an Emergency Generator or a Distributed Generator? <input type="checkbox"/> Emergency <input checked="" type="checkbox"/> Distributed
10.3.	Has an Initial Notification Pursuant to 7 DE Admin. Code 1144 Been Submitted for this Generator? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
If NO, include a copy of the Initial Notification with this application.	
10.4.	Have the Emissions From the Generator Been Certified to Meet the Currently Applicable US EPA Non-Road Emission Standards? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
If YES, attach a copy of the Manufacturer's Certification. If NO, attach copies of any/all of the following: any maintenance or operating requirements/instructions provided by the generator manufacturer; the type, or a description, of any emission control equipment use; and/or emissions test data for the generator (such as a manufacturer's technical data sheet), any supporting documentation for any emission control equipment used, any supporting calculations, any quality control or assurance information, and any other information needed to demonstrate compliance with the requirements. Proceed to Question 11.	
11.	Primary Fuel: <input checked="" type="checkbox"/> Natural Gas <input type="checkbox"/> Biodiesel <input type="checkbox"/> Diesel <input type="checkbox"/> Other (specify): <input type="checkbox"/> Propane
11.1.	Maximum Annual Primary Fuel Consumption: 141.56 MMCF
11.2.	Heat Content of Primary Fuel: 1050 BTU/CF
11.3.	Maximum Firing Rate: 0.01616 MMCF/hr
11.4.	Percent Sulfur of Primary Fuel: NA %
12.	Secondary Fuel: <input type="checkbox"/> Natural Gas <input type="checkbox"/> Biodiesel <input type="checkbox"/> Diesel <input type="checkbox"/> Other (specify): NA <input type="checkbox"/> Propane



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General Information

- 12.1. Maximum Annual Secondary Fuel Consumption: **MMCF**
- 12.2. Heat Content of Secondary Fuel: **BTU/CF**
- 12.3. Maximum Firing Rate: **MMCF/hr**
- 12.4. Percent Sulfur of Secondary Fuel: **%**
13. Is SCR/NSCR/SNCR/Ammonia Injection Used: ☒ YES ☐ NO

Stack Information

14. How Does the Process Equipment Vent:
(check all that apply)
☐ Directly to the Atmosphere
☒ Through a Control Device Covered by Forms AQM-4.1 through 4.12

If any of the process equipment vents directly to the atmosphere proceed to Question 15. If the process equipment vents through a control device, provide the stack parameters on the control device form and proceed to Question 16.

15. Emission Point Name: **EP-107**
- 15.1. Stack Height Above Grade: **40 feet**
- 15.2. Stack Exit Diameter: **2 feet**
(Provide Stack Dimensions If Rectangular Stack)
- 15.3. Is a Stack Cap Present? ☐ YES ☒ NO
- 15.4. Stack Configuration: ☒ Vertical ☐ Horizontal ☐ Downward-Venting
(check all that apply) ☐ Other (Specify):
- 15.5. Stack Exit Gas Temperature: **856 °F**
- 15.6. Stack Exit Gas Flow Rate: **14,315 ACFM**
- 15.7. Distance to Nearest Property Line: **740 ft**
- 15.8. Describe Nearest Obstruction: **Boiler House**
- 15.9. Height of Nearest Obstruction: **27 ft**
- 15.10. Distance to Nearest Obstruction: **75 ft**
- 15.11. Are Stack Sampling Ports Provided? ☒ YES ☐ NO

Monitoring Information

16. Will Emissions Data be Recorded by a Continuous Emission Monitoring System? ☐ YES ☒ NO
- If Yes, Attach a Copy of the Continuous Emission Monitoring System Manufacturer's Specification Sheets**
- If YES, complete the rest of Question 16. If NO, proceed to Question 17.*
- 16.1. Pollutants Monitored: ☐ VOCs ☐ HAPs ☐ PM ☐ PM₁₀ ☐ PM_{2.5} ☐ NO_x ☐ SO_x ☐ Metals
☐ Other (Specify):
- 16.2. Describe the Continuous Emission Monitoring System:



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<u>Monitoring Information</u>	
16.3.	Manufacturer:
16.4.	Model:
16.5.	Serial Number:
16.6.	Will Multiple Emission Units Be Monitored at the Same Point? <input type="checkbox"/> YES <input type="checkbox"/> NO
<i>If YES, complete the rest of Question 16. If NO, proceed to Question 17.</i>	
16.7.	Emission Units Monitored:
16.8.	Will More Than One Emission Unit be Emitting From the Combined Point At Any Time? <input type="checkbox"/> YES <input type="checkbox"/> NO
<i>If YES, complete the rest of Question 15. If NO, proceed to Question 17.</i>	
16.9.	Emission Units Emitting Simultaneously:

<u>Visible Emissions Monitoring Information</u>	
<i>For Primary Fuel</i>	
17.	Proposed Technique Used to Monitor Visible Emissions: <input type="checkbox"/> Opacity Monitor (COM) <input type="checkbox"/> Manual (Method 9) <input checked="" type="checkbox"/> Manual (Method 22) <input type="checkbox"/> Other (Describe):
<i>If an Opacity Monitor (COM) is used, complete the rest of Question 17. If not, proceed to Question 18.</i>	
17.1.	Describe the Continuous Opacity Monitoring System:
17.2.	Manufacturer:
17.3.	Model:
17.4.	Serial Number:
18.	Proposed Frequency of Opacity Monitoring: NA
<i>For Secondary Fuel. If no Secondary Fuel is used, proceed to Question 20.</i>	
19.	Proposed Technique Used to Monitor Visible Emissions: <input type="checkbox"/> Opacity Monitor (COMs) <input type="checkbox"/> Manual (Method 9) <input type="checkbox"/> Manual (Method 22) <input type="checkbox"/> Other (Describe):
<i>If an Opacity Monitor (COMs) is used, complete the rest of Question 19. If not, proceed to Question 20.</i>	
19.1.	Describe the Continuous Opacity Monitoring System:
19.2.	Manufacturer:
19.3.	Model:
19.4.	Serial Number:
20.	Proposed Frequency of Opacity Monitoring:



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Voluntary Emission Limitation Request Information

21. Are You Requesting Any Voluntary Emission Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.? ☐ YES ☒ NO

If YES, complete the rest of Question 21. If NO, proceed to Question 22.

21.1. Describe Any Proposed Emission Limitations:

Voluntary Operating Limitation Request Information

22. Are You Requesting Any Voluntary Operating Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.? ☐ YES ☒ NO

If YES, complete the rest of Question 22. If NO, proceed to Question 23.

22.1. Describe Any Proposed Operating Limitations:

Additional Information

23. Is There Any Additional Information Pertinent to this Application? ☐ YES ☒ NO

If YES, complete the rest of Question 23.

23.1. Describe:



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**Selective Catalytic Reduction (SCR),
Selective Non-Catalytic Reduction (SNCR),
Non-Selective Catalytic Reduction (NSCR), and
Ammonia Injection Application**

If you are using this form electronically, press F1 at any time for help

General Information

1. Facility Name: **Christiana Hospital**
2. Equipment ID Number: **107**
3. Manufacturer: **Cummins**
4. Model: **Generator model C2000 N6C, engine model QSV91G**
5. Serial Number: **TBD**
6. Type: ☒ Selective Catalytic Reduction
☐ Selective Non-Catalytic Reduction
☒ Non-Selective Catalytic Reduction
☐ Ammonia Injection

Attach the Manufacturer's Specification Sheet.

Contaminant Information

7. Concentration of Each Contaminant in the Waste Gas and Removal Efficiency

If more than five Contaminants are present, attach additional copies of this page as needed.

<u>Contaminant</u>	<u>CAS Number</u>	<u>Concentration in Waste Gas</u>	<u>Removal Efficiency</u>
7.1. NOx	NA	0.00464 % by Weight	80.7 %
7.2. CO	NA	0.0155 % by Weight	69.0 %
7.3. VOC (NMHC)	NA	0.00232 % by Weight	84.8 %
7.4. PM/PM10/PM2.5	NA	0.00145 % by Weight	NA %
7.5. CO2	NA	9.11 % by Weight	NA %

Gas Stream Information

8. Maximum Inlet Volumetric Gas Flow Rate: **5,449 acfm at 70 °F**
9. Maximum Outlet Volumetric Gas Flow Rate: **14,315 acfm at 856 °F**
10. Pressure Drop: **NA inches water**

Operational Information

11. Design Operating Temperature: **856 °F**



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Operational Information

12. Reducing Agent Used: ☐ Ammonia ☒ Urea ☐ Other (Specify):
13. Ammonia/Urea Slip: **0.00094** ppm
14. Method of Determining Slip: ☐ Continuous Emissions Monitor ☐ Stack Test
☒ Manufacturer's Specifications ☐ Other (Specify):
15. Describe the Operating Conditions that are Monitored to Determine the Reducing Agent Injection Rate:
The amount of urea is controlled by injection dosing systems as a function of control panel parameters.
16. Describe the Process Controls for Proper Mixing of the Reducing Agent in the Gas Stream: **The injection system provides simultaneous reduction of NOx with minimum ammonia slip. The system controls exhaust gas mixing to assure even distribution of gases across the catalyst surface.**
17. Operating Temperature Range for Catalyst: From **856 °F** To **985 °F**
18. Describe the Oxidation Catalyst Used: **The oxidation catalyst will be a metallic catalyst material loaded with precious metals for CO and NMHC emission reduction.**
19. Design Service Life of Catalyst: **2 years**
20. Expected Usage Rate of Reducing Agent: **2 gal/hr**
21. Expected Concentration of Reducing Agent: **32.5%**
22. Reducing Agent Injection Air Pressure Range: **NA** psi to psi
23. Reducing Agent Injection Rate: **NA** gallons/hr
- Attach justification for the Expected Usage Rate and Concentration of the Reducing Agent.**
24. Describe How Spent Catalyst is Treated or Disposed of: **NA**
- If SNCR is used complete Question 24. If not, proceed to Question 25.*
25. Describe How Frequently the System is Optimized:

Stack Information

26. Emission Point Name: **EP-107**
- 26.1. Stack Height Above Grade: **40 feet**
- 26.2. Stack Exit Diameter: **2 feet**
(Provide Stack Dimensions If Rectangular Stack)
- 26.3. Is a Stack Cap Present? ☒ YES ☐ NO
- 26.4. Stack Configuration: ☒ Vertical ☐ Horizontal ☐ Downward-Venting
(check all that apply) ☐ Other (Specify):
- 26.5. Stack Exit Gas Temperature: **856 °F**
- 26.6. Stack Exit Gas Flow Rate: **14,315 ACFM**
- 26.7. Distance to Nearest Property Line: **740 feet**
- 26.8. Describe Nearest Obstruction: **Boiler House**



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Stack Information

26.9. Height of Nearest Obstruction: **27 feet**

26.10. Distance to Nearest Obstruction: **75 feet**

26.11. Are Stack Sampling Ports Provided? ☒ YES ☐ NO

Monitoring and Alarm Information

27. Are There Any Alarms You Would Like the Department to Consider When Drafting the Permit? ☐ YES ☒ NO

If YES, complete the rest of Question 27. If NO, proceed to Question 28.

27.1. Describe the System Alarm(s):

If there are more than five alarms, attach additional copies of this page as needed.

	Operating Parameter Monitored	Describe Alarm Trigger	Monitoring Device or Alarm Type	Does the Alarm Initiate an Automated Response?
27.1.1.			<input type="checkbox"/> Visual <input type="checkbox"/> Auditory <input type="checkbox"/> Automatic (Remote Monitoring) <input type="checkbox"/> Other	<input type="checkbox"/> NO <input type="checkbox"/> YES Describe:
27.1.2.			<input type="checkbox"/> Visual <input type="checkbox"/> Auditory <input type="checkbox"/> Automatic (Remote Monitoring) <input type="checkbox"/> Other	<input type="checkbox"/> NO <input type="checkbox"/> YES Describe:
27.1.3.			<input type="checkbox"/> Visual <input type="checkbox"/> Auditory <input type="checkbox"/> Automatic (Remote Monitoring) <input type="checkbox"/> Other	<input type="checkbox"/> NO <input type="checkbox"/> YES Describe:
27.1.4.			<input type="checkbox"/> Visual <input type="checkbox"/> Auditory <input type="checkbox"/> Automatic (Remote Monitoring) <input type="checkbox"/> Other	<input type="checkbox"/> NO <input type="checkbox"/> YES Describe:
27.1.5.			<input type="checkbox"/> Visual <input type="checkbox"/> Auditory <input type="checkbox"/> Automatic (Remote Monitoring) <input type="checkbox"/> Other	<input type="checkbox"/> NO <input type="checkbox"/> YES Describe:

Additional Information

28. Is There Any Additional Information Pertinent to this Application? ☐ YES ☒ NO

If YES, complete the rest of Question 28.



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Additional Information

28.1. Describe: **Control equipment is existing. The proposed project is to replace the existing engine only.**



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Emissions Information Application

If you are using this form electronically, press F1 at any time for help

<u>Process Information</u>	
1.	Number of Individual Pieces of Process Equipment in Process: 1
2.	Number of Individual Control Devices in Process: 0

<u>Emissions Information for First Emission Point/Stack</u>						
3. Emission Point Name: EP-107						
4. Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack: 107						
5. Pollutant Emissions						
If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.						
	<u>Pollutant Name</u> (Specify VOCs and HAPs Individually in 5.10 through 5.18)	<u>CAS Number</u> (Not required for 5.1 through 5.10)	<u>Maximum Uncontrolled Emission Rate at Design Capacity</u>	<u>Maximum Controlled Emission Rate at Design Capacity</u>	<u>Annual Potential to Emit (PTE)</u>	<u>Requested Permitted Annual Emissions</u>
5.1.	Particulate Matter (PM)		0.37 lbs/hour	0.37 lbs/hour	1.64 tons/year	1.64 tons/year
5.2.	PM ₁₀		0.37 lbs/hour	0.37 lbs/hour	1.64 tons/year	1.64 tons/year
5.3.	PM _{2.5}		lbs/hour	lbs/hour	tons/year	tons/year
5.4.	Sulfur Oxides (SO _x)		0.01 lbs/hour	0.01 lbs/hour	0.04 tons/year	0.04 tons/year
5.5.	Nitrogen Oxides (NO _x)		6.23 lbs/hour	1.20 lbs/hour	5.27 tons/year	5.27 tons/year
5.6.	Carbon Monoxide (CO)		13.08 lbs/hour	4.06 lbs/hour	17.76 tons/year	17.76 tons/year
5.7.	Total Volatile Organic Compounds (VOCs)		lbs/hour	lbs/hour	tons/year	tons/year
5.8.	Total Hazardous Air Pollutants (HAPs)		lbs/hour	lbs/hour	tons/year	tons/year



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<u>Emissions Information for First Emission Point/Stack</u>						
5.9.	CO ₂		lbs/hour	lbs/hour	tons/year	tons/year
5.10.	CO _{2e}		lbs/hour	lbs/hour	tons/year	tons/year
5.11.	NMHC		3.94 lbs/hour	0.60 lbs/hour	2.63 tons/year	2.63 tons/year
5.12.	NH₄		0.25 lbs/hour	0.25 lbs/hour	1.09 tons/year	1.09 tons/year
5.13.			lbs/hour	lbs/hour	tons/year	tons/year
5.14.			lbs/hour	lbs/hour	tons/year	tons/year
5.15.			lbs/hour	lbs/hour	tons/year	tons/year
6. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:						
Attach the Basis of Determination or Calculations for each Emission Rate provided above.						

<u>Emissions Information for Second Emission Point/Stack</u>						
7. Emission Point Name:						
8. Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack:						
9. Pollutant Emissions						
If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.						
	<u>Pollutant Name</u> (Specify VOCs and HAPs Individually in 9.10 through 9.18)	<u>CAS Number</u> (Not required for 9.1 through 9.10)	<u>Maximum Uncontrolled Emission Rate at Design Capacity</u>	<u>Maximum Controlled Emission Rate at Design Capacity</u>	<u>Annual Potential to Emit (PTE)</u>	<u>Requested Permitted Annual Emissions</u>
9.1.	Particulate Matter (PM)		lbs/hour	lbs/hour	tons/year	tons/year
9.2.	PM ₁₀		lbs/hour	lbs/hour	tons/year	tons/year
9.3.	PM _{2.5}		lbs/hour	lbs/hour	tons/year	tons/year



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Emissions Information for Second Emission Point/Stack						
9.4.	Sulfur Oxides (SO _x)		lbs/hour	lbs/hour	tons/year	tons/year
9.5.	Nitrogen Oxides (NO _x)		lbs/hour	lbs/hour	tons/year	tons/year
9.6.	Carbon Monoxide (CO)		lbs/hour	lbs/hour	tons/year	tons/year
9.7.	Total Volatile Organic Compounds (VOCs)		lbs/hour	lbs/hour	tons/year	tons/year
9.8.	Total Hazardous Air Pollutants (HAPs)		lbs/hour	lbs/hour	tons/year	tons/year
9.9.	CO ₂		lbs/hour	lbs/hour	tons/year	tons/year
9.10.	CO _{2e}		lbs/hour	lbs/hour	tons/year	tons/year
9.11.			lbs/hour	lbs/hour	tons/year	tons/year
9.12.			lbs/hour	lbs/hour	tons/year	tons/year
9.13.			lbs/hour	lbs/hour	tons/year	tons/year
9.14.			lbs/hour	lbs/hour	tons/year	tons/year
9.15.			lbs/hour	lbs/hour	tons/year	tons/year
10. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:						
Attach the Basis of Determination or Calculations for each Emission Rate provided above.						

Emissions Information for Third Emission Point/Stack	
11.	Emission Point Name:
12.	Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack:
13.	Pollutant Emissions
If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.	



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Emissions Information for Third Emission Point/Stack					
<u>Pollutant Name</u> (Specify VOCs and HAPs Individually in 13.10 through 13.18)	<u>CAS Number</u> (Not required for 13.1 through 13.10)	<u>Maximum Uncontrolled Emission Rate at Design Capacity</u>	<u>Maximum Controlled Emission Rate at Design Capacity</u>	<u>Annual Potential to Emit (PTE)</u>	<u>Requested Permitted Annual Emissions</u>
13.1. Particulate Matter (PM)		lbs/hour	lbs/hour	tons/year	tons/year
13.2. PM ₁₀		lbs/hour	lbs/hour	tons/year	tons/year
13.3. PM _{2.5}		lbs/hour	lbs/hour	tons/year	tons/year
13.4. Sulfur Oxides (SO _x)		lbs/hour	lbs/hour	tons/year	tons/year
13.5. Nitrogen Oxides (NO _x)		lbs/hour	lbs/hour	tons/year	tons/year
13.6. Carbon Monoxide (CO)		lbs/hour	lbs/hour	tons/year	tons/year
13.7. Total Volatile Organic Compounds (VOCs)		lbs/hour	lbs/hour	tons/year	tons/year
13.8. Total Hazardous Air Pollutants (HAPs)		lbs/hour	lbs/hour	tons/year	tons/year
13.9. CO ₂		lbs/hour	lbs/hour	tons/year	tons/year
13.10. CO _{2e}		lbs/hour	lbs/hour	tons/year	tons/year
13.11.		lbs/hour	lbs/hour	tons/year	tons/year
13.12.		lbs/hour	lbs/hour	tons/year	tons/year
13.13.		lbs/hour	lbs/hour	tons/year	tons/year
13.14.		lbs/hour	lbs/hour	tons/year	tons/year
13.15.		lbs/hour	lbs/hour	tons/year	tons/year
14. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:					
Attach the Basis of Determination or Calculations for each Emission Rate provided above.					



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Emissions Information for Fourth Emission Point/Stack

15. Emission Point Name:

16. Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack:

17. Pollutant Emissions

If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.

<u>Pollutant Name</u> (Specify VOCs and HAPs Individually in 17.10 through 17.18)	<u>CAS Number</u> (Not required for 17.1 through 17.10)	<u>Maximum Uncontrolled Emission Rate at Design Capacity</u>	<u>Maximum Controlled Emission Rate at Design Capacity</u>	<u>Annual Potential to Emit (PTE)</u>	<u>Requested Permitted Annual Emissions</u>
17.1. Particulate Matter (PM)		lbs/hour	lbs/hour	tons/year	tons/year
17.2. PM ₁₀		lbs/hour	lbs/hour	tons/year	tons/year
17.3. PM _{2.5}		lbs/hour	lbs/hour	tons/year	tons/year
17.4. Sulfur Oxides (SO _x)		lbs/hour	lbs/hour	tons/year	tons/year
17.5. Nitrogen Oxides (NO _x)		lbs/hour	lbs/hour	tons/year	tons/year
17.6. Carbon Monoxide (CO)		lbs/hour	lbs/hour	tons/year	tons/year
17.7. Volatile Organic Compounds (VOCs)		lbs/hour	lbs/hour	tons/year	tons/year
17.8. Total Hazardous Air Pollutants (HAPs)		lbs/hour	lbs/hour	tons/year	tons/year
17.9. CO ₂		lbs/hour	lbs/hour	tons/year	tons/year
17.10. CO _{2e}		lbs/hour	lbs/hour	tons/year	tons/year
17.11.		lbs/hour	lbs/hour	tons/year	tons/year
17.12.		lbs/hour	lbs/hour	tons/year	tons/year
17.13.		lbs/hour	lbs/hour	tons/year	tons/year
17.14.		lbs/hour	lbs/hour	tons/year	tons/year
17.15.		lbs/hour	lbs/hour	tons/year	tons/year



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Emissions Information for Fourth Emission Point/Stack

18. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

If there are more than four Emission Points/Stacks, attach additional copies of this form as needed.

Overall Process Emissions

19. Pollutant Emissions

If more than 15 pollutants are emitted from this Process, attach additional copies of this page as needed.

<u>Pollutant Name</u> (Specify VOCs and HAPs Individually in 19.10 through 19.18)	<u>CAS Number</u> (Not required for 19.1 through 19.10)	<u>Maximum Uncontrolled Emission Rate at Design Capacity</u>	<u>Maximum Controlled Emission Rate at Design Capacity</u>	<u>Annual Potential to Emit (PTE)</u>	<u>Requested Permitted Annual Emissions</u>
19.1. Particulate Matter (PM)		0.37 lbs/hour	0.37 lbs/hour	1.64 tons/year	1.64 tons/year
19.2. PM ₁₀		0.37 lbs/hour	0.37 lbs/hour	1.64 tons/year	1.64 tons/year
19.3. PM _{2.5}		lbs/hour	lbs/hour	tons/year	tons/year
19.4. Sulfur Oxides (SO _x)		0.01 lbs/hour	0.01 lbs/hour	0.04 tons/year	0.04 tons/year
19.5. Nitrogen Oxides (NO _x)		6.23 lbs/hour	1.20 lbs/hour	5.27 tons/year	5.27 tons/year
19.6. Carbon Monoxide (CO)		13.08 lbs/hour	4.06 lbs/hour	17.76 tons/year	17.76 tons/year
19.7. Total Volatile Organic Compounds (VOCs)		lbs/hour	lbs/hour	tons/year	tons/year
19.8. Total Hazardous Air Pollutants (HAPs)		lbs/hour	lbs/hour	tons/year	tons/year
19.9. CO ₂		lbs/hour	lbs/hour	tons/year	tons/year
19.10. CO _{2e}		lbs/hour	lbs/hour	tons/year	tons/year
19.12. NMHC		3.94 lbs/hour	0.60 lbs/hour	2.63 tons/year	2.63 tons/year



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Overall Process Emissions

19.13. NH₄		0.25 lbs/hour	0.25 lbs/hour	1.09 tons/year	1.09 tons/year
19.14.		lbs/hour	lbs/hour	tons/year	tons/year
19.15.		lbs/hour	lbs/hour	tons/year	tons/year

20. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

Minor New Source Review Information

21. Does the Process Have the Potential to Emit More Than Five Tons Per Year of Any Pollutant? ☒ YES ☐ NO

22. Is the Source New or Existing? ☐ NEW ☒ EXISTING
See Question 11 of AQM-1

If the Process has the Potential to Emit more than five tons per year of any pollutant, and is a New Source, a Control Technology Analysis pursuant to Regulation No. 1125 Section 4 must be conducted and attached to this application.

Major New Source Review Information

23. Does the Process Have the Potential to Emit More Than the Significance Level for Any Pollutant? *(Check All That Apply)*

- ☐ Greater Than 25 Tons Per Year of Particulate Matter (PM)
- ☐ Greater Than 15 Tons Per Year of PM₁₀
- ☐ Greater Than 10 Tons Per Year of PM_{2.5}
- ☐ Greater Than 40 Tons Per Year of Sulfur Dioxide(SO₂)
- ☐ Greater Than 25 Tons Per Year of Nitrogen Oxides (NO_x) in New Castle and Kent County
- ☐ Greater Than 100 Tons Per Year of Nitrogen Oxides (NO_x) in Sussex County
- ☐ Greater Than 100 Tons Per Year of Carbon Monoxide (CO)
- ☐ Greater Than 25 Tons Per Year of Total Volatile Organic Compounds (VOCs) in New Castle and Kent County
- ☐ Greater Than 50 Tons Per Year of Total Volatile Organic Compounds (VOCs) in Sussex County
- ☐ Greater Than 75,000 Tons Per Year of Equivalent Carbon Dioxide (CO_{2e})



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If the Process has the Potential to Emit greater than any of the amounts listed above 7 DE Admin. Code 1125 Sections 2 and/or 3 apply. Contact the Department at (302) 323-4542 or (302) 739-9402 for additional information

Additional Information

24. Is There Any Additional Information Pertinent to this Application? ☐ YES ☒ NO

If YES, complete the rest of Question 24.

24.1. Describe:

Emergency Generator

Cummins model C2000 N6C

Power Rating 2000 kW
 2826 HP
 16.97 MMBTU/hr

Emission factors

PM10	0.06	g/hp-hr	Manufacturer
SOx	0.000588	lb/MMBTU	AP-42 Table 3.2-2
NOx	1.00	g/hp-hr	Manufacturer
CO	2.1	g/hp-hr	Manufacturer
NMHC *	0.633	g/hp-hr	Manufacturer
NH4	0.04	g/hp-hr	SCR manufacturer

Control Efficiency (%)

PM10	0
SOx	0
NOx	80.7
CO	69.0
NMHC	84.8
NH4	0

Uncontrolled Emissions

PM10	0.37	lb/hr
SOx	0.01	lb/hr
NOx	6.23	lb/hr
CO	13.08	lb/hr
NMHC *	3.94	lb/hr
NH4	0.25	lb/hr

Controlled Emissions

PM10	0.37	lb/hr
SOx	0.01	lb/hr
NOx	1.20	lb/hr
CO	4.06	lb/hr
NMHC *	0.60	lb/hr
NH4	0.25	lb/hr

PTE & Expected Annual Emissions (Controlled @ 8,760 hrs)

PM10	1.64	ton/yr
SOx	0.04	ton/yr
NOx	5.27	ton/yr
CO	17.76	ton/yr
NMHC *	2.63	ton/yr
NH4	1.09	ton/yr

Total 28.43

* Manufacturer lists NMHC factor of 298 mg/Nm³. The approximate ratio of mg/Nm³ to g/hp-hr = 471 from initial permit application.
 298 mg/Nm³ / 471 g/hp-hr / mg/Nm³ = 0.633 g/hp-hr

Generator set data sheet 2000 kW Continuous

New Cummins Natural Gas Engine to be shipped late April.



Model: C2000 N6C
Frequency: 60 Hz
Fuel type: Natural gas MI 78 +
Emissions NOx: 1.0 g/hp-h
LT water inlet temp: 45 °C (113 °F)
HT water outlet temp: 92 °C (198 °F)

Measured sound performance data sheet:	MSP-1063
Prototype test summary data:	PTS-284
Remote radiator cooling outline:	A054B455

Fuel consumption (ISO3046/1)	See Note	100% of rated load	90% of rated load	75% of rated load	50% of rated load
Fuel consumption (LHV) ISO3046/1, kW (MMBTU/hr)	2,4,6,7	4968 (16.97)	4522 (15.44)	3876 (13.24)	2776 (9.48)
Mechanical efficiency ISO3046/1	2,4,7	42.1%	41.7%	40.5%	37.7%
Electrical efficiency ISO3046/1	2,4,6,7	40.3%	39.8%	38.7%	36.0%

Engine

Engine manufacturer	Cummins
Engine model	QSV91G
Configuration	V18
Displacement, L (cu.in)	91.6 (5591)
Aspiration	Turbocharged (1)
Gross engine power output, kWm (hp)	2108 (2826)
BMEP, bar (psi)	18.5 (268)
Bore, mm (in)	180 (7.09)
Stroke, mm (in)	200 (7.87)
Rated speed, rpm	1514
Piston speed, m/s (ft/min)	10 (1968)
Compression ratio	12.5:1
Lube oil capacity, L (qt)	550 (581)
Overspeed limit, rpm	1800
Full load lubricating oil consumption, g/kWh (g/hp-hr)	0.4 (0.3)

Fuel

Gas supply pressure to engine inlet, bar (psi) ⁷	0.2 (2.9)
Min methane index	78

Starting system(s)

Electric starter voltage, volts	24
Min battery capacity @ 40 °C (104 °F), AH	780
Air starter pressure, barg (psig)	10.3 (150)
Air starter flow, Nm ³ /s (scfm)	0.37 (780)

Genset dimensions (see Note 1)

Genset length, m (ft)	7.22 (23.7)
Genset width, m (ft)	2.28 (7.5)
Genset height, m (ft)	2.78 (9.1)
Genset weight (wet), kg (lbs)	23957 (52705)

Energy data

	See Note	100% of rated load	90% of rated load	75% of rated load	50% of rated load
Continuous generator electrical output, kWe @ 1.0 pf	6, 10	2000	1800	1500	1000
Heat dissipated in lube oil cooler, kW (MMBTU/h)	5	276 (0.94)	265 (0.91)	247 (0.84)	207 (0.71)
Heat dissipated in block, kW (MMBTU/h)	5	501 (1.71)	484 (1.65)	447 (1.53)	406 (1.39)
Total heat rejected in LT circuit, kW (MMBTU/h)	5	218 (0.74)	198 (0.68)	166 (0.57)	126 (0.43)
Total heat rejected in HT circuit, kW (MMBTU/h)	5	1089 (3.72)	997 (3.40)	850 (2.90)	648 (2.21)
Unburnt, kW (MMBTU/h)	13	110 (0.38)	103 (0.35)	92 (0.31)	66 (0.22)
Heat radiated to ambient, kW (MMBTU/h)	13	239 (0.81)	216 (0.74)	183 (0.62)	128 (0.44)
Available exhaust heat to 105C, kW (MMBTU/h)	5	1261 (4.30)	1167 (3.98)	1022 (3.49)	796 (2.72)

Intake air flow

Intake air flow mass, kg/s (lb/hr)	4	3.16 (24992)	2.84 (22514)	2.39 (18903)	1.66 (13117)
Intake air flow volume, m ³ /s @ 0 °C (scfm)	4	2.44 (5449)	2.20 (4909)	1.85 (4122)	1.28 (2860)
Max air cleaner restriction, mmHG (in H ₂ O)		22.07 (11.8)	22.07 (11.8)	22.07 (11.8)	22.07 (11.8)

Exhaust air flow

Exhaust gas flow mass, kg/s (lb/hr)	4	3.27 (25866)	2.94 (23311)	2.47 (19583)	1.72 (13607)
Exhaust gas flow volume, m ³ /s (cfm)	4, 16	6.76 (14315)	6.18 (13080)	5.30 (11225)	3.90 (8264)
Exhaust temperature after turbine, °C (°F)	2	458 (856)	468 (875)	484 (903)	529 (985)
Max exhaust system back pressure, mmHG (in H ₂ O)	6, 14	37.3 (20.0)	37.3 (20.0)	37.3 (20.0)	37.3 (20.0)
Min exhaust system back pressure, mmHG (in H ₂ O)	6, 14	18.7 (10.0)			

HT cooling circuit

HT circuit engine coolant volume, l (gal)		498 (132)	498 (132)	498 (132)	498 (132)
HT coolant flow @ max ext restriction, m ³ /h (gal/min)		70 (308)	70 (308)	70 (308)	70 (308)
Max HT engine coolant inlet temp, °C (°F)	8	75 (167)	75 (167)	75 (167)	75 (167)
HT coolant outlet temp, °C (°F)	8	92 (198)	92 (198)	92 (198)	92 (198)
Max pressure drop in external HT circuit, bar (psig)		1.5 (22)	1.5 (22)	1.5 (22)	1.5 (22)
HT circuit max pressure, bar (psig)		6.0 (87)	6.0 (87)	6.0 (87)	6.0 (87)
Min static head, bar (psig)		0.5 (7)	0.5 (7)	0.5 (7)	0.5 (7)

LT cooling circuit	See Note	100% of rated load	90% of rated load	75% of rated load	50% of rated load
LT circuit engine coolant volume, l (gal)		59 (16)	59 (16)	59 (16)	59 (16)
LT coolant flow @ max ext restriction, m ³ /h (gal/min)		50 (220)	50 (220)	50 (220)	50 (220)
Max LT engine coolant inlet temp, °C (°F)	9	45 (113)	45 (113)	45 (113)	45 (113)
LT coolant outlet temp, °C (°F) reference only	9	47.9 (118)	47.7 (118)	47.2 (117)	46.7 (116)
Max pressure drop in external LT circuit, bar (psig)		1.5 (22)	1.5 (22)	1.5 (22)	1.5 (22)
LT circuit max pressure, bar (psig)		6.0 (87)	6.0 (87)	6.0 (87)	6.0 (87)
Min static head, bar (psig)		0.5 (7)	0.5 (7)	0.5 (7)	0.5 (7)

Emissions

NO _x emissions wet, ppm	15	168	177	177	176
NO _x emissions, mg/Nm ³ @ 5% O ₂ (g/hp-h)	15	493 (1.00)	511 (1.00)	505 (1.00)	490 (1.00)
THC emissions wet, ppm	13	1382	1431	1524	1571
THC emissions, mg/Nm ³ @ 5% O ₂ (g/hp-h)	13	1473	1517	1605	1607
CH ₄ emissions wet, ppm	13	1101	1133	1202	1247
CH ₄ emissions mg/Nm ³ @ 5% O ₂ (g/hp-h)	13	1190 (2.53)	1217 (2.60)	1284 (2.77)	1292 (3.00)
NMHC emissions wet, ppm	13	279	298	324	324
NMHC emissions mg/Nm ³ @ 5% O ₂ (g/hp-h)	13	298	315	341	331
CO emissions (dry), ppm	15	582	575	575	580
CO emissions, mg/Nm ³ @ 5% O ₂ (g/hp-h)	15	975 (2.1)	958 (2.0)	950 (2.1)	927 (2.2)
CO emissions (dry), percent	15	6.6	6.6	6.7	7.0
O ₂ emissions (dry), percent	15	9.1	9.0	8.9	8.5
Particulates PM10, g/hp-h	15	< 0.06	N/A	N/A	N/A

Genset de-rating

Altitude and temperature derate multiplication factor

Barometer		Altitude		Table A *									
In Hg	mbar	Feet	Meters	Derate multiplier with grid parallel operation									
20.7	701	9843	3000	0.75	0.75	-	-	-	-	-	-	-	
21.4	723	9022	2750	0.80	0.80	-	-	-	-	-	-	-	
22.1	747	8202	2500	0.85	0.85	0.75	-	-	-	-	-	-	
22.8	771	7382	2250	0.90	0.90	0.80	-	-	-	-	-	-	
23.5	795	6562	2000	0.95	0.95	0.85	0.75	-	-	-	-	-	
24.3	820	5741	1750	1.00	1.00	0.90	0.80	-	-	-	-	-	
25.0	846	4921	1500	1.00	1.00	0.95	0.85	0.75	-	-	-	-	
25.8	872	4101	1250	1.00	1.00	1.00	0.90	0.80	-	-	-	-	
26.6	899	3281	1000	1.00	1.00	1.00	0.95	0.85	0.75	-	-	-	
27.4	926	2461	750	1.00	1.00	1.00	1.00	0.90	0.80	-	-	-	
28.3	954	1640	500	1.00	1.00	1.00	1.00	0.95	0.85	-	-	-	
29.1	983	820	250	1.00	1.00	1.00	1.00	1.00	0.90	-	-	-	
29.5	995	492	150	1.00	1.00	1.00	1.00	1.00	0.95	0.75	-	-	
30.0	1012	0	0	1.00	1.00	1.00	1.00	1.00	1.00	0.75	-	-	
				°C	20	25	30	35	40	45	50	55	60
				°F	68	77	86	95	104	113	122	131	140
				Air filter inlet temperature									

* Based on SAE standard ambient pressure vs. altitude. Assumes LT return temperature is 10°C above air filter inlet.

Temperature & altitude derate

1. Determine derate multiplier vs. temperature and altitude in Table A or B depending upon your operating condition.
2. Assumes the LT return temperature is 10°C above the air filter inlet with a maximum LT temperature of 45°C.
3. If the LT temperature exceeds 45°C, consult factory for recommendations.
4. Altitude is based upon SAE standard ambient pressure vs. altitude. For low barometric conditions add 150 m (500 ft) to site altitude.

Barometer		Altitude		Table B *									
In Hg	mbar	Feet	Meters	Derate multiplier off grid (island or load share)									
20.7	701	9843	3000	0.75	0.75	-	-	-	-	-	-	-	
21.4	723	9022	2750	0.80	0.80	-	-	-	-	-	-	-	
22.1	747	8202	2500	0.85	0.85	0.75	-	-	-	-	-	-	
22.8	771	7382	2250	0.90	0.90	0.80	-	-	-	-	-	-	
23.5	795	6562	2000	0.95	0.95	0.85	0.75	-	-	-	-	-	
24.3	820	5741	1750	1.00	1.00	0.90	0.80	-	-	-	-	-	
25.0	846	4921	1500	1.00	1.00	0.95	0.85	0.75	-	-	-	-	
25.8	872	4101	1250	1.00	1.00	1.00	0.90	0.80	-	-	-	-	
26.6	899	3281	1000	1.00	1.00	1.00	0.95	0.85	0.75	-	-	-	
27.4	926	2461	750	1.00	1.00	1.00	1.00	0.90	0.80	-	-	-	
28.3	954	1640	500	1.00	1.00	1.00	1.00	0.95	0.85	-	-	-	
29.1	983	820	250	1.00	1.00	1.00	1.00	1.00	0.90	-	-	-	
29.5	995	492	150	1.00	1.00	1.00	1.00	1.00	0.95	0.75	-	-	
30.0	1012	0	0	1.00	1.00	1.00	1.00	1.00	1.00	0.75	-	-	
				°C	20	25	30	35	40	45	50	55	60
				°F	68	77	86	95	104	113	122	131	140
				Air filter inlet temperature									

* Based on SAE standard ambient pressure vs. altitude. Assumes LT return temperature is 10°C above air filter inlet.

Methane number capability

Load (percent of rated)			
100%	90%	75%	50%
78	72	N/A	N/A

Heat rejection factor (altitude and ambient) for HT and LT circuits

Barometer		Altitude		Table C									
In Hg	mbar	Feet	Meters	Multiplier for HT & LT heat rejection vs alt & temp									
20.7	701	9843	3000	1.11	1.13	1.14	1.15	1.17	1.18	1.19	1.20	1.22	
21.4	723	9022	2750	1.10	1.12	1.13	1.14	1.15	1.17	1.18	1.19	1.21	
22.1	747	8202	2500	1.09	1.10	1.12	1.13	1.14	1.16	1.17	1.18	1.20	
22.8	771	7382	2250	1.08	1.09	1.11	1.12	1.13	1.14	1.16	1.17	1.18	
23.5	795	6562	2000	1.07	1.08	1.09	1.11	1.12	1.13	1.15	1.16	1.17	
24.3	820	5741	1750	1.06	1.07	1.08	1.10	1.11	1.12	1.14	1.15	1.16	
25.0	846	4921	1500	1.05	1.06	1.07	1.09	1.10	1.11	1.12	1.14	1.15	
25.8	872	4101	1250	1.04	1.05	1.06	1.07	1.09	1.10	1.11	1.13	1.14	
26.6	899	3281	1000	1.02	1.04	1.05	1.06	1.08	1.09	1.10	1.12	1.13	
27.4	926	2461	750	1.01	1.03	1.04	1.05	1.07	1.08	1.09	1.10	1.12	
28.3	954	1640	500	1.00	1.02	1.03	1.04	1.05	1.07	1.08	1.09	1.11	
29.1	983	820	250	0.99	1.00	1.02	1.03	1.04	1.06	1.07	1.08	1.10	
29.5	995	492	150	0.99	1.00	1.01	1.03	1.04	1.05	1.06	1.08	1.09	
30.0	1012	0	0	0.98	0.99	1.01	1.02	1.03	1.05	1.06	1.07	1.08	
				°C	20	25	30	35	40	45	50	55	60
				°F	68	77	86	95	104	113	122	131	140
				Air filter inlet temperature									

LT & HT circuit heat rejection calculation

1. Determine derate multiplier vs. temperature derate per above.
2. Using the multiplier from #1 above as the percent load factor determine the heat rejection from the previous page.
3. From Table C find the HT and LT circuit multiplier.
4. Multiply the result of step 2 by the result of step 3 to obtain the heat rejection at your altitude and temperature.

Alternator data

Voltage range	Connection configuration	Temp rise °C	Duty ¹¹ cycle	Single phase factor	Alternator data sheet
380	Wye, 3 Phase	105	C	N/A	Note 12
380-416	Wye, 3 Phase	80/105/125	C	N/A	Note 12
416-480	Wye, 3 Phase	80/105	C	N/A	Note 12
440-480	Wye, 3 Phase	80/105/125	C	N/A	Note 12
480	Wye, 3 Phase	80/105	C	N/A	Note 12
600	Wye, 3 Phase	80/105/125	C	N/A	Note 12
4160	Wye, 3 Phase	80	C	N/A	Note 12
12470-13800	Wye, 3 Phase	80/105	C	N/A	Note 12
13200-13800	Wye, 3 Phase	105	C	N/A	Note 12
13800	Wye, 3 Phase	80	C	N/A	Note 12

Continuous rating definition

Applicable for supplying power continuously to a constant load up to the full output rating for unlimited hours. No sustained overload capability is available for this rating. Consult authorized distributor for rating (equivalent to continuous power in accordance with ISO8528, ISO3046, AS2789, DIN6271, and BS5514). This rating is not applicable to all generator set models.

Note:

1. Weights and set dimensions represent a generator set with its standard features only. See outline drawing for other configurations.
2. At ISO3046 reference conditions, altitude 1013 mbar (30 in Hg), air inlet temperature 25 °C (77 °F).
3. Nominal performance +/- 2 1/2%.
4. According to ISO 3046/I with fuel consumption tolerance of +5% -0%.
5. Production variation/tolerance ±5%.
6. At electrical output of 1.0 Power factor, 97% alternator efficiency.
7. Tested using pipeline natural gas with LHV of 33.44 MJ/Nm³ (905 BTU/ft³).
8. Outlet temperature controlled by thermostat, inlet temperature for reference only.
9. Inlet temperature controlled by thermostat, outlet temperature for reference only.
10. With engine driven coolant pump.
11. Standby (S), Prime (P), Continuous (C).
12. Alternator model and data sheet information available on power.cummins.com.
13. Tolerance +/- 15%.
14. Exhaust system back pressure is a rated load and will decrease at lower loads.
15. Tolerance ±10%.
16. At exhaust temperature and standard atmospheric pressure.

For more information contact your local Cummins distributor
or visit power.cummins.com

Our energy working for you.™



Original Engine Specification Sheet Submitted
with original construction permit application.

Model: C2000 N6C
Frequency: 60 Hz
Fuel Type: Natural Gas MI 78 +

Emissions Performance NOx: 1.0 g/hp-h
LT Water Inlet Temperature: 45°C (113°F)
HT Water Outlet Temp: 92°C (198°F)

**Generator set data sheet
2000 kW continuous**

Our energy working for you.™



Measured Sound Performance Data Sheet:	MSP - 1039
Prototype Test Summary Data:	PTS - 269
Remote Radiator Cooling Outline:	0500-5093

Fuel Consumption (ISO3046/1)	See Note	100% of Rated Load	90% of Rated Load	75% of Rated Load	50% of Rated Load
Fuel Consumption (LHV) ISO3046/1, kW (MMBTU/hr)	2,4,6,7	5004 (17.09)	4559 (15.57)	3876 (13.24)	2840 (9.7)
Mechanical Efficiency ISO3046/1, percent	2,4,7	42.1%	41.7%	40.9%	37.7%
Electrical Efficiency ISO3046/1, percent	2,4,6,7	40.0%	39.5%	38.7%	35.2%

Engine	
Engine Manufacturer	Cummins
Engine Model	QSV91G
Configuration	V18
Displacement, L (cu.in)	91.6 (5591)
Aspiration	Turbocharged (1)
Gross Engine Power Output, kWm (hp)	2108 (2826)
BMEP, bar (psi)	18.5 (268)
Bore, mm (in)	180 (7.09)
Stroke, mm (in)	200 (7.87)
Rated Speed, rpm	1514
Piston Speed, m/s (ft/min)	10 (1968)
Compression Ratio	12.5:1
Lube Oil Capacity, L (qt)	550 (581)
Overspeed Limit, rpm	1800
Regenerative Power, kW	N/A
Full Load Lubricating oil consumption, g/kWe-hr (g/hp-hr)	0.4 (0.3)

Fuel	
Gas supply pressure to engine inlet, bar (psi) ⁷	0.2 (2.9)
Minimum Methane Index	78

Starting System(s)	
Electric starter voltage, volts	24
Minimum battery capacity @ 40 deg.C (104 deg.F), AH	780
Air Starter Pressure, barg (psig)	10.3 (150)
Air Starter Flow Nm ³ /s (scfm)	0.37 (780)

Genset Dimensions (see note 1)	
Genset Length, m (ft)	7.12 (23.4)
Genset Width, m (ft)	2.16 (7.1)
Genset Height, m (ft)	2.78 (9.1)
Genset Weight (wet), kg (lbs)	20705 (45,644)

	See Notes	100% of Rated Load	90% of Rated Load	75% of Rated Load	50% of Rated Load
Energy Data					
Continuous Shaft Power, kWm (bhp)	2,10	2108 (2826)	1900 (2546)	1586 (2126)	1071 (1436)
Continuous Generator Electrical Output kWe	6,10	2000	1800	1500	1000
Heat Dissipated in Lube Oil Cooler, kW (MMBTU/h)	5	276 (0.94)	265 (0.91)	247 (0.84)	207 (0.71)
Heat Dissipated in Block, kW (MMBTU/h)	5	514 (1.75)	501 (1.71)	461 (1.57)	429 (1.46)
Total Heat Rejected in LT Circuit, kW (MMBTU/h)	5	218 (0.74)	198 (0.68)	166 (0.57)	126 (0.43)
Total Heat Rejected in HT Circuit, kW (MMBTU/h)	5	1102 (3.76)	1014 (3.46)	864 (2.95)	670 (2.29)
Unburnt, kW (MMBTU/h)	13	110 (0.38)	103 (0.35)	92 (0.31)	66 (0.22)
Heat Radiated to Ambient, kW (MMBTU/h)	13	368 (1.26)	337 (1.15)	288 (0.98)	218 (0.75)
Available Exhaust heat to 105C, kW (MMBTU/h)	5	1261 (4.30)	1167 (3.98)	1022 (3.49)	796 (2.72)
Intake Air Flow					
Intake Air Flow Mass, kg/s (lb/hr)	4	3.16 (24992)	2.84 (22514)	2.39 (18903)	1.66 (13117)
Intake Air Flow Volume, m3/s @ 0°C (scfm)	4	2.44 (5449)	2.20 (4909)	1.85 (4122)	1.28 (2860)
Maximum Air Cleaner Restriction, mmHG (in H ₂ O)		22.07 (11.8)	22.07 (11.8)	22.07 (11.8)	22.07 (11.8)
Exhaust Air Flow					
Exhaust Gas Flow Mass, kg/s (lb/hr)	4	3.27 (25866)	2.94 (23311)	2.47 (19583)	1.72 (13607)
Exhaust Gas Flow Volume, m3/s (cfm)	4	6.76 (14315)	6.18 (13080)	5.30 (11225)	3.90 (8264)
Exhaust Temperature After Turbine, °C (°F)	2	458 (856)	468 (875)	484 (903)	529 (985)
Max Exhaust System Back Pressure, mmHG (in H ₂ O)	6,14	37.3 (20.0)	37.3 (20.0)	37.3 (20.0)	37.3 (20.0)
Min Exhaust System Back Pressure, mmHG (in H ₂ O)	6,14	18.7 (10.0)			
HT Cooling Circuit					
HT Circuit Engine Coolant Volume, l (gal)		424 (112)	424 (112)	424 (112)	424 (112)
HT Coolant Flow @ Max Ext Restriction, m ³ /h (gal/min)		70 (308)	70 (308)	70 (308)	70 (308)
Maximum HT Engine Coolant Inlet Temp, °C (°F)	8	75 (167)	75 (167)	75 (167)	75 (167)
HT Coolant Outlet Temp, °C (°F)	8	92 (198)	92 (198)	92 (198)	92 (198)
Max Pressure Drop in External HT Circuit, bar (psig)		1.5 (22)	1.5 (22)	1.5 (22)	1.5 (22)
HT Circuit Maximum Pressure, bar (psig)		6.0 (87)	6.0 (87)	6.0 (87)	6.0 (87)
Minimum Static Head, bar (psig)		0.5 (7)	0.5 (7)	0.5 (7)	0.5 (7)
LT Cooling Circuit					
LT Circuit Engine Coolant Volume, l (gal)		295 (78)	295 (78)	295 (78)	295 (78)
LT Coolant Flow @ Max Ext Restriction, m ³ /h (gal/min)		50 (220)	50 (220)	50 (220)	50 (220)
Maximum LT Engine Coolant Inlet Temp, °C (°F)	9	45 (113)	45 (113)	45 (113)	45 (113)
LT Coolant Outlet Temp, °C (°F) Reference Only	9	47.9 (118)	47.7 (118)	47.2 (117)	46.7 (116)
Max Pressure Drop in External LT Circuit, bar (psig)		1.5 (22)	1.5 (22)	1.5 (22)	1.5 (22)
LT Circuit Maximum Pressure, bar (psig)		6.0 (87)	6.0 (87)	6.0 (87)	6.0 (87)
Minimum Static Head, bar (psig)		0.5 (7)	0.5 (7)	0.5 (7)	0.5 (7)
Emissions					
NO _x Emissions wet, ppm	15	168	177	177	176
NO _x Emissions, mg/Nm ³ @5% O ₂ (g/hp-h)	15	493 (1.00)	511 (1.00)	505 (1.00)	490 (1.00)
THC Emissions wet, ppm	13	1382	1431	1524	1571
THC Emissions, mg/Nm ³ @5% O ₂ (g/hp-h)	13	1473	1517	1605	1607
CH ₄ Emissions wet, ppm	13	1101	1133	1202	1247
CH ₄ Emissions, mg/Nm ³ @5% O ₂ (g/hp-h)	13	1190 (2.53)	1217 (2.60)	1284 (2.77)	1292 (3.00)
NMHC Emissions wet, ppm	13	279	298	324	324
NMHC Emissions, mg/Nm ³ @5% O ₂ (g/hp-h)	13	298	315	341	331
CO Emissions (dry), ppm	13	582	575	575	580
CO Emissions, mg/Nm ³ @5% O ₂ (g/hp-h)	13	975 (2.07)	958 (2.05)	950 (2.05)	927 (2.15)
O ₂ Emissions (dry), percent	13	9.1	9.0	8.9	8.5
Particulates PM10, g/hp-h	13	<0.06	n/a	n/a	n/a

Genset De-rating

Altitude and Temperature Derate Multiplication Factor

Barometer		Altitude		Table A *									
In Hg	mbar	Feet	Meters	Derate Multiplier with Grid Parallel Operation									
20.7	701	9843	3000	0.75	0.75								
21.4	723	9022	2750	0.80	0.80								
22.1	747	8202	2500	0.85	0.85	0.75							
22.8	771	7382	2250	0.90	0.90	0.80							
23.5	795	6562	2000	0.95	0.95	0.85	0.75						
24.3	820	5741	1750	1.00	1.00	0.90	0.80						
25.0	846	4921	1500	1.00	1.00	0.95	0.85	0.75					
25.8	872	4101	1250	1.00	1.00	1.00	0.90	0.80					
26.6	899	3281	1000	1.00	1.00	1.00	0.95	0.85	0.75				
27.4	926	2461	750	1.00	1.00	1.00	1.00	0.90	0.80				
28.3	954	1640	500	1.00	1.00	1.00	1.00	0.95	0.85				
29.1	983	820	250	1.00	1.00	1.00	1.00	1.00	0.90				
29.5	995	492	150	1.00	1.00	1.00	1.00	1.00	0.95	0.75			
30.0	1012	0	0	1.00	1.00	1.00	1.00	1.00	1.00	0.75			
				°C	20	25	30	35	40	45	50	55	60
				°F	68	77	86	95	104	113	122	131	140
				Air Filter Inlet Temperature									

* Based on SAE standard ambient pressure vs. altitude. Assumes LT return temperature is 10C above air filter inlet.

Barometer		Altitude		Table B *									
In Hg	mbar	Feet	Meters	Derate Multiplier Off Grid (Island or Load Share)									
20.7	701	9843	3000	0.75	0.75								
21.4	723	9022	2750	0.80	0.80								
22.1	747	8202	2500	0.85	0.85	0.75							
22.8	771	7382	2250	0.90	0.90	0.80							
23.5	795	6562	2000	0.95	0.95	0.85	0.75						
24.3	820	5741	1750	1.00	1.00	0.90	0.80						
25.0	846	4921	1500	1.00	1.00	0.95	0.85	0.75					
25.8	872	4101	1250	1.00	1.00	1.00	0.90	0.80					
26.6	899	3281	1000	1.00	1.00	1.00	0.95	0.85	0.75				
27.4	926	2461	750	1.00	1.00	1.00	1.00	0.90	0.80				
28.3	954	1640	500	1.00	1.00	1.00	1.00	0.95	0.85				
29.1	983	820	250	1.00	1.00	1.00	1.00	1.00	0.90				
29.5	995	492	150	1.00	1.00	1.00	1.00	1.00	0.95	0.75			
30.0	1012	0	0	1.00	1.00	1.00	1.00	1.00	1.00	0.75			
				°C	20	25	30	35	40	45	50	55	60
				°F	68	77	86	95	104	113	122	131	140
				Air Filter Inlet Temperature									

* Based on SAE standard ambient pressure vs. altitude. Assumes LT return temperature is 10C above air filter inlet.

Heat Rejection Factor (altitude and ambient) for HT and LT Circuits

Barometer		Altitude		Table C									
In Hg	mbar	Feet	Meters	Multiplier for HT & LT Heat Rejection vs Alt & Temp.									
20.7	701	9843	3000	1.11	1.13	1.14	1.15	1.17	1.18	1.19	1.20	1.22	
21.4	723	9022	2750	1.10	1.12	1.13	1.14	1.15	1.17	1.18	1.19	1.21	
22.1	747	8202	2500	1.09	1.10	1.12	1.13	1.14	1.16	1.17	1.18	1.20	
22.8	771	7382	2250	1.08	1.09	1.11	1.12	1.13	1.14	1.16	1.17	1.18	
23.5	795	6562	2000	1.07	1.08	1.09	1.11	1.12	1.13	1.15	1.16	1.17	
24.3	820	5741	1750	1.06	1.07	1.08	1.10	1.11	1.12	1.14	1.15	1.16	
25.0	846	4921	1500	1.05	1.06	1.07	1.09	1.10	1.11	1.12	1.14	1.15	
25.8	872	4101	1250	1.04	1.05	1.06	1.07	1.09	1.10	1.11	1.13	1.14	
26.6	899	3281	1000	1.02	1.04	1.05	1.06	1.08	1.09	1.10	1.12	1.13	
27.4	926	2461	750	1.01	1.03	1.04	1.05	1.07	1.08	1.09	1.10	1.12	
28.3	954	1640	500	1.00	1.02	1.03	1.04	1.05	1.07	1.08	1.09	1.11	
29.1	983	820	250	0.99	1.00	1.02	1.03	1.04	1.06	1.07	1.08	1.10	
29.5	995	492	150	0.99	1.00	1.01	1.03	1.04	1.05	1.06	1.08	1.09	
30.0	1012	0	0	0.98	0.99	1.01	1.02	1.03	1.05	1.06	1.07	1.08	
				°C	20	25	30	35	40	45	50	55	60
				°F	68	77	86	95	104	113	122	131	140
				Air Filter Inlet Temperature									

Temperature & Altitude Derate

1. Determine derate multiplier vs. temperature and altitude in Table A or B depending upon your operating condition.
2. Assumes the LT return temperature is 10 deg C above the air filter inlet with a maximum LT temperature of 45 deg C.
3. If the LT temperature exceeds 45 deg C, consult factory for recommendations.
4. Altitude is based upon SAE standard ambient pressure vs. altitude. For low barometric conditions add 150m (500 ft) to site altitude.

Methane Number Capability

Load (Percent of Rated)			
100%	90%	75%	50%
78	72	n/a	n/a

LT & HT Circuit Heat Rejection Calculation

1. Determine derate multiplier vs. temperature derate per above.
2. Using the multiplier from #1 above as the percent load factor determine the Heat rejection from the previous page.
3. From Table C find the HT and LT circuit multiplier.
4. Multiply the result of step 2 by the result of step 3 to obtain the heat rejection at your altitude and temperature.

Alternator Data

Voltage Range	Connection Configuration	Temp Rise Degrees C	Duty ¹¹ Cycle	Single Phase Factor	Maximum Surge kVA ¹²	Alternator Data Sheet	Feature Code
380	Wye, 3 Phase	105	C	N/A	7960	515	B597-2
380-416	Wye, 3 Phase	80	C	N/A	9700	516	B829-2
380-416	Wye, 3 Phase	105	C	N/A	8250	516	B831-2
416-480	Wye, 3 Phase	80	C	N/A	9700	517	B587-2
416-480	Wye, 3 Phase	105	C	N/A	7200	516	B627-2
440-480	Wye, 3 Phase	80	C	N/A	9700	517	B588-2
440-480	Wye, 3 Phase	105	C	N/A	7200	515	B832-2
480	Wye, 3 Phase	80	C	N/A	8400	516	B653-2
480	Wye, 3 Phase	105	C	N/A	7200	515	B583-2
600	Wye, 3 Phase	80	C	N/A	8250	516	B589-2
600	Wye, 3 Phase	105	C	N/A	7200	516	B582-2
4160	Wye, 3 Phase	80	C	N/A	6300	518	B590-2
12470-13800	Wye, 3 Phase	80	C	N/A	8000	523	B591-2
12470-13800	Wye, 3 Phase	105	C	N/A	6800	522	B484-2
13200-13800	Wye, 3 Phase	105	C	N/A	5000	521	B657-2
13800	Wye, 3 Phase	80	C	N/A	6800	522	B565-2

Continuous Rating Definition

Applicable for supplying power continuously to a constant load up to the full output rating for unlimited hours. No sustained overload capability is available for this rating. Consult authorized distributor for rating. (Equivalent to Continuous Power in accordance with ISO8528, ISO3046, AS2789, DIN6271, and BS5514). This rating is not applicable to all generator set models.

Notes

- Weights and set dimensions represent a generator set with its standard features only. See outline drawing for other configurations.
- At ISO3046 reference conditions, altitude 1013 mbar (30in Hg), air inlet temperature 25°C (77°F)
- Nominal performance $\pm 2 \frac{1}{2}\%$.
- According to ISO 3046/I with fuel consumption tolerance of +5% -0%
- Production variation/tolerance $\pm 5\%$.
- At electrical output of 1.0 Power Factor.
- Tested using pipeline natural gas with LHV of 33.44MJ/Nm³ (905BTU/ft³)
- Outlet temperature controlled by thermostat. Inlet temperature for reference only.
- Inlet temperature controlled by thermostat, outlet temperature for reference only.
- With engine driven coolant pump.
- Standby (S), Prime (P), Continuous (C)
- Maximum rated starting kVA that results in minimum of 90% of rated sustained voltage during starting.
- Tolerance $\pm 15\%$
- Exhaust system back pressure is a rated load and will decrease at lower loads.
- Tolerance $\pm 10\%$

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Web: www.cumminspower.com



603989

STATE OF DELAWARE
 DNREC DIV AIR QUALITY TITLE V PERMIT FEES
 97 COMMERCE WAY SUITE 106
 DOVER, DE 19904

STATE OF DELAWARE
 SUP-00001111

DETACH BEFORE DEPOSITING
 CHRISTIANA CARE HEALTH SERVICES, INC.

603989

VOUCHER NUMBER	INVOICE NUMBER	PURCHASE ORDER	INVOICE DATE	Memo	INVOICE AMOUNT	DISCOUNT	NET AMOUNT
	Check is needed for permit fee for		4/29/20	Check is needed for permit fee for the	265.00	0.00	265.00
TOTALS					265.00	0.00	265.00

P.O. Box 2653
 Wilmington, DE 19805

(302) 6237240

THE ORIGINAL DOCUMENT HAS A WHITE REFLECTIVE WATERMARK ON THE BACK.

HOLD AT AN ANGLE TO VIEW. DO NOT CASH IF NOT PRESENT.



ChristianaCare

DATE
 5/8/20

CHECK NO.
 603989

AMOUNT

62-8 / 311

*****265.00

PAY

TWO HUNDRED SIXTY-FIVE DOLLARS AND 00/100

TO THE
 ORDER
 OF

STATE OF DELAWARE
 DNREC DIV AIR QUALITY TITLE V PERMIT FEES
 97 COMMERCE WAY SUITE 106
 DOVER, DE 19904

CHRISTIANA CARE HEALTH SERVICES, INC.
 OPERATING ACCOUNT

PNC Bank, N.A. 080

Janice E. Neenan MD

⑈603989⑈ ⑆031100089⑆ 5606427482⑈

603990

STATE OF DELAWARE
 DNREC DIV AIR QUALITY TITLE V PERMIT FEES
 97 COMMERCE WAY SUITE 106
 DOVER, DE 19904

STATE OF DELAWARE
 SUP-00001111

DETACH BEFORE DEPOSITING
 CHRISTIANA CARE HEALTH SERVICES, INC.

603990

VOUCHER NUMBER	INVOICE NUMBER	PURCHASE ORDER	INVOICE DATE	Memo	INVOICE AMOUNT	DISCOUNT	NET AMOUNT
	Check is for Advertisement fee		4/29/20	Check is for Advertisement fee for	325.00	0.00	325.00
TOTALS					325.00	0.00	325.00

P.O. Box 2653
 Wilmington, DE 19805
 (302) 6237240

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HOLD AT AN ANGLE TO VIEW. DO NOT CASH IF NOT PRESENT.



ChristianaCare™

DATE
 5/8/20

CHECK NO.
 603990

AMOUNT
 *****325.00

PAY

THREE HUNDRED TWENTY-FIVE DOLLARS AND 00/100

TO THE
 ORDER
 OF

STATE OF DELAWARE
 DNREC DIV AIR QUALITY TITLE V PERMIT FEES
 97 COMMERCE WAY SUITE 106
 DOVER, DE 19904

CHRISTIANA CARE HEALTH SERVICES, INC.
 OPERATING ACCOUNT

Janice E. Neenan MD

PNC Bank, N.A. 080

603990 031100089 5606427482