

5/15/2020

Rule Registrations Section,
APD Mail Code 163,
12100 Park 35 Circle, Building F, First Floor, Room 1206,
Austin, Texas 78753
(512) 239-1250

Reference: Customer Reference Number: CN603222902
Regulated Entity Number: RN105295687

**Subject: Notification of changes to Microsoft San Antonio Data Center covered under
Certified Registration # 82486 under Project SN7**

To whom it may concern,

On behalf of Microsoft Corporation, please find enclosed herewith the complete application package requesting for a revision to the operating limits supporting Certified Registration # 82486 in light of changes to the representations previously submitted. The changes comprise of the addition of fifteen (16) 3000 ekW generators, six (6) 2500 ekW generators, and one (1) 500 ekW generator to the Data Center complex at an adjacent property, 5200 Rogers Road, San Antonio, TX 78251 under the “SN7” phase of the project.

The current PBR registration limits the facility-wide NOx emissions to 99.10 tpy by restricting the pre-existing twenty-eight (28) 2500 ekW generators, twenty (20) 2000 ekW generators, and two (2) 1500 ekW generators to 85 hours of operation each and the site-wide fuel consumption to 665,312 gallons per year. Microsoft Corporation certifies to maintain NOx emissions at or below 99 tpy of NOx and maintain all emissions below major source thresholds by observing the following operational restrictions:

1. Limiting the fuel consumption of the group of twenty-eight previously certified 2500 ekW generators to 301,196 gal/yr. At the maximum fuel consumption rate, this is equivalent to restricting these generators to 1736 aggregate hours per year.
2. Limiting the fuel consumption of the group of twenty 2000 ekW generators to 171,120 gal/yr. At the maximum fuel consumption rate, this is equivalent to restricting these generators to 1240 aggregate hours per year.
3. Limiting the fuel consumption of the group of two 1500 ekW generators to 12,970 gal/yr. At the maximum fuel consumption rate, this is equivalent to restricting these generators to 124 aggregate hours per year.
4. Limiting the fuel consumption of the group of new addition of sixteen 3000 ekW generators to 206,336 gal/yr. At the maximum fuel consumption rate, this is equivalent to restricting these generators to 992 hours per year.
5. Limiting the fuel consumption of the group of existing six 2500 ekW generators to 54,684 gal/yr. At the maximum fuel consumption rate, this is equivalent to restricting these generators to 372 hours per year.
6. Limiting the fuel consumption of the group of new one 500 ekW generators to 2151 gal/yr. At the maximum fuel consumption rate, this is equivalent to restricting these generators to 62 hours per year.

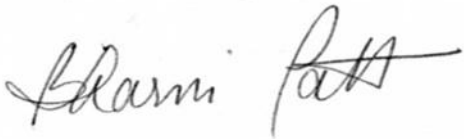
Additionally, this request is also asking to update the emission limit for carbon monoxide (CO) in the registration. The certified emission rate does not coincide with the calculated emissions for the facility.

The application package consists of TCEQ Form APD-Cert and the following supporting documents:

1. A process description
2. A list of each source of air emission at the site
3. A summary of the certified emission rates
4. Manufacturer's data sheets of new sources added to the registration
5. Copy of previously issued Certified Registration # 82486

Copies have been submitted to the TCEQ regional office and local air pollution control office as required. Please do not hesitate to contact me should you require additional information or clarification.

Sincerely,



Bharvi Patel
Environmental Engineer
Versar, Inc.
(Environmental Consulting for Microsoft Corporation)
Mobile: (480) 273-5643
bpatel@versar.com

Cc:

TCEQ Region 13 Office

Regional Director: Joel Anderson
14250 Judson Road,
San Antonio, TX 78233-4480
210-490-3096

City of San Antonio

Ms. Kyle Cunningham
Health Program Manager, Air Quality
San Antonio Metropolitan Health District,
San Antonio, Texas 78235-5160
210-207-2071

Electronic cc:

Ruben Aguilar, Securities Manager, Microsoft Corporation, rubenagu@microsoft.com

Texas Commission on Environmental Quality
Form APD – CERT
Certification of Emission Limits
(Page 1)

I. Company and Site Information		
A. Company Name: MICROSOFT CORPORATION		
B. Responsible Official Name: Mr. Ruben Aguilar		
Responsible Official's Title: Facility Securities Manager		
Mailing Address: 5150 Rogers Road		
City: San Antonio	County: Bexar	
State: Texas	ZIP Code: 78251	
Telephone:	Fax:	
E-mail Address: ruberagu@microsoft.com		
C. Site Name: Microsoft San Antonio Data Center (SN)		
Street Address: <i>(if different from above)</i> 5200 Rogers Road, San Antonio, TX 78251		
If "NO," street address describe physical location with driving directions:		
City or nearest city:	County:	ZIP Code:
D. TCEQ Account Identification Number <i>(leave blank if unknown)</i> :		
E. TCEQ Customer Reference Number <i>(leave blank if unknown)</i> : CN603222902		
TCEQ Regulated Entity Number <i>(leave blank if unknown)</i> : RN105295687		
F. Does the site have a Title V Permit?		☐ YES ☒ NO
G. Title V Permit Number:		
H. Is this a small business?		☐ YES ☒ NO
II. Attach the Following Documentations		
A. Copies of a previously completed Form PI-7 and all supporting documentation.		
B. A list of each source of air emissions at the site.		
C. A summary of the certified emission rates.		
D. A process description.		
III. Maintain Records On Site to Demonstrate Continuing Compliance and Make the Records Available on Request		

Texas Commission on Environmental Quality
Form APD – CERT
Certification of Emission Limits
(Page 2)

IV. Purpose of this Certification <i>(choose and complete all that are appropriate)</i>	
This certification is intended to establish emission rates below state and federal rule thresholds and triggers for:	
☒ 30 TAC § 106.4 for Permits by Rule	☐ Permit by Rule Number:
☐ HR VOC Emissions Cap and Trade Program	☐ Emissions Banking and Trading Program (other than HRVOC)
☐ 30 TAC § 115 for Volatile Organic Compounds	☐ 30 TAC § 117 for Nitrogen Oxides
☐ 40 CFR Part 60, Subpart	☐ 40 CFR Part 61, Subpart
☐ 40 CFR Part 63, Subpart	☒ Title V Permit Major Source Applicability
☐ Standard Permit:	☐ Other:
V. Requests Associated with this Certification	
A. Are you requesting to withdraw your Title V operating permit application? ☐ YES ☒ NO	
<i>If "YES," submit the original of this certification, directly to the assigned Title V permit reviewer and send a copy to the locations indicated in the Mailing Instruction below.</i>	
B. Are you requesting to void an issued Title V operating permit or authorization to operate under a general operating permit? ☐ YES ☒ NO	
<i>If "YES," submit this certification to the locations indicated in the Mailing Instructions page 9</i>	
C. For issued Title V permits, are you subject to Title V permitting requirements, but are submitting this certification to demonstrate that you are not subject to MACT requirements? ☐ YES ☒ NO	
<i>If "YES," submit this certification to the locations indicated in the Mailing Instructions page 9</i>	
D. For pending Title V permits, are you subject to Title V permitting requirements, but are submitting this certification to demonstrate that you are not subject to MACT requirements? ☐ YES ☒ NO	

Texas Commission on Environmental Quality
Form APD – CERT
Certification of Emission Limits
(Page 3)

If "YES," submit the **original** of this certification directly to the assigned Title V permit reviewer and send a **copy** to the locations indicated in the Mailing Instructions page 9.

VI. Certification by Responsible Official

All representations in this certification of emissions are conditions upon which the stationary source shall operate. This certification reflects the maximum emission rates for the operation of this facility. The facility will operate in compliance with all regulations of the Texas Commission on Environmental Quality and with Federal U.S. Environmental Protection Agency regulations governing air pollution. It shall be unlawful for any person to vary from such representation unless the certification is first revised. The signature below indicates that, based on information and belief formed after reasonable inquiry, the statements, and information contained in the attached documents are true, accurate, and complete.

Name and Title: Ruben Aguilar, Security's Manager, SN1/2, SN4, & SN7

Signature: _____ **Date:** _____

Origin Signature Required

Reminder: The original of this certification must be sent to the TCEQ in Austin and copies sent to the appropriate TCEQ Regional office and any local air pollution control programs with jurisdiction. A copy must also be maintained on site or, for sites that normally operate unattended, at an office within Texas having day-to-day operational control of the site.

Texas Commission on Environmental Quality
Form APD – CERT
Certification of Emission Limits
Attach additional pages if needed if needed.
(Page 4)

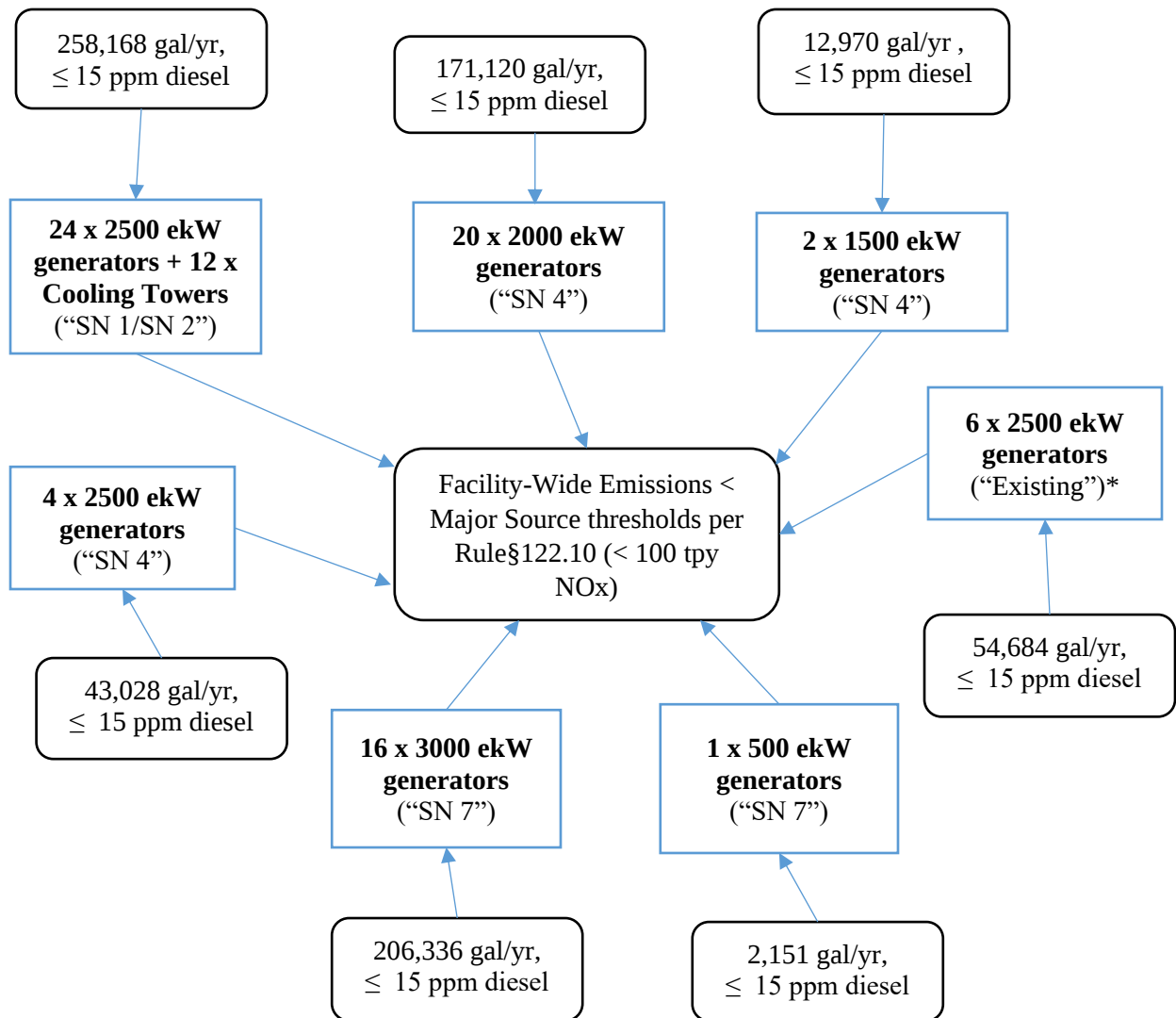
Emission Rate Data									
FIN	Facility Name	EPN	Point Name	Authorization Type	Authorization Date	Permit or Registration Number (if applicable)	Air Contaminant Name	Maximum Certified Emission Rates	
								Pounds/Hour	Tons/Year
	MICROSOFT CORPORATION			PBR Registration	August 16, 2007	82486	VOCs		4.71
							Formaldehyde (included in VOC)		0.17
							SO2		4.21
							CO		6.95
							NOx		99.10
							PM10		4.44
Emissions Totals:									

MICROSOFT SAN ANTONIO DATA CENTER PROCESS DESCRIPTION

Microsoft Corporation's data center in San Antonio covered in this registration modification application consists of three adjacent facilities: 5150 Rogers Road ("SN 1/2" projects), Block 48, Lot 4 Wiseman Boulevard ("SN 4 project"), and 5200 Rogers Road ("SN7 project"), all located in San Antonio, TX 78251.

SN 1/2 consist of twenty four (24) 2500 ekW Caterpillar generators and twelve (12) mechanical draft cooling towers SN4 consists of twenty (20) generators rated at 2000 ekW, four (4) generators rated at 2500 ekW, and two (2) that are rated at 1500 ekW. All these generators at SN1/2 and SN4 are already registered and certified under PBR # 82486. This modification application is for an additional seventeen (17) new generators, and (6) from an existing PBR*. SN7 has sixteen (16) generators rated at 3000 ekW, one (1) rated at 500 ekW, and six (6) existing generators from existing PBR* rated at 2500 ekW.

All generators are 15 ppm sulfur diesel-fueled and conform to EPA Tier 2 emission standards. The process flow diagram below captures the maximum fuel consumption and emissions to which each size-based generator group would be limited.



*Could not locate the PBR number/copy for the existing sources, maybe have been filed under CN600132484, RN105575617.

MICROSOFT CORPORATION
PBR 82486 MODIFICATION APPLICATION
FACILITY-WIDE POTENTIAL EMISSIONS @ SAN ANTONIO DATA CENTER, 5150-5200 RODGERS ROAD, SAN ANTONIO, TX

STACK/ VENT EMISSIONS																										
Unit ID	EU ID	Source description	Output (kW)	Generator Serial #	Engine Serial #	PBR #	PM	PM-10	SO ₂	NOx + NMHC	CO	VOC	CO ₂	CH ₄	N ₂ O	SF ₆	HFC	PFC	Acetaldehyde	Acrolein	Benzene	Formaldehyde	Naphthalene	Toluene	Xylene	
							tons per year (tpy)																			
SN1/2 GENERATORS - EXISTING																										
SN1-1	1	3516C	2500	G4B00114	SBK00173	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN1-2	2	3516C	2500	G4B00115	SBK00175	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN1-3	3	3516C	2500	G4B00105	SBK00161	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN1-4	4	3516C	2500	G4B00108	SBK00166	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN1-5	5	3516C	2500	G4B00123	SBK00191	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN1-6	6	3516C	2500	G4B00121	SBK00188	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN1-7	7	3516C	2500	G4B00120	SBK00185	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN1-8	8	3516C	2500	G4B00122	SBK00186	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN1-9	9	3516C	2500	G4B00116	SBK00180	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN1-10	10	3516C	2500	G4B00111	SBK00174	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN1-11	11	3516C	2500	G4B00117	SBK00178	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN1-12	12	3516C	2500	KHD00228	SBK00986	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN2-1	13	3516C	2500	G4B00106	SBK00163	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN2-2	14	3516C	2500	G4B00107	SBK00164	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN2-3	15	3516C	2500	G4B00109	SBK00165	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN2-4	16	3516C	2500	G4B00104	SBK00157	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN2-5	17	3516C	2500	G4B00118	SBK00177	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN2-6	18	3516C	2500	G4B00110	SBK00167	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN2-7	19	3516C	2500	G4B00119	SBK00183	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN2-8	20	3516C	2500	G4B00303	SBK00367	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN2-9	21	3516C	2500	G4B00306	SBK00377	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN2-10	22	3516C	2500	G4B00304	SBK00366	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN2-11	23	3516C	2500	G4B00305	SBK00374	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
SN2-12	24	3516C	2500	KHD00229	SBK00987	82486	0.01	0.01	0.00	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04	
							0.31	0.31	0.00	37.64	4.47	0.82	2,904.57	1.18E-01	2.36E-02	0.00	0.00	0.00	0.00	1.40E-04	1.38E-02	1.41E-03	2.32E-03	5.01E-03	3.44E-03	
SN4 GENERATORS - EXISTING																										
SN4-ELECR2-GEN01	1	3516C	2000	SFJ00422	DD600421	82486	0.01	0.01	0.00	1.31	0.11	0.03	96.26	3.90E-03	7.81E-04	N/A	N/A	N/A	1.49E-05	4.65E-06	4.58E-04	4.66E-05	7.67E-05	1.66E-04	1.14E-04	
SN4-ELECR1-GEN01	2	3516C	2000	SFJ00424	DD600422	82486	0.01	0.01	0.00	1.31	0.11	0.03	96.26	3.90E-03	7.81E-04	N/A	N/A	N/A	1.49E-05	4.65E-06	4.58E-04	4.66E-05	7.67E-05	1.66E-04	1.14E-04	
SN4-MDF1-GEN01	3	3512C	1500	YBD00167	CT200151	82486	0.02	0.02	0.00	0.72	0.39	0.04	72.96	2.96E-03	5.92E-04	N/A	N/A	N/A	1.13E-05	3.53E-06	3.47E-04	3.53E-05	5.82E-05	1.26E-04	8.64E-05	
SN4-MDF2-GEN01	4	3512C	1500	YBD00166	CT200150	82486	0.02	0.02	0.00	0.72	0.39	0.04	72.96	2.96E-03	5.92E-04	N/A	N/A	N/A	1.13E-05	3.53E-06	3.47E-04	3.53E-05	5.82E-05	1.26E-04	8.64E-05	
SN4-COLO2-GEN03	5	3516C	2000	SFJ00428	DD600425	82486	0.01	0.01	0.00	1.31	0.11	0.03	96.26	3.90E-03	7.81E-04	N/A	N/A	N/A	1.49E-05	4.65E-06	4.58E-04	4.66E-05	7.67E-05	1.66E-04	1.14E-04	
SN4-COLO2-GEN02	6	3516C	2000	SFJ00426	DD600426	82486	0.01	0.01	0.00	1.31	0.11	0.03	96.26	3.90E-03	7.81E-04	N/A	N/A	N/A	1.49E-05	4.65E-06	4.58E-04	4.66E-05	7.67E-05	1.66E-04	1.14E-04	
SN4-COLO1-GEN03	7	3516C	2000	SFJ00432	DD600431	82486	0.01	0.01	0.00	1.31	0.11	0.03	96.26	3.90E-03	7.81E-04	N/A	N/A	N/A	1.49E-05	4.65E-06	4.58E-04	4.66E-05	7.67E-05	1.66E-04	1.14E-04	
SN4-COLO4-GEN01	8	3516C	2000	SFJ00433	DD600432	82486	0.01	0.01	0.00	1.31	0.11	0.03	96.26	3.90E-03	7.81E-04	N/A	N/A	N/A	1.49E-05	4.65E-06	4.58E-04	4.66E-05	7.67E-05	1.66E-04	1.14E-04	
SN4-COLO3-GEN03	9	3516C	2000	SFJ00430	DD600428	82486	0.01	0.01	0.00	1.31	0.11	0.03	96.26	3.90E-03	7.81E-04	N/A	N/A	N/A	1.49E-05	4.65E-06	4.58E-04	4.66E-05	7.67E-05	1.66E-04	1.14E-04	
SN4-COLO4-GEN03	10	3516C	2000	SFJ00436	DD600435	82486	0.01	0.01	0.00	1.31																

MICROSOFT CORPORATION
PBR 82486 MODIFICATION APPLICATION
FACILITY-WIDE POTENTIAL EMISSIONS @ SAN ANTONIO DATA CENTER, 5150-5200 RODGERS ROAD, SAN ANTONIO, TX

STACK/ VENT EMISSIONS																									
Unit ID	EU ID	Source description	Output (kW)	Generator Serial #	Engine Serial #	PBR #	PM	PM-10	SO ₂	NOx + NMHC	CO	VOC	CO ₂	CH ₄	N ₂ O	SF ₆	HFC	PFC	Acetaldehyde	Acrolein	Benzene	Formaldehyde	Naphthalene	Toluene	Xylene
							tons per year (tpy)																		
SN7 GENERATORS - NEW TO THIS PBR (EXISTING UNDER PBR#XXXX)																									
	1	16V4000G83	2500				0.03	0.03	0.00	1.10	0.60	0.07	102.54	4.16E-03	8.32E-04	N/A	N/A	N/A	1.58E-05	4.96E-06	4.88E-04	4.96E-05	8.18E-05	1.77E-04	1.21E-04
	2	16V4000G83	2500				0.03	0.03	0.00	1.10	0.60	0.07	102.54	4.16E-03	8.32E-04	N/A	N/A	N/A	1.58E-05	4.96E-06	4.88E-04	4.96E-05	8.18E-05	1.77E-04	1.21E-04
	3	16V4000G83	2500				0.03	0.03	0.00	1.10	0.60	0.07	102.54	4.16E-03	8.32E-04	N/A	N/A	N/A	1.58E-05	4.96E-06	4.88E-04	4.96E-05	8.18E-05	1.77E-04	1.21E-04
	4	16V4000G83	2500				0.03	0.03	0.00	1.10	0.60	0.07	102.54	4.16E-03	8.32E-04	N/A	N/A	N/A	1.58E-05	4.96E-06	4.88E-04	4.96E-05	8.18E-05	1.77E-04	1.21E-04
	5	16V4000G83	2500				0.03	0.03	0.00	1.10	0.60	0.07	102.54	4.16E-03	8.32E-04	N/A	N/A	N/A	1.58E-05	4.96E-06	4.88E-04	4.96E-05	8.18E-05	1.77E-04	1.21E-04
	6	16V4000G83	2500				0.03	0.03	0.00	1.10	0.60	0.07	102.54	4.16E-03	8.32E-04	N/A	N/A	N/A	1.58E-05	4.96E-06	4.88E-04	4.96E-05	8.18E-05	1.77E-04	1.21E-04
							0.21	0.21	0.01	6.58	3.60	0.40	615.23	2.50E-02	4.99E-03	0.00	0.00	0.00	9.51E-05	2.97E-05	2.93E-03	2.98E-04	4.91E-04	1.06E-03	7.28E-04
SN7 GENERATORS - NEW																									
SN7-COLO1-GEN01	1	500DFEK	500	E190573791	80180882		0.01	0.01	0.00	0.22	0.02	0.02	24.20	9.82E-04	1.96E-04	N/A	N/A	N/A	3.74E-06	1.17E-06	1.15E-04	1.17E-05	1.93E-05	4.17E-05	2.87E-05
SN7-COLO1-GEN02	2	C3000 D6E	3000	C190527371	37277546		0.03	0.03	0.00	1.35	0.15	0.09	145.09	5.89E-03	1.18E-03	N/A	N/A	N/A	2.24E-05	7.01E-06	6.91E-04	7.02E-05	1.16E-04	2.50E-04	1.72E-04
SN7-COLO1-GEN03	3	C3000 D6E	3000	C190521972	37277684		0.03	0.03	0.00	1.35	0.15	0.09	145.09	5.89E-03	1.18E-03	N/A	N/A	N/A	2.24E-05	7.01E-06	6.91E-04	7.02E-05	1.16E-04	2.50E-04	1.72E-04
SN7-COLO1-GEN04	4	C3000 D6E	3000	B190508093	37277912		0.03	0.03	0.00	1.35	0.15	0.09	145.09	5.89E-03	1.18E-03	N/A	N/A	N/A	2.24E-05	7.01E-06	6.91E-04	7.02E-05	1.16E-04	2.50E-04	1.72E-04
SN7-COLO1-GEN05	5	C3000 D6E	3000	E190575198	37278834		0.03	0.03	0.00	1.35	0.15	0.09	145.09	5.89E-03	1.18E-03	N/A	N/A	N/A	2.24E-05	7.01E-06	6.91E-04	7.02E-05	1.16E-04	2.50E-04	1.72E-04
SN7-COLO1-GEN06	6	C3000 D6E	3000	E190573581	37278796		0.03	0.03	0.00	1.35	0.15	0.09	145.09	5.89E-03	1.18E-03	N/A	N/A	N/A	2.24E-05	7.01E-06	6.91E-04	7.02E-05	1.16E-04	2.50E-04	1.72E-04
SN7-MR1-GEN07	7	C3000 D6E	3000	F190595213	37279033		0.03	0.03	0.00	1.35	0.15	0.09	145.09	5.89E-03	1.18E-03	N/A	N/A	N/A	2.24E-05	7.01E-06	6.91E-04	7.02E-05	1.16E-04	2.50E-04	1.72E-04
SN7-COLO2-GEN01	8	C3000 D6E	3000				0.03	0.03	0.00	1.35	0.15	0.09	145.09	5.89E-03	1.18E-03	N/A	N/A	N/A	2.24E-05	7.01E-06	6.91E-04	7.02E-05	1.16E-04	2.50E-04	1.72E-04
SN7-COLO2-GEN02	9	C3000 D6E	3000				0.03	0.03	0.00	1.35	0.15	0.09	145.09	5.89E-03	1.18E-03	N/A	N/A	N/A	2.24E-05	7.01E-06	6.91E-04	7.02E-05	1.16E-04	2.50E-04	1.72E-04
SN7-COLO2-GEN03	10	C3000 D6E	3000				0.03	0.03	0.00	1.35	0.15	0.09	145.09	5.89E-03	1.18E-03	N/A	N/A	N/A	2.24E-05	7.01E-06	6.91E-04	7.02E-05	1.16E-04	2.50E-04	1.72E-04
SN7-COLO2-GEN04	11	C3000 D6E	3000				0.03	0.03	0.00	1.35	0.15	0.09	145.09	5.89E-03	1.18E-03	N/A	N/A	N/A	2.24E-05	7.01E-06	6.91E-04	7.02E-05	1.16E-04	2.50E-04	1.72E-04
SN7-COLO2-GEN05	12	C3000 D6E	3000				0.03	0.03	0.00	1.35	0.15	0.09	145.09	5.89E-03	1.18E-03	N/A	N/A	N/A	2.24E-05	7.01E-06	6.91E-04	7.02E-05	1.16E-04	2.50E-04	1.72E-04
SN7-COLO3-GEN01	13	C3000 D6E	3000				0.03	0.03	0.00	1.35	0.15	0.09	145.09	5.89E-03	1.18E-03	N/A	N/A	N/A	2.24E-05	7.01E-06	6.91E-04	7.02E-05	1.16E-04	2.50E-04	1.72E-04
SN7-COLO3-GEN02	14	C3000 D6E	3000				0.03	0.03	0.00	1.35	0.15	0.09	145.09	5.89E-03	1.18E-03	N/A	N/A	N/A	2.24E-05	7.01E-06	6.91E-04	7.02E-05	1.16E-04	2.50E-04	1.72E-04
SN7-COLO3-GEN03	15	C3000 D6E	3000				0.03	0.03	0.00	1.35	0.15	0.09	145.09	5.89E-03	1.18E-03	N/A	N/A	N/A	2.24E-05	7.01E-06	6.91E-04	7.02E-05	1.16E-04	2.50E-04	1.72E-04
SN7-COLO3-GEN04	16	C3000 D6E	3000				0.03	0.03	0.00	1.35	0.15	0.09	145.09	5.89E-03	1.18E-03	N/A	N/A	N/A	2.24E-05	7.01E-06	6.91E-04	7.02E-05	1.16E-04	2.50E-04	1.72E-04
SN7-COLO3-GEN05	17	C3000 D6E	3000				0.03	0.03	0.00	1.35	0.15	0.09	145.09	5.89E-03	1.18E-03	N/A	N/A	N/A	2.24E-05	7.01E-06	6.91E-04	7.02E-05	1.16E-04	2.50E-04	1.72E-04
							0.52	0.52	0.03	21.87	2.37	1.39	2,345.63	9.51E-02	1.90E-02	0.00	0.00	0.00	3.63E-04	1.13E-04	1.12E-02	1.14E-03	1.87E-03	4.04E-03	2.78E-03
Total Facility Potential-to-Emit (PTE)							1.27	1.27	0.06	99.97	14.12	3.41	8,420.68	0.34	6.83E-02	0.00	0.00	0.00	1.30E-03	4.07E-04	4.01E-02	4.07E-03	6.71E-03	1.45E-02	9.97E-03

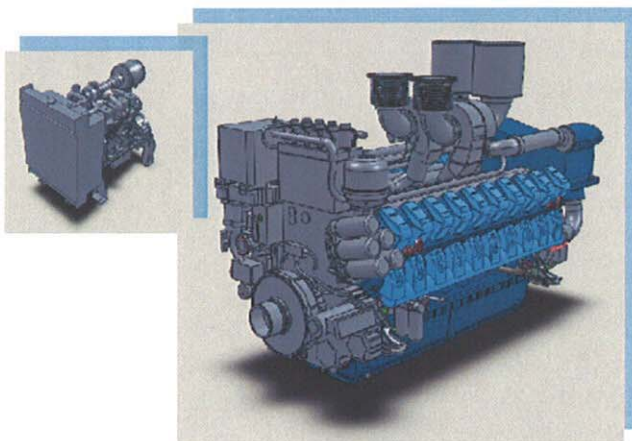
Microsoft Corporation - Emission Calculations for PBR 82486 Modification - 23 NEW and 50 EXISTING Generators

REGISTERED SOURCES																			
SN 1/2 Generators: 2500 ekW x 24																			
Rated engine BHP = 3634 2709.87 kWm						Rated fuel gph (full load) 173.5		No. if units = 24											
Site rating =						Hrs/Yr 62		CAT Engine Model: 3516C g/hp-hr HCHO 2.36E-04											
Pollutant	PM	PM-10	SO2	NOx (as NO ₂)	CO	VOC	CO2	CH ₄	N ₂ O	SF ₆	HFC	PFC	Acetaldehyde	Acrolein	Benzene	Formaldehyde	Naphthalene	Toluene	Xylene
Per unit emissions:																			
lb/hr	0.41	0.41	0.00	50.59	6.01	1.10	3903.99	0.16	3.17E-02	N/A	N/A	N/A	6.03E-04	1.89E-04	1.86E-02	1.89E-03	3.11E-03	6.73E-03	4.62E-03
lb/yr	25.42	25.42	0.00	3136.58	372.62	68.20	242047.67	9.82	1.96	N/A	N/A	N/A	3.74E-02	1.17E-02	1.15E+00	1.17E-01	1.93E-01	4.17E-01	2.87E-01
tpy	0.01	0.01	2.25E-06	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04
Total emissions																			
lb/hr	9.84	9.84	0.00	1214.16	144.24	26.40	93695.87	3.80	0.76	N/A	N/A	N/A	1.45E-02	4.53E-03	4.46E-01	4.53E-02	7.47E-02	1.61E-01	1.11E-01
lb/yr	610.08	610.08	0.11	75277.92	8942.88	1636.80	5809144.00	235.63	47.13	N/A	N/A	N/A	8.98E-01	2.81E-01	2.76E+01	2.81E+00	4.63E+00	1.00E+01	6.88E+00
tpy	0.31	0.31	0.00	37.64	4.47	0.82	2904.57	0.12	0.02	N/A	N/A	N/A	4.49E-04	1.40E-04	1.38E-02	1.41E-03	2.32E-03	5.01E-03	3.44E-03
SN4 Phase 1 Generators: 2000 ekW x 14																			
Rated engine = 2937 bhp 2190.12 kWm						Rated fuel gph (full load) 138		No. if units = 14											
Site rating = 2937 bhp 2190.12 kWm						Hrs/ Yr 62		CAT Engine Model: 3516C g/hp-hr HCHO 2.32E-04											
Pollutant	PM	PM-10	SO2	NOx (as NO ₂)	CO	VOC	CO2	CH ₄	N ₂ O	SF ₆	HFC	PFC	Acetaldehyde	Acrolein	Benzene	Formaldehyde	Naphthalene	Toluene	Xylene
Per unit emissions:																			
lb/hr	0.23	0.23	0.04	42.10	3.45	0.93	3105.19	0.13	2.52E-02	N/A	N/A	N/A	4.80E-04	1.50E-04	1.48E-02	1.50E-03	2.48E-03	5.35E-03	3.68E-03
lb/yr	14.26	14.26	2.21	2610.20	213.90	57.66	192522.06	7.81	1.56	N/A	N/A	N/A	2.98E-02	9.30E-03	9.16E-01	9.32E-02	1.53E-01	3.32E-01	2.28E-01
tpy	0.01	0.01	1.10E-03	1.31	0.11	0.03	96.26	3.90E-03	7.81E-04	N/A	N/A	N/A	1.49E-05	4.65E-06	4.58E-04	4.66E-05	7.67E-05	1.66E-04	1.14E-04
Total emissions																			
lb/hr	3.22	3.22	0.50	589.40	48.30	13.02	43472.72	1.76	0.35	N/A	N/A	N/A	6.72E-03	2.10E-03	2.07E-01	2.10E-02	3.47E-02	7.49E-02	5.15E-02
lb/yr	199.64	199.64	30.94	36542.80	2994.60	807.24	2695308.89	109.33	2.19E+01	N/A	N/A	N/A	4.17E-01	1.30E-01	1.28E+01	1.30E+00	2.15E+00	4.64E+00	3.19E+00
tpy	0.10	0.10	0.02	18.27	1.50	0.40	1347.65	0.05	1.09E-02	N/A	N/A	N/A	2.08E-04	6.51E-05	6.41E-03	6.52E-04	1.07E-03	2.32E-03	1.60E-03
SN4 Phase 1 Generators: 1500 ekW x 2																			
Rated engine = 2206 bhp 1645.01 kWm						Rated fuel gph (full load) 104.6		No. if units = 2											
Site rating = 2206 bhp 1645.01 kWm						Hrs/ Yr 62		CAT Engine Model: 3512C g/hp-hr HCHO 2.34E-04											
Pollutant	PM	PM-10	SO2	NOx (as NO ₂)	CO	VOC	CO2	CH ₄	N ₂ O	SF ₆	HFC	PFC	Acetaldehyde	Acrolein	Benzene	Formaldehyde	Naphthalene	Toluene	Xylene
Per unit emissions:																			
lb/hr	0.73	0.73	0.03	23.21	12.69	1.42	2353.65	0.10	1.91E-02	N/A	N/A	N/A	3.64E-04	1.14E-04	1.12E-02	1.14E-03	1.88E-03	4.06E-03	2.79E-03
lb/yr	44.97	44.97	1.66	1439.05	786.98	87.75	145926.14	5.92	1.18	N/A	N/A	N/A	2.26E-02	7.05E-03	6.94E-01	7.06E-02	1.16E-01	2.51E-01	1.73E-01
tpy	0.02	0.02	8.30E-04	0.72	0.39	0.04	72.96	2.96E-03	5.92E-04	N/A	N/A	N/A	1.13E-05	3.53E-06	3.47E-04	3.53E-05	5.82E-05	1.26E-04	8.64E-05
Total emissions																			
lb/hr	1.45	1.45	0.05	46.42	25.39	2.83	4707.29	0.19	0.04	N/A	N/A	N/A	7.28E-04	2.27E-04	2.24E-02	2.28E-03	3.75E-03	8.11E-03	5.57E-03
lb/yr	89.94	89.94	3.32	2878.09	1573.96	175.49	291852.29	11.84	2.37E+00	N/A	N/A	N/A	4.51E-02	1.41E-02	1.39E+00	1.41E-01	2.33E-01	5.03E-01	3.45E-01
tpy	0.04	0.04	0.00	1.44	0.79	0.09	145.93	0.01	1.18E-03	N/A	N/A	N/A	2.26E-05	7.05E-06	6.94E-04	7.06E-05	1.16E-04	2.51E-04	1.73E-04
SN4 Phase 2 Generators: 2000 ekW x 6																			
Rated engine = 2937 bhp 2190.12 kWm						Rated fuel gph (full load) 138		No. if units = 6											
Site rating = 2937 bhp 2190.12 kWm						Hrs/ Yr 62		CAT Engine Model: 3516C g/hp-hr HCHO 2.32E-04											
Pollutant	PM	PM-10	SO2	NOx (as NO ₂)	CO	VOC	CO2	CH ₄	N ₂ O	SF ₆	HFC	PFC	Acetaldehyde	Acrolein	Benzene	Formaldehyde	Naphthalene	Toluene	Xylene
Per unit emissions:																			
lb/hr	0.23	0.23	0.04	42.45	3.48	0.93	3105.19	0.13	2.52E-02	N/A	N/A	N/A	4.80E-04	1.50E-04	1.48E-02	1.50E-03	2.48E-03	5.35E-03	3.68E-03
lb/yr	14.26	14.26	2.21	2631.90	215.76	57.66	192522.06	7.81	1.56	N/A	N/A	N/A	2.98E-02	9.30E-03	9.16E-01	9.32E-02	1.53E-01	3.32E-01	2.28E-01
tpy	0.01	0.01	1.10E-03	1.32	0.11	0.03	96.26	3.90E-03	7.81E-04	N/A	N/A	N/A	1.49E-05	4.65E-06	4.58E-04	4.66E-05	7.67E-05	1.66E-04	1.14E-04
Total emissions																			
lb/hr	1.38	1.38	0.21	254.70	20.88	5.58	18631.17	0.76	0.15	N/A	N/A	N/A	2.88E-03	9.00E-04	8.87E-02	9.02E-03	1.49E-02	3.21E-02	2.21E-02
lb/yr	85.56	85.56	13.26	15791.40	1294.56	345.96	1155132.38	46.86	9.37E+00	N/A	N/A	N/A	1.79E-01	5.58E-02	5.50E+00	5.59E-01	9.21E-01	1.99E+00	1.37E+00
tpy	0.04	0.04	0.01	7.90	0.65	0.17	577.57	0.02	4.69E-03	N/A	N/A	N/A	8.93E-05	2.79E-05	2.75E-03	2.79E-04	4.60E-04	9.95E-04	6.84E-04
SN4 Phase 2 Generators: 2500 ekW x 4																			
Rated engine = 3633 bhp 2709.13 kWm						Rated fuel gph (full load) 173.5		No. if units = 4											
Site rating = 3633 bhp 2709.13 kWm						Hrs/ Yr 62		CAT Engine Model: 3516C g/hp-hr HCHO 2.36E-04											
Pollutant	PM	PM-10	SO2	NOx (as NO ₂)	CO	VOC	CO2	CH ₄	N ₂ O	SF ₆	HFC	PFC	Acetaldehyde	Acrolein	Benzene	Formaldehyde	Naphthalene	Toluene	Xylene
Per unit emissions:																			
lb/hr	0.41	0.41	0.04	50.59	6.01	1.10	3903.99	0.16	3.17E-02	N/A	N/A	N/A	6.03E-04	1.89E-04	1.86E-02	1.89E-03	3.11E-03	6.73E-03	4.62E-03
lb/yr	25.42	25.42	2.73	3136.58	372.62	68.20	242047.67	9.82	1.96	N/A	N/A	N/A	3.74E-02	1.17E-02	1.15E+00	1.17E-01	1.93E-01	4.17E-01	2.87E-01
tpy	0.01	0.01	1.37E-03	1.57	0.19	0.03	121.02	4.91E-03	9.82E-04	N/A	N/A	N/A	1.87E-05	5.85E-06	5.76E-04	5.86E-05	9.65E-05	2.09E-04	1.43E-04
Total emissions																			
lb/hr	1.64	1.64	0.18	202.36	24.04	4.40	15615.98	0.63	0.13	N/A	N/A	N/A	2.41E-03	7.55E-04	7.43E-02	7.56E-03	1.25E-02	2.69E-02	1.85E-02
lb/yr	101.68	101.68	10.93	12546.32	1490.48	272.80	968190.67	39.27	7.85E+00	N/A	N/A	N/A	1.50E-01	4.68E-02	4.61E+00	4.68E-01	7.72E-01	1.67E+00	1.15E+00
tpy	0.05	0.05	0.01	6.27	0.75	0.14	484.10	0.02	3.93E-03	N/A	N/A	N/A	7.48E-05	2.34E-05	2.30E-03	2.34E-04	3.86E-04	8.34E-04	5.73E-04

Microsoft Corporation - Emission Calculations for PBR 82486 Modification - 23 NEW and 50 EXISTING Generators

NEW SOURCES																			
SN7 Generators: 3000 kW x 16																			
Rated engine = 4308 bhp3212.48 kWm						Rated fuel gph (full load)208		No. if units = 16											
Site rating = 4308 bhp3212.48 kWm						Hrs/ Yr62		Cummins Engine Model: QSK95-G9g/hp-hr HCHO2.38E-04											
Pollutant	PM	PM-10	SO2	NOx (as NO2)	CO	VOC	CO2	CH4	N2O	SF6	HFC	PFC	Acetaldehyde	Acrolein	Benzene	Formaldehyde	Naphthalene	Toluene	Xylene
Per unit emissions:																			
lb/hr	1.04	1.04	0.05	43.65	4.74	2.76	4680.29	1.90E-01	3.80E-02	N/A	N/A	N/A	7.23E-04	2.26E-04	2.23E-02	2.26E-03	3.73E-03	8.07E-03	5.54E-03
lb/yr	64.72	64.72	3.24	2706.26	294.15	171.36	290178.18	1.18E+01	2.35E+00	N/A	N/A	N/A	4.48E-02	1.40E-02	1.38E+00	1.40E-01	2.31E-01	5.00E-01	3.43E-01
tpy	0.03	0.03	1.62E-03	1.35	0.15	0.09	145.09	5.89E-03	1.18E-03	N/A	N/A	N/A	2.24E-05	7.01E-06	6.91E-04	7.02E-05	1.16E-04	2.50E-04	1.72E-04
Total emissions																			
lb/hr	16.70	16.70	0.84	698.39	75.91	44.22	74884.69	3.04E+00	6.08E-01	N/A	N/A	N/A	1.16E-02	3.62E-03	3.56E-01	3.62E-02	5.97E-02	1.29E-01	8.86E-02
lb/yr	1035.45	1035.45	51.86	43300.11	4706.44	2741.69	4642850.92	1.88E+02	3.77E+01	N/A	N/A	N/A	7.18E-01	2.24E-01	2.21E+01	2.25E+00	3.70E+00	8.00E+00	5.50E+00
tpy	0.52	0.52	0.03	21.65	2.35	1.37	2321.43	9.42E-02	1.88E-02	N/A	N/A	N/A	3.59E-04	1.12E-04	1.10E-02	1.12E-03	1.85E-03	4.00E-03	2.75E-03
SN7 Generator: 500 kW x 1																			
Rated engine = 755 bhp563.00 kWm						Rated fuel gph (full load)34.7		No. if units = 1											
Site rating = 755 bhp563.00 kWm						Hrs/ Yr62		Cummins Engine Model: QSX15-G9 NR2g/hp-hr HCHO2.27E-04											
Pollutant	PM	PM-10	SO2	NOx (as NO2)	CO	VOC	CO2	CH4	N2O	SF6	HFC	PFC	Acetaldehyde	Acrolein	Benzene	Formaldehyde	Naphthalene	Toluene	Xylene
Per unit emissions:																			
lb/hr	0.17	0.17	0.01	7.15	0.67	0.48	780.80	3.17E-02	6.33E-03	N/A	N/A	N/A	1.21E-04	3.77E-05	3.72E-03	3.78E-04	6.23E-04	1.35E-03	9.24E-04
lb/yr	10.31	10.31	0.57	443.30	41.24	30.03	48409.53	1.96E+00	3.93E-01	N/A	N/A	N/A	7.48E-03	2.34E-03	2.30E-01	2.34E-02	3.86E-02	8.34E-02	5.73E-02
tpy	0.01	0.01	2.84E-04	0.22	0.02	0.02	24.20	9.82E-04	1.96E-04	N/A	N/A	N/A	3.74E-06	1.17E-06	1.15E-04	1.17E-05	1.93E-05	4.17E-05	2.87E-05
Total emissions																			
lb/hr	0.17	0.17	0.01	7.15	0.67	0.48	780.80	3.17E-02	6.33E-03	N/A	N/A	N/A	1.21E-04	3.77E-05	3.72E-03	3.78E-04	6.23E-04	1.35E-03	9.24E-04
lb/yr	10.31	10.31	0.57	443.30	41.24	30.03	48409.53	1.96E+00	3.93E-01	N/A	N/A	N/A	7.48E-03	2.34E-03	2.30E-01	2.34E-02	3.86E-02	8.34E-02	5.73E-02
tpy	0.01	0.01	0.00	0.22	0.02	0.02	24.20	9.82E-04	1.96E-04	N/A	N/A	N/A	3.74E-06	1.17E-06	1.15E-04	1.17E-05	1.93E-05	4.17E-05	2.87E-05
Existing Chevron Generators: 2500 kW x 6																			
Rated engine = 3363 bhp2507.79 kWm						Rated fuel gph (full load)147		No. if units = 6											
Site rating = 3363 bhp2507.79 kWm						Hrs/ Yr62		Dynamics Engine Model: 16V400G83 EEO EPAg/hp-hr HCHO2.16E-04											
Pollutant	PM	PM-10	SO2	NOx (as NO2)	CO	VOC	CO2	CH4	N2O	SF6	HFC	PFC	Acetaldehyde	Acrolein	Benzene	Formaldehyde	Naphthalene	Toluene	Xylene
Per unit emissions:																			
lb/hr	1.11	1.11	0.04	35.38	19.35	2.16	3307.71	0.13	2.68E-02	N/A	N/A	N/A	5.11E-04	1.60E-04	1.57E-02	1.60E-03	2.64E-03	5.70E-03	3.92E-03
lb/yr	68.56	68.56	2.53	2193.80	1199.73	133.77	205077.85	8.32	1.66	N/A	N/A	N/A	3.17E-02	9.91E-03	9.76E-01	9.92E-02	1.64E-01	3.53E-01	2.43E-01
tpy	0.03	0.03	1.27E-03	1.10	0.60	0.07	102.54	0.00	8.32E-04	N/A	N/A	N/A	1.58E-05	4.96E-06	4.88E-04	4.96E-05	8.18E-05	1.77E-04	1.21E-04
Total emissions																			
lb/hr	6.63	6.63	0.24	212.30	116.10	12.95	19846.24	0.81	0.16	N/A	N/A	N/A	3.07E-03	9.59E-04	9.45E-02	9.60E-03	1.58E-02	3.42E-02	2.35E-02
lb/yr	411.34	411.34	15.18	13162.78	7198.39	802.60	1230467.10	49.91	9.98E+00	N/A	N/A	N/A	1.90E-01	5.95E-02	5.86E+00	5.95E-01	9.81E-01	2.12E+00	1.46E+00
tpy	0.21	0.21	0.01	6.58	3.60	0.40	615.23	0.02	4.99E-03	N/A	N/A	N/A	9.51E-05	2.97E-05	2.93E-03	2.98E-04	4.91E-04	1.06E-03	7.28E-04

2 **DIESEL ENGINE**



2.1 **MAIN FEATURES**

Characteristic	Value	Unit	Remark
Brand	MTU		
Model	16V4000G83 EEO EPA		
Rated speed	1800	RPM	
Displacement	76.3	L	
Number of cylinders	16		
Electrical system	24	V DC	
Prime power rating (PRP)	2280 (3058)	kW (BHP)	At 40°C and 100kPa according to ISO 3046
Standby power (ESP)	2508 (3363)	kW (BHP)	

2.2 **SPECIAL FEATURES AND AUXILIARIES**

Accessories	Included
Prelubrication pump	Yes
Manual oil sump extraction pump	Yes
Water circuit preheating with thermostatic control and circulation pump	Yes
Air/water charge air cooler	Yes
Oil pressure electrical sensor	Yes
Water temperature electrical sensor	Yes
Overspeed electrical sensor	Yes
Oil replenishment system	No
Fuel cooler	Yes

2.3 FLUIDS CAPACITIES

Fluid type	Quantity	Unit
Lubricating oil capacity (total)	300 (79)	l (US gal)
Lubricating oil consumption at rated power		l/h (US gal/h)
Coolant capacity in engine circuit (radiator not included)	175 (46)	l (US gal)
Coolant capacity in aftercooler circuit (if applicable and radiator not included)	50 (13)	l (US gal)

2.4 FUEL

Fuel consumption (Admissible tolerance : +/-5%)	g/kWh	l/h (US gal/h)
at 25% PRP	254	170 (45)
at 50% PRP	223	299 (79)
at 75% PRP	212	427 (113)
at 100% PRP	208	558 (147)
at rated output power	209	540 (143)

Other characteristics	Value	Unit
Fuel maximum inlet temperature		°C (°F)
Maximum fuel flow	1,020 (269)	l/h (US gal/h)

2.5 EXHAUST

Characteristics	Value	Unit
Exhaust gas flow	30,200 (17,800)	m ³ /h (cfm)
Exhaust gas temperature	503 (937)	°C (°F)
Heat rejection to exhaust		kW (BTU/min)
Exhaust back pressure (Design value)	30 (0.43)	mbar (psi)
Maximum exhaust back pressure	85 (1.23)	mbar (psi)

Exhaust emissions (PRP)	Value	Unit
Complies with	EPA 40 CFR 89 – Tier 2	
NOx + Unburned hydrocarbons	6.4	g/kWh
CO	3.5	g/kWh
Particulate matter (Dust)	0.2	g/kWh

Specification sheet



Diesel Generator set QSK95 series engine

2500 kW-3500 kW 60 Hz

EPA Tier 2 emissions regulated



Description

Cummins® commercial generator sets are fully integrated power generation systems providing optimum performance, fuel economy, reliability and versatility for stationary Standby, Prime and Continuous power applications.

Features

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

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

Control system - The PowerCommand® digital control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protective relay, output metering and auto-shutdown.

Cooling system - Standard and enhanced integral set-mounted radiator systems, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat. Also optional remote cooled configuration for non-factory supplied cooling systems.

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

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

Model	Standby rating	Prime rating	Continuous rating	Emissions compliance	Data sheets
	60 Hz kW (kVA)	60 Hz kW (kVA)	60 Hz kW (kVA)	EPA	60 Hz
C3000 D6e	3000 (3750)	2750 (3438)	2500 (3125)	EPA Tier 2	NAD-5942-EN
C3250 D6e	3250 (4063)	3000 (3750)	2500 (3125)	EPA Tier 2	NAD-3527-EN
C3500 D6e	3500 (4375)	3000 (3750)	2750 (3438)	EPA Tier 2	NAD-5917-EN

Note: All ratings include radiator fan losses.

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Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio Frequency (RF) emission compliance	47 CFR FCC PART 15 Subpart B (Class A for industrial)

Engine specifications

Bore	190 mm (7.48 in)
Stroke	210 mm (8.27 in)
Displacement	95.3 litres (5815 in ³)
Configuration	Cast iron, V 16 cylinder
Battery capacity	6 x 1400 amps minimum at ambient temperature of -18 °C (0 °F)
Battery charging alternator	145 amps
Starting voltage	24 volt, negative ground
Fuel system	Cummins modular common rail system
Fuel filter	On engine triple element, 5 micron primary filtration with water separators, 3 micron/2 micron (filter in filter design) secondary filtration.
Fuel transfer pump	Electronic variable speed priming and lift pump
Breather	Cummins impactor breather system
Air cleaner type	Unhoused dry replaceable element
Lube oil filter type(s)	Spin-on combination full flow filter and bypass filters
Standard cooling system	High ambient cooling system (ship loose)

Alternator specifications

Design	Brushless, 4 pole, drip proof, revolving field
Stator	Optimal
Rotor	Two bearing, flexible coupling
Insulation system	Class H on low and medium voltage, Class F on high voltage
Standard temperature rise	125 °C Standby/105 °C Prime
Exciter type	Optimal
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform Total Harmonic Distortion (THDV)	< 5% no load to full linear load, < 3% for any single harmonic
Telephone Influence Factor (TIF)	< 50 per NEMA MG1-22.43
Telephone Harmonic Factor (THF)	< 3
Anti-condensation heater	1400 watt

Available voltages

60 Hz Line – Neutral/Line – Line

• 220/380	• 7200/12470	• 2400/4160
• 240/416	• 277/480	• 7620/13200
• 255/440	• 347/600	• 7970/13800

Note: Consult factory for other voltages.

Generator set options and accessories

Engine

- 480 V thermostatically controlled coolant heater for ambient above 4.5 °C (40 °F)
- Heavy duty air cleaner
- Redundant fuel filter
- Air starter
- Redundant electric starting

- Eliminator oil filter system
- Lube oil make up
- Coalescing breather filter

Alternator

- 80 °C rise
- 105 °C rise
- 125 °C rise
- 150 °C rise

- Differential current transformers

Cooling system

- Enhanced high ambient cooling system (ship loose)
- Remote cooled configuration

Generator set options and accessories (continued)

Control panel

- Multiple language support
- Ground fault indication
- Remote annunciator panel
- Paralleling and shutdown alarm relay package
- Floor mounted pedestal installed control panel

Generator set

- Battery
- Battery charger
- LV and MV entrance box
- Spring isolators
- Factory witness tests
- IBC, OSHPD, IEEE seismic certification

Warranty

- 3, 5, or 10 years for Standby including parts (labor and travel optional)
- 2 or 3 years for Prime including parts, labor and travel

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

PowerCommand 3.3 – control system



An integrated microprocessor based generator set control system providing voltage regulation, engine protection, alternator protection, operator interface and isochronous governing. Refer to document S-1570 for more detailed information on the control.

AmpSentry – Includes integral AmpSentry protection, which provides a full range of alternator protection functions that are matched to the alternator provided.

Power management – Control function provides battery monitoring and testing features and smart starting control system.

Advanced control methodology – Three phase sensing, full wave rectified voltage regulation, with a PWM output for stable operation with all load types.

Communications interface – Control comes standard with PCCNet and Modbus interface.

Regulation compliant – Prototype tested: UL, CSA and CE compliant.

Service - InPower™ PC-based service tool available for detailed diagnostics, setup, data logging and fault simulation.

Easily upgradeable – PowerCommand controls are designed with common control interfaces.

Reliable design – The control system is designed for reliable operation in harsh environment.

Multi-language support

Operator panel features

Operator/display functions

- Displays paralleling breaker status
- Provides direct control of the paralleling breaker
- 320 x 240 pixels graphic LED backlight LCD
- Auto, manual, start, stop, fault reset and lamp test/panel lamp switches
- Alpha-numeric display with pushbuttons
- LED lamps indicating genset running, remote start, not in auto, common shutdown, common warning, manual run mode, auto mode and stop

Paralleling control functions

- First Start Sensor™ system selects first genset to close to bus
- Phase lock loop synchronizer with voltage matching
- Sync check relay
- Isochronous kW and kVar load sharing
- Load govern control for utility paralleling
- Extended paralleling (base load/peak shave) mode
- Digital power transfer control, for use with a breaker pair to provide open transition, closed transition, ramping closed transition, peaking and base load functions.

Other control features

- 150 watt anti-condensation heater
- DC distribution panel
- AC auxiliary distribution panel

Alternator data

- Line-to-Neutral and Line-to-Line AC volts
- 3-phase AC current
- Frequency
- kW, kVar, power factor kVA (three phase and total)
- Winding temperature
- Bearing temperature

Engine data

- DC voltage
- Engine speed
- Lube oil pressure and temperature
- Coolant temperature
- Comprehensive FAE data (where applicable)

Other data

- Genset model data
- Start attempts, starts, running hours, kW hours
- Load profile (operating hours at % load in 5% increments)
- Fault history
- Data logging and fault simulation (requires InPower)
- Air cleaner restriction indication
- Exhaust temperature in each cylinder

Standard control functions

Digital governing

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

Standard control functions (continued)

Digital voltage regulation

- Integrated digital electronic voltage regulator
- 3-phase, 4-wire Line-to-Line sensing
- Configurable torque matching

AmpSentry AC protection

- AmpSentry protective relay
- Over current and short circuit shutdown
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shutdown
- Over and under frequency shutdown
- Overload warning with alarm contact
- Reverse power and reverse Var shutdown
- Field overload shutdown

Engine protection

- Battery voltage monitoring, protection and testing
- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning

- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown
- Fuel-in-rupture-basin warning or shutdown
- Full authority electronic engine protection

Control functions

- Time delay start and cool down
- Real time clock for fault and event time stamping
- Exerciser clock and time of day start/stop
- Data logging
- Cycle cranking
- Load shed
- Configurable inputs and outputs (20)
- Remote emergency stop

Ratings definitions

Emergency Standby Power (ESP):

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

Limited-Time Running Power (LTP):

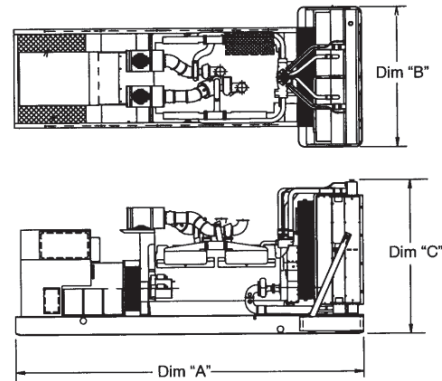
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):

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

Base Load (Continuous) Power (COP):

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



This outline drawing is for reference only. See PowerSuite library for specific model outline drawing number.

Do not use for installation design

Model	Dim "A"* mm (in.)	Dim "B"* mm (in.)	Dim "C"* mm (in.)	Set weight* dry kg (lbs)	Set weight* wet kg (lbs)
C3000 D6e	7902 (311)	3028 (119)	3663 (144)	29526 (65092)	31194 (68771)
C3250 D6e	7902 (311)	3028 (119)	3663 (144)	29526 (65092)	31194 (68771)
C3500 D6e	7902 (311)	3028 (119)	3663 (144)	29526 (65092)	31194 (68771)

* Weights and dimensions represent a set with standard features and alternator frame P80X. See outline drawing for weights and dimensions of other configurations.

Codes and standards

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

	This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.		The generator set is available listed to UL 2200, Stationary Engine Generator Assemblies for all 60 Hz low voltage models. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage.
	The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.	U.S. EPA	Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards, 40 CFR 60 subpart IIII Tier 2 exhaust emission levels. U.S. applications must be applied per this EPA regulation.
	All models are CSA certified to product class 4215-01.		

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

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

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Exhaust emission data sheet

C3000 D6e

60 Hz Diesel generator set

EPA Tier 2

Engine Information:

Model:	Cummins Inc. QSK95-G9	Bore:	7.48 in. (190 mm)
Type:	4 Cycle, VEE, 16 cylinder diesel	Stroke:	8.27 in. (210 mm)
Aspiration:	Turbocharged and Aftercooled	Displacement:	5816 cu. in. (95.3 liters)
Compression Ratio:	15.5:1		
Emission Control Device:	Turbocharged and Aftercooled		
Emission Level:	Stationary Emergency		

	<u>1/4</u>	<u>1/2</u>	<u>3/4</u>	<u>Full</u>	<u>Full</u>	<u>Full</u>
<u>Performance Data</u>	<u>Standby</u>	<u>Standby</u>	<u>Standby</u>	<u>Standby</u>	<u>Prime</u>	<u>Continuous</u>
BHP @ 1800 RPM (60 Hz)	1145	2185	3225	4308	3919	3572
Fuel Consumption L/Hr (US Gal/Hr)	254 (67)	443 (117)	602 (159)	787 (208)	719 (190)	659 (174)
Exhaust Gas Flow m³/min (CFM)	282 (9963)	45 (15921)	55 (19592)	662 (23369)	623 (21997)	588 (20776)
Exhaust Gas Temperature °C (°F)	331 (628)	354 (670)	377 (711)	443 (830)	417 (783)	396 (745)
<u>Exhaust Emission Data</u>						
HC (Total Unburned Hydrocarbons)	0.3 (114)	0.18 (76)	0.1 (48)	0.07 (33)	0.08 (37)	0.09 (42)
NOx (Oxides of Nitrogen as NO ₂)	3.4 (1290)	3.3 (1350)	4.2 (1900)	5.2 (2440)	4.9 (2250)	4.5 (2080)
CO (Carbon Monoxide)	0.5 (170)	0.2 (90)	0.1 (60)	0.2 (100)	0.2 (80)	0.2 (70)
PM (Particulate Matter)	0.21 (69)	0.1 (37)	0.06 (23)	0.04 (18)	0.05 (19)	0.05 (21)
SO ₂ (Sulfur Dioxide)	0.006 (1.8)	0.005 (1.8)	0.005 (1.8)	0.005 (1.8)	0.005 (1.8)	0.005 (1.8)
Smoke (FSN)	0.92	0.62	0.46	0.44	0.44	0.45
All values (except smoke) are cited: g/BHP-hr (mg/Nm³ @ 5% O ₂)						

Test Conditions

Steady-state emissions recorded per ISO8178-1 during operation at rated engine speed (+/-2%) and stated constant load (+/-2%) with engine temperatures, pressures and emission rates stabilized.

Fuel Specification:	40-48 Cetane Number, 0.0015 Wt.% Sulfur; Reference ISO8178-5, 40 CFR 86, 1313—98 Type 2-D and ASTM D975 No. 2-D. Fuel Density at 0.85 Kg/L (7.1 lbs/US Gal)
Air Inlet Temperature	25 °C (77 °F)
Fuel Inlet Temperature:	40 °C (104 °F)
Barometric Pressure:	100 kPa (29.53 in Hg)
Humidity:	NOx measurement corrected to 10.7 g/kg (75 grains H ₂ O/lb) of dry air
Intake Restriction:	Set to 20 in of H ₂ O as measured from compressor inlet
Exhaust Back Pressure:	Set to 1.5 in Hg

Note: mg/m³ values are measured dry, corrected to 5% O₂ and normalized to standard temperature and pressure (0°C, 101.325 kPa)

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



2018 EPA Tier 2 Exhaust Emission Compliance Statement C3000 D6e Stationary Emergency 60 Hz Diesel Generator Set

Compliance Information:

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

Engine Manufacturer: Cummins Inc.
EPA Certificate Number: JCEXL95.0AAA-006
Effective Date: 07/03/2017
Date Issued: 07/03/2017
EPA Engine Family (Cummins Emissions Family): JCEXL95.0AAA

Engine Information:

Model: QSK95-G9 Bore: 7.48 in. (190 mm)
Engine Nameplate HP: 5051 Stroke: 8.27 in. (210 mm)
Type: 4 cycle, Vee, 16 Cylinder Diesel Displacement: 5816 cu. in. (95.3 liters)
Aspiration: Turbocharged and Aftercooled Compression Ratio: 15.5:1
Emission Control Device: Turbocharged and Aftercooled Exhaust Stack Diameter: 14 in.

Diesel Fuel Emissions Limits

D2 Cycle Exhaust Emissions

	Grams per BHP-hr			Grams per kW _m -hr		
	<u>NO_x + NMHC</u>	<u>CO</u>	<u>PM</u>	<u>NO_x + NMHC</u>	<u>CO</u>	<u>PM</u>
Test Results - Diesel Fuel	4.6	0.5	0.11	6.2	0.7	0.15
EPA Emissions Limit	4.8	2.6	0.15	6.4	3.5	0.20

Test methods: EPA nonroad emissions recorded per 40CFR89 (ref. ISO8178-1) and weighted at load points prescribed in Subpart E, Appendix A for constant speed engines (ref. ISO8178-4, D2)

Diesel fuel specifications: Cetane number: 40-48. Reference: ASTM D975 No. 2-D, <15 ppm Sulfur

Reference conditions: Air inlet temperature: 25°C (77°F), Fuel inlet temperature: 40°C (104°F). Barometric pressure: 100 kPa (29.53 in Hg), Humidity: 10.7 g/kg (75 grains H₂O/lb) of dry air; required for NO_x correction, Restrictions: Intake restriction set to a maximum allowable limit for clean filter; Exhaust back pressure set to a maximum allowable limit.

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



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CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS



Certification No.

VMA-49625-01C (REVISION 1)

Expiration Date: 4/30/2021

Certification Parameters:

The nonstructural products (mechanical and/or electrical components) listed on this certificate are CERTIFIED¹ FOR SEISMIC APPLICATIONS in accordance with the following building code² releases.

IBC 2009, 2012, 2015, 2018

The following model designations, options, and accessories are included in this certification. Reference report number **VMA-49625-01** as issued by The VMC Group for a complete list of certified models, included accessories/options, and certified installation methods.

**Cummins Power Generation, Incorporated; Diesel Gensets
QSK95 Series; 2500 – 3750 kW**

The above referenced equipment is **APPROVED** for seismic application when properly installed³, used as intended, and contains a Seismic Certification Label referencing this Certificate of Compliance⁴. As limited by the tabulated values, below grade, grade, and roof-level installations, installations in essential facilities, for life safety applications, and/or of equipment containing hazardous contents are permitted and included in this certification with an Equipment Importance Factor assigned as $I_p=1.5$. The equipment is qualified successful seismic shake table testing at the nationally recognized Construction Engineering Research Laboratory under the witness of the ISO Accredited Product Certification Agency, The VMC Group.

Certified Seismic Design Levels			
Certified IBC	Importance $I_p \leq 1.5$ Soil Classes A-E Risk Categories I-IV Design Categories A-F	$S_{DS} \leq 2.400 \text{ g}$ $z/h = 0.0$	$S_{DS} \leq 2.000 \text{ g}$ $z/h \leq 1.0$
		Horizontal Design $\frac{F_p}{W_p} = 0.4 S_{DS} I_p \frac{a_p}{R_p} \left(1 + 2 \frac{z}{h}\right) \leq$	4.500 g
Test Datum AC156	ISO 17025 Laboratory Continuous Functionality During Shake Tri-axial, 5% Damping SRS	$A_{FLEX-H} \leq 3.200 \text{ g}$ $A_{RIG-H} \leq 2.400 \text{ g}$ $ZPA_H \leq 2.160 \text{ g}$	$A_{FLEX-V} \leq 1.600 \text{ g}$ $A_{RIG-V} \leq 0.640 \text{ g}$ $ZPA_V \leq 0.576 \text{ g}$

Certified Seismic Installation Methods

External isolation mounting from unit base to rigid structure



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CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Certified Product Table:

Model	Frequency (Hz)	Max Rating		Dimensions (in)			Max Weight [lbs]
		kW	kVA	Length	Width	Height	
C3500 D5	50	N/A	3500	311	119	144	76566
C3500 D5e		N/A	3500	311	119	144	76566
C3750 D5		N/A	3750	311	119	144	78947
C3750 D5e		N/A	3750	311	119	144	78947
C3000 D6	60	3000	N/A	311	119	144	74060
C3000 D6e		3000	N/A	311	119	144	74060
C3250 D6		3500	N/A	311	119	144	79807
C3250 D6e		3500	N/A	311	119	144	79807
C3500 D6e		3500	N/A	311	119	144	79807
C3500 D6		3500	N/A	311	119	144	79807

This certification **includes** open diesel engine generators as detailed in the above charts. The open diesel engine generator configuration and options shall be a catalogue design and factory supplied. The open diesel engine generator shall be installed and attached to the building structure per the manufacturer's supplied seismic installation instructions. For a list of certified configurations and options please directly contact the manufacturer. This certification **excludes** all non-factory supplied accessories, all connections for electrical, fuel, heating or cooling fluid, or other pipe/conduit connections and all non-catalogued, standard options and/or configurations not detailed in the above charts. Flexibility in the connections must be maintained as to not transmit load into the equipment. Fuel Tanks, Enclosures, and design specials are outside the scope of this certification.



VMA-49625-01C (Revision 1)
 Issue Date: April 17, 2015
 Revision Date: April 5, 2018
Expiration Date: April 30, 2021



THE VMC GROUP

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CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Notes and Comments:

1. All equipment listed herein successfully passed the seismic acceptance criteria for shake testing non-structural components and systems as set forth in the ICC AC-156. The Test Response Spectrum (TRS) enveloped the Required Response Spectrum (RRS) for all units tested. The units cited in this certification were representative sample(s) of a contingent of models and all remained captive and structurally sound after the seismic shake simulation. The units also remained functionally operational before, during, and after the simulation testing as functional testing was completed by the equipment manufacturer before, during, and after the seismic simulations. Although a seismic qualified unit inherently contains some wind resisting capacity, that capacity is undetermined and is excluded from this certification. Snow/Ice loads have been neglected and thus limit the unit to be installed both indoors (covered by an independent protective structure) and out of doors (exposed to accumulating snow/ice) for ground snow loads no greater than 30 psf for all applications.
2. The following building codes are addressed under this certification:
IBC 2009 – referencing ASCE7-05 and ICC AC-156
IBC 2012 – referencing ASCE7-10 and ICC AC-156
IBC 2015 – referencing ASCE7-10 and ICC AC-156
IBC 2018 – referencing ASCE7-16 and ICC AC-156
3. Refer to the manufacturer supplied installation drawings for anchor requirements and mounting considerations for seismic applications. Required anchor locations, size, style, and load capacities (tension and shear) may be specified on the installation drawings or specified by a 3rd party. Mounting requirement details such as anchor brand, type, embedment depth, edge spacing, anchor-to-anchor spacing, concrete strength, special inspection, wall design, and attachment to non-building structures must be outlined and approved by the Engineer of Record for the project or building. Structural walls, structural floors, and housekeeping pads must also be seismically designed and approved by the project or building Structural Engineer of Record to withstand the seismic anchor loads as defined on the installation drawings. The installing contractor is responsible for observing the installation detailed in the seismic installation drawings and the proper installation of all anchors and mounting hardware.
4. For this certificate and certification to remain valid, this certificate must correspond to the "Seismic Certification Label" found affixed to the unit by the factory. The label ensures the manufacturer built the unit in conformance to the IBC seismic design criteria set forth by the Certified Seismic Qualification Agency, The VMC Group, and meets the seismic design levels claimed by this certificate.
5. Mechanical, Electrical, and Plumbing connections to the equipment must be flexibly attached as to not transfer load through the connection. The structural integrity of any conduit, cable trays, piping, ductwork and/or flexible connections is the responsibility of others. This certification does not guarantee the equipment will remain compliant to NEMA, IP, UL, or CSA standards after a seismic event.
6. This certificate applies to units manufactured at:
1400 73rd Ave NE, Fridley, MN 55432
7. This project follows The VMC Group's ISO-17065 Scheme for Product Certification of Nonstructural Components.

John P. Giuliano, PE
President, The VMC Group

VMA-49625-01C (Revision 1)
Issue Date: April 17, 2015
Revision Date: April 5, 2018
Expiration Date: April 30, 2021



Specification sheet



Diesel generator set QSX15 series engine

450 kW – 500 kW Standby



Description

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

Features

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

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

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

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

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

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

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

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

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

	Standby rating	Prime rating	Continuous rating	Data sheets
Model	60 Hz kW (kVA)	60 Hz kW (kVA)	60 Hz kW (kVA)	60 Hz
DFEJ	450 (563)	410 (513)		D-3400
DFEK	500 (625)	455 (569)		D-3401

Generator set specifications

Governor regulation class	ISO 8528 part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
EMS compatibility	IEC 61000-4-2: Level 4 Electrostatic discharge IEC 61000-4-3: Level 3 Radiated susceptibility

Engine specifications

Design	Turbocharged with air-to-air charge air-cooling
Bore	136.9 mm (5.39 in.)
Stroke	168.9 mm (6.65 in.)
Displacement	14.9 L (912.0 in ³)
Cylinder block	Cast iron with replaceable wet liners, in-line 6 cylinder
Battery capacity	1400 Amps minimum at ambient temperature 0 °C (32 °F)
Battery charging alternator	35 Amps
Starting voltage	24 volt, negative ground
Fuel system	Full authority electronic (FAE) Cummins HPI-TP
Fuel filter	
Air cleaner type	
Lube oil filter type(s)	Single spin-on combination full flow and bypass filters
Standard cooling system	40 °C (104 °F) ambient radiator

Alternator specifications

Design	Brushless, 4 pole, drip-proof revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible discs
Insulation system	Class H
Standard temperature rise	125 °C standby at 40 °C ambient
Exciter type	PMG (Permanent Magnet Generator)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform total harmonic distortion (THDV)	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50% per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3%

Available voltages

60 Hz Line – Neutral/Line - Line

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

Note: Consult factory for other voltages.

Generator set options

Engine

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

Alternator

- 80 °C rise
- 105 °C rise
- 150 °C rise
- 120/240 V 200 W anti-condensation heater

Exhaust system

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

Fuel system

- 1022 L (270 gal) sub-base tank
- 1136 L (300 gal) sub-base tank
- 1514 L (400 gal) sub-base tank
- 1893 L (500 gal) sub-base tank
- 2271 L (600 gal) sub-base tank
- 2498 L (660 gal) sub-base tank
- 3218 L (850 gal) sub-base tank
- 6435 L (1700 gal) sub-base tank
- 9558 L (2525 gal) sub-base tank

Cooling system

- High ambient 50 °C radiator

Control panel

- PC 3.3
- PC 3.3 with MLD
- 120/240 V 100 W control anti-condensation heater
- Ground fault indication
- Remote fault signal package
- Run relay package

Generator set

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

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

Control system 2.3

The PowerCommand 2.3 control system - An integrated generator set control system providing voltage regulation, engine protection, generator protection, operator interface and isochronous governing (optional).

Control - Provides battery monitoring and testing features and smart-starting control system.

InPower™ - PC-based service tool available for detailed diagnostics.

PCCNet RS485 - Network interface (standard) to devices such as remote annunciator for NFPA 110 applications.

Control boards - Potted for environmental protection.

Ambient operation - Suitable for operation in ambient temperatures from -40 °C to +70 °C and altitudes to 13,000 feet (5000 meters). Prototype tested - UL, CSA and CE compliant.

AC protection

- AmpSentry protective relay
- Over current warning and shutdown
- Over and under voltage shutdown
- Over and under frequency shutdown
- Over excitation (loss of sensing) fault
- Field overload
- Overload warning
- Reverse kW shutdown
- Reverse Var shutdown
- Short circuit protection

Engine protection

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning

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

Operator/display panel

- Manual off switch
- 128 x 128 Alpha-numeric display with push button access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- LED lamps indicating genset running, not in auto, common warning, common shutdown, manual run mode and remote start
- Suitable for operation in ambient temperatures from -20 °C to +70 °C

Alternator data

- Line-to-Neutral AC volts
- Line-to-Line AC volts
- 3-phase AC current
- Frequency
- kVA, kW, power factor

Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature

Control functions

- Time delay start and cool down
- Glow plug control (some models)
- Cycle cranking
- PCCNet interface
- (4) Configurable inputs
- (4) Configurable outputs
- Remote emergency stop
- Battle short mode
- Load shed
- Real time clock with exerciser
- Derate

Digital governing (optional)

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

Digital voltage regulation

- Integrated digital electronic voltage regulator
- 3-phase Line-to-Line sensing
- Configurable torque matching
- Fault current regulation under single or three phase fault conditions

Other data

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

Options

- Auxiliary output relays (2)
- 120/240 V, 100 W anti-condensation heater
- Remote annunciator with (3) configurable inputs and (4) configurable outputs
- PMG alternator excitation
- PowerCommand for Windows® remote monitoring software (direct connect)
- AC output analogue meters
- PowerCommand 2.3 and 3.3 control with AmpSentry protection

For further detail on PC 2.3 see document S-1569.

For further detail on PC 3.3 see document S-1570.

Emergency Standby Power (ESP):

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

Limited-Time running Power (LTP):

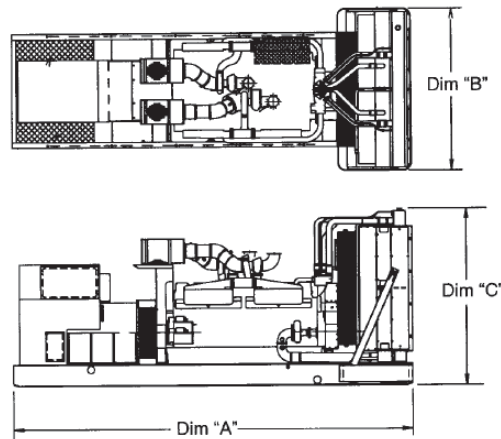
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):

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

Base Load (Continuous) Power (COP):

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



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

Do not use for installation design

Model	Dim 'A' mm (in.)	Dim 'B' mm (in.)	Dim 'C' mm (in.)	Set weight dry* kg (lbs)	Set weight wet* kg (lbs)
DFEJ	3864 (152.1)	1524 (60.0)	1812 (71.3)	4098 (9035)	4234 (9335)
DFEK	3864 (152.1)	1524 (60.0)	1812 (71.3)	4325 (9535)	4461 (9835)

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

Codes and standards

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

	This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.		The generator set is available listed to UL 2200, Stationary Engine Generator Assemblies for all 60 Hz low voltage models. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage. Circuit breaker assemblies are UL 489 Listed for 100% continuous operation and also UL 869A Listed Service Equipment.
	The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.	U.S EPA	Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards, 40 CFR 60 subpart IIII Tier 2 exhaust emission levels. U.S. applications must be applied per this EPA regulation.
	All low voltage models are CSA certified to product class 4215-01.	International Building Code	The generator set package is available certified for seismic application in accordance with the following International Building Code: IBC2000, IBC2003, IBC2006, IBC2009 and IBC2012.

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

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

Our energy working for you.™





Exhaust Emission Data Sheet

500DFEK

60 Hz Diesel Generator Set

EPA NSPS Stationary Emergency

Engine Information:

Model:	Cummins Inc. QSX15-G9 NR 2	Bore:	5.39 in. (137 mm)
Nameplate BHP @ 1800 RPM:	755	Stroke:	6.65 in. (169 mm)
Type:	4 cycle, in-line, 6 cylinder diesel	Displacement:	912 cu. in. (14.9 liters)
Aspiration:	Turbocharged with air-to-air charge air cooling		
Compression Ratio:	17:1		
Emission Control Device:	Turbocharged with charge air-cooled		

	<u>1/4</u>	<u>1/2</u>	<u>3/4</u>	<u>Full</u>	<u>Full</u>
<u>Performance Data</u>	<u>Standby</u>	<u>Standby</u>	<u>Standby</u>	<u>Standby</u>	<u>Prime</u>
Engine HP @ Stated Load (1800 RPM)	202	379	555	732	668
Fuel Consumption (gal/Hr)	11.3	18.7	25.8	34.7	30.6
Exhaust Gas Flow (CFM)	1400	2150	2730	3625	3160
Exhaust Gas Temperature (°F)	745	830	820	900	880
<u>Exhaust Emission Data</u>					
HC (Total Unburned Hydrocarbons)	0.24	0.09	0.07	0.14	0.12
NOx (Oxides of Nitrogen as NO ₂)	3.24	3.65	4.64	4.43	4.04
CO (Carbon Monoxide)	0.57	0.34	0.40	0.39	0.36
PM (Particulate Matter)	0.09	0.05	0.05	0.02	0.02
Smoke (Pierburg)	0.52	0.44	0.42	0.21	0.20

All values (except smoke) are cited: g/BHP-hr

Test Methods and Conditions

Steady-state emissions recorded per ISO8178-1 during operation at rated engine speed (+/- 2%) and stated constant load (+/- 2%) with engine temperatures, pressures and emission rated stabilized.

Fuel specification:	40-48 Cetane Number, 0.05 Wt.% max. Sulfur; Reference ISO8178-5, 40CFR86.1313-98 Type 2-D and ASTM D975 No. 2-D.
Air Inlet Temperature:	25 °C (77 °F)
Fuel Inlet Temperature:	40 °C (104 °F)
Barometric Pressure:	100 kPa (29.53 in Hg)
Humidity:	10.7 g/kg (75 grains H ₂ O/lb) of dry air (required for NOx correction)
Intake Restriction:	Set to maximum allowable limit for clean filter
Exhaust Back Pressure:	Set to maximum allowable limit

Data was taken from a single engine test according to the test methods, fuel specification and reference conditions stated above and is subjected to instrumentation and engine-to-engine variability. Tests conducted with alternate test methods, instrumentation, fuel or reference conditions can yield different results.



2018 EPA Tier 2 Exhaust Emission Compliance Statement 500DFEK Stationary Emergency 60 Hz Diesel Generator Set

Compliance Information:

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

Engine Manufacturer: Cummins Inc.
EPA Certificate Number: JCEXL015.AAJ-004
Effective Date: 06/26/2017
Date Issued: 06/26/2017
EPA Engine Family (Cummins emissions family): JCEXL015.AAJ

Engine Information:

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

Diesel Fuel Emissions Limits

D2 Cycle Exhaust Emissions

	Grams per BHP-hr			Grams per kW _m -hr		
	NO _x + NMHC	CO	PM	NO _x + NMHC	CO	PM
Test results - diesel fuel (300-4000 ppm sulfur)	4.3	0.4	0.10	5.7	0.6	0.13
EPA emissions limit	4.8	2.6	0.15	6.4	3.5	0.20
Test results - CARB diesel fuel (<15 ppm sulfur)	3.9	0.4	0.08	5.2	0.06	0.11
CARB emissions limit	4.8	2.6	0.15	6.4	3.5	0.20

The CARB emission values are based on CARB approved calculations for converting EPA (500 ppm) fuel to CARB (15 ppm) fuel.

Test methods: EPA/CARB Nonroad emissions recorded per 40CFR89 (ref. ISO8178-1) and weighted at load points prescribed in Subpart E, Appendix A for Constant Speed Engines (ref. ISO8178-4, D2)

Diesel fuel specifications: Cetane Number: 40-48. Reference: ASTM D975 No. 2-D.

Reference conditions: Air Inlet Temperature: 25 °C (77 °F), Fuel Inlet Temperature: 40 °C (104 °F). Barometric Pressure: 100 kPa (29.53 in Hg), Humidity: 10.7 g/kg (75 grains H₂O/lb) of dry air; required for NO_x correction, Restrictions: Intake Restriction set to a maximum allowable limit for clean filter; Exhaust Back Pressure set to a maximum allowable limit.

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



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CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS



Certification No.

VMA-50957-01C (REVISION 07)

Expiration Date: 06/30/2020

Certification Parameters:

The nonstructural products (mechanical and/or electrical components) listed on this certificate are CERTIFIED¹ FOR SEISMIC APPLICATIONS in accordance with the following building code² releases.

IBC 2006, 2009, 2012, 2015

The following model designations, options, and accessories are included in this certification. Reference report number **VMA-50957-01** as issued by The VMC Group for a complete list of certified models, included accessories/options, and certified installation methods.

Cummins Power Generation, Inc. Diesel Generator Sets
DSGAA-E, DSHAD, DQDAA-C, DQHAA-B, DFEJ-K 100kW - 500kW

The above referenced equipment is **APPROVED** for seismic application when properly installed³, used as intended, and contains a Seismic Certification Label referencing this Certificate of Compliance⁴. As limited by the tabulated values, below grade, grade, and roof-level installations, installations in essential facilities, for life safety applications, and/or of equipment containing hazardous contents are permitted and included in this certification with an Equipment Importance Factor assigned as $I_p=1.5$. The equipment is qualified by successful seismic shake table testing at the nationally recognized University of California Berkley Pacific Earthquake Engineering Research Center under the review of the ISO Accredited Product Certification Agency, The VMC Group.

Certified Seismic Design Levels⁸

Certified IBC	Importance $I_p \leq 1.5$ Soil Classes A-E Risk Categories I-IV Design Categories A-F	$S_{DS} \leq 1.940 \text{ g}$	$S_{DS} \leq .647 \text{ g}$
		$z/h = 0.0$	$z/h \leq 1.0$
		Horizontal Design ⁵	$\frac{F_p}{W_p} = 0.4 S_{DS} I_p \frac{a_p}{R_p} \left(1 + 2 \frac{z}{h}\right) \leq 1.455 \text{ g}$
Test Datum AC156	ISO 17025 Laboratory Pre/Post-Shake Functionality Tri-axial, 5% Damping SRS	$A_{FLEX-H} \leq 1.940 \text{ g}$	$A_{FLEX-V} \leq 1.293 \text{ g}$
		$A_{RIG-H} \leq 0.776 \text{ g}$	$A_{RIG-V} \leq 0.518 \text{ g}$
		$ZPA_H \leq 0.698 \text{ g}$	$ZPA_V \leq 0.466 \text{ g}$

Certified Seismic Installation Methods⁹

Rigid mounting from unit base to rigid structure	External isolation mounting from unit base to rigid structure
Rigid mounting from unit base to fuel tank	External isolation mounting from unit base to fuel tank



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CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Certified Product Table:

Series	Model Family	Max Rating [kW]	Max Dimensions [in]			S _{DS} Level [g]		Tank Range [gal]	Enclosure	Mounting Configurations
			Length	Width	Height	z/h=0.0	z/h=1.0			
DFEx (QSX15)	J, K	450, 500	366	86	128	1.94	0.64	270-2525	F183, F200, F201, F202, F203, F204, F205	Rigid mounting from unit base to rigid structure / fuel tank External isolation mounting from unit base to rigid structure / fuel tank
DQDAx (QSL9-G7)	A, B, <u>C</u>	250, 275, <u>300</u>	266	90	134	2.48	2.00	270-2050		
DQHAx (QSM11)	<u>A</u> , B	<u>275</u> , 300	226	80	128	2.28	2.28	270-1700		
DSHAx (QSL9-G2)	<u>D</u>	<u>230</u>	143	42	110	2.28	2.28	282-1296	F172, F173, F182, F216, F217	Rigid mounting from unit base to rigid structure / fuel tank
DSGAx (QSB7)	<u>A</u> , B, C, D, E	<u>100</u> , 125, 150, 175, 200	184	44	114	2.48	2.00	309-1140	F173, F182, F216, F217, F232, F233	Rigid mounting from unit base to rigid structure / fuel tank

This certification **includes** the open generator set and the enclosed generator set when installed with or without the sub-base tank. The generator set and included options shall be a catalogue design and factory supplied. The generator set and applicable options shall be installed and attached to the building structure per the manufacturer supplied seismic installation instructions. This certification **excludes** After Treatment Units (ATUs), all non-factory supplied accessories, including but not limited to mufflers, isolation/restraint devices, remote control panels, remote radiators, pumps and other electrical/mechanical components.



VMA-50957-01C (Revision 07)
Issue Date: March 02, 2017
Revision Date: June 04, 2018
Expiration Date: June 30, 2020



THE VMC GROUP
The Power of Together™



CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Notes and Comments:

1. All equipment listed herein successfully passed the seismic acceptance criteria for shake testing non-structural components and systems as set forth in the ICC AC-156. The Test Response Spectrum (TRS) enveloped the Required Response Spectrum (RRS) for all units tested. The units cited in this certification were representative sample(s) of a contingent of models and all remained captive and structurally sound after the seismic shake simulation. The units also remained functionally operational after the simulation testing as functional testing was completed by the equipment manufacturer before and after the seismic simulations. Although a seismic qualified unit inherently contains some wind resisting capacity, that capacity is undetermined and is excluded from this certification. Snow/Ice loads have been neglected and thus limit the unit to be installed both indoors (covered by an independent protective structure) and out of doors (exposed to accumulating snow/ice) for ground snow loads no greater than 30 psf for all applications.
2. The following building codes are addressed under this certification:

IBC 2015 – referencing ASCE7-10 and ICC AC-156
IBC 2012 – referencing ASCE7-10 and ICC AC-156
IBC 2009 – referencing ASCE7-05 and ICC AC-156
IBC 2006 – referencing ASCE7-05 and ICC AC-156
3. Refer to the manufacturer supplied installation drawings for anchor requirements and mounting considerations for seismic applications. Required anchor locations, size, style, and load capacities (tension and shear) may be specified on the installation drawings or specified by a 3rd party. Mounting requirement details such as anchor brand, type, embedment depth, edge spacing, anchor-to-anchor spacing, concrete strength, special inspection, wall design, and attachment to non-building structures must be outlined and approved by the Engineer of Record for the project or building. Structural walls, structural floors, and housekeeping pads must also be seismically designed and approved by the project or building Structural Engineer of Record to withstand the seismic anchor loads as defined on the installation drawings. The installing contractor is responsible for observing the installation detailed in the seismic installation drawings and the proper installation of all anchors and mounting hardware.
4. For this certificate and certification to remain valid, this certificate must correspond to the "Seismic Certification Label" found affixed to the unit by the factory. The label ensures the manufacturer built the unit in conformance to the IBC seismic design criteria set forth by the Certified Seismic Qualification Agency, The VMC Group, and meets the seismic design levels claimed by this certificate.
5. Mechanical, Electrical, and Plumbing connections to the equipment must be flexibly attached as to not transfer load through the connection. The structural integrity of any conduit, cable trays, piping, ductwork and/or flexible connections is the responsibility of others. This certification does not guarantee the equipment will remain compliant to NEMA, IP, UL, or CSA standards after a seismic event.
6. This certificate applies to units manufactured at:

Cummins Power Generation, Inc., 1400 73rd Ave NE, Minneapolis, MN 55432
7. This project follows The VMC Group's ISO-17065 Scheme for Product Certification of Nonstructural Components
8. The qualified seismic design level stated is the lowest for all series this certificate covers, for more detailed ranges of qualified seismic design levels, see the certified product tables
9. The certified seismic installation methods states are a summary for all series this certificate covers, for more detailed information on the certified seismic installation methods, see the certified product tables.


John P. Giuliano, PE
President, The VMC Group

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Kathleen Hartnett White, *Chairman*
Larry R. Soward, *Commissioner*
H. S. Buddy Garcia, *Commissioner*
Glenn Shankle, *Executive Director*



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

August 16, 2007

MR STEVEN FORD
SENIOR PROGRAM MANAGER
MICROSOFT CORPORATION
1 MICROSOFT WAY
REDMOND WA 98052-6399

Permit by Rule Registration Number: 82486
Location/City/County: 5120 Rogers Road, San Antonio, Bexar County
Project Description/Unit: Backup Generators and Mechanical Draft Cooling Towers
Regulated Entity Number: RN105295687
Customer Reference Number: CN603222902
New or Existing Site: New
Affected Permit (if applicable): None
Renewal Date (if applicable): None

Microsoft Corporation has certified the emissions associated with the Backup Generators and Mechanical Draft Cooling Towers under Title 30 Texas Administrative Code §§ 106.371 and 106.511.

For rule information see www.tceq.state.tx.us/permitting/air/nav/numerical_index.html.

The company is also reminded that these facilities may be subject to and must comply with other state and federal air quality requirements. This certification is taken under the authority delegated by the Executive Director of the TCEQ. If you have questions, please contact Ms. Patricia Martin at (512) 239-5323.

Sincerely,

A handwritten signature in black ink, appearing to read "Anne M. Inman".

Anne M. Inman, P.E., Manager
Rule Registrations Section
Air Permits Division

Certified Sitewide Emissions:

VOCs	4.71	tpy
Formaldehyde (included in VOC)	0.17	tpy
SO ₂	4.21	tpy
CO	6.95	tpy
NO _x	99.10	tpy
PM ₁₀	4.44	tpy

cc: Environmental Health Administrator, Environmental Health Administration, San Antonio
Metropolitan Health District, San Antonio
Air Section Manager, Region 13 - San Antonio

Project Number: 131312